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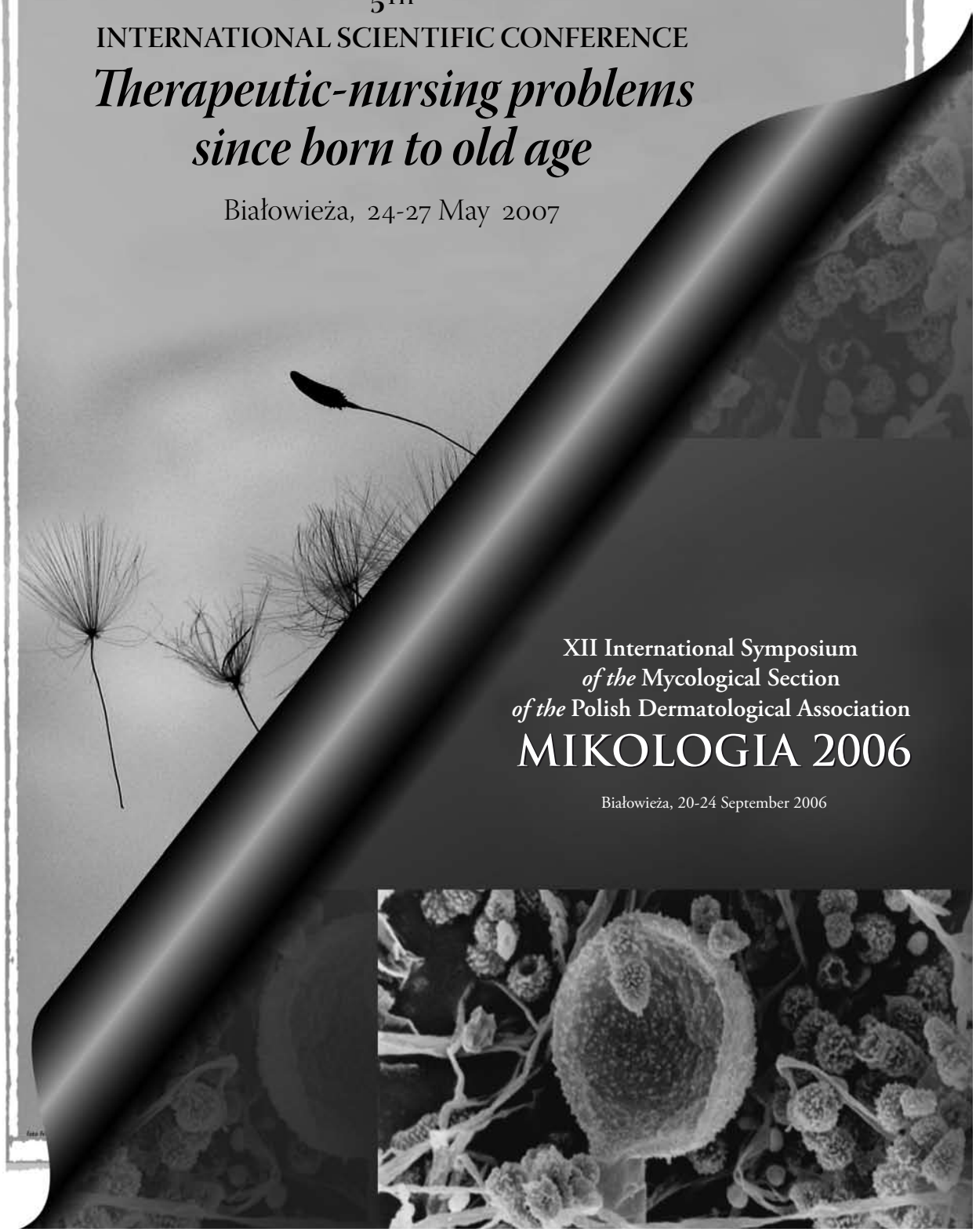

XII International Symposium
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MIKOLOGIA 2006

Białowieża, 20-24 September 2006

Indoor air studies of fungi contamination at the Neonatal Department and Intensive Care Unit an Palliative Care in Kavala Hospital in Greece

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Abstract

Purpose: The assessment of the indoor air and walls contamination of fungi at the Kavala Hospital in Greece was made.

Material and methods: The study was carried out at the Neonatal Department and Intensive Care Unit and Palliative Care in Kavala Hospital (Greece). Materials for the tests were: the air samples (in front of the building and the selected rooms) and swabs from the walls. The air pollution was determined using SAS SUPER 100 (Pbi International). The microbial flora from walls was assessed using the Count-Tact applicator and the plate Count-Tact (BioMerieux). Fungi were identified using standard microbial procedures. Classification of isolated fungi was made with an accordance to the current procedures. Humidity and temperature were evaluated by a termohigrometr.

Results: The following fungal pathogens isolated from air were *Candida albicans*, non-*Candida albicans*, *Penicillium* species *Acremonium*, *Rhodotorula species*, and *Aspergillus species*.

Candida albicans and *Penicillium* species were dominated fungi in the air of Neonatal Department and Intensive Care Unit. Mean number of fungi colonies isolated from air in the Neonatal Department was significantly ($p<0.001$) higher compared to Intensive Care Unit. No significant correlations between CFU of fungi in air and temperature in both Departments were noted.

Conclusions: The main fungal pathogen isolated from the air samples was *Candida albicans*. No significant differences between number of fungal colonies temperature and humidity of air were found. Further investigations on isolation of the fungal pathogenes from the air samples of operating rooms are needed.

Key words: indoor air, fungi, Neonatal Department.

Introduction

Critically ill infants receiving care in Nneonatal Intensive-Care Units are at increased risk for hospital-acquired infections due to their developmentally immature immune system and the invasive diagnostic and therapeutic procedures they undergo [1]. Fungal infections of hospital origin are gaining in importance in recent years due to their progressive increase and to the high rates of morbidity and mortality with which they are associated [2,3]. Many of these infections are endogenous in nature, but others can be acquired by exogenous routes, through the hands of healthcare workers, contaminated infusion products and biomaterials, and abiotic environmental sources [3,4]. Nosocomial infection remains an important problem in intensive care units. Hospital wards had been shown to act as reservoirs of pathogenic microorganisms associated with infection

The object of the present research was to assess the presence of airborne fungi in at the Neonatal Department and Intensive Care Unit and Palliative Care in Kavala Hospital (Greece).

Material and methods

Air sampling was carried out at the Neonatal Department and Intensive Care Unit and Palliative Care in Kavala Hospital – Greece in September 2005. Material into mycological studies was air sampled at the entrance of hospital building, the entrance

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Table 1. **Fungal occurrence in the air of rooms of the Intensive Care Unit in the Kavala Hospital in Greece**

Intensive Care Unit						
Site of sampling	**Number of colonies**	**Corrected number**	**CFU/1000L of air**	**Temp.**	**Humidity**	**Taxonomy**
Corridor entrance to Department	15	15	150	25.7	62,1	14 *Candida albicans* 1 non-*Candida*
Corridor of the second entrance	48	50	500	24.3	62.1	23 *Candida albicans* 24 *Penicllium* spp. 1 non-*Candida alb*.
Main corridor	20	20	200	26.5	56.4	16 *Candida albicans* 3 *Penicllium* spp. 1 *Acremonium* spp.
Room I	11	11	110	24.6	58	11 *Candida albicans*
Room II	45	47	470	24.1	56.4	45 *Candida albicans*
Nurses's stadion	23	24	240	24.1	58.7	23 *Candida albicans*
Infusion room	11	11	110	25.5	55	11 *Candida albicans*
Laboratory	10	10	100	24.8	57	10 *Candida albicans*
Physician's/ nurses's room	6	6	60	25.8	56.2	4 *Candida albicans* 1 *Penicllium* spp. 1 *Acremonium* spp.
WC	12	12	120	25.3	56.4	8 *Candida albicans* 3 *Penicllium* spp. 1 *Acremonium* spp.
Soiled-lien closet I	8	8	80	25.9	56.1	8 *Candida albicans*
Soiled-lien closet II	7	7	70	25.5	57.7	7 *Candida albians*
Storing room	4	4	40	25.8	55.3	3 *Candida albicans* 1 non-*Candida*
Kitchen	26	27	270	25.6	57.4	23 *Candida albicans* 3 *Penicllium* spp.
		Total 252	**Mean 180±140.3**	**Mean 25.3±0.7**	**Mean 57.5±2.1**	

CFU – colony forming unit

into operating room, hall and the selected rooms of operating department and nurses' stations. The microbial flora from the walls was detected using the Count-Tact applicator and the plate Count-Tact (BioMerieux). Fungi were identified using the standard microbial procedures. The monitoring of airborne fungi pollution was done using a SAS SUPER 100 (pbi international). Classification of isolated fungi was made with an accordance to the current procedures. Sample has a flow rate of 100 liters air/ /min. At each site, a 100 liters sample was taken with the sampler placed at a height of 150 cm above floor level in the middle of the room, with all windows and doors closed. After incubation at 27°C for three days quantitative analysis and morphological evaluation of fungal colonies were carried out, and depending on the nature of the fungi cultures the plates were incubated for up to 14 days to allow identification. The raw counts of colonies on the agar plates were adjusted by reference to statistical scaling tables applying to the particular sampler. The fungi cultured were identified from macroscopic and microscopic characteristics, and biochemical tests were appropriate. Yeast-like fungi were identified by means of original Candida ID (bioMerieux) medium, API 20C AUX (bioMerieux) identification sequence as well as CandiSelect (Bio-Rad) medium. For moulds, microscopical evaluation of morphological elements in preparations stained with lactophenol/methylene blue (Merck). Humidity and temperature were evaluated by a termohigrometr.

Results

Tab. 1 presents of fungal occurrence in the air of rooms of the Intensive Care Unit in the Kavala Hospital in Greece.

Numbers of airborne culturable fungi were lowest in the storing room but the highest number of fungi were found in the corridor of the second entrance. Similarly, the highest number of air borne fungi were detected in the corridor of the second entrance and room II (*Tab. 1*).

Mean number of fungi colonies isolated from air was 180±140.3, mean temperature 25.3±0.7°C and humidity 57.5±2.1. No significant correlation (p=0.119) between CFU of fungi in air and temperature was noted. Similarly, no relationship between CFU of fungi in air and humidity was found. The following fungal pathogens isolated from air were: *Candida albicans*, non-*Candida albicans*, *Penicillium species* and *Acremonium species*. *Tab. 2* presents of fungal occurrence in the air of rooms of the Neonatal Department in the Kavala Hospital in Greece. Numbers of airborne culturable fungi were lowest in

Table 2. **Fungal occurrence in the air of rooms of the Neonatal Department in the Kvala Hospital in Greece**

Neonatal Departament						
Site of sampling	**Number of colonies**	**Corrected number**	**CFU/1000L of air**	**Temp.**	**Humidity**	**Taxonomy**
Corridor entrance to Department	20	20	200	25.8	64.1	17 *Candida albicans* 3 *Acremonium* spp.
Corridor at Departament	26	27	270	26.1	60.6	24 *Candida albicans* 1 *Acremonium* spp. 1 *Rhodotorula* spp.
Septic room	250	330	3300	27.0	59.4	10 *Candida albicans* 240 *Penicillium* spp.
Incubator room	241	330	3300	27.8	57.2	1 *Candida albicans* 240 *Penicillium* spp
Nurses's stadion	8	8	80	27.6	57.0	8 *Candida albicans*
		Total 715	**Mean 1430±1528.1**	**Mean 26.9±0.8**	**Mean 59.9±2.6**	

CFU – colony forming unit

the nurses's station but the highest number of fungi were found in the septic room (*Tab. 2*). Similarly, the highest number of air borne fungi were detected in the septic and incubator rooms but the lowest number in the nurses's station. Mean number of fungi colonies isolated from air was 1430±1528.1, mean temperature 26.9±0.8°C and humidity 59.9±2.6. Mean number of fungi colonies isolated from air in the Neonatal Department was significantly ($p<0.001$) higher compared to Intensive Care Unit. No significant correlation ($p=0.119$) between CFU of fungi in air and temperature was noted. The following fungal pathogens isolated from air were *Candida albicans*, *Penicillium species*, *Acremonium species* and *Rhodotorula species*. No non-*Candida albicans* species were detected in the Neonatal Department.

Discussion

In the present study, we demonstrated considerable numbers of fungi in the air of the two Departments of Kavala Hospital in Greece. This is the first study carried out in Kavala Hospital comparing the fungal contamination of air in the Neonatal Department and Intensive Care Unit.

In the literature there is clear evidence of seasonal differences in the numbers of fungi in indoor air. For example, Lumpkins et al. [5,6] reported that numbers were higher in summer and autumn than in spring and winter.

In our previous report [7] in the various four social welfare homes in Poland air borne fungi counts were the highest in either summer or autumn and mainly the lowest in winter. *Penicillium* and *Cladosporium* were dominated isolates in the air in these homes during all seasons of the year. In contrast, in the present study we found significant number of *Candida albicans* and *Penicillium*. The environmental fungal load of three hospitals was studied in representative regions in Greece (Thessalonika, Northern Greece, Athens, Central Greece and Heraklion, Southern Greece) [8]. Air, surfaces and tap water from high-risk departments were sampled monthly during one year. Air fungal load was lower in winter and higher in summer and autumn but seldom above acceptable levels. *Aspergillus* spp. constituted 70.5% of the filamentous fungi isolated. *Aspergillus niger* was the most prevalent species in the air of all the hospitals followed by *Aspergillus flavus* and *Aspergillus fumigatus*. The least contaminated departments were the intensive care units, whilst most contaminated were the solid organ transplantation in Athens and haematology departments in Thessalonika. No correlation between fungal species, season, hospital or departments was observed. The presence of *Penicillium*, or *Aspergillus*, may pose a potential threat to the health of patients of these rooms. Fungi in these and other genera affect humans in complex ways and are capable of causing a variety of diseases, such as infection, allergy and irritation, and toxicosis. Exposure to fungi has been unequivocally associated with exacerbation of asthma, although the role of fungi in causing the disease may not yet have been fully determined. Neonates, especially premature babies, are considered as immunocompromised patients due to immature T-cell activity and incompetent phagocytosis [9]. Fungi, especially moulds, can cause devastating infections in these high-risk patients [10]. Moreover, surface contamination with settled fungal spores, which is not detected by air sampling, could also present a source of potential colonization. The role of nasopharyngeal surveillance cultures in high-risk neonates during periods of increased exposure could not be assessed and the need for air sampling as a tool for prevention of pulmonary aspergillosis is questionable [11].

Fungal conidia enter buildings through windows, doors or ventilation systems and sediment onto surfaces, survive in dust or grow on organic matter present in materials such as ceiling tiles [12]. In the hospital setting, construction work that liberates large amounts of *Aspergillus* spores has been identified as the source of nosocomial aspergillosis. In contrast, in our study we found a high occurrence of *Candida* and *Penicillium* in the air in the both departments.

In conclusion, the main fungal pathogen isolated from the air samples was *Candida albicans*. No significant differences between number of fungal colonies, temperature and humidity of air were found. Further investigations on isolation of the fungal pathogenes from the air samples of operating rooms are needed.

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Analysis of the incidence of fungal pathogens in air of the Department of Dermatology, Venereology and Allergology of Medical University in Wrocław

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Abstract

Purpose: Analysis of incidence of fungal pathogens in air of Department of Dermatology, Venereology and Allergology of Medical University in Wrocław.

Material and methods: Materials for the tests were: the air samples in front of the building, corridors, library, lecture hall, and mycological laboratory. The air pollution was determined using SAS SUPER 100. Humidity and temperature were evaluated by a termohigrometr. Classification of the isolated fungi was made with an accordance to the current procedures

Results: From the air was isolated: in library 69 colonies (mean CFU 138±41.5), from the bookstands – 25 colonies (mean CFU–125±63.6), lecture hall – 119 colonies (mean CFU–380±98.8), mason room – 52 colonies (mean CFU–104±21.9), mycological laboratory – 154 colonies (mean CFU–513±155.3). Temperature in the tested rooms ranged from 24.5ºC (mason room) to 26.1ºC (library), humidity ranged from 40.1%-53.1%. Temperature outside of the building was 23.6ºC, and humidity 51.6%. Moulds *Peniciullium citricum* and *Aspergillus niger* and the yeasts *Candida albicans* were isolated more frequently

Conclusions: The highest number of fungi colonies were isolated from the air sampled at the lecture hall and mycological laboratory. Moulds were the most common airborne fungi. Temperature and huimidity in the tested rooms are good conditions for the development of fungi.

Key words: air, fungi, dermatology department.

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Introduction

Fungi are ubiquitous in the natural environment, appearing in air, water and soil. Some people may spend as much as 90% of their time within one building, or perhaps the same room, and as a result may be subject to lengthy exposure to fungal bioaerosols [1]. In the air of the buildings with ineffective ventilation or with damage and poor air conditioning systems, there may be an increase in the concentration of mycotoxinogenic moulds *Penicillium* and *Aspergillus species* [2]. Airborne microflora in hospital rooms was the subject of numerous studies as a potential cause of hospital infections [3,4]. Most of the studies were performed in intensive care units, surgical units, haematological wards, maternity wards and other department where the risk of infections is greatest [5,6]. The object of the present research was the determination of airborne fungi in selected rooms of the Department of Dermatology, Venereology and Allergology of Medical University in Wrocław.

Material and methods

Air sampling was carried out in selected rooms of the Department of Dermatology, Venereology and Allergology in Wrocław. Air was sampled in library, bookstands, mason room, lecture hall, and mycology laboratory. SAS SUPER 100 sampler (pbi international) in of impactor sampler have a flow rate of 100 l air/min.

At each site, a 100 l sample was taken with the sampler placed at a height of 150 cm above floor level in the middle of the room, with all windows and doors closed. The single 9 cm Petri dish collection plates onto which particles impacted contained Sabouraud agar amended with chloramphenicol to prevent bacterial growth. After incubation at 27ºC for three days quantitative analysis and morphological evaluation of fungal colonies were carried out, and depending on the nature of the fungi cultures the plates were incubated for up to 14 days to

***Table 1*. Number of culturable fungi in air samples taken in the rooms of the Department of Dermatology, Venereology and Allergology of Medical University in Wrocław**

	Library	Bookstands	Lecture hall	Mason room	Mycology laboratory	Total
Candida albicans	17	4	5	22	3	51
Acremonium strictum	1		13	3	7	24
Penicillium citricum	20	9	50	10	62	151
Penicillium commune	9	2	6	3	10	30
Fusarium solani	3	2	10	1	4	20
Aspergillus ochraceus	8		11		30	49
Aspergillus niger	10	7	20	10	35	82
Mucor racemosus	1	1	2			4
Rhodotorula mulcilaginosa			2	3	3	8
Sum	69	25	119	52	154	419

allow identification. The raw counts of colonies on the agar plates were adjusted by reference to statistical scaling table applying to the sampler. Yeast-like fungi were identified by means of original Candida ID (bioMerieux) medium, API 20C AUX (bioMerieux) identification sequence as well as CandiSelect (Bio-Rad) medium. For moulds, microscopical evaluation of morphological elements in preparations stained with lactophenol/methylene blue (Merck).

Results

From the air was isolated: in library 69 colonies (mean CFU 138±41.5), from the bookstands – 25 colonies (mean CFU–125±63.6), lecture hall – 119 colonies (mean CFU–380±98.8), mason room – 52 colonies (mean CFU–104±21.9), mycological laboratory – 154 colonies (mean CFU–513±155.3) (*Tab. 1*). Temperature in the tested rooms ranged from 24.5ºC (mason room) to 26.1ºC (library), humidity ranged from 40.1% to 53.1%. Temperature outside of the building was 23.6ºC, and humidity 51.6%. Sampling air in the rooms of the Department of Dermatology, Venereology and Allerology in Wrocław (*Tab. 1*) revealed that numbers of airborne culturable fungi were the highest at mycological laboratory and lecture hall. In contrast the lowest numbers of airborne fungi at bookstands and mason room were found. Moulds *Peniciullium citricum* and *Aspergillus niger* and the yeasts *Candida albicans* were isolated more frequently (*Tab. 1*). In contrast *Mucor racemosus and Rhodotorula mulcilaginosa* were detected more rarely. The highest number of *Candida albicans* was isolated at mason room and library. In lecture hall *Penicillium citricum* and *Aspergillus niger* were detected more frequently. *Penicllium citricum, Aspergillus niger, Aspergillus ochraceus* were more often isolates detected at mycological laboratory.

Discussion

In the present study, we found that moulds *Peniciullium citricum* and *Aspergillus niger* and the yeasts *Candida albicans* were isolated more frequently in air of the Department of Dermatology, Venereology and Allerology in Wrocław. We also found the highest number of airborne culturable fungi at mycological laboratory and lecture hall. Our findings are in accordance with previous reports on airborne contamination [2-4]. Indoor air quality exert effect on health of workers [7]. Indoor-air-related symptoms were studied among hospital workers (N=5598) in a questionnaire survey in which employees from 10 central hospitals participated. The survey was based on the Indoor Air Questionnaire (MM-40) by the Finnish Institute of Occupational Health. The authors found the environmental problems most frequently reported were dry air (reported by 46% of the respondents), stuffy air (40%), noise (30%), draft (27%), and unpleasant odor (26%). The most common symptoms were nasal irritation (reported by 25% of the participants), hand irritation (24%), eye irritation (23%), and fatigue (21%). They concluded that dry and stuffy air, noise, draft, and unpleasant odors were more common in hospitals than in office environments. Irritation of the nose, hands, and eyes, as well as fatigue, were also experienced more often in hospitals than in office environments. In our study we did not assess indoor-air-related symptoms by hospital workers. In Greek study [8] air, surface, and tap water sampling was performed in four departments with high-risk patients. As sampling sites, the solid-organ transplantation department and the hematology department and the pediatric oncology department and the pediatric intensive care unit were selected. They found from culture of air specimens were *Aspergillus niger* (25.9%), *Aspergillus flavus* (17.7%), and *Aspergillus fumigatus* (12.4%). The pediatric intensive care unit had the lowest mean CFU (7.7/m^3) compared with the pediatric oncology department 8.7 CFU/m^3, and the hematology department 22.6 CFU/m^3. Environmental surfaces were swabbed, and 62.7% of the swab samples cultured yielded fungi similar to the fungi recovered from air but with low numbers of colony-forming units.

The present data are partially in agreement with our report [9]. In a comparative study of the occurrence of culturable airborne fungi carried out during the four seasons of the year in four social welfare homes. Air of randomly chosen rooms and bathrooms, corridors, ward kitchens, soiled-linen closets, din-

ing-rooms, day-rooms and nurses' stations was sampled using single-stage impactor samplers and isolated moulds and yeasts were identified by macroscopic, microscopic and biochemical characteristics. Generally the greatest numbers of fungi were observed in the autumn. *Penicillium* and *Cladosporium* were isolated from the air in social welfare homes during all seasons of the year.

Conclusions

Concluding, we did not analyze allergic symptoms among workers of the Department of Dermatology, Venereology and Allerology, for the well-being of workers the cleanliness of their indoor environment should be monitored.

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Environmental risk of mycosis in patients treated at an acquired immunodeficiency ward

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Abstract

Purpose: Patients with acquired immunodeficiency are particularly predisposed to fungal infections. The purpose of the study was evaluation of the presence of fungi in the environment of a ward where Human Immunodeficiency Virus (HIV) positive and Acquired Immune Deficiency Syndrome (AIDS) patients were treated.

Materials and methods: The evaluation of fungal presence in the indoor air and on the room walls at an acquired immunodeficiency ward in the University Hospital in Cracow was carried out in December 2006. Indoor air specimens were sampled using an aspiration method (a MAS 100 device) while imprints from the walls using Cont-Tact method (bioMèrieux) in the morning ad in the evening during five consecutive days. A total of sixty air specimens and thirty imprints from the walls were obtained. The fungi cultured from those specimens were analysed using standard mycological procedures.

Results: It was found out that the numbers of fungi sampled from the indoor air in the morning were significantly higher than those sampled in the evening. The average numbers of fungi isolated in the rooms inhabited by the patients varied from 55 c.f.u (colony forming units)×m^{-3} to 490 c.f.u×m^{-3} as calculated for the entire testing period. Fungi potentially pathogenic for persons with impaired immunity were found in all of the rooms: *Aspergillus* sp., *Mucor* sp., and yeast-like fungi *Candida* sp.

Conclusion: Reduction of the numbers of potentially pathogenic bacteria, viruses and fungi in the indoor air should be a standard in the practice of medical staff (mainly epidemiological nurses).

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Key words: indoor air, fungi, Acquired Immune Deficiency Syndrome (AIDS).

Introduction

Acquired Immune Deficiency Syndrome (AIDS) was diagnosed in 1798 persons in Poland between the year 1985 and August 31, 2006. Out of them, 825 have died. However, it is estimated, that the real number of persons infected with human immunodeficiency virus (HIV) and/or suffering from AIDS is 15 000-20 000 [1].

The stages of HIV infection, according to Center for Disease Control and Prevention (CDC) make the basis for evaluation of the disease progression and are commonly applied in the clinical practice. The following criteria are used in the above classification: immunological i.e. the number of CD4 cells, and clinical – concerning concomitant diseases accompanying HIV infections and/or suggesting the presence of AIDS. Fungal infection very often accompany HIV infections. Clinical data give evidence that oral candidiasis develops in 100% of HIV positive patients when the number of CD4 cells is below 200 in one millilitre of blood [1,2].

Opportunistic fungi may cause infections in otherwise healthy persons, but those infections recover spontaneously due to natural defence mechanisms. However, similar infections in immunocompromised patients result in severe invasive infections. Such infections comprise aspergillosis, candidiasis cryptococcosis, mucormycosis, fusariosis. The mortality due to fungal infections in immunocompromised patients is high [3,4].

Immunodeficiency is the primary factor predisposing to fungal infections in AIDS patients, however, the risk of invasive infection depends also on the exposure, infecting dose, pathogenicity of the fungus, the form of immunosuppressive treatment and fungal infections undergone in the past [5,6].

Evaluation of the extent of fungal infection risk is very important from the clinical point of view, however, the expo-

sure intensity and the quantity of infectious material can hardly be determined because there are no non-pathogenic fungi for immunocompromised patients.

Therefore, it appears reasonable environment cleanness monitoring in the rooms where patients under immunosuppression are present. Identification of pathogenic and/or biochemically active fungi (e.g. *Candida* sp., *Aspergillus* sp., *Mucor* sp.) in the hospital indoor air should be an imperative to undertake proper safety measures. Spores of those fungi can colonise the patients' airways and, in presence of predisposing factors, to cause fungal infection [7-9].

The purpose of this study was determination of the presence of fungi in the environment of an acquired immunodeficiency ward.

Materials and methods

The study was carried out at the Acquired Immunodeficiency Ward in the Gastroenterology, Hepatology and Infectious Diseases Department of the University Hospital in Cracow in December 2006. Patients infected with HIV and suffering from AIDS were treated at the Ward. The ward included six rooms: two bays, two corridors, patients' bathroom and nurse's station. The presence of fungi was tested in all of those rooms by simultaneous sampling indoor air specimens and imprints from the walls. The materials were sampled during five consecutive days between 11 and 15 December 2006. The samples were taken twice daily, at approximately 7 a.m. and 7 p.m. Additional air specimens were sampled in front of the ward entrance and in front of the Department building entrance door once daily in the morning.

Sixty indoor air specimens were taken using aspiration method (MAS 100 device, Merck), while thirty imprints from the walls were taken using Count-Tact method (bioMèrieux).

Each of the air specimens consisted of 200 litres of air aspirated on the Petri dish. The air sampler was positioned in the middle of the room, 1.5 metre above the floor level. The doors and windows of the rooms were closed during the air sampling. The Petri dishes used in the study were filled with commercial Sabouraud Glucose Selective Agar medium, with gentamicin and chloramphenicol added. After material sampling, the Petri dishes were incubated at 27°C. After three days of incubation the colonies were counted, and their morphology evaluated. The Petri dishes were further incubated up to 14 days, the exact time of incubation depended on the fungal genus. After incubation, the real number of colonies was corrected and the number of colony forming units in one cubic metre of air was calculated using the formula:

$$X = \frac{\alpha \times 1000}{V}$$

where: α – number of fungal colonies grown on the medium from the air sample; V – volume of the air sample in liters; X – the number of fungi present in the air expressed in terms of number of colony forming units in one cubic meter of air (c.f.u.×m^{-3})

The imprints from the walls were taken using the Count-Tact technique. The applicator (bioMèrieux) was used to make the imprint from the dry wall surface. The imprints were taken on the dish with Sabouraud glucose medium with chloramphenicol added. The imprints were taken from the walls 1.5 metre above the floor level, while in the bays just above the patients' beds. The dishes with material samples were then incubated, first at 37°C for 3 days, then at 27°C for next 3 days. The colonies were counted, and the number of c.f.u. on one square centimeter was calculated using a formula:

$$X = \frac{\alpha}{\pi r^2}$$

where: α – number of fungal colonies in the dish, r – radius of the dish in centimeters, X – number of colony forming units on one square centimeter of the wall (c.f.u.×cm^{-2})

The fungi were identified using routine procedures of mycological diagnostics. The moulds were evaluated macroscopically and microscopically on the basis of the culture appearance and their morphological features in direct preparations stained with lactophenol and methyl blue (Merck). In doubtful cases, slide microcultures were made and preparations made of them were identified. Yeast-like fungi were Gram-stained and cultured on starvation medium.

In the statistical analysis, maximum, minimum, median and mean values were found and the standard deviation was calculated. The data were processed using the t-test. The value of $p<0.05$ was accepted as the threshold of significance.

Results

The mean numbers of fungi isolated from the indoor air samples taken at the acquired immunodeficiency ward in the morning and in the evening during five consecutive days are presented in *Tab. 1* in terms of c.f.u×m^{-3}. Fungi were present in all of the sixty air specimens. The numbers of c.f.u×m^{-3} varied from 12 in the bathroom to 710 in the corridor No 1. The highest numbers of fungi were detected in the corridors while the lowest in the nurse's station during the entire resting period. The mean number of fungi in the bays varied between 55 and 490 c.f.u×m^{-3}; it was considerably lower in the evening. The fluctuations of the number of fungi in the particular rooms during the entire testing period were highest in the morning sampling at the corridor No 1 (standard deviation 247.52) and the lowest in the evening sampling at the bay No 2 (standard deviation 57.73). Little differences in the mean numbers of fungi were observed both in the morning and evening samplings at the nurse's station (standard deviation 75.61 and 62.55 respectively).

The comparison of median, mean, minimum and maximum numbers isolated from all of the rooms in the particular sampling days revealed that higher numbers of fungi were isolated in the morning than in the evening (*Tab. 2*). Those observations were confirmed by the t-test which revealed significance on the third ($p<0.001$), the second and fourth ($p<0.01$) as well as on the first day of sampling ($p<0.05$). It was also observed that the numbers of fungi in the indoor air decreased during the consecutive days, as compared with those on the first day, however, they increased on the last day.

Table 1. **Mean numbers of fungi (in terms c.f.u. [colony forming units]×m^{-3}) isolated from the indoor air in the morning and the evening in the rooms during entire assay period**

Samplings time	Statistical analysis	Sampling site					
		corridor 1 (n=10)	**bay 1** (n=10)	**corridor 2** (n=10)	**bay 2** (n=10)	**bathroom** (n=10)	**nurse's station** (n=10)
Morning (07:00)	arithmetic mean	279	238	269	212	189	184
	standard deviation	247.52	161.73	167.01	118.77	90.37	75.61
	median	210	205	235	190	185	200
	maximum	710	490	470	340	335	265
	minimum	75	70	55	55	90	60
Evening (19:00)	arithmetic mean	176	126	148	128	153.4	140
	standard deviation	90.99	58.67	59.85	57.73	143.10	62.55
	median	155	115	130	115	130	130
	maximum	325	225	240	225	390	240
	minimum	85	70	85	80	12	70

n – number of days in which samples were collected

Table. 2. **Maximum, minimum, medians, and arithmetic mean of fungi (c.f.u [colony forming units]×m^{-3}) isolated from the indoor air in the morning and evening in the rooms during entire assay period**

Statistical analysis	**Date of sampling**									
	11.12.2006		**12.12.2006**		**13.12.2006**		**14.12.2006**		**15.12.2006**	
	Morning (07:00)	Evening (19:00)	Morning (07:00)	Evening (19:00)	Morning (07:00)	Evening (19:00)	Morning (07:00)	Evening (19:00)	Morning (07:00)	Evening (19:00)
arithmetic mean	389.17	139.17	210.83	85	67.5	119.17	190	124.17	293.33	274.17
median	370	135	200	82.5	65	115	195	125	275	240
maximum	710	170	335	115	90	155	210	185	470	390
minimum	185	110	140	70	55	85	150	80	195	225
Test t-student	*p<0.05*		p<0.01		*p<0.001*		*p<0.001*		NS	

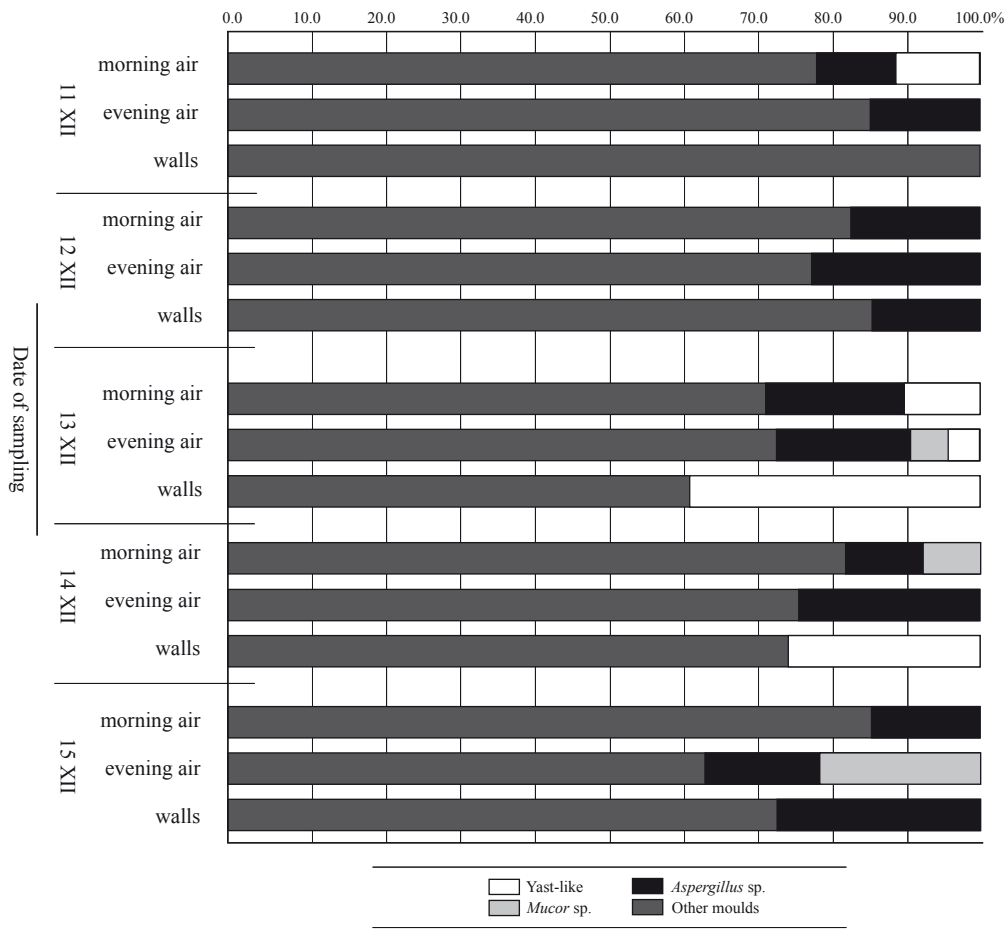
Table 3. **Mean values of fungal c.f.u [colony forming units]×cm^{-2} isolated from the walls in the rooms tested**

Sampling site	**Sampling date**				
	11.12.2006	12.12.2006	13.12.2006	14.12.2006	15.12.2066
Corridor 1	0.04	0.08	0	0	0
Bay 1	0.34	0.51	0.21	0	0.17
Corridor 2	0	0.21	0.04	0.13	0
Bay 2	0	0	0.04	0.21	0
Bathroom	0	0	0	0.13	0
Nurse's station	0	0	0.04	0.4	0.04

A quantitative analysis of the thirty imprints from the walls revealed presence of fungi only in half of them (*Tab. 3*). The mean numbers of fungi varied between 0.04 and 0.51 c.f.u.×cm^{-2}. Most frequently fungi were isolated from the walls in the bay No 1 and in the nurse's station on the third and fourth day of sampling. Least frequently fungi were isolated from the wall in the bathroom: only once on the fourth day.

The genera of fungi isolated from both the indoor air and from the walls are presented in (*Fig. 1*). The fungi were divided into four groups: yeast-like fungi, moulds *Aspergillus*, moulds *Mucor* and other moulds. Moulds other then *Aspergillus* and *Mucor* outnumbered other fungi on the particular sampling days and sites (total percentage over 60%). The genus *Aspergillus* was present in the indoor air every day, and comprised from 0 to 30% of all of the fungi isolated. The genus *Mucor* was not isolated from the walls, while in the indoor air it was detected in the evening on the second and fifth days of sampling, and in the morning on the third day. Yeast-like fungi were isolated both from the air and from the walls on the third and fourth day of sampling. They were also present in the indoor air in the morning on the first day and in the evening on the fifth day, The percentage of yeast-like fungi varied from 0 do 40% and depended on the sampling time and site; the majority of them were isolated from the walls. The yeast-like fungi isolated from the indoor air and from the walls belonged mainly to the genus *Candida* and to the species *Rhodotorula rubra*.

Figure 1. **Genera of the fungi isolated from the indoor air and walls of the rooms during the entire testing period**



Discussion

The microorganisms' adherence capacity to the host epithelium is one of their pathogenicity determinants. In healthy individuals, this process is inhibited by physiological mechanisms such as gastrointestinal passage and mucocilliary clearance in the nose, trachea and bronchi [10,11]**.** When those mechanisms are impaired and/or the bacterial flora is scarce, the fungal adherence capacity to the host cells increases. This concerns particularly yeast-like fungi, mainly *Candida albicans* and *Candida tropicalis* as well as moulds *Aspergillus, Mucor,* or *Fusarium.* Moreover, some of those fungi may produce proteolytic and lipolytic enzymes that may damage host cell membranes and enable penetration of hyphe and pseudomycelium to the intercellular space [12-14]. Such an unfavorable situation occurs in patients with acquired immunodeficiency where impaired cell-mediated immunity does not inhibit dissemination of fungal infection. This is confirmed in numerous reports giving evidence that yeast-like fungi *Candida* and moulds *Aspergillus* and *Mucor* produce invasive infections of myocardium, lungs, brain as well as generalized candidiasis, aspergillosis or mucormycosis [15-17]. In many cases, such infections are cause of death or make it necessary to perform surgery. Some studies [9,14,18] suggest that there is a relationship between the number of mould spores in the air and the prevalence of aspergillosis in the patients. It appears unequivocal that opportunistic fungi must not be present in the indoor air at the acquired immunodeficiency ward. Unfortunately, it was not the case in our study. Yeast-like fungi *Candida* as well as moulds *Aspergillus* and *Mucor* were detected in the indoor air on each of the sampling days. The were also isolated from the walls on the second, third, fourth and fifth days. The percentage of the fungi able to cause opportunistic infections varied within the range 0-40% of the total of fungi isolated. The mean number of fungi isolated from the air varied within the range 12 c.f.u×m^{-3} -710 c.f.u×m^{-3} which many times exceeded the standards accepted by Krzysztofik (up to 200 c.f.u×m^{-3}) [19]. If the rooms of the acquired immunodeficiency ward were classified as treatment rooms (standard up to 50 c.f.u×m^{-3}), only the bathroom could meet that criterium, and not on each of the sampling days.

The concentration of the fungi in the indoor air is related to the natural migration of people in the rooms which makes the possibility to transfer the fungal spores on the hands and/or

clothes of the staff and the patients. An acquired immunodeficiency ward, as a rule, is a ward of higher sanitary standards and limited access for visitors [7,9].

Our investigations revealed that higher concentration of fungi was in the morning that in the evening which was significant on four consecutive days: ($p<0.001$, $p<0.01$, and $p<0.05$). Such a situation may be explained by the fact that the rooms were ventilated by day, and the number of patients was 7 on the first day but only four on the last day. The findings are consistent with those obtained at the invasive chest diagnostics ward in the University Hospital in Cracow and at the operating theatre in one of the hospitals in Białystok. In both of those sites, the number of fungi sampled in the morning outnumbered those sampled in the evening [20,21].

Providing conditions conducive to recovery for an inpatient at a hospital ward is an imperative for the medical staff. It is particularly important in case of immunocompromised patients. It appears reasonable that there should not be fungi present in the indoor air in such patients' environment. Reduction of the numbers of potentially pathogenic bacteria, viruses and fungi in the indoor air should be a standard in the practice of medical staff (mainly epidemiological nurses). Proper procedures, including air conditioning, in rooms where immunocompromised patients are present should eradicate the most pathogenic fungi from the environment: *Candida albicans, Candida parapsilosis, Aspergillus* sp., *Mucor* sp. and others potentially causing deep and/or generalised mycoses.

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Clinical forms of infections in neonates hospitalized in clinic of obstetrics and perinatology within the space of one year

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Abstract

Because of their specificity, infections in neonatal units form one of the main clinical problems. Our research involved all neonates (1 019) hospitalized in Clinic of Obstetrics and Perinatology within the space of one year. Clinically manifested infections were diagnosed in the total number of 47 (4.6%) newborns, including 23 (2.4%) neonates from the neonatal unit (NU) and 24 (46.2%) – from the Neonatal Intensive Care Unit (NICU). In both units, the most commonly observed were general infections (59.6%) and pneumonias (21.3%); cerebrospinal meningitis and necrotic enteritis were diagnosed in a few cases. Urinary system infections were only found in neonates hospitalized in the NU (30.5%). The course of infection was mild in most cases.

Key words: hospital infections, neonate.

Introduction

Among contemporary infectious diseases, hospital infections are one of the main reasons for infections; they are found in all hospitals, from low-ranking institutions to highly specialistic clinics [1]. Hospital infections reflect imperfection of the hospital procedures applied in everyday life. Because of their specificity, neonatological units are places where infections are one of the main clinical problems. Neonatal infections can be manifested by various sytems, but they usually take form of general infections.

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The aim of this study was to analyse clinical forms of infections and their course in neonates hospitalized over a span of one year in Clinic of Obstetrics and Perinatology.

Material and methods

The research involved all neonates (1019) born/hospitalized in the period from March 15, 2003 to March 14, 2004 in Chair and Clinic of Obstetrics and Perinatology, Pomeranian Medical University in Szczecin – the health care institution with the third reference level. 967 newborns were hospitalized in the neonatal unit (NU), 52 neonates – in the Neonatal Intensive Care Unit (NICU).

Each child had its own infection registration card elaborated for the sake of the research. In case of suspicion of infection adequate materials were taken for microbiological analysis, namely: blood, cerebrospinal fluid, urine, bronchoaspirat (BAL), and swabs from: nasopharyngeal cavity, ear, intubation tube, anal orifice. The material was analysed in Chair and Department of Microbiology and Immunology, Pomeranian Medical University in Szczecin.

The obtained numerical values were subjected to statistical analysis. The significance of differences between the frequency of occurrence/non-occurrence of categorical variables (qualitative) of the compared units (NU and NICU) was assessed by means of: chi-square test, Yates chi-square test and Fisher exact test.

Results

Clinically manifested infections were diagnosed in 47 (4.6%) neonates altogether, including 23 (2.4%) newborns in the NU, and 24 (46.2%) – in the NICU. Two neonates hospitalized in NICU died because of infection. Congenital infections were diagnosed in 12 babies (1.2%), among them 8 neonates

Table 1. **Clinical forms of infections in Neonatal Unit and Neonatal Intensive Care Unit from March 15, 2003 to March 14, 2004**

Clinical forms of infection n=47	NU		NICU		Statistical significance of the difference
	n=23	%	n=24	%	
Septicaemia[x] n=12 (25.6%)	4	17.4	8	33.3	Ins
General infections[v] n=16 (34%)	9	39.1	7*•	29.2	Ins
Cerebrospinal meningitis n=1 (2.1%)	0	0	1	4.2	Ins
Necrotic enteritis (NEC) n=1 (2.1%)	1	4.3	0	0	Ins
Pneumonia with lesions seen on X-rays (PNEU) n=10 (21.3%)	2	8.7	8	33.3	Ins
Urinary system infection (USI) n= 7 (14.9%)	7	30.5	0	0	**p<0.02**

n – the number of neonates; Ins – statistically insignificant difference; **• –** besides general infection, also skin infection in the same neonate; * – besides general infection, also conjunctivitis in the same neonate; [x] – clinical and laboratory symptoms of general infection, positive blood culture; [v] – clinical and laboratory symptoms of general infection, negative blood culture/blood culture was not done, positive cultures from other material

Table 2. **The clinical course of hospital infections in the Neonatal Unit and Neonatal Intensive Care Unit from March 15, 2003 to March 14, 2004**

The course of infection	NU		NICU		Statistical significance of the difference
	n=23	%	n=24	%	
Slight	6	26.1	0	0	**p<0.02**
Mild	12	52.2	11	45.8	NS
Severe	5	21.7	11	45.8	NS
Death	0	0	**2**	8.4	NS

n – the number of infected neonates

from the NU and 4 – from the NICU, while acquired infections were found in 35 (3.4%) babies, including 15 from NU and 20 from NICU. Clinical forms of infections observed in neonates were show in *Tab. 1*.

In both units, the most commonly diagnosed infections were general infections (59.6%). All the children manifested clinical and laboratory symptoms of general infections, but positive blood culture were only noted in 12 out of 28 neonates. The rest of infants had positive culture from other clinical material. As for other clinical forms, pneumonia was relatively common (on average 21.3%); cerebrospinal meningitis and necrotic enteritis were only diagnosed in a few cases. Urinary system infections were only found in the neonates hospitalized in the NU; they made 30.5% of all infections in the above-mentioned unit. In the NICU, two babies with general infection were diagnosed on the basis of positive microbiological test results as having: the first one – infection of skin and umbilicus (positive culture of purulent secretion from the umbilical area), and the second one – conjunctivitis (purulent secretion from conjunctivas). No statistically significant differences were found in the incidence of clinical forms in both units, excepting for urinary system infections which were statistically significantly more common in the NU.

The assessment of the clinical course of neonatal infections was shown in *Tab. 2*.

Most neonatal infections both in the NU and NICU had mild character. Slight infections were statistically significantly more common in the NU, than in the NICU ($p<0.02$). Severe infections were twice more frequent in the NICU, but the differences were not statistically significant.

Discussion

The clinical form of infection is associated with the specificity of a particular hospital unit. However, such risk factors as patient's age, initial disease and the type of applied medical procedures must not be ignored. Severity of infection and its localisation in neonates depend on a baby's maturity. An infant's immune system shows signs of morphological and functional immaturity, and impairment of both specific and non-specific resistance mechanisms facilitates invasion of microorganisms and generalization of infection [2]. Nosological picture of a newborn serves as the basic criterion for diagnosing infection which often takes form of general infection/septicaemia. Most neonates show very subtle and non-characteristic clinical symptoms. Full-term babies mainly suffer from surface infections limited to skin, conjunctivas, umbilicus, and oral cavity. In the group of preterm infants treated in NICU, the most common are general blood-derivative infections (bacteremia, septicaemia – 32.3%), on the second place there are respiratory tract infections (especially pneumonia – 17.4%), then infections of skin and mucous membrane (10.5%), intestines (7.8%), postoperational wounds (5.4%) and others (26.6%) [3]. In our research, the most common clinical form of hospital infection was general infection (59.6%), just as it was in the quoted literature [4].

Blood infection is general infection and belongs to the most severe clinical forms [5]. In developed countries, the incidence of neonatal septicaemia among born-alive neonates is 1-8‰ depending on the unit specificity [5]. Gajewska et al. [6] imply that the incidence of septicaemia in the group of neonates

depends on their maturity and body weight. In babies with birth weight >2 500 g, the occurrence frequency is from 1 to 3‰; in infants whose weight ranges from 2 500 g to 1 000 g, it is between 4 and 10‰, and neonates weighing <1 000 g it is as much as 50‰. Our results are consistent with those presented by other authors. During the analysed period, septicaemia appeared in 4 out of 967 (0.4%) neonates hospitalized in NU and in 8 out of 52 (15.3%) babies in NICU. The percentage of septicaemias was 17.4% in NU and 33.3% in NICU of all clinical forms of infections.

For a neonatologist, a serious problem is pneumonia which can be either primary infection or the one accompanying septicaemia. In our research, pneumonia was the second most frequent clinical form of infection (21.3%). In each case it was confirmed by chest X-rays. These results correspond with those reported by other authors [6,7] who estimate the occurrence frequency of pneumonia from 20% to 32 % in born-alive neonates irrespective of maturity. Epidemiology of urinary system infections is, according to Jańczewska et al. [8], as follows: during the first month of life, urinary system infections are diagnosed in 5/1 000 born-alive newborns; in premature infants they are more frequent and amount to 3-5%. Gajewska et al. [6] estimate the incidence of this clinical form of infection at 0.1%-1% in born-alive infants, 10% in neonates with low birth weight, several times more often in boys than in girls. In the analysed hospital unit, urinary tract infections occurred in 7 neonates out of 1019 born-alive ones, which is 14.9% of all clinical forms; these infections were statistically significantly more common in NU than in NICU. The group of babies with diagnosed urinary tract infection included 5 female and 2 male neonates. These results do not differ much from those reported by other authors [6,8].

The incidence of cerebrospinal meningitis is assessed at 0.1-1‰ (world data) and 0.4‰ (Polish data) [6]. It depends on sex (boys suffer from cerebrospinal meningitis four-times as often as girls) and prematurity (preterm infants fall ill 10-times more often than full-term newborns). Death rate goes up to 20%, severe complications – 10-20%, moderate complications – 30-40% [6]. According to Szczapa [7] cerebrospinal meningitis is found in every third infant with septicaemia; its incidence is 0.3-2.7 per 1 000 born-alive newborns and it is the reason for 4% of neonatal deaths. In our research, such clinical forms of infections as cerebrospinal meningitis and necrotic enteritis were only observed in several cases.

According to epidemiological data, necrotic enteritis is found in 10-15% of neonates with birth weight lower than 1 500 g, and 5-10% – in full-term infants. In NU, 0.5-15‰ of cases are diagnosed, and in NICU – 2-5% of all born-alive infants. [6]. Chandrel et al. [9] estimate the incidence of necrotic enteritis in neonates requiring intensive therapy at 1-7.7%, while Iwaszko-Krawczuk et al. [10] at 12% in babies with very low birth weight. Stachowicz et al. [11] claim that necrotic enteritis was diagnosed in 0.96% of babies, including 36 infants with weight <1 000 g. In our research, necrotic enteritis was only noted in one neonate hospitalized in NU.

Mostly mild infections were observed in neonates both in NU and in NICU. Slight infections were significantly more common ($p<0.02$) in NU than in NICU. Severe infections were noted in NICU twice as often as in NU, but the differences in the frequency of occurrence were not statistically significant.

The obvious thing is that neonatal infections will not be completely eliminated, and yet their incidence can be considerably reduced. This is why it is necessary to rigorously comply with the rules, to control epidemiological procedures, to constantly monitor hospital infections, and, the last but not least, to increase the expenditure on hospital hygiene.

Conclusions

1. The most common clinical forms of infections in NU and NICU were general infections (about 60%) and pneumonias (about 21%).

2. Urinary system infections were only observed in NU.

3. Mostly mild infections were observed both in NU and in NICU.

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In vitro antifungal activity of 2,5 disubstituted amino-oksometyloso-arylo-thiadiazole derivatives

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Abstract

Purpose: The aim of the study was the determination of antifungal activity of new of 2,5 disubstituted amino-oksometyloso-arylo-thiadiazole (AOAT) derivatives against *Candida albicans,* non-*Candida albicans.*

Material and methods: The determination of antifungal activity AOATs against 20 *Candida albicans*, 18 non-*Candida albicans* was performed. Isolates were from different ontocenoses of patients were used for tests. AOATs were synthesized at Department of Chemistry University of Agriculture in Lublin.

Results: The mean MIC of AOATs against *Candida albicans* strains was 141.625 (37.5-200) mg/L on Sabouraud's medium (SB). The mean MIC of AOATs against non-*Candida albicans* strains was 153.3 (50-200) mg/L.

Conclusion: It seems that AOATs exert potent antifungal activity against the yeast-like fungi strains *in vitro*.

Key words: 2,5 disubstituted amino-oksometyloso-arylo-tiadiazoles, *Candida albicans*, non-*Candida albicans*.

Introduction

The incidence of nosocomial infections by the yeast-like fungi strains has surged over the past decade, from the eighth to the fourth most common cause of nosocomial bloodstream infection in the general hospital population [1]. In surgical patients, the incidence of *Candida* infections has increased from 2.5 to 5.6 per 1 000 discharges, with mortality rates of 30% to 75%. Most reports are drawn from general hospital populations, or general surgery, burns and oncology services [2-4]. However, one result of widespread use of powerful antifungal drugs administered for increasingly broader indications has been a dramatic increase in the isolation of resistant forms of *Candida* [5-7].

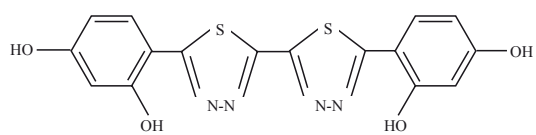
Advances made during the 1990's led to the introduction of a new allylamine, terbinafine, for the treatment of dermatophytoses and new lipid formulations of amphotericin B with improved safety profiles [8,9]. In addition, new classes of antifungal agents such as the candins (pneumocandins and echinocanidins), the nikkomycins, and the pradamicins-benanomicins are being studied. However, the resistance of the yeasts to fungal agents is increasing. This still need to develop new antimycotics.

The aim of the study was the determination of antifungal activity of new of 2,5 disubstituted amino-oksometyloso-arylo-thiadiazole (AOAT) derivatives against *Candida albicans*, and non-*Candida albicans* strains.

Material and methods

AOATs were synthesized at Department of Chemistry University of Agriculture in Lublin. An example of chemical structure of compound No 509 (bis(5-(2,4-dihydroxyphenyl)-2-1,3,4-thiadiazole) was presented in *Fig. 1*.

Figure 1. **Chemical structure of bis(5-(2,4-dihydroxyphenyl)-2-1,3,4-thiadiazole (No 509)**



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In order to define the antifungal activity of 2,5 disubstituted amino-oksometyloso-arylo-thiadiazole (AOATs) derivatives, we tested against 20 fresh clinical isolates of *Candida albicans*, and 18 isolates of non-*Candida albicans*. We used 30 different compounds of AOAT for tests. The yeasts were identified to the species level by the Candi*Select* (Bio-Rad), Fungiscreen 4H (Bio-Rad), Auxacolor (Bio-Rad) tests. Prior to antifungal susceptibility testing, each isolate was passaged on SB medium to ensure optimal growth characteristics.

AOATs were used in the tests. These compounds were dissolved in 1% DMSO. Susceptibility testing was performed by the agar dilution method. Minimum inhibitory concentrations (MICs) were determined by the agar dilution procedure according to National Committee for Clinical Laboratory Standards (NCCLS) reference document M27 [10]. Sabouraud's medium-SB (Bio-Rad) was used. Starting inocula were adjusted by the spectrophotometric method densitometr (BioMerieux) to 1x 10^5 CFU/ml. Concentrations of AOATs were ranging from 25 to 200 mg/L. Plates were incubated at 37°C and read after 24 h incubation. A solvent control was included in each set of assays; the DMSO solution at maximum final concentration of 1% had no effect on fungal growth. Control plates with SB medium without AOATs or with 1% DMSO were also prepared.

Two-tailed test was used to compare mean MIC values. Significance was defined as a p value of 0.05. These analyses were performed on a personal computer with a commercially available statistics program (Statistica 6.0)

Results

The analytical data of compounds were in agreement with the proposed structure. The purity was confirmed by HPLC and HPTLC chromatography in reversed-phase system (RP-8, RP-18, methanol-water). Details of number compounds used for fungal tests are shown in *Tab. 1*. AOATs had a mean MIC of 141.62 mg/L for 20 of *Candida albicans* strains on SB *(Tab. 1)*. AOATs had MIC over the test range of 37.5-200 mg/L for *Candida albicans* isolates on SB. AOATs had a men MIC of 153.3 mg/L for 18 non-*Candida albicans* strains. We found that AOATs had MIC over the test range of 50-200 mg/l for non-*Candida albicans* clinical isolates on SB (*Tab. 2*).

Discussion

In our study, we demonstrated the antifungal activity of new thiadiazole derivatives against *Candida albicans*, and non-*Candida albicans in vitro*. The MICs values of this sample were comparable with currently used antifungal drugs (e.g. itraconazole and fluconazole). These compounds had different MICs against the yeast-like fungi strains. We should mention *Candida albicans* strains used in the present study were resistant to several antimycotics.

In mycological reports there are a lot data on resistance problem of the yeast-like fungi to antifungal agents [11-13]. Among factors known to contribute to the pathogenicity of yeast, enzymes play a significant role, possibly being harmful to host tissues when they are liberated by the fungi [1]. A correlation has been demonstrated between the amount of phospholipase produced and virulence in *Candida albicans* strains and other yeast species. Certain fungi such as: *Mucor, Rhizopus, Aspergillus, Penicllium* and *Candida*, have the ability of releasing hydrolytic enzymes into environment, which break down multimolecular compounds – polysaccharides, proteins, lipids, hydrocarbons [1]. Our findings are in accordance with earlier studies on antimicrobial activity of thiadiazole derivatives [13-15].

In previous study [13] various new 1,4-disubstituted thiosemicarbazide and 2,5-disubstituted-1,3,4-thiadiazole derivatives were synthesized and evaluated for their *in vitro* antimicrobial activity. The structure of compounds was confirmed by elemental analyses and spectroscopic techniques. Some of the synthesized compounds were found to be active against *Candida albicans*. Similar findings were reported by Mamolo et al. [14]. In recent report [15] the two series of 4,6-disubstituted 1,2,4-triazolo-1,3,4-thiadiazole derivatives were synthesized and checked for their efficacy as antimicrobials in vitro. These compounds significant inhibition against all the strains tested, when compared to standard drugs. Furthermore, recently Rzeski et al. [16] reported anticancer activity of thiadiazole derivatives. Anticancer activity studies of 2-(4-fluorophenylamino)-5-(2,4-dihydroxyphenyl)-1,3,4-thiadiazole (FABT), as one of the most promising derivatives from the N-substituted 2-amino-5-(2,4-dihydroxyphenyl)-1,3,4-thiadiazole set, have been continued. The tested compound inhibited proliferation of tumor cells derived from cancers of nervous system (medulloblastoma/rhabdosarcoma, neuroblastoma, and glioma) and peripheral cancers including colon adenocarcinoma and lung carcinoma. The anticancer effect of FABT was attributed to decreased cell division and inhibited cell migration. In anticancer concentrations it exerted a trophic effect in neuronal cell culture and had no influence on viability of normal cells including astrocytes, hepatocytes, and skin fibroblasts. Moreover, a prominent neuroprotective activity of FABT was observed in the neuronal cultures exposed to neurotoxic agents like serum deprivation and glutamate.

In conclusion, it seems that AOATs exert potent antifungal activity against the yeast-like fungi strains *in vitro*. Further studies are needed to select the most potent compounds from these derivatives.

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Table 1. **MIC value of thiadiazole compounds against 20 of *Candida albicans* strains on Sabouraud's medium**

No sample	No strain																				Mean MIC Value mg/L
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	
469	200	200	200	100	200	100	100	200	100	100	50	100	100	100	50	50	100	200	100	50	**120**
470	200	200	200	200	200	200	200	200	100	200	200	200	200	200	200	200	200	200	200	100	**190**
471	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	**100**
472	200	200	200	100	200	200	100	200	100	100	100	100	100	200	50	100	100	200	100	50	**135**
474	200	200	200	50	100	100	50	100	50	50	50	100	50	100	50	50	100	100	100	50	**92.5**
479	100	100	100	50	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	**97.5**
490	100	200	200	100	100	100	100	200	100	100	100	50	50	100	100	100	100	100	100	100	**110**
492	25	25	50	25	25	25	50	50	50	50	25	25	25	25	25	25	50	25	25	25	**32.5**
499	100	100	100	100	100	100	100	100	100	100	50	50	50	100	100	100	100	100	100	50	**90**
501	100	200	200	25	100	25	25	200	50	50	50	100	25	200	100	25	25	200	50	25	**88.75**
506	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	**200**
507	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	**200**
509	50	50	50	25	50	50	25	25	25	25	50	50	50	50	25	25	25	50	25	25	**37.5**
528	100	100	100	100	100	100	100	100	50	100	100	100	100	100	100	100	100	100	100	100	**97.5**
529	200	200	200	200	200	200	200	200	100	200	200	200	200	200	100	200	200	200	200	200	**190**
530	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	**200**
533	200	200	200	100	200	200	100	200	100	100	100	100	100	200	100	200	200	200	100	100	**155**
534	200	200	200	200	200	200	200	200	100	200	200	200	200	200	200	200	200	200	200	200	**195**
535	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	**200**
536	100	100	100	50	50	50	50	100	50	100	100	100	100	100	50	50	50	100	50	50	**75**
537	200	200	200	200	200	200	200	200	100	200	200	200	200	200	100	100	100	200	200	200	**180**
538	200	200	200	100	200	200	100	200	100	100	100	100	100	200	100	100	100	200	100	200	**145**
539	200	200	200	100	100	100	100	200	100	200	100	100	200	200	200	200	200	200	100	100	**155**
540	100	100	100	50	50	100	50	100	50	50	50	50	100	50	50	50	50	100	50	50	**67.5**
541	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	**200**
542	200	200	200	200	200	200	100	200	100	100	100	100	100	200	100	200	100	200	200	100	**155**
544	200	200	200	100	200	200	200	200	100	100	100	200	200	200	100	100	100	200	200	100	**160**
545	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	**200**
546	200	200	200	200	200	200	200	200	200	200	100	200	100	200	200	200	200	200	200	200	**190**
550	200	200	200	200	200	200	200	200	100	100	200	200	200	200	200	200	200	200	200	200	**190**
																					141.625

Table 2. **MIC value of thiadiazole compounds against 18 of non-*Candida albicans* strains on Sabouraud's medium**

No sample	No strain																		Mean MIC value mg/L
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
427	200	200	200	100	200	100	100	100	200	50	50	100	200	200	200	200	200	200	**155.6**
429	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	**200**
446	200	200	200	100	200	100	100	100	200	100	200	200	50	50	200	200	200	200	**155.6**
438	100	100	100	100	100	100	50	100	100	100	100	100	100	100	100	100	50	100	**94.4**
468	200	200	200	100	200	100	100	200	100	200	200	200	100	50	200	50	200	200	**155.6**
438	200	200	200	200	200	200	200	100	50	100	200	200	200	200	200	200	200	100	**175**
528	200	200	200	200	200	100	200	100	100	50	200	200	200	200	200	200	100	100	**163.9**
499	200	200	200	200	200	200	100	50	50	50	200	200	200	200	200	200	100	100	**158.3**
492	50	100	50	50	50	50	50	50	50	50	100	50	50	50	100	50	50	50	**58.3**
536	200	200	200	200	200	100	100	50	50	50	100	100	100	200	200	200	100	100	**136.1**
474	200	200	200	200	200	100	200	100	100	50	200	200	200	200	200	200	200	200	**175**
479	200	200	200	200	200	100	200	200	100	100	200	200	200	200	200	200	200	100	**172.2**
501	200	200	200	200	200	200	200	100	50	50	200	200	200	200	200	200	100	100	**166.7**
509	200	200	200	200	200	200	200	50	100	50	200	200	200	200	200	200	200	200	**177.8**
540	200	200	200	200	200	100	100	50	50	100	200	200	200	200	200	200	100	100	**155.6**
																			153.3

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Clinical and microbiological characteristics of hospital infections in the neonatal intensive care unit

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Abstract

Neonates hospitalized in intensive care units, are exposed to a higher risk of infectious complications. The research involved 52 neonates hospitalized in the Neonatal Intensive Care Unit (NICU), Chair and Clinic of Obstetrics and Perinatology over a span of one year. The incidence of hospital infections as well as etiological factors were analyzed. Clinically manifested hospital infections were diagnosed in 38.5% of babies with very low or extremely low birth weight, in boys twice as often as in girls. Generalised invasive infections prevailed; in most cases they were caused by Gram-negative rods, mainly *Klebsiella* spp.

Key words: hospital infections, neonate.

Introduction

Hospital infections pose a serious problem of contemporary medicine in the whole world, irrespective of the level of civilization development. Neonatal wards, where preterm neonates are treated, are especially difficult in respect of epidemiology. Despite complying with safety rules, the risk of neonatal infections in Neonatal Intensive Care Units (NICUs) shows upwards tendency.

The aim of this study was the clinical and microbiological analyses of hospital infections found in babies hospitalized in NICU.

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Material and methods

The research involved 52 neonates hospitalized within the space of one year in NICU, Clinic of Obstetrics and Perinatology, Pomeranian Medical University in Szczecin. Each child had its own infection registration card elaborated for the sake of the research. In case of clinical suspicion of infection (in different days of hospitalization), adequate materials were taken for microbiological analysis, namely: blood, cerebrospinal fluid, urine, bronchoaspirat (BAL), and swabs from: nasopharyngeal cavity, ear, intubation tube, anal orifice. Microbiological analysis was done in Chair and Department of Microbiology and Immunology, Pomeranian Medical University in Szczecin in accordance with valid procedures**.**

Results

Clinically manifested infections were diagnosed in 24 (46.2%) babies altogether. Most of them (20) were given birth by the caesarean section. In 4 cases, they were congenital **i**nfections, in 20 (38.5%) – acquired ones. Hospital infections were found in 13 male and 7 female neonates. All the children had either very low (8) or extremely low (12) birth weight. The prevailing infections were general infections/septicaemia and pneumonia. Two babies with diagnosed septicaemia died. Etiological factors of infections varied – both Gram-positive and Gram-negative microbes were isolated; Gram-negative rods from the family *Enterobacteriacae* were most numerous. In the microbiological tests performed successively, the same child had sometimes different microbes isolated, and negative inoculation results were obtained (from blood or cerebrospinal fluid). Detailed clinical and microbiological characteristics of infections were shown in *Tab. 1*.

***Table 1*. The profile of acquired infections in NICU over a span of one year**

No	Material	Sex	Birth weight (g)	Isolated microbes	Clinical forms of infections
1	blood, rectal swabs	m	1640	*Serratia liquefaciens,* *Serratia liquefaciens*	Septicaemia *
2	rectal swabs nasopharyngeal swabs	m	890	*Pneumocystis carini,* *Klebsiella pneumoniae* ESBL(-) *Klebsiella pneumoniae* ESBL(-)	Pneumocystis pneumonia
3	rectal swabs rectal swabs rectal swabs rectal swabs	m	985	*Pneumocystis carini,* *Staphylococcus haemolyticus* *Enterobacter cloacae* *Enterobacter cloacae*	Pneumocystis pneumonia
4	rectal swabs rectal swabs nasopharyngeal swabs nasopharyngeal swabs	m	1640	*Staphylococcus haemolyticus* *Pneumocystis carini* *Staphylococcus haemolyticus* *Staphylococcus haemolyticus* *Enterobacter cloacae*	Pneumocystis pneumonia
5	rectal swabs	f	600	*Klebsiella oxytoca* ESBL(+)	Generalised infection **
6	rectal swabs blood nasopharyngeal swabs	m	1470	*Klebsiella pneumoniae* ESBL(-) *Klebsiella pneumoniae* ESBL(-) *Serratia marcescens*	Septicaemia *
7	nasopharyngeal swabs nasopharyngeal swabs nasopharyngeal swabs nasopharyngeal swabs	f	890	*Serratia marcescens* *Serratia marcescens* *Serratia marcescens* *Serratia marcescens* *Enterobacter cloacae* *Pseudomonas aeruginosa*	Generalised infection **
8	rectal swabs blood	m	1270	*Klebsiella oxytoca* ESBL(-) *Serratia marcescens*	Septicaemia *
9	rectal swabs rectal swabs	m	1270	*Enterococcus faecium* *Candida albicans* *Klebsiella oxytoca* ESBL(+)	Generalised infection **
10	rectal swabs rectal swabs	m	985	*Enterobacter cloacae* *Klebsiella oxytoca* ESBL(-)	Cerebrospinal meningitis
11	rectal swabs rectal swabs rectal swabs	f	920	*Citrobacter freundii* *Klebsiella oxytoca* ESBL(-) *Klebsiella oxytoca* ESBL(-)	Generalised infection **
12	blood purulent secretion	m	1500	*Enterobacter cancerogenus* *Enterobacter cloacae*	Septicaemia * Skin infection
13	nasopharyngeal swabs blood rectal swabs rectal swabs	m	1000	*Staphylococcus haemolyticus* *Staphylococcus epidermidis* *Enterobacter cloacae* *Klebsiella oxytoca* ESBL(-)	Septicaemia *
14	nasopharyngeal swabs urine purulent secretion from conjunctiva	m	920	*Klebsiella pneumoniae* ESBL(+) *Klebsiella oxytoca* ESBL(+) *Streptococcus agalactiae* *Proteus* spp.	General infection ** Conjunctivitis
15	rectal swabs	m	750	*Klebsiella pneumoniae* ESBL(-)	Pneumonia
16	nasopharyngeal swabs nasopharyngeal swabs blood	f	540	*Stenotrophomonas maltophilia* *Stenotrophomonas maltophilia* *Candida albicans*	Septicaemia *
17	rectal swabs bronchoaspirat rectal swabs	f	580	*Candida albicans* *Stenotrophomonas maltophilia* *Enterobacter cloacae*	Pneumonia
18	rectal swabs	m	1250	*Escherichia coli*	Pneumonia
19	blood nasopharyngeal swabs rectal swabs rectal swabs	f	980	*Staphylococcus haemolyticus* *Klebsiella oxytoca* ESBL(+) *Pseudomonas aeruginosa* *Klebsiella oxytoca* ESBL(+) *Klebsiella oxytoca* ESBL(-)	Septicaemia *
20	nasopharyngeal swabs rectal swabs	f	1700	*Klebsiella pneumoniae* ESBL(+) *Klebsiella pneumoniae* ESBL(+)	Pneumonia

m – male, f – female, * – positive blood culture, ** – negative blood culture

Discussion

Medical achievements of the last twenty years have increased the survival rate of premature and extremely low birth weight infants [1]. These babies always need prolonged hospitalization in an intensive care unit which, combined with the short pregnancy duration and low weight, is a factor contributing to the elevated risk of post-infectious complications [1]. Moreover, this is the group of patients whose own resistance is low, which additionally increases their susceptibility to infections.

As the result, the stay in NICU, diversity of the invasive diagnostic-therapeutic procedures, and infections acquired in a hospital may thwart the efforts of medical staff and dash parents' hopes for health and life of premature infants [2]. Both intrauterine infections and those acquired after childbirth are, at present, the most serious problem in neonatology – the one which, besides congenital defects and complications associated with prematurity and oxygen deficiency during labour, contribute greatly to perinatal mortality.

Various authors report on different incidence of hospital infections. It mainly depends on the level of newborns' maturity and applied therapeutic procedures as well as the centre publishing data. In the United States, the incidence of the acquired infections in neonates is estimated as 5.2-30.4%, and in Europe – 8-10% [3]. The incidence of infections in neonates treated in NICU increases to 17-25%, and is inversely proportional to gestational age and birth weight. In newborns with birth weight lower than 1 500 g, it is 5-32%, in babies weighing less than 1 000 g – up to 40%, and neonates born earlier than in the 25th week of pregnancy – even up to 46% [4].

According to Szczapa [5], in the group of premature infants treated in NICU, the percentage of infections is 15-25%, and in babies with birth weight below 1 500 g it is as much as up to 40%. Similar results were obtained in our research, where all neonates hospitalized in the NICU within the space of one year, were subjected to analysis, and 38.5% of hospital infections were found. They were observed in babies with very low (8) and extremely low (12) birth weight. According to other authors, the incidence of infections in NICU ranges from 2.7% to 24.6%, and mortality rate among septicaemic infants in these wards is estimated as 21% [6].

In NICU, infections are usually caused by Gram-positive bacteria (57-70%), and about 40% of infections are caused by coagulase-negative staphylococci. Infections with Gram-negative rods and fungi are less common, but they are responsible for greater number of deaths. In case of *Pseudomonas aeruginosa* mortality rate amounts to 75% [4].

During our research, sometimes a few potentially pathogenic microbes were isolated from a neonate. It happened in such cases that etiologic factor of infection could not be exactly determined. Most infections, however, were caused by Gram-negative rods, among them the strains producing β-lactamases with a wide substrate spectrum (ESBL). The above data have their reflection in the results presented by other authors [7,8]. Poland lacks a standardized system for monitoring the frequency and kind of acquired infections in hospitalized neonates; this is why data considering bacterial etiologic factors are so varied. Gadzinowski [9] and Zięba [10] report, however, on the prevalence of Gram-negative rods, including *Klebsiella pneumoniae* and *Pseudomonas aeruginosa*. Coagulase-negative staphylococci place on the second position in these authors' reports. The basic reason why the resistant strains of Gram-negative rods spread in hospitals is hygienic neglect. These bacteria are very capable of living on human hand skin. What is more, they multiply rapidly in warm fluids. They spread on hands of medical staff members, on medical tools, and sometimes, but rarely by air. Also preventive use of ampicillin and cephalosporin contributes to the increased microbial colonization.

Infections caused by Gram-negative rods belong to the life-threatening ones. Through endotoxin production, not only can they considerably disturb the functioning of various organs, but also the whole systems with symptoms of septic shock, and, as a consequence, they can lead to neonatal death [11]. In the analyzed hospital unit, the following Gram-negative rods were identified and listed from the most to the least frequently occurring: *Klebsiella* spp*., Enterobacter cloacae, Serratia* spp. Based on the research conducted in Cracow, Kędzierska et al. [8] mention *Enterobacter cloacae* as the most frequently occurring, then *Escherichia coli,* and finally *Klebsiella pneumoniae* and *Serratia marcescens*.

In case of *Klebsiella* spp., the most commonly described mechanism of resistance is the production of β-lactamases with an extended substrate spectrum (ESBL), which are coded by plasmids. This phenomeon was also observed in our research. The presence of ESBL-producing *Klebsiella* clone in an intensive care unit poses a serious threat and therapeutic problem, as the plasmids can easily transfer between Gram-negative rods, and infections are likely to spread to other hospital units, and the use of β-lactam antibiotics in the therapy has its limitations. Such a situation always requires verification of the applied procedures, and strict sanitary routines in the unit.

Conclusions

Hospital infections in NICU were diagnosed in about 40% of neonates, more frequently in males. In most cases they were generalised invasive infections and pneumonia. The most common etiologic factors were Gram-negative rods including ESBL-positive strains of *Klebsiella* spp.

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Satisfaction of women after mastectomy for nursing care

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Abstract

Purpose: The assessment of satisfaction of women after mastectomy for nursing care.

Material and methods: The research was carried out on a group of 217 patients after radical mastectomy and took place at Surgical Clinic of Świętokrzyskie Oncology Centre in Kielce. Authors' assessment scale was used in research.

Results: Tested patients assessed nurses' professional tasks in terms of therapy as very high. The lowest marks were given to nurses' tasks in terms of physical rehabilitation. On intermediate level in patients' assessment were nursing, prophylactic, psychosocial support and educational tasks. Patients after mastectomy in younger age group (less then 50 years) assessed nurses' therapy tasks ($p<0.05$) significantly higher in comparison to group of women in the age of 50 and more. Married and professional active women assessed significantly higher therapeutic and nursing tasks. Moreover, therapeutic tasks were higher assessed by women with two-sided mastectomy.

Conclusions: 1) Patients assessed nurses' professional tasks realised in terms of therapy as very high, while nursing service as far as physical rehabilitation is concerned was assessed as very low. 2) The higher level of satisfaction from therapy tasks was seen in younger patients (under 50), married, professionally active, not longer than 1 year after the operation and with two-sided mastectomy.

Key words: mastectomy, nursing care, satisfaction.

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Introduction

The application of comprehensive oncological treatment including surgery, chemotherapy, hormone therapy and radiotherapy became a great success of medicine in the fight against breast cancer [1,2]. Negative or positive measures of health determined in epidemiology as well as results of diagnostic and medical treatment are, above all, the basic methods of the assessment of such treatment effectiveness.

The assessment of effectiveness of curing patients after radical mastectomy covers the assessment of nursing care as well. It allows to identify these care fields in which patients' expectations are higher to what they had been given and it contributes to improvement of these fields.

Material and methods

The aim of the research was the assessment of satisfaction of women after mastectomy for nursing care. The research was carried out on a group of 217 patients after radical mastectomy and took place at Surgical Clinic of Świętokrzyskie Oncology Centre in Kielce.

The level of satisfaction from nursing in women after mastectomy was determined with the use of unaided assessment scale. Questions included in nursing care inquiry were divided into 6 categories: psychosocial support, nursing, educational, prophylactic, therapeutic and rehabilitation tasks. Nursing care questionnaire was checked in terms of reliability. The Alpha Cronbach index for each individual care category varied from 0.64 to 0.87 and the index for the whole scale was 0.93.

Collected data were subjected to statistical analysis. In statistical description of the obtained results the following characteristics were used: mean results and median as measures of central tendencies and standard deviation, bottom quartile and upper quartile as measures of dispersion. The relationship between categorial variables presented in charts were analysed

***Table 1*. Characteristic of tested group**

Attributes	Tested group	
	n	%
Age		
< 50 year of age	67	30.9
50 year of age ≥	150	69.1
Education		
Elementary school	20	9.2
Vocational secondary education	34	15.7
General secondary education	119	54.8
Higher education	44	20.3
Marital status		
Single	7	3.2
Married	158	72.8
Widow	32	14.7
Divorced	20	9.2
Professional status		
Intellectual job	21	9.7
Physical job	40	18.4
Dole	60	27.6
Pension	75	34.6
Retirement	21	9.7
Place of residence		
The country	53	24.4
Town (less then 100 thousand of people)	76	35.0
City (more then 100 thousand of people	88	40.6

with Chi-square test. In order to assess differences between the level of tested characteristics in subscales non-parametric tests by U Mann-Whitney and Kruskal-Wallis were used.

Results

The tested group consisted of patient after radical surgical treatment for breast cancer – mastectomy (n=217), in the 28 to 81 age bracket. The most numerous age bracket was 51-60, with 36.8% of women. About 3/4 of patients (72.8%) were married and living in the city (75.6%). Most women (54.8%) had secondary education. Only 28.1% of patients after mastectomy were professionally active (*Tab. 1*). In tested group 92.6% patients underwent one-sided mastectomy while the rest of them had two-sided breast removal. About a 43% of patients were not longer than 6 months after the operation whereas 20.7% of them were longer than 5 years after mastectomy. For 16.6% of patients radical surgical treatment for breast cancer was the only method, the rest of them underwent supplementary treatment such as: chemotherapy, radiotherapy and hormone therapy.

Tested patients assessed nurses' professional tasks in terms of therapy as very high (average – 60.93). The lowest marks were given to nurses' tasks in terms of physical rehabilitation (average – 43.98). On intermediate level in patients' assessment were nursing, prophylactic, psychosocial support and educational tasks (*Tab. 2*).

Patients after mastectomy in younger age group (less then 50 years) assessed nurses' therapy tasks ($p<0.05$) significantly higher in comparison to group of women in the age of 50 and more. Results of the rest of criteria included in the questionnaire did not differ much as far as age is concerned.

Level of education influenced significantly one category of nurses' professional tasks, these were physical rehabilitation tasks. It was seen that patients with lower education level (primary and vocational) assessed the level of satisfaction from rehabilitation tasks much higher in comparison to women with secondary and high education.

Married women reported higher level of satisfaction from nursing tasks ($p<0.05$) and therapeutic tasks ($p<0.05$) in comparison to unmarried women. The difference on the limit of gravity level ($p=0.050$) applied to education tasks.

Professionally active women obtained statistically significant higher results in terms of nursing tasks ($p<0.01$) and therapeutic tasks ($p<0.001$) in comparison to unemployed women.

Women living in the village obtained also statistically significant higher results in terms of psychosocial support from nurses ($p<0.01$), educational tasks ($p<0.05$) and rehabilitation tasks ($p<0.001$) in comparison to patients living in the cities.

Analysis, using Kruskal-Wallis test, proved that women after two-sided breast removal obtained significantly higher results in terms of nursing therapeutic tasks in comparison to patients after one-sided mastectomy at the level of significance $p<0.05$ ($\chi^2=6.299$).

Period since the operation appeared to be the variable significantly diversifying the patients' assessment of nurses' professional tasks. It was observed that women in the period till 1 year after mastectomy evaluated higher nursing tasks ($p<0.001$), psychosocial support ($p<0.01$) and participation in therapy ($p<0.01$) in comparison to women being over 1 year after mastectomy.

Discussion

Research reported that patients evaluated best nurses' professional tasks provided during therapy, and worst – those referring to rehabilitation tasks. Similar results were obtained

***Table 2*. Statistical description for the results of the scale of satisfaction level from nursing care of patients after radical mastectomy**

Scale of satisfaction level from nursing care	Average	Median	Quartile I	Quartile III	Minimum	Maximum
Nursing tasks	56.75	60.71	50.00	67.86	3.53	75.00
Psychosocial support	53.14	55.56	44.44	66.67	0.00	75.00
Educational tasks	52.24	53.33	46.67	60.00	5.00	75.00
Prophylactic tasks	56.41	60.00	50.00	65.00	15.00	75.00
Therapeutic tasks	60.93	62.50	54.17	70.83	8.33	75.00
Rehabilitation tasks	43.98	43.75	25.00	62.50	0.00	75.00

by Jankowiak at al. [2]. According to their research, nursing staff performs most frequently their duties regarding therapeutic tasks (100% of the questioned), nursing (95%), and prophylactic tasks (85%). The most rarely, in nurses' opinions, rehabilitation, educational and health promotion tasks are undertaken. There are numerous publications of conceptual nature that dwell on significance and the range of professional duties in care taking of an oncological patient [3-6], nevertheless there are scarcely few empirical publications which aim is to measure the level of satisfaction from the realisation of these duties. In the study of books [7] dedicated to the assessment of quality of care taking of patient after surgical treatment for lung cancer in Chest Surgery Clinic of Medical University in Gdańsk and in Chest and Cancer Surgery Clinic of Regional Oncology Centre in Bydgoszcz the level of satisfaction from nursing care in both these clinics was evaluated as high. Indexes were accordingly 59.98 and 64.42 and the differences between them appeared to be statistically important ($p<0.001$). Similar results as far as this matter is concerned were reached by Reguła at al. [8] while they assessed patients' and patients' families' satisfaction from palliative care in stationary ward. Issues dealing with nursing care were evaluated as very good (average 4.85, marks range 2-5).

As Razavi and Delavox claim, nowadays the most important aspect is to support patients with cancer by multidisciplinary team, and an educated nurse should be its member [9]. In Stępień and Wrońska's research [10] significant percentage of women after mastectomy (78%) expected above all emotional support from nurses: kindness, warm-heartedness, understanding problems of psychical nature, leniency, honest talk about emotions experienced during an illness, concern and smile. More than half of women (55%) were interested in providing them informational support. Also it was expected that nurses would involve more in providing information on planned and executed nursing and caring procedures, making patients aware of dangers and threats which are linked to conducted treatment and making patients aware of ways to prevent these threats, and in proper communication in patient-nurse relation. 24% of opinions pointed out the need for self-esteem support which reflects in patient's strive for acceptance among nursing staff in their altered health state. Numerous publications point out the need for taking basic psychotherapeutic care of patients with cancer [3,11,12]. In the light of presented literature and authors' research, patients with breast cancer perceive nursing care not only as medical-instrumental or technical tasks, but also as personal contact that is to bring psychical support, together with composure, care, understanding and hope.

Conclusions

1) Patients assessed nurses' professional tasks realised in terms of therapy as very high, while nursing service as far as physical rehabilitation is concerned was assessed as very low.

2) The higher level of satisfaction from therapy tasks was seen in younger patients (under 50), married, professionally active, not longer than 1 year after the operation and with two-sided mastectomy.

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Health-related behaviour self-assessment of children living in a children's home; study based on own research realised in the Podlaskie Province

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Abstract

Purpose: The purpose of the study was to diagnose the health-related behaviour of children brought up in children's homes, to compare the obtained results with those obtained from a group of peers brought up in their own families.

Material and methods: The study group included 180 children living in children's homes in the Podlaskie Province and in a control group composed of children brought up in their own families and living in the same places where the children's homes are located. A questionnaire of the Health Behaviour Scale, composed of 40 statements determining health-related issues was used.

Results: Self-assessment of health-related behaviour in the studied youth depended on age, for which a statistical significance was shown for: health self-assessment (p=0.011), categories of stressful situations (p=0.047), physical activity (p=0.028) and social support (p=0.001); gender, for which a statistical significance was shown for the categories of usage of stimulants (p=0.000) and place of living, in which the factor "place" was significant (p=0.000) for all categories; and education, where p=0.000 for the following categories: stressful situations, using stimulants, physical activity, social support and health self-assessment. Relationships between the categories of health-related behaviour were much stronger in the assessments of the children brought up in children's homes were found.

Conclusions: The self-assessment of health-related behaviour of the studied youth depended on age, gender, place of living and education. Relationships between the categories of health-related behaviour were much stronger in assessments of the children brought up in children's homes as compared to controls.

Key words: health-related behaviour, children's home, children.

Introduction

Studying health-related behaviour is an important method for measuring the health status of a population, as how an individual lives largely determines his/her health. Childhood and youth are periods in which intellectual and physical development takes place. Those are the periods in which health-related behaviours are acquired for the rest of one's life. It was proven that young people's ability to make decisions regarding health-related behaviour is the highest when those people have an influence on their social, physical and educational environment [1].

A broad view on family and its key importance in shaping health and health-related behaviour takes on a special value today. Also noted is the equal importance of biological, mental and social factors that influence health. Social customs, way of life (the way of eating, resting and spending free time, smoking, alcohol abuse), cultural and intellectual life and beliefs can support health or cause its loss [2]. Children living in children's homes long for their families, do not know parental love, are frequently humiliated and laughed at, and they do not acquire the formulas of conduct necessary for adult life [3].

The aim of the study was to diagnose the health-related behaviour of children brought up in children's homes, to compare results with a group of peers living in normal families, to determine theoretical relationships in this area, and to develop practical postulates that constitute a basis for planning actions aimed at optimising and promoting health among the selected group of children.

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Table 1. **Comparison of mean values in separate subgroups, along with a presentation of the average values of assessments for the category of "stimulant usage" with values of 95% confidence intervals**

Age	Group		*s*
Girls	Total	92.9	13.1
	Control	99.2	3.0
	Study	87.2	16.0
Boys	Total	88.2	18.4
	Control	97.4	7.9
	Study	78.5	21.3
Results of significance tests for individual factors			
Factor	**F**	***P***	
Study group	106.2	0.000***	
Gender	13.7	0.000***	
Interaction	6.3	0.013*	

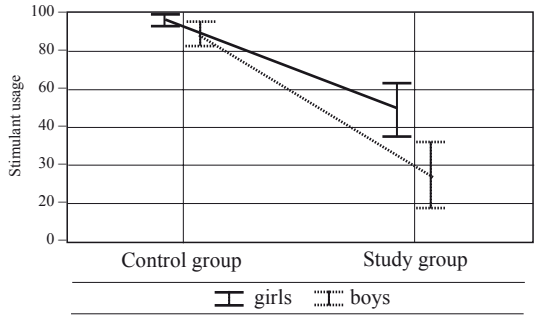

Table 2. **Comparison of assessments of the Health Behaviour Scale in both groups of children**

Place	Group	Health valuation (1)	Health self-assessment (2)	Stressful situations (3)	Stimulant usage (4)	Eating habits (5)	Physical activity (6)	Prophylactics (7)	Social support (8)
Białystok	Control (35)	63.0	74.8	60.1	99.0	62.7	75.0	45.9	78.0
	Study (40)	57.7	54.4	49.0	72.4	50.1	55.1	43.6	56.3
Łomża	Control (30)	66.5	75.8	60.9	95.8	64.3	70.1	48.8	69.9
	Study (35)	58.9	54.2	51.4	76.4	52.9	58.1	46.9	52.9
Supraśl	Control (35)	63.2	71.9	64.3	99.0	64.6	79.0	45.6	79.1
	Study (30)	64.3	57.7	54.0	70.7	52.9	58.5	42.8	61.0
Pawłówka	Control (50)	70.4	74.8	67.4	99.0	65.3	84.7	43.4	83.3
	Study (25)	60.7	65.5	60.4	88.3	55.6	65.7	46.9	53.7
Krasne	Control (30)	65.0	69.9	58.8	97.0	67.6	77.0	47.4	74.8
	Study (50)	77.9	83.6	66.9	98.3	86.5	92.7	51.3	79.8

Material and methods

The study was conducted after R-I-00.23/2006 consent was obtained from the Bioethical Commission of the Medical Academy in Białystok and from managers of children's homes, parents or legal guardians of a child, in a group of 180 children brought up in children's homes located in the Podlaskie Province: in Białystok, Krasne, Supraśl, Łomża, Nowa Pawłówka; and 180 children in a control group composed of children brought up in full families living in the same places where the children's homes are located. A diagnostic survey method, with the Health Behaviour Scale questionnaire, composed of 40 questions defining various behaviours connected with health in the study and control groups: health valuation, health self-assessment, stressful situation, usage of stimulants, eating behaviour, prophylactics, physical activity, and social support was used. The Health Behaviour Scale was provided by the author: Dr M. Banaszkiewicz from the Medical Academy in Bydgoszcz.

Results

Results obtained with the Health Behaviour Scale showed that the self-assessment of health-related behaviour of the studied youth depended on their age, for which a statistical significance was achieved for health self-assessment, for which p=0.011, in the categories of stressful situations (p=0.047), physical activity (p=0.028) and social support (p=0.001); gender, for which statistical significance was shown in the categories of using stimulants (p=0.000) (*Tab. 1*) and place of living, for which it was shown that the bigger the town, the larger the difference in favour of children belonging to the control group; the only exception is a children's home in Krasne, where surprisingly high results were obtained, higher than for the control group living in the same town, and in some cases also higher than for all control groups (*Tab. 2*). It was shown that the factor of place was significant for all eight categories of the Health Behaviour Scale (*Tab. 3*) and for education, where p=0.000 was obtained for the following categories: stressful situations, use of stimulants, physical activity, social support and health self-assessment (*Tab. 4*). Relations between categories of health-related behaviour were much stronger in assessments of children brought up in children's homes, for which it was shown that the correlation coefficients were close to the range of 0.4-0.6 (medium correlation), and in several cases they reached over 0.7 (strong correlation) in comparison with the control group. In the study group, with one increasing measure in the Health Behaviour Scale (for example: health self-assessment), another one increased (for example: stressful situations),

Table 3. **Presentation of test results for individual factors**

Effect	Category of the scale of self-assessment of health-related behaviour							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Place	0.004**	0.000***	0.000***	0.000***	0.000***	0.000***	0.011**	0.000***
Group	0.296	0.000***	0.000***	0.000***	0.000***	0.000***	1.000	0.000***
Interaction	0.003**	0.000***	0.000***	0.000***	0.000***	0.000***	0.143	0.000***

* – significance

Table 4. **Comparison of the results of statistical tests of assessments of the Health Behaviour Scale**

Health Behaviour Scale	*ANOVA* Test		Mann-Whitney *U* Test				95% confidence interval	
	F	*p*	Total rank		*Z*	*p*		
			control group	study group				
Health valuation	0.2	0.635	32124	32857	-0.4	0.709	-2.9	5.2
Health self-assessment	22.2	0.000***	36115	28866	3.7	0.000***	5.1	12.7
Stressful situations	20.6	0.000***	35947	28674	3.6	0.000***	3.2	8.5
Stimulant usage	107.1	0.000***	40421	23841	9.9	0.000***	13.0	19.0
Eating habits	2.9	0.087	33837	30424	1.9	0.054	-0.4	6.3
Physical activity	22.6	0.000***	35786	28118	4.1	0.000***	6.1	14.2
Prophylactics	0.6	0.445	30754	32437	-1.0	0.330	-3.2	1.4
Social support	49.1	0.000***	38222	26039	6.4	0.000***	10.6	19.2

F – value; p – value probability; Z– value

Table 5. **Spearman's rank correlation coefficients between the categories of the Health Behaviour Scale (for the control group, over the diagonal; for the study group, below)**

Health Behaviour Scale categories	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Health valuation (1)	1	*0.28*	*-0.01*	*0.09*	*0.14*	*0.10*	*0.05*	*0.16*
Health self-assessment (2)	0.47	1	*0.43*	*0.18*	*0.24*	*0.49*	*-0.01*	*0.37*
Stressful situations (3)	0.40	0.76	1	*0.15*	*0.13*	*0.35*	*-0.01*	*0.40*
Stimulant usage (4)	0.32	0.54	0.43	1	*0.16*	*0.18*	*-0.01*	*0.22*
Eating habits (5)	0.44	0.66	0.55	0.56	1	*0.32*	*0.11*	*0.40*
Physical activity (6)	0.44	0.73	0.54	0.54	0.66	1	*-0.03*	*0.44*
Prophylactics (7)	0.19	0.22	0.17	0.20	0.28	0.23	1	*0.07*
Social support (8)	0.53	0.54	0.38	0.39	0.56	0.55	0.21	1

and in this group health self-assessment showed strong correlations, and prophylactics was the weakest correlated with the other measurements (*Tab. 5*).

Discussion

Based on analysis of our study, the presence of significant differences for the following: stressful situations, use of stimulants, physical activity, social support and health self-assessment in both groups were found. In each case, the difference was unfavourable for the children brought up in children's homes, which is partially consistent with data from the literature. It has to be noted that the biggest differences were found for the categories of stimulant usage and social support. The statistical significance presented for the category of stressful situations in both groups of respondents has been confirmed by other authors.

Głomski [4] believes that every child that lives at a care and upbringing institution has frequent adaptive stress, and the stress has significant psychological and social consequences. Children long for home, are laughed at, feel lonely, they cannot adapt to regulations and requirements, they have difficulties with learning, and they encounter a lack of understanding [5]. Parting from the family or a sudden change of environment are factors that cause a feeling of threat and anxiety [6]. It should be noted that children's homes are places where neglected children stay. Children are separated from social contacts and treat placement in a children's home as an unjust punishment or misfortune. They feel aggrieved [7].

Tatarowicz observed that at the source of demoralisation and criminality of children and youth, there is often improper family structure and function and lack of family ties [8].

Socha-Kołodziej states that disturbance in behaviour of charges of care and upbringing institutions are caused by the following reasons: lack of natural family and positive models of coexistence and personality features, living in a children's home, and school environment through improper attitude of teachers and failures at school [9]. Raczkowska [10] and Lis [11] suggest that charges of children's homes cause troubles in

a school setting because they are arrogant and vulgar towards their peers and teachers, frequently run away from school, drink beer and wine, and force younger children to sniff "various filth". Similar results were obtained by Telka [12] and Nzimakwe [13]. It is worth noting that numerous studies showed that cigarette smoking by primary school children is a very frequent phenomenon [14,15] and that children start smoking before they turn 8. Marihuana, however, is more popular among secondary school students [16], and "hard" drugs are most popular among students of secondary vocational schools and general secondary schools [17]. Physical activity should not become a duty for health, but should be an integral element of everyday life, taking into account work time, household duties and free time [18]. It opens a broad area for development of personality, and provides an opportunity for self-realization, and – most importantly – shapes a new quality of life, and improves an individual through its health, prophylactic and entertainment functions [19].

In this study, a significant difference was found for the physical activity category of health-related behaviour, in both groups of children surveyed, to the disadvantage of those children brought up in children's homes. Data from the literature also suggests that the phenomenon of the low level of physical activity is present both in the group of charges in children's homes and children brought up in their own families [20,21]. Przygoda [22] showed that only some charges of children's homes are interested in sport and music, adding that this is equal to watching to a sports broadcasts, playing football, volleyball or basketball with friends, and listening to cassettes of popular music. Other authors also stress that the interests of the studied charges were very monotonous and scarce, and are characterised by large variability and lack of stability [21,23]. Bielecka suggests, however, that children's homes prepare their charges to spend free time properly [21]. Krajewska et al. have proven, that youth from post-primary schools present deficiencies in health behaviour and only a half of the studied subjects assesses the level of their physical activity as very good [24]. Kubik, in a study conducted among children in post-primary schools, showed that the physical activity of the studied group is low and does not correspond to the principles of a healthy lifestyle [25].

Social support and health self-assessment are factors that are more and more frequently taken into account in the context of health-related behaviour. A question concerning health self-assessment is encountered in almost every social survey regarding matters connected with health.

The results obtained with the Health Behaviour Scale are consistent with reports from literature, suggesting that only few charges of the children's homes can count on support from their families, and they have to rely on themselves even if they have friends. This is probably due to their specific life experience, which proves that even those closest to you can let you down [5]. Studies by Formicki et al. [26] prove that 61.9% of the studied charges of children's homes believe that they cannot always rely on support and aid from their caregivers, or from anyone else. Those children frequently adopt a repulsive and protective attitude towards any kind gesture. This opinion is shared by Gajewska [27]. Studies by Supranowicz [28] realised among students of post-primary schools suggest that a lack of a mother's and father's support has an influence on starting regular usage of addictive drugs, drinking alcohol, smoking cigarettes and acquiring a more favourable attitude towards all health-damaging behaviours. This is confirmed by other authors [29,30]. In our own study, we demonstrate a statistically significance difference for the category of health self-assessment in both studied groups. The difference is unfavourable for the charges of children's homes.

HBSC (Health Behaviour in Schoolaged Children) studies by Woynarowska et al. carried out in a group of schoolaged children (11-15 years) have proven that the majority of youth in Poland assess their health as good and very good [20]. Moreover, Pilawska et al. have shown that in a group of primary school students, over half of them assess their health as good, and revealed the following regularity: students who exercise intensively usually feel better [31].

Our own studies showed the existence of an interaction between the place of living and the group, which means that children belonging to the control group "react" to their place of living in a different way than the children in the study group. It was shown that the difference in health-related behaviour self-assessment between children in both groups is statistically significant for the following categories: health self-assessment, stressful situations, use of stimulants, physical activity, social support and eating habits, and in each case the difference is unfavourable for charges of children's homes. The present study proved that place of living influenced self-assessment of health-related behaviours in all categories, as they were usually lower in cities as compared to villages, and especially pronounced among children brought up in children's homes. Woynarowska et al. proved that 11-15 years old children assess their health much higher than village children [20]. The authors suggest that physical activity is lower for village children compared to city children [20]. Varenne [32] and Moalice [33] state that cavities are more frequent among city children than in the village. Sałaga-Pylak et al. proved that behaviours of primary-school children connected with smoking tobacco, drinking alcohol and using drugs were more frequent among city children [34]. It is worth adding that Borzęcki's studies, carried out in a group of primary-school children, showed that city children spend their free time on school days mostly at home: watching TV, reading, listening to music, practicing their hobbies; and village children spend more time doing active sport activities outdoors [35]. In our own studies, it was observed that in Białystok, Łomża, Supraśl and Pawłówka children brought up in children's homes usually had lower values and no significant differences were found for any of the categories of the Health Behaviour Scale between the mean values in the control group in relation to the place of living.

For most of the categories of the Health Behaviour Scale, the difference between the control and study group was higher in the cities than in Pawłówka and Krasne, and the difference in this last category was highly surprising. The reasons for those results can be found in the exceptionally good conditions in the children's home located there. Analysis of the obtained results showed a negative influence of being brought up in a children's home on the assessment of the category of health

self-assessment. Moreover, the influence of age was statistically significant. The influence consisted in the fact that during adolescence (13-16 years) children assessed their health better. Woynarowska et al. [20] and Gacek [36] suggest, however, that youth health self-assessment decreases with time. It was also found that the category of stressful situations was assessed lower by the children from children's homes, and the interaction of this factor and children's age was revealed. Age has a positive influence on the assessment of the category, but only in case of the children's homes charges. Analysis of the stimulants usage category showed that this category of health-related behaviour is completely independent from age. However, it is worth noting studies of the authors [20,36,37] that suggest that the coffee drinking habit in children aged 11-15 years, in Poland, the number of cigarettes smoked, the experience of being drunk, and drinking a beer at least once a month increase with age. No significant relations in the category of eating habits were obtained. Woynarowska et al. suggest that children aged 11-15 years in Poland eat sweets more frequently in cities than in the country, and that eating "fast-food" is more frequent for city children [20]. Our own studies proved that the item of "physical activity" on the Health Behaviour Scale depends to some extend on age, and that this phenomenon is present independently for the children brought up in children's homes and for children living with their own families. It was found that older children are slightly more physically active. Different results were obtained by Pilawska et al. for children from primary schools [31]. Authors have proven that younger children exercise more than older ones. They have also suggested that older students spend more of their free time watching TV [31]. Different results have been obtained by other authors who claim that the frequency of watching TV and physical activity drop with age [20,36,38,39]. The physical activity assessment of youth decreases with age [36,20]. In neither the areas of prophylactics nor age does membership in a group influence the assessments. Bhowate et al., conducting studies among Indian youth, suggest that the presence of cavities and gum infections increases with age [40].

The category of social support is significantly related to the factor of age, positively influencing the obtained assessments, and to the factor of being brought up in a children's home, which has a negative influence. Woynarowska et al., in studies carried out in Poland, have proven that difficulties in relations with parents intensify with age [20]. It was shown that there is a relation between children's health-related behaviour assessment and gender. In our own results, statistically significant results have been obtained only for the category of usage of stimulants. This is confirmed by Kuźma's studies [17,41], carried out in selected primary schools, which state that cigarette smoking is more frequent among boys than among girls. Other authors also state that more boys than girls drink alcohol [30,42,43]. Similar results have been also obtained by Moździerz [44], who showed that symptoms of negative behaviour (smoking, drinking alcohol, using drugs, stress) are more frequent among boys, and less frequent among girls [20,45-48]. Researchers also believe that as for oral hygiene, girls clean their teeth more frequently than boys do and the frequency is "more often than once a day" [20,48,49].

Rational nourishment is a condition for proper development and preservation of health and a good overall feeling. Providing the body with a proper quality and quantity of nourishing agents not only prevents numerous diseases, but also constitutes an important element in prophylactics and treatment of various diseases [50]. Studies performed by Cimoszuk et al. [51] showed that among students aged 13-15 years, there is a deficiency of body weight in 42% of girls and 26% of boys, and the risk of obesity is serious for 2% of children in the group of boys.

Studies performed by Supranowicz et al. [53] and by Gacek et al. [54] in a group of primary-school children showed that girls tend to assess their health much lower than boys do, and almost half of the studied boys perceive their health as very good. Consistent results have been obtained by Woynarowska et al. for 11-15 years children in Poland [20,48].

As for the next category of health-related behaviour, "social support", studies by Płotka et al. performed in a group of primary school children showed that parents are the most frequent source of support for girls, with peers and siblings playing an important role as well; and the boys willingly manage themselves [55].

Conclusions

The self-assessment of health-related behaviour depends largely on age, gender, the place of living and education. Relationships between the categories of health-related behaviour were much stronger in the assessments of children brought up in children's homes, as compared to the control group. There is a need to employ a nurse-educator in children's homes and schools. It would be recommended to introduce health education not only among children, but also among parents and caregivers. Interdisciplinary teams should be formed to deal with the problem of health education for children and youth.

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Quality of life self-assessment of children living in a children's home, based on own research conducted in the Podlaskie Province

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Abstract

Purpose: The purpose of the study was to diagnose the quality of life (QoL) of children brought up in children's homes, to compare findings with results for peers living in complete families.

Material and methods: In the Stage I was to determine the usefulness of tools for QoL evaluation in a group of 120 children from children's homes in the Podlaskie Province and in a group of 120 children belonging to a control group, brought up in their own families, in the same places where the children's homes were located. Selected research tools were used in Stage II, and the study was carried out in a group of 180 children in the same children's homes and a control group. We used the following survey questionnaires: the standardised CHQ-CF87 survey, standardised KINDL survey and Children's Survey based on WHOQOL-BREF.

Results: Significant relationship between the quality of life self-assessment and the place of being brought up for all categories of quality of life was found. A relationship was indicated between the QoL self-assessment and the place of living, age, gender, and physical condition. The charges of a children's home assessed their QoL as significantly lower compared to children living in normal families, mostly in the following categories: health, physical domain and psychological domain, social relations and the ability to function in everyday life. In KINDL survey, strong relationships were found between assessments of QoL categories.

Conclusions: Significant relation between QoL self-assessment and where children were brought up was found. Positive relationship between QoL self-assessment and the place of living, age, gender, and children's physical condition was found.

Key words: quality of life, children's home, children.

Introduction

The system for caring for and bringing up orphaned and neglected children has various forms in Poland. The system includes diagnostic, qualifying and official institutions (children's homes, school and upbringing centres) [1]. It is estimated that there are over 21 thousand children in 380 children's homes. Another 7 000 children live in 63 emergency shelters, crisis intervention centres and hotels, and approx. 1 500 in family children's homes. Over 50 thousand children take advantage of daily care institutions. 99% of children in children's homes have biological parents, and natural orphans constitute just 1% of the number. Over 50 thousand children live in foster families, and just 2% in family children's homes [2]. All societies are aware of the importance of creating conditions in which children can be born, develop and grow up, protected against poverty and diseases, and receive an education that will allow them to develop their intellectual potential. Each child, for his full and harmonic development, should be brought up in a family setting, in atmosphere of happiness, love and understanding [3]. Children living in children's homes long for their families. They do not know parental love, contend with new problems, are frequently laughed at and humiliated, and they do not acquire models necessary for their adult life [4].

The purpose of this study was to diagnose the quality of life (QoL) of children brought up in children's homes, to compare the results with a group of peers living in full families, and to determine theoretical relationships in this area.

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Table 1. **Results of statistical tests comparing the average level of children's assessments of quality of life categories**

QoL Category	ANOVA Test		Mann-Whitney *U* Test				95% interval of confidence	
	F	*p*	Rank sum		*Z*	*P*		
			Control	Test group				
Quality of life	52.6	0.000***	38758	26223	6.7	0.000***	13.9	24.4
Health	18.3	0.000***	35863	29117	3.6	0.000***	5.5	15.9
Physical domain	40.5	0.000***	37531	27450	5.1	0.000***	6.7	13.0
Psychological domain	52.2	0.000***	38257	26363	6.0	0.000***	10.9	19.5
Social relations	17.5	0.000***	36191	28789	3.8	0.000***	4.6	12.8
Environment	45.2	0.000***	37614	27006	5.3	0.000***	9.2	16.8

Table 2. **Comparison of the average level of assessments of QoL categories based on statistical tests**

QoL Category	ANOVA Test		Mann-Whitney *U* Test				95% interval of confidence	
	F	*p*	Rank sum		*Z*	*p*		
			Control	Test group				
Good mental feeling	26.0	0.000***	17759	12132	5.1	0.000***	5.9	13.3
Physical condition	1.2	0.274	15684	14206	1.3	0.180	–1.7	5.9
Social relations	14.3	0.000***	17001	12890	3.7	0.000***	3.6	11.4
Function in everyday life	17.8	0.000***	17348	12543	4.4	0.000***	3.8	10.4

F – value; Z – value; P – value probability; * – significance

Material and methods

The study was carried out after obtaining R-I-00.23/2006 consent from the Bioethical Commission of the Medical University of Białystok and from managers of children's homes, parents or legal guardians of children. The study was divided into two stages. The aim of Stage I was to determine the usability of tools for QoL assessment in a group of 120 children from the following children's homes located in the Podlaskie Province: Białystok, Krasne, Supraśl, Łomża, Nowa Pawłówka; and 120 children in a control group, brought up in full families, in the same places where children's homes were located. The aim was realised using the diagnostic survey method, using the following questionnaires: standardised CHQ-CF87 (Child Health Questionnaire-Child Self Report Form) designed for children aged 10-17 years, developed by the Health Institute in Boston, containing 85 questions related to the physical and psycho-social state of children [5]; and the standardised KINDL survey, developed by the Department of Medical Psychology in Hamburg, applied to children aged 8-16 years, for assessment of four dimensions of QoL: good feeling from the point of view of psychology, physical condition, social relations and the ability to function in everyday life [6]. As the CHQ-CF87 tool was too extensive and not adapted to Polish conditions, it was abandoned in the further part of the study. In Stage II, the selected research tool was used. The tool was a Children's Survey, based on WHOQOL-BREF in its Polish adaptation by Wołowicka and Jaracz, containing questions regarding the following areas: physical, psychological, social relations and environment relations. The scale contained also items (questions) which were analysed separately: questions regarding individual general perception of QoL and regarding general perception of one's own health [7]. The study was performed in a group of 180 children living in the same children's homes and a group of 180 children in a control group, brought up in their own families, in the same places where the children's homes were located.

Results

The results of tests obtained using the Children's Questionnaire showed a significant relationship between self-assessment of QoL and the place of upbringing, as a p value of 0.000 was obtained for the all tested categories: physical, psychological, social relations and environment, and for the questions analysed separately: self-assessment of health and QoL (*Tab. 1*). Moreover, the results of the tests obtained in the KINDL survey showed that assessment of the tested groups of children in the following categories of quality of life: good mental feeling, social relations and function in everyday life, differed at a statistically significant level, as in each case values of p=0.000 were obtained (*Tab. 2*). Using the Children's Questionnaire, a relation was shown between self-assessment of QoL and the place of living in the following categories of QoL, for which a statistical significance was found (p=0.000): physical, mental, social relations and environment. It must be noted that the results obtained for two items: self-assessment of health and self-assessment of QoL were close to the border value of 0.05 (*Tab. 3*). Results obtained with the KINDL questionnaire lead to the conclusion that the influence of the place of living on the average level of all categories of QoL was small in the control group, and larger in the test group. The place that stood out for the majority of QoL components was the city of Białystok – in the city children brought up in normal homes had higher average values, and children from children's homes had lower average values. The difference between the control group and the test group depended on the place of living – in small towns, the difference was smaller than in big ones (*Tab. 4)*. Results

Table 3. **Results of double-factor analysis of variance determining the *p* value for individual factors**

Effect	QoL	Health	Physical domain	Mental domain	Social relations	Environment
Place	0.071	0.076	0.000***	0.000***	0.022*	0.000***
Group	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Interaction	0.000***	0.000***	0.000***	0.000***	0.002**	0.000***

Table 4. **Average level of QoL assessment depending on the place of living and the place of upbringing**

Place	Group	Good mental feeling	Physical condition	Social relations	Function in everyday life
Białystok	Control (30)	76.0	75.1	83.9	66.1
	Test (30)	55.5	62.1	61.9	52.5
Łomża	Control (23)	70.9	69.6	70.7	62.2
	Test (23)	68.7	71.9	71.6	59.6
Supraśl	Control (24)	69.5	72.2	78.0	64.9
	Test (24)	57.3	67.2	70.3	57.4
Pawłówka	Control (15)	69.8	68.9	75.0	64.7
	Test (15)	66.0	72.6	78.7	60.3
Krasne	Control (30)	72.1	69.5	81.0	63.5
	Test (30)	67.0	74.4	76.3	58.5

* – significance

Table 5. **Comparison of mean values in isolated groups, with presentation of the average values of assessment of the category of physical condition**

Gender	Group	$\bar{x}$	*s*
Girl	Total (120)	68.0	15.6
	Control (60)	70.7	15.6
	Test (60)	65.2	15.3
Boy	Total (124)	72.6	14.1
	Control (62)	72.0	14.7
	Test (62)	73.2	13.5
Tested effect		**F**	**P**
Gender		5.9	0.016*
Test group		1.3	0.255
Interaction between the factors		3.1	0.080

$\bar{x}$ – mean; s – standard deviation

obtained with the Children's Questionnaire showed that difference between average QoL assessment of children brought up in children's homes and in their own families is present regardless of age, but it is almost two times greater in the younger group (8-12 years) for the following categories of QoL: psychological p=0.005, social relations p=0.034, environment p=0.005 and health self-assessment p=0.002, and QoL self-assessment p=0.039. Results obtained with the KINDL questionnaire showed that children's age had a negative influence on the following categories of QoL: good mental feeling p=0.037, physical condition p=0.035, social relations p=0.005, and ability to function in everyday life p=0.032. Results obtained with the KINDL questionnaire showed that the sphere of QoL in which the most significant influence of gender was present (p=0.016) was physical condition. It is worth noting that the influence was mostly visible among charges of children's homes, among girls who tended to assess their physical condition as much lower (*Tab. 5*). Charges of children's homes assessed their QoL as significantly lower compared to children living in normal families, mainly in the following categories: health, physical and psychological domain, social relations (*Tab. 6*) and the ability to function in everyday life (*Tab. 7*). Based on the KINDL questionnaire, relatively strong relationships between the assessments of QoL categories was found, as the majority of determined Spearman's rank correlation coefficients remained between 0.5 and 0.7, and correlation strength was not significantly dependent on membership in the control group or the test group (*Tab. 8*). In the test group, the strongest correlation was found for good feeling and function in everyday life r=0.67; and the weakest correlation was found for physical condition and function in everyday life r=0.49. Based on the Children's Questionnaire, some stronger correlations were found in the test group, for which the values of coefficients were between 0.5 and 0.8 (*Tab. 9*). Correlations between environment and social relations were identical in both groups (r=0.54), but for the other four categories (environment vs the following categories): quality of life (r=0.65), health (r=0.60), physical domain (r=0.79), and psychological domain (r=0.73), the strength of the relationship was much higher in the test group.

Table 6. **Presentation of descriptive statistics for the Quality of Life (QoL) categories in the compared groups**

Group	Quality of Life (question 1)							Health (question 2)						
	$\bar{x}$	s	Min.	Max.	Q_{25}	Me	Q_{75}	$\bar{x}$	s	Min.	Max.	Q_{25}	Me	Q_{75}
Control	81.9	20.0	0.0	100.0	75.0	75.0	100.0	79.9	20.3	0.0	100.0	75.0	75.0	100.0
test	62.9	29.0	0.0	100.0	50.0	75.0	75.0	68.8	28.3	0.0	100.0	50.0	75.0	100.0
Group	**Physical domain**							**Psychological domain**						
	$\bar{x}$	s	Min.	Max.	Q_{25}	Me	Q_{75}	$\bar{x}$	s	Min.	Max.	Q_{25}	Me	Q_{75}
Control	84.0	10.9	46.4	100.0	78.6	85.7	92.9	74.5	14.7	16.7	100.0	66.7	77.1	83.3
test	73.9	18.5	25.0	100.0	60.7	75.0	89.3	59.1	24.5	0.0	100.0	37.5	62.5	79.2
Group	**Social relations**							**Environment**						
	$\bar{x}$	s	Min.	Max.	Q_{25}	Me	Q_{75}	$\bar{x}$	s	Min.	Max.	Q_{25}	Me	Q_{75}
Control	81.9	17.1	12.5	100.0	75.0	87.5	100.0	76.4	12.4	37.5	100.0	68.8	78.1	84.4
test	73.3	21.4	0.0	100.0	62.5	75.0	87.5	63.6	22.4	9.4	100.0	50.0	65.6	84.4

$\bar{x}$ – mean; s – standard deviation; Me – mediana; Min. – minimal; Max. – maximal; Q – quartile

Table 7. **Presentation of descriptive statistics for Quality of Life (QoL) categories in the compared groups**

Group	Good mental feeling							Physical condition						
	$\bar{x}$	s	Min.	Max.	Q_{25}	Me	Q_{75}	$\bar{x}$	s	Min.	Max.	Q_{25}	Me	Q_{75}
Control	72.0	13.4	25	97.7	65.9	72.7	81.8	71.4	15.1	31	100	61.1	72.2	80.6
Test	62.4	16.0	14	97.7	52.3	63.6	72.7	69.3	14.9	22	100	61.1	66.7	80.6
Group	**Social relations**							**Function in everyday life**						
	$\bar{x}$	s	Min.	Max.	Q_{25}	Me	Q_{75}	$\bar{x}$	s	Min.	Max.	Q_{25}	Me	Q_{75}
Control	78.4	13.5	39	100	72.2	80.6	88.9	64.3	11.6	32	95	56.8	65.9	72.7
Test	71.0	17.1	11	100	63.9	72.2	83.3	57.2	14.5	20	100	50.0	55.7	65.9

$\bar{x}$ – mean; s – standard deviation; Me – mediana; Min. – minimal; Max. – maximal; Q – quartile

Table 8. **Spearman's rank correlation coefficients between the Quality of Life (QoL) categories (over the diagonal – values for the control; under the diagonal – for the test group)**

QoL category	(1)	(2)	(3)	(4)
Good feeling (1)	1	*0.71*	*0.66*	*0.67*
Physical condition (2)	0.62	1	*0.53*	*0.55*
Social relations (3)	0.63	0.55	1	*0.65*
Function in everyday life (4)	0.67	0.49	0.58	1

Table 9. **Spearman's rank correlation coefficients between the QoL categories (over the diagonal – values for the control; under the diagonal – for the test group)**

QoL category	(1)	(2)	(3)	(4)	(5)	(6)
Life quality (1)	1	*0.41*	*0.39*	*0.52*	*0.32*	*0.51*
Health (2)	0.61	1	*0.40*	*0.38*	*0.30*	*0.38*
Physical domain (3)	0.58	0.58	1	*0.46*	*0.33*	*0.49*
Psychological domain (4)	0.65	0.61	0.73	1	*0.41*	*0.58*
Social relations (5)	0.48	0.43	0.57	0.61	1	*0.54*
Environment (6)	0.65	0.60	0.79	0.73	0.54	1

Discussion

Based on the results of analysis obtained with the KINDL questionnaire, it was found that assessment of mental feeling in the group of charges of children's homes is much lower compared to the groups of children living with their own families, and that this difference is statistically significant. The present results are also supported by data from literature suggesting that children brought up in children's homes present weak mental resistance [8]. Numerous authors note that many of charges are characterised by having a strong feeling of mental discomfort triggered mostly by stress, anxiety, lack of stable support from relatives, and manifested by depression, nervousness, anxiety, inability to concentrate (at school, for exam-

ple), lack of ability to join a game, and passive sitting in front of a TV. They frequently have weaker or stronger disturbances of mental health expressed in younger children as neurosis, and in older children as school and existential anxieties, anorexia, bulimia, and depression. Tests performed much earlier showed that the presence of a mother is necessary for a child's proper development. Lack of this contact causes anxiety that is responsible for inhibition of mental and physical development. The tests also proved that the earlier a child loses his/her contact with close family, the more pronounced are the changes that occur in his/her mental and physical development [9,10]

Based on data of our own studies, it was found that children brought up in children's homes had a significantly lower assessment of the category of physical domain in the Children's Questionnaire. Our results confirms data from literature suggesting that the majority of charges of children's homes show departures from a normal health condition, sometimes even very serious ones [11], and that a significant group of children's homes charges requires special care and support because of their health defects [12]. Studies by el-Gendi and Abd el-Rehim realised among children living in children's homes in Cairo have proven the worse physical development of charges of care and upbringing institutions compared to children brought up in family homes [13]. Charges were characterised by lower body weight, lesser height, and skin diseases, and parasitic infections were a very common phenomenon. Similar results were obtained by Makhlouf [14] for children brought up in children's homes in Cairo. The author proved that charges of those institutions are more prone to parasitic infections. Similar results are suggested by Chisholm [15], who reported that two children from children's homes in Romania adopted by Canadian families were largely neglected, as they showed under nourishment, were stressed, their development was delayed, and suffered from parasitic diseases and chronic inflammation of ears leading to 40% hearing loss. This is also confirmed by observations of Nzimakwe et al. [16], who realised their study in children's homes in South Africa, of Baldo et al. [17] and Saksirisampant et al. [18]. Mietzel [19] reports that Wayne, a researcher of the children's home in Teheran, showed the negative influence of low-stimuli conditions present in the institution on the motor development of children brought up there. Analysis of the present report allows us to state that QoL assessment in the category of social relations is much lower in the population of children brought up in children's homes, compared to assessment of children in the control group, and this difference is statistically significant. The results are consistent with data reported in professional literature. Numerous studies concerning the development of children brought up from early childhood in care and upbringing institutions note some difficulties in shaping close interpersonal relations, and the fact that disturbances in emotional development are usually connected with disturbances in social relations [20,21]. According to Kulpiński [22], charges of small children's homes and pre-school groups of children's homes tend to take to every person, even to someone met for the first time. Consistent reports come from Vorria et al. [23].

Based on the analysis of our own results obtained with the KINDL questionnaire, it was found that the assessment in the category of function in everyday life is lower in case of children from a children's home, and that the difference is statistically significant. Those results are supported by studies of other authors [24,25].

It is possible to state that children brought up in their own families assess their QoL higher. Minimal values for the four categories of QoL: physical domain, psychological domain, social relations and environment, are lower in the case of children brought up in children's homes. Charges of the care and upbringing institutions assessed their quality of life and health as significantly lower. The difference between the study group and the control was highly statistically significant in all categories. Results obtained in our own study are comparable with literature reports [26,27].

Analysis of the KINDL questionnaire showed significance of the influence of place of living on the assessment of the QoL category of social relations. The assessment was significantly lower in the case of charges of children's homes in Białystok and Łomża. Additionally, earlier conclusions regarding the high significance of influence of being brought up in a children's home on the decreased QoL category of social relations were confirmed, as for the negative influence of entering adolescence. It should be noted that the influence of the place of living on the average level of assessments for all QoL categories was small in the control and more pronounced in the test group. Moreover, it was found that the place standing out for the majority of QoL categories was the city of Białystok, as there the children brought up in their own families had higher average results, and children from children's homes had lower ones. Moreover, it was shown that the difference between the control and test group depended on the place of living. Therefore, it was smaller in small towns as compared to big ones. It is, therefore, justified to suppose that charges of children's homes located in big cities will feel the fact of being a child from a children's home stronger than charges of homes located in smaller towns, where the difference between the two compared groups was not as visible. Formicki et al. report that almost half of children's homes charges in Oświęcim and Jaszczurowa would like to live in a big city in a future, and – in consequence – have broader possibilities and perspectives in their life [28]. It is probable that the charges are fully aware of the differences in life standards occurring between small towns/villages and large cities.

Analysing the data obtained in the Children's Questionnaire it is possible to state that the influence of the place of living on the average level of all QoL categories was small in the control group. However, in the test group composed of charges of children's homes located in the cities of: Białystok, Łomża, and Supraśl, a similar average quality of life values was observed, but those values were significantly lower than in the control groups. The difference was always the biggest in Białystok.

Moreover, results of the tests have proven that for all QoL categories a statistically significant interaction was observed between the place and membership in a group, and the place of living itself was statistically significant for the physical domain, mental domain and environment, and to a smaller extent for social relations. The analysis of test results obtained with the KINDL questionnaire, comparing their average results it was found that the influence of age on good mental feeling was visible mostly in the older age group, and that the influence

was negative. Moreover, it is worth noting that the difference between the quality of life in this category, between children from the control group and children from children's homes, was also significantly higher in the older age group. A study by Woynarowska et al. [29] among 11-15-years youth in Poland proved that the number of people who are highly satisfied with their life decreases with age, and the number of dissatisfied people increases, and that proportion of youth who always or frequently believe in their abilities decreases with age among girls. The authors suppose that this may be a result of changes that occur during the adolescence period, and also of a new situation connected with changing schools.

We found that in the category of physical condition, the influence of the "age" factor on the assessment was significant in the test group. Studies performed by Łuczak [30] among charges of care and upbringing institutions located in Warsaw proved that children over a year of age suffered mainly from inflammations of their upper respiratory tract (rhinitis, laryngitis, bronchitis), and infants more frequently suffered from ear infections as compared to other children.

The results from the Children's Questionnaire showed that a difference between the average assessment of QoL of children from children's homes and of children from normal families is present for all ages, but it is almost twice as high in the younger period. An influence of age on the assessment of quality of life was found only in the test group, and the significance of the "test group" factor was shown. Supplementing the results presented above, it is worth noting that Talarska, in her study on students of post-primary and secondary schools, showed the existence of a statistically significant difference in global assessment of QoL, depending on the age of the youth [31]. Kaim suggests that negative assessments regarding life satisfaction increase with age [32].

We found that the only QoL category in which significant influence of the gender factor was visible in the KINDL questionnaire was physical condition. It is also worth noting that the influence was visible mostly among charges of children's homes, and namely in girls who tend to assess their physical condition as much lower. Concurrent results for populations of girls brought up in their own families have been reported by other researchers [33,34].

Results obtained with the Children's Questionnaire have not, shown any significant differences between boys and girls, in scope of assessment of areas of life in the questionnaire. This is not completely consistent with the literature [35,29].

Conclusions

A significant relation was found between self-assessment of quality of life and the place of being brought up. A relation was shown between QoL self-assessment and the place of living, age, gender and physical condition of the children. Charges of children's homes assessed the quality of their life much lower compared to the children brought up in normal families, mainly in the following categories: health, physical domain, psychological domain, social relations and the ability to function in everyday life. In the KINDL questionnaire, a rather strong relation was found between assessments of QoL categories, and the strength of the correlation was not significantly dependent on membership in the control or the test group.

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Relations occurring between health-related behaviour categories and quality of life made by children brought up in a children's home, in the Podlaskie Province

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Abstract

Purpose: The purpose of the study was to determine relations between health-related behaviour categories and quality of life (QoL) categories made by children brought up in a children's home and to compare the results obtained with the results for a group of peers brought up by their own families.

Material and methods: The study was performed on a group of 180 children living in children's homes located in Białystok, Krasne, Supraśl, Łomża, Nowa Pawłówka; and on a control group of children living with their own families in the same places where children's homes were located. The diagnostic survey method with the Health Behaviour Scale questionnaire, composed of 40 statements defining various behaviours connected with health, and the Children's Questionnaire, based on The World Health Organization Quality of Life (WHOQOL-BREF) was used.

Results: Strong correlations between assessments of the Health Behaviour Scale categories and assessments of quality of life categories were found in the group of children living in children's homes, mostly in respect to the relation between health self-assessment and physical activity r=0.77, mental activity r=0.74 and environment r=0.72, and between the physical domain and eating habits r=0.70, and physical activity and the physical domain r=0.69. The determination coefficient R^2 for the study group had high values for three QoL categories: physical domain 71.5%, mental domain 69.7% and environment 70.1%.

Conclusions: Correlations between Health Behaviour Scale categories and QoL categories were found in the group of children living in children's homes compared to children living with their own families. The relationships for health self-assessment and the physical and mental domains and the environment, and for the physical domain and eating habits and physical activity were found.

Key words: theoretical relations, quality of life, health-related behaviour, children's home, children.

Introduction

Actions aimed at the improvement of health, which is a basic element of quality of life, should be undertaken in many areas: in the family, at home, at school, and in the society of peers. The health needs of young people depend on numerous factors, including healthy surroundings, the information, knowledge and skills necessary to stay healthy, proper individual psycho-social and psycho-sexual development; proper healthcare; health-promotion and health-protection policy; and a healthy lifestyle and favourable conditions for it [1,2].

The purpose of the study was to determine relations occurring between assessments of health-related behaviour categories and assessments of quality of life (QoL) categories made by children brought up in a children's home and to compare the results obtained with the results for a group of peers brought up by their own families.

Material and methods

The study was performed after obtaining consent No R-I-00.23/2006 from the Bioethical Commission in the Medical University of Białystok. The following children participated in the study: a group of 180 children living in children's homes located in the Podlaskie Province, in Białystok, Krasne, Supraśl, Łomża, Nowa Pawłówka; and 180 children in a control

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***Table 1*. Correlations between the categories of the Health Behaviour Scale and categories of quality of life in the study group of children (coefficient R^2)**

Health-related behaviour	Quality of life					
	Quality of life	Health	Physical domain	Psychological domain	Social relations	Environment
Health valuation	0.33	0.33	0.47	0.48	0.41	0.48
Health self-assessment	0.60	0.63	0.77	0.74	0.53	0.72
Stressful situations	0.50	0.50	0.66	0.59	0.39	0.62
Stimulant usage	0.40	0.39	0.55	0.47	0.30	0.54
Eating habits	0.52	0.45	0.70	0.57	0.41	0.65
Physical activity	0.55	0.50	0.69	0.62	0.45	0.66
Prophylactics	0.32	0.18	0.26	0.20	0.20	0.31
Social support	0.49	0.42	0.58	0.70	0.53	0.60

***Table 2*. Correlations between the categories of the Health Behaviour Scale and categories of quality of life in the control group (coefficient R^2)**

Health-related behaviour	Quality of life					
	Quality of life	Health	Physical domain	Psychological domain	Social relations	Environment
Health valuation	0.12	0.19	0.04	0.10	0.09	0.17
Health self-assessment	0.36	0.47	0.48	0.50	0.30	0.45
Stressful situations	0.35	0.28	0.35	0.52	0.29	0.37
Stimulant usage	0.16	0.10	0.22	0.23	0.05	0.21
Eating habits	0.15	0.14	0.18	0.25	0.19	0.24
Physical activity	0.18	0.22	0.32	0.47	0.20	0.22
Prophylactics	-0.03	0.05	-0.10	-0.09	0.16	0.06
Social support	0.40	0.23	0.40	0.48	0.45	0.49

group, living with their own families, in the same places where the children's homes were located. The purpose of the study was realised using a diagnostic survey method applying the following questionnaires: the Health Behaviour Scale, provided by its author, Dr. M. Banaszkiewicz from the Medical Academy in Bydgoszcz, composed of 40 statements defining behaviour connected with health in the study group and the control: health valuation, health self-assessment, stressful situations, stimulant usage, eating habits, prophylactics, physical activity, social support; and the Children's Questionnaire developed based on The World Health Organization Quality of Life (WHOQOL-BREF), in its Polish adaptation by Wołowicka and Jaracz [3], containing questions regarding: the physical domain, psychological domain, social relations and environment. The Scale contains also items (questions) which are analyzed separately: questions concerning individual, general perception of quality of life, and regarding individual, general perception of one's own health. Data were analyzed using Statistica 6.0. computer software (Spearman correlation).

Results

Compared to the control group, strong correlations between assessments of the Health Behaviour Scale categories and assessments of the quality of life (QoL) categories were found for children living in children's homes. The correlations regarded mainly: health self-assessment and physical domain r=0.77, psychological domain r=0.74 and environment r=0.72; physical domain and eating habits r=0.70; and physical activity and physical domain r=0.69. The weakest correlations found were between: prophylactics and health r=0.18; prophylactics and psychological domain r=0.20; and prophylactics and social relations r=0.20 (*Tab. 1*). It is worth noting that health valuation and other categories of health-related behaviour were rather strongly correlated with various QoL categories.

It should be mentioned that the correlations in the control group were much weaker, and there was no correlation in many cases. Medium correlations found between the areas were: health self-assessment and psychological domain are correlated with r=0.50; stressful situations and psychological domain are correlated with r=0.52 (*Tab. 2*).

To answer the question concerning the level of explanation of four QoL categories, namely: physical domain, psychological domain, social relations and environment, with all areas of the Health Behaviour Scale, or in other words, to determine to what extent the broadly understood "health self-assessment" influenced assessments for individual QoL categories, where individual QoL categories have been assumed to be dependent variables, and all categories of the Health Behaviour Scale were assumed to be independent variables, a statistical test was applied that determined the value of the determination coeffi-

***Table 3*. Percent of variability of the QoL categories explained by the values of all areas of the Health Behaviour Scale (value of the determination coefficient R^2)**

Group	Physical domain	Psychological domain	Social relations	Environment
Study	71.5%	69.7%	43.8%	70.1%
Control	35.1%	43.1%	26.5%	38.4%

cient R^2 (*Tab. 3*), which makes it possible to estimate in what percentage the variability of a dependent variable (selected QoL category) is explained by linear combination of the independent variables (Health Behaviour Scale categories). The coefficient adopts values between 0% and 100%.

In the case considered, high values of the coefficient were obtained in the study group for three QoL categories: physical domain – 71.5%, psychological domain – 69.7% and environment – 70.1% (with the exception of social relations – 43.8%). In the control group, the values were much lower for all four QoL categories: physical domain – 35.1%, psychological domain – 43.1%, social relations – 26.5% and environment – 38.4%. In no case were the values even close to 50%, which confirms the previous conclusions drawn based on the Spearman's rank correlation coefficients analysis.

Discussion

Numerous reports in literature [4-11] indicate the poor health condition of children brought up in children's homes, and state that this poor condition influences the level of their quality of life. The majority of the children presented improper physical development (height and weight below the standard value) and poor overall health. A significant percentage of those children has features of a lack of social adaptation. Without positive models presented by their families, they frequently show habits and behaviours contrary to the accepted social standards, and have difficulties in establishing social contacts with adults and peers. Frequent school problems result from environmental negligence and the children's non-harmonic development. Younger children, in post-infant and pre-school age, present development disturbances connected with orphan's disease, resulting from unsatisfied emotional needs.

Children living in a care and upbringing institution since birth do not understand basic family relations [4,11,12]. Opponents of this kind of institutions indicate their anonymity, the poor level of experience and views, and the child's feeling of being lost [7,12,13]. Those are institutions aimed at collective education, presenting a risk of suppressing children's individuality, and presenting no possibilities for projecting their own fate [10,12,14-16].

However, a children's home is a special part of the society that created it. And this part should undoubtedly be normal and healthy – for this is necessary to ensure the proper quality of life and adequate preparation of children for independent life in society [17-20]. Its purpose is, therefore, to create proper conditions for normal development of children in terms of educational, health and material conditions. The homes should also enable processes of development and resocialization [9,10,21].

In conclusion, children living in children's homes, compared to those in the control group, presented strong correlations between assessments of the Health Behaviour Scale categories and assessments of quality of life categories, mainly regarding the correlation of health self-assessment and the physical domain, the psychological domain and the environment; and between the physical domain and eating habits and physical activity.

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Comparison functioning and quality of life of patients with osteoarthritis and rheumatoid arthritis

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Abstract

Purpose: The aim of this study was to assess the quality of life of the osteoarthritis (OA) and rheumatoid arthritis (RA) patients of Outpatient Clinic Rehabilitation in Poznań.

Material and methods: The study consisted of 97 OA patients, including 86 women and 11 men. Almost 123 patients with RA included of 102 women and 21 men. The mean age of the treated patients with OA was 11.50 and 11.10 years for RA patients. The Polish version of the Arthritis Impact Measurement Scales-2 (AIMS -2) was used to assess the quality of life. AIMS-2 scores range from 0-10, with 0 representing good quality of life, 10 representing poor quality of life.

Results: It was showed that the mean score on the AIMS-2 for OA patients was: physical – 3.53, affect – 4.42, symptom – 6.74, social interaction – 3.33, role – 4.20. Mean score on the AIMS-2 for RA patients was: physical – 3.73, affect – 4.48, symptom – 7.09, social interaction – 3.45, role – 3.63. The quality of life depended on the sex of these patients. Women of OA and RA patients scored significantly higher in the physical state and symptom then men. Younger patients and suffering shorter than 5 years demonstrated higher evaluation of quality of life in the physical state. The assessment in most of the subscales of the AIMS-2 correlated significantly with Pain, Morning Stiffness and Grip Strength for OA and RA patients.

Conclusion: This study showed that quality of life of OA and RA depends on gender, age and clinical variables.

Key words: functioning, quality of life, osteoarthritis, rheumatoid arthritis, Arthritis Impact Measurement Scales-2.

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Introduction

Joint disorders, particularly osteoarthritis (OA) and rheumatoid arthritis (RA) are a leading cause of disability. Research on osteoarthritis and rheumatoid arthritis has stressed the experience of loss of independence, being a burden on others, the difficulties involved in asking for help and consequently, the importance of being able to maintain independence and normal social roles [1,2]. Osteoarthritis is primarily a non-inflammatory disorder of movable joints characterized by an imbalance between the synthesis and degradation of the articular cartilage, leading to the classic pathologic changes of wearing away and destruction of cartilage. This destruction of joint cartilage often results in joint pain and loss of mobility, which may lead to long-term disability. This is of major concern because the prevalence of OA is expected to increase significantly due to the aging of the Poland population [1,2]. Rheumatoid arthritis is a chronic, developing process of inflammation of synovial membrane, leading to the destruction of the articular and periarticular tissues, which results in deformity and disability of the functioning of theses tissues, and, in consequence, leads to permanent lameness. Apart from the articular and periarticular symptoms there occur also changes within the internal organs: heart, lungs, liver, spleen, as well as skin and blood-vessels which occur with various frequency. Because of that placement of the disease process, RA has been classified as the systemic disease of the connective tissue [1,2].

A faster development of the disease and a more rapid loss of physical ability has been observed among the patients over 60. More than a half of RA patients suffer from at least one more chronic condition such as conditions of respiratory system, alimentary system, circulatory system, urinary system and a diabetes. The most common are the complications caused by the medication, especially length use of non-steroid antiphlogistic medication [1,2]. The impact of OA and RA have been studied mainly focusing on their consequences on health status. Similarly, treatment efficacy is assessed within the context of

health status and symptomatology in many clinicl trials [3,4]. In rheumatology, Health Related Quality of Life (HRQoL) refers to patients' evaluates of their current levels of functioning and satisfaction, and assessment allows a subject to express ability to perform daily activities across many domains which include physical, social and cognitive functioning, role activities and emotional well-being. Recently in rheumatology are research (qualitative study) at subject perceptions patients of treatment with new drug therapy (anti-TNF therapy) [5]. Important goals of health care for patients with joint disorders are to minimize functional loss, maintain independence and preserve quality of life [6].

Aim

The aim of this study was to assess the functioning and quality of life of patients with Osteoarthritis and Rheumatoid Arthritis treated in Outpatient Clinic Rehabilitation in Poznan, Poland. All were attendees to a regular outpatient clinic.

The specific question was: does the functioning and the quality of life of OA and RA patients depend on demographic variables (gender and age) and duration of the disease?

Does the quality of life of OA and RA patients depend on clinical symptoms and pain?

Material and methods

The study sample consisted of 97 patients with symptomatic OA of the knee and hand, including 88.66% women and 11.34% men. According to American College of Rheumatology (ACR) [1,2,7] classification criteria OA was diagnosed if pain and radiological OA were present, with morning stiffness lasting less than 30 min. The sample 123 patients with RA included of 83% women and 17% men. Patients with RA were recruited according to American College of Rheumatology (ACR) [1,2,7] classification criteria RA. Exclusion criteria included severe neurological for both groups. The mean age of treated patients with OA was 56.8 (±13.54) years and 53.4 (±12.93) years for RA patients.

The mean duration of the OA was 11.5 (±8.91) and duration of the disease for patients with RA 11.1 (±8.30). There were no notable differences between the groups on demographic variables (gender and age) and duration of the disease. To assess the functioning and the quality of life the Polish version of the Arthritis Impact Measurement Scales-2 (AIMS-2) [8,9] was applied. AIMS-2 scores range from 0-10, with 0 representing high quality of life, 10 representing poor quality of life. The questions included refer to the quality of life in 12 subscales. These are mobility level, walking and bending, hand and finger function, arm function, self care tasks, household tasks, social activity, social support pain from arthritis, work, level of tension and mood.

Clinical tests

Grip Strength Measurement (measured by vigor meter); Morning Stiffness (duration of morning stiffness in minutes from arising until maximal improvement with a maximum of 300 minutes); Visual Analogue Scale (10 cm Pain VAS).

Results

The results showed that the mean score on the clinical tests for OA patients was: Pain – 6.58 (±1.66), Stiffness – 0.28 (±0.12), Grip Strength right hand 70.71 (±16.28), Grip Strength left hand – 63.81 (±14.81). The mean score on the clinical tests for RA patients was: Pain – 6.11 (±1.57), Morning Stiffness – 1.63 (±0.69), Grip Strength right hand 67.92 (±16.31), Grip Strength left hand – 53.34 (±17.23). The results showed that the mean score on the AIMS-2 for OA patients was: physical – 3.53, affect – 4.42, symptom – 6.74, social interaction – 3.33, role – 4.20. Mean score on the AIMS-2 for RA patients was: physical – 3.73, affect – 4.48, symptom – 7.09, social interaction – 3.45, role – 3.63 (*Fig. 1* and *Tab. 1*). The quality of life depended on the sex of these patients (*Fig. 2*). Women of OA and RA patients scored significantly higher in the physical state and symptom then men ($p<0.05$). Also, younger patients and suffering shorter than 10 years demonstrated higher evaluation of quality of life in the physical state ($p<0.05$) and ($p<0.001$) (*Tab. 2*), (*Tab. 3*).

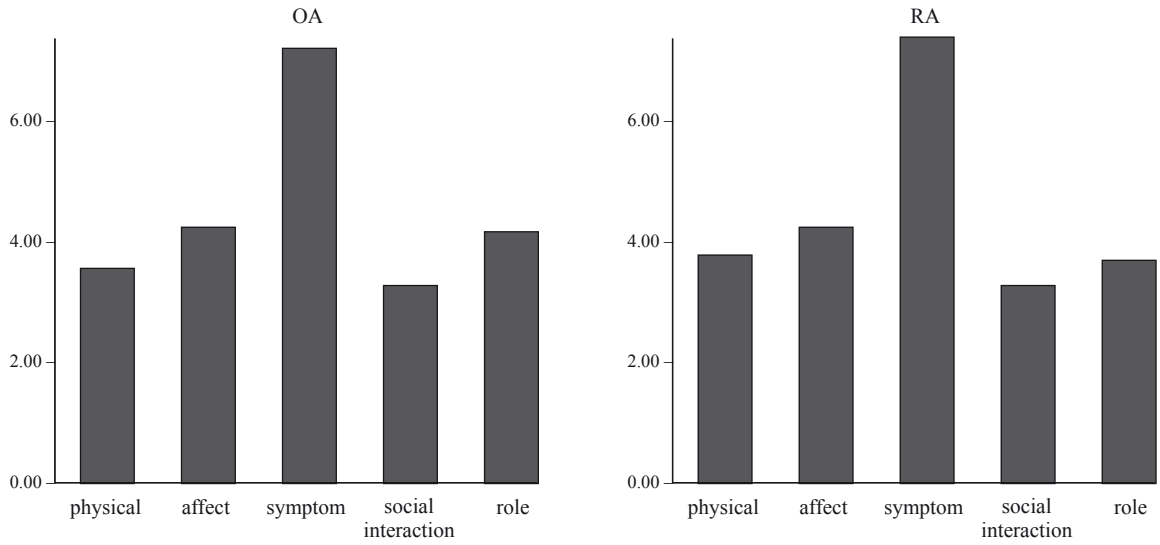
The next step in the research consisted in the evaluation of the influence of the duration of the disease (*Tab. 4*). The applied indicator of correlation of Pearson's to analyze the relation between duration of the diseases and AIMS-2 (mobility level, walking and bending, hand and finger function, arm function, social activity, support of family and friends), health perception showed correlation (0.195-0.323). The assessment in most of the subscales of the AIMS-2 correlated significantly with Pain, Morning Stiffness and Grip Strength for OA and RA patients (*Tab. 5*).

Discussion

In this study we have examined the impact of OA and RA in the functioning and the quality of life, as assessed by the AIMS-2 instruments in a sample of patients treated in Outpatient Clinic Rehabilitation in Poznań, Poland. Our results suggest the good assessment of the functioning and quality of life among OA and RA patients is influenced by the support of family and friends. Negative assessment of the quality of life among OA and RA patients results from the limitations in carrying out activities of daily living. It is related to joints pain and morning stiffness (the average value for OA patients – 5.17, for RA patients – 6.47).

The age of patients and duration OA and RA influences the quality of life of people. Younger patients suffering shorter than 10 years with OA showed higher evaluation of quality of life in the area of walking and bending and mobility. Younger patients and suffering shorter than 10 years with RA demonstrated higher evaluation of quality of life in the area of walking and bending, mobility, household task and social activity. The conclusion supports the results of our earlier research among patients of RA [10]. The research by Sherrer and co-authors [11] on demographic variables (gender and age) and duration of the disease describe the influence of the older age of patients with RA on physical limitations and lower efficiency in dealing with household tasks, or carrying out tasks related to self-care.

Figure 1. **The functioning and the quality of life patients with OA and RA (AIMS-2)**



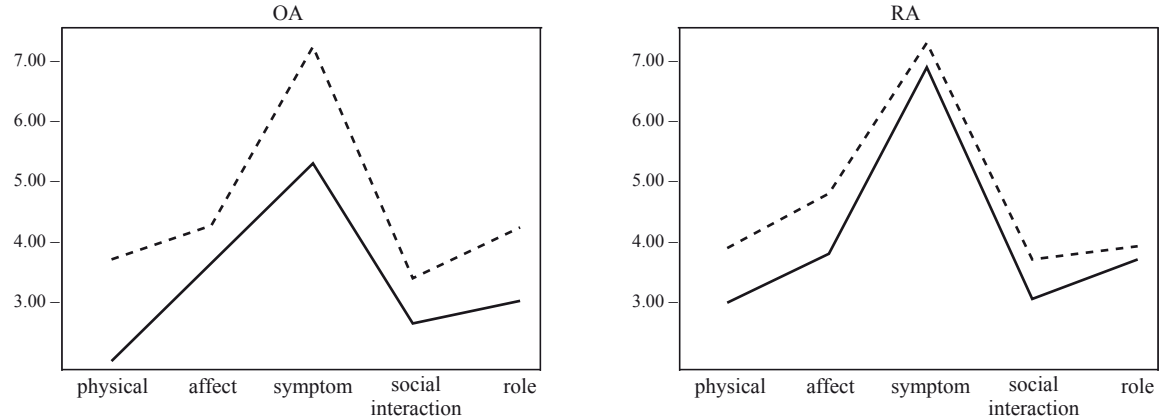
AIMS-2 scores range from 0-10, (higher scores – poorer quality of life)

Table 1. **AIMS-2 scale scores in osteoarthitis and rheumatoid arthritis subject groups**

	Osteoarthritis (n=98)		**Rheumatoid arthritis** (n=123)		
	Mean	SD	Mean	SD	p
Mobility	3.57	2.15	3.78	2.32	0.48
Walking and bending	5.23	2.41	5.35	2.45	0.72
Hand and finger function	3.88	2.52	4.27	2.36	0.23
Arm function	3.21	2.46	3.21	2.32	0.99
Self-care	2.73	2.40	2.85	2.50	0.72
Household task	2.60	2.48	2.90	2.55	0.38
Social activity	5.16	1.36	5.33	1.49	0.37
Support from family	1.96	2.08	1.90	2.33	0.83
Arthritis pain	6.74	2.07	7.09	2.07	0.21
Work	4.20	2.98	3.63	2.28	0.32
Level of tension	5.36	1.52	5.27	1.91	0.71
Mood	3.47	1.70	3.69	1.62	0.35
Satisfaction	4.71	1.84	5.01	1.79	0.23
Health perception	7.77	2.34	8.38	0.15	0.05*
Arthritis impact	6.48	2.21	6.54	2.23	0.83

AIMS-2 scores range from 0-10, (higher scores – poorer quality of life) $p \leq 0.05$

Figure 2. **The quality of life of patients with OA and RA for women and men (AIMS-2)**



AIMS-2 scores range from 0-10, (higher scores – poorer quality of life)

Table 2. **AIMS-2 scale scores in osteoarthitis and rheumatoid arthritis and age**

	Osteoarthitis (age ≤55; n=38) (age >56; n=60)			Rheumatoid arthritis (age ≤55; n=58) (age >56; n=66)		
AIMS-2	Mean	SD	p	Mean	SD	p
Physical	3.19	2.09	0.05*	2.99	2.07	0.00**
	3.62	2.43	3.81	2.38		
Affect	4.63	1.43	0.21	5.19	1.71	0.06
	4.44	1.53	5.36	1.61		
Symptom (Arthritis pain)	6.49	2.31	0.55	7.01	2.19	0.19
	6.35	2.35	6.94	1.88		
Role	4.08	2.39	0.48	3.73	1.76	0.43
	3.78	2.49	4.84	1.72		

p≤0.05; p≤0.001

Table 3. **AIMS 2 scale scores in osteoarthitis and rheumatoid arthritis and duration of the diseases**

	Osteoarthritis (≤10 years; n=40) (>10years; n=58)			Rheumatoid arthritis (≤10 years; n=72) (>10years; n=42)		
AIMS-2	Mean	SD	p	Mean	SD	p
Physical	3.37	1.72	0.02*	3.18	2.09	0.05*
	3.82	2.01		3.62	2.43	
Affect	4.61	1.45	0.34	4.81	1.74	0.14
	4.46	1.51		5.09	1.93	
Symptom (Arthritis pain)	6.40	2.34	0.87	7.03	2.09	0.34
	6.44	2.34		6.54	2.22	
Role	3.47	1.71	0.34	4.27	2.36	0.23
	3.68	1.62		3.87	2.51	

p≤ 0.05

Meenan and co-authors [12,13] did not show any influence of the sex on the assessment of functioning and quality of life within the particular domain in AIMS-2 scale. Chacon and co-authors [14] found correlation between total AIMS scores and age among patients of keen osteoarthritis. Their results do not support a role for depression as assessed by correlating age with the AIMS component that evaluates the affective status of patients. Their study indicated that the perception of quality of life of patients with keen OA is mainly affected by pain, suggesting the need for vigorous and early therapeutic strategies aimed at effectively treating this symptom. Research by Łaskowiecka co-authors [15] showed that OA patients had decreased work ability and decreased quality of life. A worse work ability and a worse quality of life were related with multijoint localization of OA and co-existence of other diseases. A negative correlation was found between general score of scale. Kawasaki co-authors [16] noted that quality of life after treatments for osteoarthritis of the hip changes depending on the treatment method and the number of years since treatment. They found that the quality of life of patients after a rotational acetabular osteotomy was significantly poorer than that of patients with primary total hip arthroplasty. This result may mean that the quality of life of the first group was significantly worse than that of second group.

Table 4. **The correlation of AIMS-2 and duration of the diseases (Pearson's)**

AIMS 2	OA	RA
mobility	0.169	0.195*
walking and bending	0.203*	0.059
hand and finger function	0.183	0.077
arm function	0.048	0.189*
self-care	0.158	0.117
household task	0.194	0.011
social activity	0.204*	0.169
support from family	-0.001	0.313**
arthritis pain	0.052	0.034
work	0.178	-0.198
level of tension	0.193	-0.021
mood	0.128	0.008
satisfaction	0.176	0.163
health perception	0.206*	0.232**
arthritis impact	0.168	0.050

* p≤ 0.05; ** p≤0.01

Table 5. **The correlation of AIMS-2 and clinical symptoms (Pearson's)**

	AIMS-2	Pain-VAS	Morning Stiffness	Grip Strength (right hand)	Grip Strength (left hand)
OA	mobility	-0.094	0.084	-0.005	0.001
	walking and bending	-0.121	0.089	0.151	0.141
	hand and finger function	0.021	0.096	-0.119	-0.167
	arm function	-0.045	-0.099	-0.081	-0.071
	self-care	-0.149	-0.055	0.025	0.072
	household task	-0.096	0.053	-0.147	-0.078
	social activity	-0.128	-0.056	-0.136	-0.120
	support from family	0.099	0.046	0.030	0.021
	arthritis pain	-0.116	-0.012	0.031	0.009
	work	-0.149	-0.404*	-0.033	-0.023
	level of tension	-0.089	-0.038	-0.027	-0.103
	mood	-0.149	-0.080	-0.019	-0.106
	satisfaction	-0.061	0.011	-0.137	-0.136
	health perception	0.003	0.081	0.052	0.038
	arthritis impact	-0.125	0.065	-0.062	-0.113
RA	mobility	0.070	-0.192*	-0.001	-0.022
	walking and bending	0.147	-0.063	-0.004	0.008
	hand and finger function	0.091	-0.138	-0.068	-0.026
	arm function	0.060	-0.149	-0.106	-0.061
	self-care	0.058	-0.065	0.077	0.031
	household task	0.080	-0.178*	0.022	0.115
	social activity	0.109	-0.051	0.063	0.065
	support from family	0.109	0.026	-0.126	-0.114
	arthritis pain	0.139	-0.051	0.101	0.080
	work	0.025	-0.200	0.144	0.103
	level of tension	0.070	-0.043	0.038	0.021
	mood	0.135	-0.025	0.120	0.068
	satisfaction	0.147	-0.061	-0.006	-0.027
	health perception	0.071	-0.020	-0.133	-0.142
	arthritis impact	0.051	-0.103	-0.007	0.007

* $p \leq 0.05$

Further research into the quality of life of OA and RA patients can lead to improvement in the quality of care. Treatment of pain and other symptoms is a major for community rehabilitation.

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The prevalence of tobacco smoking among Public Health students at Medical University of Białystok

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Abstract

The rate of cigarettes' consumption in the world is regularly decreasing, although it remains high. In spite of the fashion for non-smoking, younger and younger people start to smoke. It is important that health related major students' behaviour is a social example. The aim of this study was to determine the number of smokers among public health major students at Medical University of Białystok, and to present the influence of socio-demographic features of respondents on their behaviour related to smoking. The results showed that among the examined students the prevalence of smoking was high – almost one-third of respondents smoked. The prevalence of smoking was significantly higher in men than in women students.

Key words: cigarette smoking, smoke, health-related majors' students.

Introduction

According to WHO, in the world, there are almost one billion smoking men and 250 million smoking women. In the year 2000, world inhabitants smoked about 5.5 trillion cigarettes [1]. Poland is one of the leading countries according to the highest cigarettes consumption. In the year 2003, the number of cigarettes per one citizen was 4.3 times higher than the average number per one citizen in 1923 [2]. Among smokers, significant percentage is health related majors' students [3-6]. Smoking is a risk factor of many diseases development, fortunately, one of the few that can be fully eliminated. Health promotion and prevention are the basis of the strategy of health threats elimination, especially the habit of smoking. The significant role in the fight against the habit of smoking is played by health care workers. That is why it is important that behaviour of health related majors' students is an example for the rest of society [7].

Aim

The aim of this study was to determine the number of smokers among public health students and to determine the socio-demographic features influencing students' habits related to smoking.

Material and methods

In March 2007 at the Department of Public Health, Medical University of Białystok we conducted the study on a group of 337 public health major students. We used the questionnaire developed in 2006 by the Chair of Social and Preventive Medicine, Medical University of Łódź. In total, the questionnaire was filled by 286 students, that is 84.9% of all students. Students of public health major filled 109 questionnaires, students of public health – specialization: paramedic – 101, and public health – specialization: dietetics – 76 students. The structure of examined students according to sex, major and specialization is presented in *Tab. 1*. The results were statistically elaborated by using descriptive methods and the methods of statistical calculations. In order to describe analyzed respondents we counted structure indexes and expressed them in percentages. To evaluate whether the relation between analyzed features was statistically significant, we used the independence test chi^2.

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***Table 1*. Structure of examined students according to sex, major and year of study**

Number	Major	Women		Men		Total	
		N	%	N	%	N	%
1.	Public health	95	47.3	14	16.5	109	38.1
2.	Public health – specialization: paramedic	34	16.9	67	78.8	101	35.3
3.	Public health – specialization: dietetics	72	35.8	4	4.7	76	26.6
Total		201	100.0	85	100.0	286	100.0

***Table 2*. Public Health students' habits related to smoking in January and February 2007**

Number	Habits related to smoking	Total	
		N	%
1.	Smoking	88	30.8
2.	Non-smoking	198	69.2
Total		286	100.0

***Figure 1*. Public health students' habits related to smoking in January and February 2007 according to sex (N=286)**

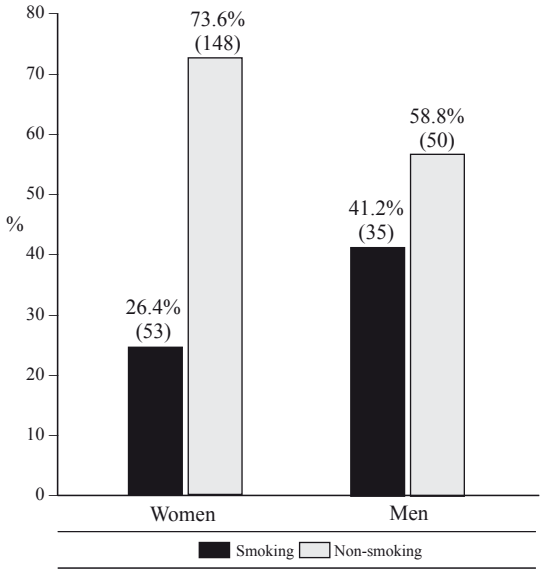
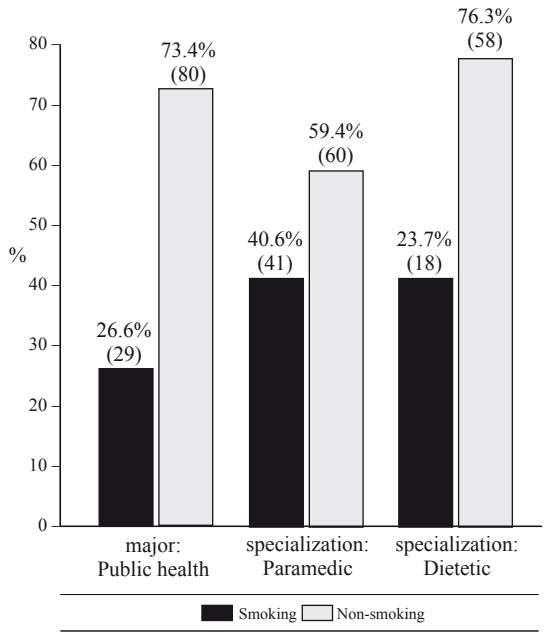


***Figure 2*. Public health students' habits related to smoking in January and February 2007 according to major (N=286)**



Results

The analysis of results showed that among 286 students, 198 people (69.2%) stated that at least in January and February 2007 did not smoke, and 88 respondents (30.8%) described themselves as smokers (*Tab. 2*). Among 198 non-smokers there were 148 women – 74.7% and 50 men – 25.3%.

In the group of women, non-smokers were 73.6%, and smokers 26.4%. Among men non-smokers were 58.8%, and smokers 41.2%. The habits of students are presented in (*Fig. 1*).

Among Ppublic health major students 29 people (26.6%) stated that they smoked during the analyzed period of time, and 80 students (73.4%) stated that they did not smoke at all. Among students of public health – specialization: paramedic 41 people (40.6%) stated that they smoked, and 60 people (59.4%) that they did not smoke at all. Among public health – specialization: dietetics, smokers were the smallest number, that is 23.7% (18 people), and 58 non-smokers – the highest number – 72.3% (*Fig. 2*).

In a group of 88 smoking respondents – 13 people (14.8%) were living in the cities with the citizens number between 50 thousand and 100 thousand, and the rest of smokers in equal groups (25 people each; each 28.4%) were living in large cities, and also in small cities with the number of citizens less than 50 thousand of people (*Fig. 3*).

In the group of smokers, the highest percent, that is 61.4% of examined have had older brothers or sisters, and in the group of non-smokers the percent of respondents with older brothers and

***Figure 3*. Public health students' habits related to smoking in January and February 2007 according to the residence place (N=286)**

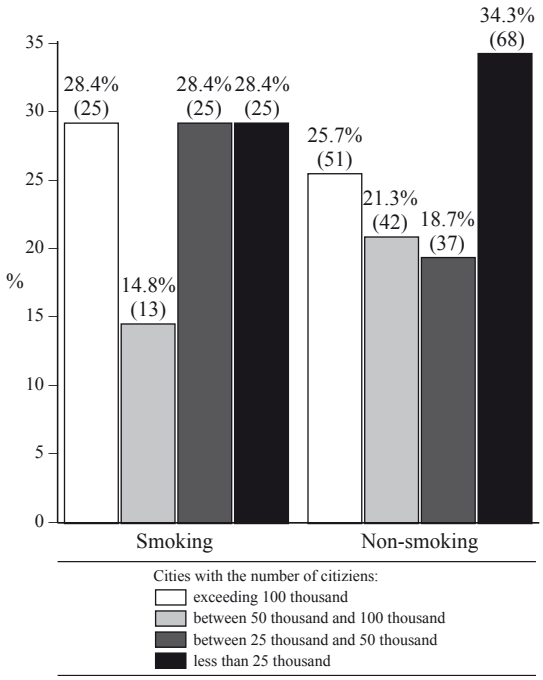
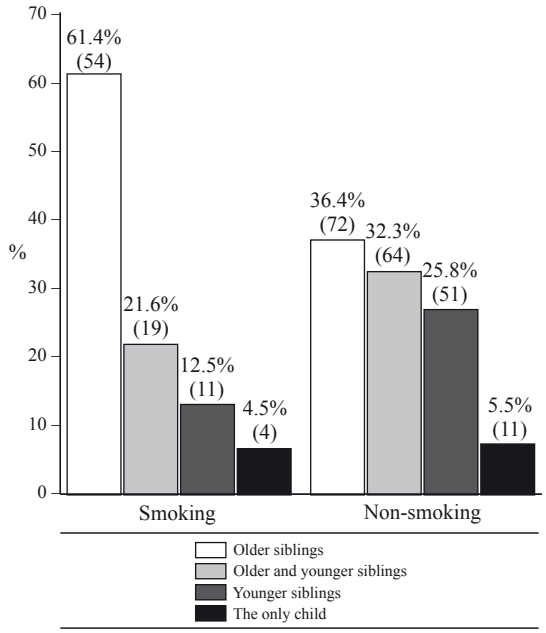


***Figure 4*. Public health students' habits related to smoking in January and February 2007 according to siblings (N=286)**



sisters was 36.4%. Younger brothers or sisters in the group of smokers were observed in 21.6% of respondents, and in the group of non-smokers – 36.4%. In the group of smokers, both older and younger brothers and sisters were observed in 12.5% of examined students, and in the group of non-smokers 25.8% (*Fig. 4*).

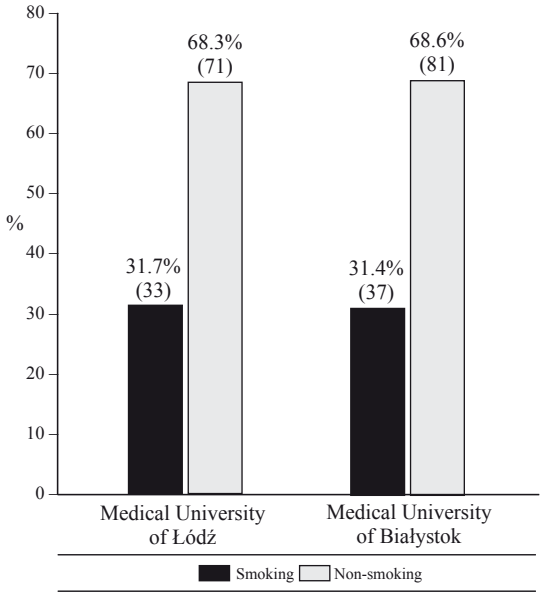
Discussion

The prevalence of tobacco smoking among Public Health students at Medical University of Białystok was high, because almost every third person in response to the questionnaire stated that he or she smoked during analyzed period of time. Students of public health – specialization: paramedic smoked more often in comparison to students of public health major and students of public health – specialization: dietetics (chi^2=7.255; p=0.026). The results of studies performed in the other research centers show that the frequency of tobacco smoking among academic students was similarly high [8-12]. The results of our study show that the frequency of smoking in the group of men was significantly higher than in the group of women (chi^2= 6.150; p= 0.013). The percentage of smoking men was higher in comparison with women by 14.8 percent points. The frequency of smoking among men students in comparison with women students was higher also at Medical University in Łódź [13], at Medical University in Lublin [8], at Medical University and at University in Poznań [12], and also among students of health related majors in Greece [14] and Slovakia [15]. The results of our study show that the frequency of smoking among students living in large cities, that is with the number of citizens exceeding 100 thousand of people, in the cities with the number of people from 25 to 50 thousand and living in the small towns was quite similar (chi^2=4.791; p=0.19). The studies performed in Lublin show that students living in cities smoked significantly more often that students from small towns [8]. Our study show that in the group of smokers, the percentage of respondents with younger brothers or sisters and both older and younger brothers or sisters was significantly lower than in the group of non-smokers (chi^2=16.119; p=0.001). During the analysis of students, we isolated first year students. As we could see, the percentage of smokers which was 31.4% of first year students of public health major, was lower by 0.3 percent point in comparison with the first year students of the Department of Health Sciences, Medical University of Łódź (*Fig. 5*) [16]. The frequency of smoking among academic students of health related majors is constantly on worrisome high level.

Conclusions

1. The prevalence of smoking among Public Health students was high – almost every third person smoked.
2. The frequency of smoking was significantly higher among men than women students.
3. The respondents with younger siblings were less frequent smokers than the group with only older siblings or than the group of the only child.
4. Worrisome high level of smoking frequency among health-related majors' students needs the implementation of directed actions aimed at lowering the number of smokers.

***Figure 5*. The comparison between first year smoking students (public health major) from Medical University of Łódź and Medical University of Białystok**



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Inflammatory bowel disease – nursing care during the surgery treatment period

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Abstract

Inflammatory bowel disease is highly associated with an option of potential surgical treatment. Variety of surgical methods require detailed and appropriate patient preparation for the operation.

In our study we tried to present some problems in dealing with patients with inflammatory bowel disease in aspect of perioperative period. We discussed methods of solving these problems and expected effects of nursing procedures.

Key words: inflammatory bowel disease, surgery, nursing.

Introduction

Ulcerative colitis (UC) and Crohn's disease (CD) are two separate units classified as inflammatory bowel diseases (IBD). These are the chronic diseases with changing course characterized by acuteness and remission periods. Etiology is still hardly known. Among the factors predisposing to inflammatory bowel disease development the main roles play: genetic factors (ethnicity, hereditary), environmental factors (smoking, diet, infections, drugs, stress), immunological factors (disorders of immunological system regulation, overproduction of inflammatory cytokines) [1,2].

Inflammatory bowel disease is more frequent in the developed countries rather than in Africa, Asia or South America. Morbidity is the highest between 20 and 40 years of age [1]. There's no significant difference in aspect of gender.

UC is described as chronic, recurrent and disseminate inflammation of colon mucosa with unknown etiology, localised in rectum from where it can spread out proximally to the other parts of colon [3].

Crohn's disease is characterized by inflammatory process of all parts of gastrointestinal tract's wall which predispose to narrowing, ruptures and fistulas. It is usually localised in terminal part of ileum but it can also be found in every part of gastrointestinal tract [1,4-6].

Clinical features of the both diseases are very similar in early stages. Predominating symptoms are stubborn diarrhoea with mucosanguineous or mucopurulent stools, non-specific abdominal pain and subfebrile states. Extraintestinal symptoms are also often. These include dermatitis and cellulitis, arthritis, narrowings in biliary tracts, changes in the liver, uveitis, aphtae, anaemia, thrombophlebitis and loss of weight [1,5].

Perioperational care

Consent to surgery is very important in every patient. This consent has a special dimension in case of chronic disease when surgery is often the life-saving procedure. Variety of surgical procedures in the treatment for IBD requires precise and accurate preparation of patient. Next to routine procedures, e.g.: preparation of colon, shaving the operating field or catheterization of bladder, the psychological preparation is also very important. Discussion with the patient and explanation of the main points of the procedure as well as thoughtful and kind care all have a significant influence on postoperative period. In case of colostomy important part is an additional preparation and allocation of the place for future ostomy [7,8].

Nursing problems in patients with IBD in pre- and postoperative periods, methods of solving and the expected effects of therapeutic and nursing procedures are shown in *Tab. 1* and *2*.

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Table 1. **Nursing goals in inflammatory bowel disease patients – a preoperative period**

Preoperative period		
Nursing problems	**Nursing procedures**	**Expected effects**
Patient's anxiety about hospitalization	On admission: – sincere conversation during the completion of admission documents – introduction to the nurse and the leading doctor – familiarization with the ward, introduction to the other patients – acquaintance with the ward regulations (visits, phone calls, schedule of the day)	Patient experiences calmness and increased sense of security and confidence in medical staff.
Discomfort because of chronic diarrhoea	– observation and documentation of stools (blood, mucous or pus dash) – protection of sheets and patients against soiling – privacy in patient's room, air-conditioning, single room if possible – prevention of dehydration and electrolyte misbalance – ordering of antidiarrhoic drugs – special diet rich in proteins and energy	Reduction of discomfort caused by diarrhoea. Correction of electrolyte misbalance.
Abdominal pain	– pain killers – comfortable in-bed position – peace and silence	Decrease of pain. Improvement of patient's mood.
Major malnutrition	– diagnosis of malnutrition (weight, hight, BMI) – laboratory tests (albumin, haemoglobin) – supplementation of nutrition deficiency – adaptation of enteral feeding to patient's condition – total parenteral feeding if indicated	Patient's nutrition betterment. Preparation for the operation.
Patient's anxiety about diagnostic tests	– physical and psychological preparation for testing – patient's consent for testing – ensuring the sense of security during diagnostic procedures, premedication if indicated, pain killers – observation of the patient and care after the diagnostic procedure – resting after the procedure	Patient's anxiety minimized. Positive attitude towards the treatment.
Anxiety about surgery and losing of selfdependence. Lack of informations about the surgery procedure.	– sincere care – giving detailed information about the surgery – nurse's consultation and explanation of the nursing care after the surgery (physical activity, diet, pain) – elimination of doubts and answering the questions – assurance of psychologist's consultation if necessary – physical and psychological preparation for operation – providing information about anaesthesia, sedatation drugs and premedication – allowing the contact with the family	Patient is acquainted with the treatment plan and possess general knowledge about the preoperative period. Patient is calm and informed consent for the surgery is given. The family support positively influences the sense of security.
Fears about having ostomy	– evaluation of patient's state of mind in the case of ostomy, encouraging for discussion, evaluation of the patient's state of knowledge and experience (relatives or other people with ostomy, leaflets, the internet) – dispersing of doubts – establishing of individual plan of care (localisation of the ostomy, self-care, out-patient procedures) – presentation of positive aspects of ostomy as a part of the treatment – presentation of the ostomy equipment	Patient has acquired the knowledge about ostomy and informed patient's consent is given.

We considered the most frequent problems risen by the chronicity of disease, severe patient condition and variety of surgical methods.

Integral part of perioperational nursing care in patients with IBD, next to the preoperative preparation and providing the postoperative supervision and ostomy care, is the patient education.

Learning process is an intentional influence on patient's personality throughout forming the health behaviour, responsibility of own health, compliance in nursing activities and treatment and self-care [7,9,10].

Discussion

Treatment for IBD patients is widely discussed in numerous papers. These are mainly focused on pharmacological and surgical approach to the therapy as well as on assessment of the therapeutic outcome and complications [11-14]. In this study we present the nursing care model scheduled strictly for the perioperative period which is a substantial part of long-term care for patients with IBD. Stein et al. presented the nursing care plan for undergoing surgery for ulcerative colitis. Nursing interventions in the perioperative period were based on the nursing diagnosis as follows: alteration in body image related to the need for a permanent or temporary ileostomy, anxiety related to knowledge deficit and stress of surgery, risk for acute

***Table 2*. Nursing problems in patients with inflammatory bowel disease – a postoperative period.**

Postoperative period		
Nursing problems	**Nursing procedures**	**Expected effects**
Risk of early postoperative complications	– thorough patient observation, assuring the sense of security – control of vital parameters and patient's consciousness – responsiveness to deviations in vital parameters and any possible complications (oxygen mask, assistance patient while vomiting, diuresis control, evaluation of the exudate from drainage tubes) – observation of general symptoms and the postoperative wound to prevent potential bleeding – safe and comfortable in-bed position – taking care about drainage, catheters, feeding tube status – assuring conditions for the patient's rest – documentation of all measurements	No disorders are found in respiratory, circulatory, thermoregulation, gastrointestinal and nervous systems. Good coursed postoperative period
Surgical wound pain	– systematic dosage of pain killers – elimination of factors triggering the pain by setting patient's comfortable position, using round-the-bed facillities and decreasing of the patient's physical activity – peace and silence	Elimination of the pain
Discomfort caused by limited physical activity	– assuring patients help during changing positions and hygienic activities (changing clothes etc.) – physical and respiratory rehabilitation – passive and active – bed-sore prevention – encouraging patient to self-care – assuring contact with the family	Lack of discomfort caused by immobilisation. Patient feels fine. Active attitude is helpful in regaining the physical efficiency
Risk of respiratory and circulatory complications due to pain and immobilisation	– prevention of atelectasis and pneumonia – deep breathing, respiratory exercises – assistance patients in coughing, prevention of wound dehiscence – prevention of thrombophlebitis, active exercises, early positioning	No complications during the postoperative period. Patient rehabilitation runs while on pain killer drugs
Impossible oral feeding in early stages of the postoperative period. Thirst.	– parenteral hydration and nutrition – care about canules – prevention of feeling of dryness in the mouth – moistening of the oral mucosa by mineral water – restrain patient from oral intake of fluids – hygiene of oral cavity – water balance control – observation of symptoms from gastrointestinal tract (nausea, vomiting, gases, first bowel movement)	Good level of hydration. Lack of complications allows diet be enriched
Risk of postoperative wound infection	– observation of postoperative wound, evaluation of exudate from the drainage tubes (documentation of the amount of exudate) – dressing changes according to aseptic/antiseptic regimen – antibiotic prophylaxis – taking care about the perianal wound following Miles's resection – patient education towards domestic wound care	Correct wound healing
Lack of knowledge and skills in ostomy care	– identification of self-care deficit in aspect of peristomal skin care – in-hospital early education about ostomy care, equipment etc. – giving detailed information about the diet, prevention of complications, possible ambulatory treatment and participation in ostomy patients associations	Patient is ready for self-care when back at home

or chronic pain related to surgery, risk for injury related to perioperative experience [13].

Nursing diagnosis remains basic for conducting the nursing process. The diagnosis allows to undertake the proper interventions as well as to evaluate and revise the initial proceedings.

Quality of life (QoL) stands for crucial indicator of sufficient nursing care in IBD patients. Good QoL is predominant in patients well educated by nurses in respect of the disease, preventing complications, rational dietary behaviour, rehabilitation and stoma care [15-17]. Physical and emotional support rendered to the patient hardens it's sense of security.

Conclusions

In conclusion, diagnosis of ulcerative colitis or Crohn's disease is concerned with the high possibility of the surgical treatment. Intensively treated patients are under holistic care of multidisciplinary team including surgeon, gastroenterologist, nurse, dietetist and psychologist. Epidemiological studies indicate an increase of morbidity in aspect of both diseases thus it would be justified to educate more specialist nurses, well prepared for care among patients with IBD.

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Comparative analysis of informative support in lactation in lying-in women hospitalized in rooming-in system

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Abstract

Purpose: The aim of the study was to assess the expected and received informative support in lactation in hospitalized lying-in women. Such variables as the number of deliveries and participation in antenatal classes were taken into consideration.

Material and methods: The research was conducted from May to September 2005, and involved 202 lying-in women staying in maternity wards in Chair and Clinic of Obstetrics and Perinatology, Pomeranian Medical University (PAM) in Szczecin, and Obstetrics and Gyneacology Unit in Independent Public Specialistic Health Care Centre Zdroje Szczecin. The diagnostic survey was carried out; it was based on the questionnaire of author's design.

Results: The obtained results suggest that primiparas significantly more frequently than multiparas show demand for all elements of informative support in lactation ($p<0.001$), while women who did not attend antenatal classes considerably more often need information on the half of elements of informative support connected with lactation. Informative support that lying-in women receive does not satisfy the demand for it.

Conclusions: 1. Professional support provided by midwives/nurses should be particularly directed on primiparas and women who did not attend antenatal classes. 2. Participation of future parents in antenatal classes causes them to be better prepared to breastfeeding, and be less needing the mentioned information while their stay in a mother-baby ward. 3. It is necessary that midwives/nurses constantly perfect their professional skills in order to improve the quality of obstetrical care.

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Key words: informative support, postpartum care, lactation, rooming-in system.

Introduction

Helena Sęk [1] defines social support as a kind of interaction which occurs in a difficult or problematic situation. Its aim is to cause one or both participants of the interaction to get closer to the possible solution of a problem, to overcome difficulties, reorganize the disturbed relation with environment and provide emotional support. Support is divided into several categories. One of them is informative support connected with teaching new skills and providing information and advice how to cope with particular situations. The provided information should concern breastfeeding technique, and signs of the proper breastfeeding as well as the most common lactation problems and ways of dealing with them. As many nursing theories state, for example these of Roy and Orem, social support is inseparable from nurse's/midwife's tasks. Its particular categories should be put into everyday practice, not forgetting that stay in a hospital is always a difficult situation [1]. Therefore, medical staff should make a special effort to lavish attention on a woman in puerperium and her family, and to make all the problems easier to cope with.

The aim of the study was to assess the expected and received informative support in lactation in hospitalized lying-in women. Such variables as the number of deliveries and participation in antenatal classes were taken into account.

Material and methods

The research involved 202 lying-in women hospitalized in maternity wards in the mother-baby system with the third reference level in Chair and Clinic of Obstetrics and Perinatology, Pomeranian Medical University in Szczecin, and Obstetrics and Gyneacology Unit in Independent Public Specialistic Health

Table 1. **The expected informative support in lactation with reference to the number of pregnancies**

No	Elements of informative support	Primiparas		Multiparas		p
		n=116	%	n=86	%	
1.	Mechanisms of milk production and secretion	108	93	38	44	<0.0001
2.	Signs of satiety of the neonate	106	91	50	58	<0.0001
3.	Signs of hunger of the neonate	108	93	50	58	<0.0001
4.	Contraindications to breastfeeding	99	85	24	28	<0.0001
5.	Effect of drugs on lactation	102	88	25	29	<0.0001
6.	The reflex of sucking	108	93	39	45	<0.0001
7.	Techniques for suppressing lactation	104	90	27	31	<0.0001
8.	Techniques for stimulating lactation	106	91	43	50	<0.0001
9.	Technique of milk collection	106	91	41	48	<0.0001
10.	Technique of milk storage	95	82	43	50	<0.0001
11.	Body position during breastfeeding	114	98	64	74	<0.0001
12.	Neonate position during breastfeeding	114	98	71	82	<0.0001
13.	Signs of correct neonatal positioning	112	97	60	70	<0.0001
14.	Signs of incorrect neonatal positioning	112	97	50	58	<0.0001
15.	Time and technique to terminate lactation	101	87	29	34	<0.0001
16.	Prevention of problems with breastfeeding	103	89	30	35	<0.0001
17.	Management of painful nipples	110	95	53	62	<0.0001
18.	Breastfeeding with small nipples	101	87	29	34	<0.0001
19.	Management of engorgement	106	91	38	44	<0.0001
20.	Management of insufficient lactation	104	90	44	51	<0.0001
21.	Prevention of complications of lactation	100	86	20	23	<0.0001
22.	Management of breast congestion	104	90	28	33	<0.0001
23.	Management of postpartum mastitis	100	86	18	21	<0.0001
24.	Management of breast ulcer	99	85	20	23	<0.0001

p – a chi-square independence test

Care Centre Zdroje Szczecin. They are highly specialistic centres realizing "10 steps to the successful breastfeeding", and decorated with the distinction of "the child-friendly hospital" which is conferred by WHO and UNICEF. The research were carried out from May to September 2005. They involved lying-in women with physiological course of the early stage of puerperium. Women's min. age was 16, max. 43 years, and median was 27.5 years. The diagnostic survey was carried out. It was based on the questionnaire of author's design [2] consisting of 24 issues concerned with informative support in lactation provided for lying-in women staying in a mother-baby ward. Each patient included in the survey gave consent to use her data. The obtained material was subjected to statistical analysis with the chi-square independence test.

Results

Almost the half of surveyed women (47%) had a higher education, 37% – secondary education, 12% – vocational education, and only 4% – primary education. Most respondents (68%) – were married, 18% – lived together with a partner, and 14% of women were single. 55% of the surveyed were Szczecin dwellers, 16% – lived in the town with up to 100 thousand dwellers, 17% – in a town with less than 100 thousand dwellers, and 12% – lived in the country. Almost 21% of women declared being prepared for the labour and motherhood by their participation in antenatal classes, as much as 79% of the surveyed did not received this type of education (antenatal classes were provided by hospitals in which the research were conducted). A midwife/nurse was mentioned as the main source of informative support by the surveyed women. Lying-in women's demand for informative support in lactation was analyzed and the variable related to the number of deliveries was taken into account; primiparas were 57%, and multiparas – 43%. Analysis proved that primiparas significantly more frequently ($p<0.0001$) show demand for all elements of informative support (*Tab. 1*). Primiparas were particularly interested in information on the best positions for breastfeeding (98%), holding a baby during breastfeeding (98%), and signs of putting a baby to the breast properly or improperly (97%). In case of multiparas, the demand for information on lactation was very similar; 84% of the respondents wanted to know how to hold a baby during breastfeeding, 74% – what the best positions for breastfeeding are, 70% – signs of putting a baby to the breast properly, and 62% – how to cope with sore nipples.

Analysis of the obtained informative support in lactation revealed that primiparas significantly more often ($p<0.03$) received information on taking the position and holding a baby during breastfeeding, while multiparas considerably more often than primiparas ($p<0.04$) got information what to do when they have too little milk (*Tab. 2*).

The next examined variable was the participation in antenatal classes; 21% of the surveyed took part in this type of education, and 79% of the respondents did not. The analysis of lying-in women's demand for informative support in lactation revealed statistically significant differences (*Tab. 3*). Women in

***Table 2*. The received informative support in lactation with reference to the number of pregnancies**

No.	Elements of informative support	Primiparas		Multiparas		
		n=116	%	n=86	%	p
1.	Mechanisms of milk production and secretion	63	54	36	42	>0.08
2.	Signs of satiety of the neonate	68	58	49	57	>0.81
3.	Signs of hunger of the neonate	63	54	49	57	>0.70
4.	Contraindications to breastfeeding	23	20	23	27	>0.24
5.	Effect of drugs on lactation	29	25	24	28	>0.64
6.	The reflex of sucking	55	47	37	43	>0.53
7.	Techniques for suppressing lactation	38	32	26	30	>0.70
8.	Techniques for stimulating lactation	57	49	42	49	>0.96
9.	Technique of milk collection	50	43	40	47	>0.62
10.	Technique of milk storage	36	31	38	44	>0.0551
11.	Body position during breastfeeding	100	86	63	73	<0.03*
12.	Neonate position during breastfeeding	105	90	68	79	<0.03*
13.	Signs of correct neonatal positioning	90	78	59	69	>0.15
14.	Signs of incorrect neonatal positioning	79	69	49	57	>0.10
15.	Time and technique to terminate lactation	24	21	28	33	>0.0564
16.	Prevention of problems with breastfeeding	33	28	28	33	>0.52
17.	Management of painful nipples	67	58	52	61	>0.69
18.	Breastfeeding with small nipples	32	28	28	33	>0.44
19.	Management of engorgement	38	32	35	41	>0.24
20.	Management of insufficient lactation	38	32	41	48	<0.04*
21.	Prevention of complications of lactation	17	15	18	21	>0.21
22.	Management of breast congestion	31	26	26	30	>0.58
23.	Management of postpartum mastitis	17	15	16	19	>0.45
24.	Management of breast ulcer	13	11	16	19	>0.13

p – a chi-square independence test

***Table 3*. The expected informative support in lactation with reference to participation in antenatal classes**

No.	Elements of informative support	Antenatal classes		Without antenatal classes		p
		n=43	%	n=159	%	
1.	Mechanisms of milk production and secretion	26	61	120	75	>0.051
2.	Signs of satiety of the neonate	29	67	127	80	>0.08
3.	Signs of hunger of the neonate	29	67	129	81	>0.0537
4.	Contraindications to breastfeeding	19	44	104	65	<0.02*
5.	Effect of drugs on lactation	24	56	103	65	>0.28
6.	The reflex of sucking	27	63	120	75	>0.09
7.	Techniques for suppressing lactation	21	49	110	69	<0.02*
8.	Techniques for stimulating lactation	26	61	123	77	<0.03*
9.	Technique of milk collection	25	58	122	76	<0.02*
10.	Technique of milk storage	23	54	115	72	<0.02*
11.	Body position during breastfeeding	38	89	140	88	>0.95
12.	Neonate position during breastfeeding	37	86	146	93	>0.24
13.	Signs of correct neonatal positioning	34	79	138	87	>0.20
14.	Signs of incorrect neonatal positioning	32	74	130	82	>0.28
15.	Time and technique to terminate lactation	21	49	109	69	<0.02*
16.	Prevention of problems with breastfeeding	22	51	111	70	<0.03*
17.	Management of painful nipples	30	70	113	84	>0.86
18.	Breastfeeding with small nipples	22	51	108	68	<0.05*
19.	Management of engorgement	25	58	119	75	<0.04*
20.	Management of insufficient lactation	26	60.5	122	77	<0.04*
21.	Prevention of complications of lactation	20	47	104	65	<0.03*
22.	Management of breast congestion	23	53	109	69	>0.06
23.	Management of postpartum mastitis	18	42	100	63	<0.02*
24.	Management of breast ulcer	20	47	99	62	>0.06

p – a chi-square independence test

***Table 4*. The received informative support in lactation with reference to participation in antenatal classes**

No.	The assessed elements of informative support	Antenatal classes		Without antenatal classes		p
		n=43	%	n=159	%	
1.	Mechanisms of milk production and secretion	18	42	81	51	> 0.29
2.	Signs of satiety of the neonate	26	60	91	57	> 0.70
3.	Signs of hunger of the neonate	25	58	87	55	> 0. 68
4.	Contraindications to breastfeeding	10	23	36	22	> 0.93
5.	Effect of drugs on lactation	13	30	40	25	> 0.50
6.	The reflex of sucking	19	44	73	46	> 0.84
7.	Techniques for suppressing lactation	13	30	51	32	> 0.81
8.	Techniques for stimulating lactation	18	42	81	51	> 0.29
9.	Technique of milk collection	21	49	69	43	> 0.52
10.	Technique of milk storage	17	40	57	36	> 0.65
11.	Body position during breastfeeding	36	84	127	80	> 0.57
12.	Neonate position during breastfeeding	35	81	136	86	> 0.50
13.	Signs of correct neonatal positioning	31	72	118	74	> 0.77
14.	Signs of incorrect neonatal positioning	30	69	98	62	> 0.32
15.	Time and technique to terminate lactation	12	28	40	25	> 0.71
16.	Prevention of problems with breastfeeding	13	30	48	30	> 0.99
17.	Management of painful nipples	24	56	95	60	> 0.64
18.	Breastfeeding with small nipples	13	30	47	30	> 0.93
19.	Management of engorgement	16	37	57	36	> 0.86
20.	Management of insufficient lactation	17	40	62	39	> 0.94
21.	Prevention of complications of lactation	9	21	30	18	> 0.76
22.	Management of breast congestion	13	30	44	28	> 0.74
23.	Management of postpartum mastitis	8	19	25	16	> 0.65
24.	Management of breast ulcer	9	21	20	12	> 0.16

p – a chi-square independence test

puerperium who did not attend antenatal classes considerably more often ($p<0.02$) needed information on contraindications to breastfeeding, ways of suppressing lactation (if milk is too abundant), drawing milk from a breast, storing milk, the time and way of stopping lactation, and copying with puerperal nipple inflammation. They also much more often ($p<0.03$) needed information on the ways of stimulating lactation, and dealing with the situation when milk is insufficient, than women who participated in antenatal classes. In case of received informative support in lactation, no statistically significant differences were found between lying-in women who attended antenatal classes, and those who did not (*Tab. 4*).

Discussion

Changing social situation and greater demand for high quality health services force health service workers to constantly improve their professional skills. It especially applies to nurses and midwives, because their professional tasks include providing widely understood support and help [3,4] connected, among others, with lactation and preventing lactation complications [5,6]. Many authors claim that competent assistance in the first days of breastfeeding is really essential, just as a kind and sympathetic attitude towards lying-in women and questions that bother them. The mechanisms of milk production and secretion were shown by Slusser [7] and Powers [8] who suggested how long a baby should be kept at breast in order to prevent lactation complications.

Mikiel-Kostyra [6] explained that the good position of a baby is crucial for successful breastfeeding, and putting a baby to the breast properly makes breastfeeding easier, and guarantees an adequate milk supply; it also prevents sore and cracked nipples and milk stasis. Our results confirm that there is a great demand for information connected with lactation. Suchocki [9] implies that the care of lying-in women and their babies is highly assessed, whereas Perez-Escamilla [10], Grossman [11] emphasize the necessity for providing professional help, especially during the first days of breastfeeding. The research conducted by Sendecka et al. [12] proved that 41.5% of the surveyed women had breastfeeding problems while their stay in the maternity ward. Over 80% of these difficulties resulted from the improper dealing with breastfeeding in the ward. Only 67.2% of the women received help and information how to cope with their problems, while the others were left on their own. Our results show that lying-in women's demand for information on lactation is not fully satisfied which means that nurses/midwives need to constantly improve their professional skills.

Conclusions

1. Professional support provided by midwives/nurses should be particularly directed on primiparas and women who did not attend antenatal classes.

2. Participation of future parents in antenatal classes causes them to be better prepared to breastfeeding, and be less needing

the mentioned information while their stay in a mother-baby ward.

3. It is necessary that midwives/nurses constantly develop their professional skills in order to improve the quality of obstetrical care.

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Health behaviour of students versus a sense of self-efficacy

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Abstract

Purpose: A sense of self-efficacy has become such an important construct in recent years that it has been included in most behaviour theories. Self-efficacy turned out to be very strong conditioning for health in a lot of research. The general influence of self-efficacy on health behaviour exceeds the influence of any other single variable. The feeling of self-efficacy allows to predict the intentions of actions in different spheres of human activity, including health behaviour. A higher sense of self-efficacy increases motivation for action, it is related to greater achievements of an individual and his/her better health**.** The aim of the research was to diagnose health behaviour of college students, to evaluate their sense of self-efficacy and to specify the relation between health behaviour presented by the participants and their sense of self-efficacy.

Material and methods: The research was conducted using the method of diagnostic questionnaire with the following instruments: Generalized Self-Efficacy Scale – GSES R. Schwarzer, M. Jerusalem, the Questionnaire of Health Behaviour designed by one of the authors, and the measurement of BMI. The results from a group of 164 students enrolled in year 1 of bachelor of nursing programme from Kraków and Bielsko-Biała were statistically analyzed by using the chi-square test.

Results: The conducted study confirmed the hypothesis about the relation between self-efficacy and health behaviour only partly. A statistically significant influence of the sense of self-efficacy on such health behaviour as the consumption of fat in daily diet and drinking alcohol was revealed. Most students participating in the study achieved a high indicator of the sense of self-efficacy and presented both right and wrong health behaviour.

Conclusions: The sense of self-efficacy of the participants is a promising and positive indicator presaging the sustainability and change of health behaviour.

Key words: the sense of self-efficacy, health behaviour.

Introduction

The sense of self-efficacy has become such an important construct in recent years that it has been included in most behaviour theories. Self-efficacy turned out to be very strong conditioning for health in a lot of research. The general influence of self-efficacy on health behaviour exceeds the influence of any other single variable [1]. The sense of self-efficacy expresses the subjective belief that the means which are at one's disposal allow to conduct the planned actions. The sense of self-efficacy makes it possible to predict the intentions of actions in different spheres of human activity, including health behaviour. A higher sense of self-efficacy increases motivation for action and is related to greater achievements of an individual and his/her better health. In Schwarzer's model presenting the process attitude to health actions, the sense of self-efficacy as a 'positive indicator of health' plays the primary role in the prediction of preventive actions, in the change of harmful habits and in continuing behaviour which is beneficial to health [2]. People 'equipped with' a high sense of self-efficacy are able to make better use of their mental resources, which allows to meet their various needs actively and to take up different activities [3]. 'A characteristic feature of current changes in the sphere of health is emphasizing the importance of individual behaviour as a factor which decides about sustaining and reinforcing health' [4]. Sustainability of optimal health in the sense of physical and mental functioning requires right eating habits as well as

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Figure 1. **The respondents' BMI**

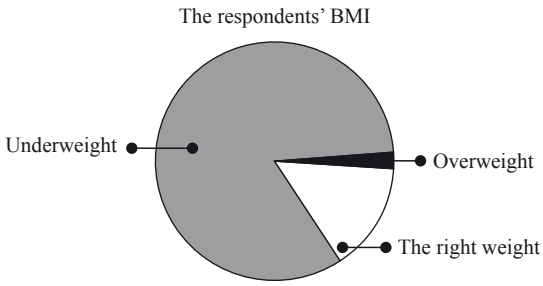
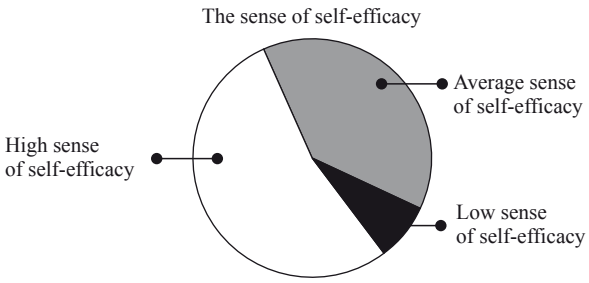


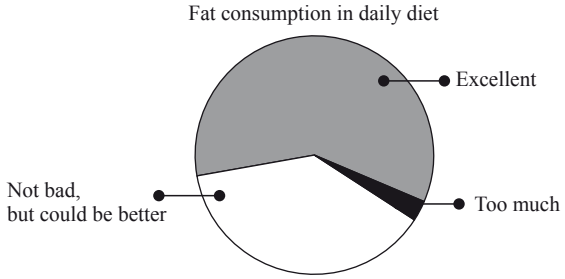
Figure 2. **The sense of self-efficacy of the students participating in the research**



regular and constant physical activity adequate to one's age and physical potential, life without addictions and the ability to manage stress successfully [5].

A good balanced diet is one of the most important factors from the group of environmental determinants which decide about a child's health, pace and level of his/her physical and mental development and perceptual abilities which in turn have a great significance for the pace and effects of learning [6]. The proper health behaviour is especially important for young people since it determines not only their own health but also health of the next generation. The aim of the research was to diagnose health behaviour of college students, to evaluate their sense of self-efficacy and to determine the relation between health behaviour of the participants and their sense of self-efficacy.

Figure 3. **Fat consumption in daily diet of the respondents**



Material and methods

The research was conducted using the method of diagnostic questionnaire with the following instruments: Generalized Self--Efficacy Scale – GSES R. Schwarzer, M. Jerusalem, adapted by Z. Juczyński [7], the Questionnaire of Health Behaviour designed by one of the authors and including questions, which related, among others, to diet, physical activity, drinking alcohol and smoking cigarettes; BMI was also measured. The results from a group of 164 students enrolled in year 1 of bachelor of nursing programme from Kraków and Bielsko-Biała were statistically analyzed by using the chi-square test. The respondents' age ranged from 19 to 33 (on average 21 years old, 153 women and 11 men). Most participants came from the country (39.6%), from boroughs (26.8%), province main cities (25%) and little towns (8.5%). During the studies 49.9% of the students lived at family home, 26.2% rented flats and 24.4% lived in students' houses and dormitories. A vast majority of the students finished general secondary school (86%). The respondents came from families of various levels of financial status: 64% declared that they came from an averagely rich family (income per capita 500-1 000 pln), 25.6% from moderately rich families (income per capita below 500 pln), 9.1% from rich families (income per capita 1 000-1 500 pln) and 1.2% from very rich families (income per capita over 1 500 pln). Only 14.7% of respondents had the right body weight according to the BMI, in most cases (82.5%) the respondents were underweight (BMI<20) and 2.5% were overweight (*Fig. 1*).

Results

The hypothesis made in the presented paper concerns the relation between self-efficacy and such health behaviour as fat consumption, fiber consumption, drinking alcohol, smoking cigarettes and physical activity. The collected data point to the fact that most students are characterized by high (53.7%) or average (38.4%) sense of self-efficacy, and only 7.9% of respondents have a low sense of self-efficacy (*Fig. 2*).

The statistical analysis of the data gathered in the research also showed that such variables as age of the respondents (p=0.297), mother's education (p=0.784), father's education (p=0.861), income per family member (p=0.848), place of residence of family (p=0.686), place of residence during the studies (p=0.454), and secondary school (p=0.709) had no influence on the level of sense of self-efficacy.

The analysis of the data gathered in the research showed that fat consumption among the respondents is at a good level, only 3% of the participants declare over consumption of fats in daily diet (*Fig. 3*).

It was shown that the sense of self-efficacy is related to the readiness to eat low-fat products because a statistically significant relation ($p<0.05$) was achieved between the level of self-efficacy and fat consumption by the respondents – the higher the self-efficacy indicator, the fewer fats consumed (*Tab. 1*). No significant relation was shown between the amount of fats in daily diet and BMI (p=0.233) and the place of residence during the studies (p=0.232).

Table 1. **The relation between the level of efficacy and fat consumption by the respondents**

The scale of efficacy	Fat consumption			χ^2 value p value
	too much fat	not bad, but it should be less	excellent	
Low self-efficacy (10-24)	0	9	4	χ^2=9.6369 p=0.047
Average self-efficacy (25-29)	4	20	39	
High efficacy (30-40)	1	33	54	

Table 2. **The relation between place of residence during the studies and fiber consumption by the respondents**

Place of residence during the studies	Fiber consumption			χ^2 value p value
	too few products high in fiber	not bad, but there could be more	excellent	
Family house	45	34	2	χ^2=12.5914, p=0.050
Students' house	15	16	1	
A rented flat	34	8	1	
Other	5	2	1	

Figure 4. **Fiber consumption in daily diet of the students**

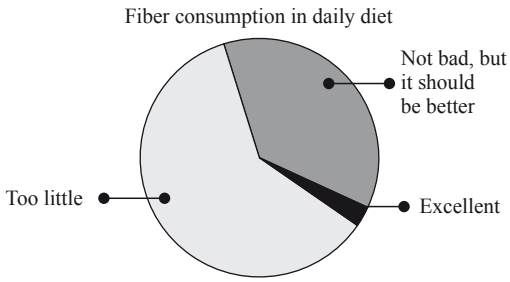


Table 3. **Smoking cigarettes by the respondents**

Smoking cigarettes	N	%
I have never smoked	116	70.7
I smoked, but I quit	13	7.9
I smoke occasionally	26	15.9
I smoke every day	9	5.5

Table 4. **Alcohol consumption by the respondents**

Alcohol consumption	N	%
Never	31	18.9
Once a month or more seldom	84	51.2
2-4 times a month	42	25.6
2-3 times a week	7	4.3

The results of the data gathered in the research show that only 3% of the students declare fiber consumption at the level of eating standards, unfortunately as many as 60.4% of students pay no attention to products including fiber in their daily diet and they eat too little of it (*Fig. 4*).

The statistical analysis did not confirm the hypothesis on the influence of sense of self-efficacy on fiber consumption (p=0.965) or about the influence of BMI (p=0.436), but a statistically significant relation was shown between the place of residence during the studies and fiber consumption (p=0.05), which indicates that living in a students' house is conducive to fiber consumption (*Tab. 2*).

Tab. 3-6 show risk behaviour among students including smoking cigarettes, drinking alcohol and lack of physical activity. The majority of respondents (70.7%) declare that they have never smoked cigarettes and only 5.5% admit that they smoke on daily basis. The presented research did not show any statistically significant relation (p=0.3) between the sense of self-efficacy and nicotine smoking or any relation between BMI (p=0.486) and place of residence during the studies (p=0.06) and smoking cigarettes (*Tab. 3*). As the respondents declare 18.9% of them have never drunk alcohol, 51.2% drink alcohol once a month or more seldom, 25.6% – two-four times a month and 4.3% two-three times a week (*Tab. 4*). The answers to the question about the number of standard alcohol units drunk at one occasion were: 1-2 units (75.9%), 3-4 units (19.6%), 5-6 units portions (3%), 10 units and more – 1.5% of the participants. The statistical analysis showed the relation (p=0.02) between drinking alcohol and the sense of self-efficacy (*Tab. 5*), people with high self-efficacy drink alcohol more often, in most cases once a month. No significant relation between BMI and drinking alcohol (p=0.231) was shown. In contrast to smoking cigarettes, no relation was observed between the place of residence and drinking alcohol (p=0.609). The answers of the participants show that the students' physical activity is kept at a very good level, the answer 'never' didn't appear even once whereas 79.9% of the respondents take up sport regularly (*Tab. 6*).

The statistical analysis did not confirm the hypothesis the influence of self-efficacy on the physical activity of young people (p=0.695), but it showed a statistically significant relation between physical activity and BMI (p=0.000) (*Tab. 7*). People with low BMI (<20) take up sport often or very often.

Discussion

Starting with the theory of self-efficacy which says that the sense of self-efficacy influences the determination and kind of

***Table 5*. The relation between the level of efficacy and alcohol consumption by the students**

The scale of efficacy	Alcohol consumption				χ^2 value p value
	never	once a month or more seldom	2-4 times a month	2-3 times a week	
Low self-efficacy (10-24)	7	4	2	0	χ^2=14.7762, p=0.022
Average self-efficacy (25-29)	14	29	17	3	
High self-efficacy (30-40)	10	51	23	4	

***Table 6.* Physical activity of the students**

Physical activity of the students	N	%
Every day	40	24.4
3-4 times a week	48	29.3
Once-twice a week	43	26.2
A few times per month	17	10.4
Seldom	16	9.7

***Table 7.* The relation between BMI and physical activity of the students**

BMI range according to WHO	Physical activity					χ^2 value p value
	every day	3-4 times a week	once-twice a week	a few times a month	seldom	
Underweight (<20)	34	44	33	14	10	χ^2=40.8843, p=0.000
The right weight (20-24.9)	6	4	9	4	2	
Overweight (25-30)	0	0	0	0	4	

activities undertaken including those related to personal development (educational), the authors assumed that students will be characterized by a high sense of self-efficacy. The hypothesis was confirmed in the research – more than a half of the students participating in the research are characterized by a high sense of self-efficacy, only every fourteenth respondent has a low sense of self-efficacy. The statistical analysis showed that such variables as: age, education of parents, financial status of family, place of residence of family, place of residence during the studies and the kind of secondary school finished by the participants do not influence the sense of self-efficacy.

The sense of self-efficacy is related to such health behaviour as: prevention of uncontrolled sexual behaviour, taking up physical activity regularly, controlling weight and eating habits, prevention and quitting smoking and other addictions [2]. Therefore, the study was based on the hypothesis about the relation between self-efficacy and health behaviour such as: fat consumption, fiber consumption, drinking alcohol, nicotine smoking and physical activity.

The hypothesis was confirmed only in relation to fat consumption and drinking alcohol by young people. Fat consumption is at a good level among the respondents, only 3% of the participants show wrong eating habits in this respect and over consume fats. It was shown that the sense of self-efficacy has a great influence on fat consumption – the higher level of self-efficacy the fewer fats consumed. The authors related fat consumption at the level recommended by dieticians directly to the cult of slim body.

Fat consumption in the understanding of the respondents directly influences their appearance and physical condition, whereas fiber consumption has influence mainly on health. Health reasons are less crucial for the respondents than appearance, which seems to be a typical preference of young people. That's why fiber is consumed in daily diet at the right level by 3% of the respondents. The statistical analysis did not confirm the hypothesis about the influence of the sense of self-efficacy on fiber consumption. It is surprising that a statistically significant relation was discovered between the place of residence during the studies and fiber consumption, which results in the conclusion that living in a students' house is conductive to fiber consumption. Thus, it is not family house (as one would expect) that is a carrier of the right eating behaviour in the case of the participants.

The so-called risk health behaviour such as cigarette smoking, drinking alcohol and lack of physical activity relate to the group of respondents to a small extent. About 3/4 of the respondents do not smoke cigarettes and every twentieth student admits that he/she smokes on daily basis (is addicted). It is difficult to predict if such tendency continues till the end of studies because as Jabłoński's research shows [8] 29% of male students and 18% of female students smoke in their first year at university, and those numbers increase to 42% and 28% respectively in the fifth year, whereas the number of smoking nurses is 45%.

The study conducted among Dutch young people by Kok and co-authors [1] prove that a high sense of self-efficacy has a positive influence on quitting smoking and persisting in this decision. However, the presented research does not show any

statistically significant relation between the sense of efficacy and cigarette smoking or between BMI and the place of residence during the studies and cigarette smoking. Nicotine abstinence among students of nursing who are future professionals in promoting a healthy lifestyle is not surprising ad seems to be something natural, but again the authors look for the reasons in fashion. Nicotine abstinence has become fashionable not only among adults who are aware of health dangers of the addiction, but also among young people. The authors merit here a great advertising campaign in all the media to quit smoking or not light the first cigarette. Unfortunately, it was also the influence of adverts and commercials which resulted in the conviction that drinking beer is not harmful. Beer has become more of a soft drink than alcohol. Research showed that more than 3/4 of the respondents drink alcohol more or less often (4% of the students often). One should pay attention to the fact that the group of respondents included only 6.7% of men, so the problem of drinking relates also to young women. The data gathered in the research seem to confirm the study by the State Agency to Solve Alcohol Problems, which shows that the problem of drinking women at the age of 18-29 is an increasing phenomenon. This may result from the misunderstood concept of equality of rights which unfortunately includes also risk behaviour as well as from the change of perception of drinking women (nobody ostracizes young girls drinking beer).

The statistical analysis showed the relation between drinking alcohol and the sense of self-efficacy, people with a high indicator of self-efficacy drink alcohol more often. The results of the available research is ambiguous, the data from the presented research confirm the results of the study by Okulicz-Kozaryn and Pisarska [3] and at the same time negate Taylor's research [9] who discovered an exactly opposite relation. The authors of this paper favour the opinion that high sense of self-efficacy of young people creates their conviction that they can control the consequences of drinking alcohol and that they demonstrate their independence and adulthood by drinking.

Physical activity of the respondents continues to be at a very good level, more than 3/4 of the respondents declare that they take up sport often and the answer 'I don't do sport at all' didn't appear even once. Fuchs and Schwarzer [1] found in their report a high correlation between the intention to take up physical exercise and physical actions and a sense of self-efficacy. The presented study did not reveal the influence of a sense of self-efficacy on physical activity, but it showed the statistically significant relation between physical activity and BMI. People with low BMI take up physical activity often or very often. Naturally, it is not eligible to draw conclusions like: does low weight influence increased physical activity or is it increased physical activity that results in low weight (the authors favour the latter opinion).

Conclusions

The conducted research confirmed the hypothesis about the relation between self-efficacy and health behaviour only partly. Self-efficacy turned out to be a good predictor of undertaking some health behaviour. The sense of self-efficacy of the respondents is a promising, positive indicator of health behavior. The presented results of research point to the need of discussion and further longitudinal research into the relationship between the sense of self-efficacy and health behavior of various groups of young people.

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Estimation of the declared knowledge of anaesthesiology nurses concerning some chosen procedures and actions being within the scope of professional competence

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Abstract

Together with introducing legal regulations as well as modern standards of postgraduate education, the professional position of a nurse has strengthened and also her responsibility for professional activity has increased. Performing the profession of an anaesthesiology nurse involves necessity of possessing some adequate professional qualifications. The aim of the study was an attempt to answer the question on how the knowledge of an anaesthesiology nurse concerning the activities being within her professional qualifications shapes. The research was carried out in 2005 among 123 anaesthesiology nurses working in some Polish hospitals chosen at random. Method of diagnostic opinion poll was applied and a questionnaire of own authorship was a research tool. Analysing the obtained results the following conclusions have been drawn: 1. The level of knowledge of an anaesthesiology nurses on the activities being within their qualifications is unsatisfactory; 2. Obtaining competence in anaesthesiology nursing involves the necessity of continual raising of qualifications by nurses, especially being on specialization level; 3. A necessity of differentiation between particular competence levels of anaesthesiology nurses during different forms of education should be underlined; 4. Possibility of realization of their competences on a particular level by anaesthesiology nurses is connected with the necessity of improving whole therapeutic team work.

Key words: anaesthesiology nurse, professional competences.

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Introduction

Anaesthesiology nursing takes a special place in Polish nursing. As the only one among all nursing branches has its own full legal powers. Performing anaesthesiology nurse profession involves the necessity of possessing some adequate professional qualifications. In order to achieve them a nurse should complete pre- and postgraduate training which is defined by the separate legal acts, and is obliged to continual education throughout all her career. Competences are rights and authorities which enable realisation of tasks depending on the level of qualifications [1]. The aim of the study was an attempt to answer the question on how knowledge of anesthesiology nurses shapes as far as functions falling within their competences are concerned.

Material and methods

The study was carried out between April and October 2005 among one hundred and twenty three anesthesiology nurses working in randomly chosen hospitals in Poland. In the questioned group sixteen respondents completed specialization training in anaesthesiology nursing and intensive therapy, 67 nurses completed qualification course, and 40 nurses did not participate in any form of postgraduate training. In the study method of diagnostic opinion poll was used with a questionnaire as a research tool. The questionnaire consisted of basic specification questions and names of activities, which anaesthesiology nurses with the title of specialist in anaesthesiology nursing can perform unaided, without doctor's order. A questioned nurse marked the activities which, in her opinion, she can perform according to her qualifications.

Results

Nurses after obtaining the title of specialist in anaesthesiology nursing and intensive care are not convinced of the competences they gained. Most specialist nurses, i.e. 87% know that they can perform endotracheal intubation in a sudden situation, also the possibility of performing defibrillation was confirmed by 75% of respondents. However, after completing qualification course, the possibility of performing defibrillation was confirmed only by 34% of nurses. 62% of specialists recognised auditory evaluation of breathing activity in a patient as well as estimation of heart dysfunction in EKG image as their competence. What can be striking is that only 56% of them confirmed qualifications to performing EKG examination. Completing qualification course also authorises to performing EKG examinations – only 58% respondents knew about it. Only 25% respondents after specialization knew about possibility of sending a patient to take tests and/or to sampling for bacteriology tests. Only 25% specialists and 22% nurses after qualification course in anaesthesiology nursing and intensive care know that the conferred title authorises them to clinical death recognition. Specialization completion entitles to organizing and running courses in circulatory and respiratory resuscitation – it was confirmed by 62% nurses.

Not many anaesthesiology nurses (specialization – 44%, qualification course – 45%, without any training – 57%) recognise performing pulsoxymetry as well as ordering patient's transportation by nurses (specialization – 31%, qualification course – 7%, without any training – 8%) as activities falling within their competences (see *Tab. 1*).

Discussion

Anaesthesiology nurses have to fulfil high career development requirements. The necessity of defining competences results from discrepancy between doctors' expectations towards anaesthesiology nurses and legal conditionings of the performed profession [2]. For the time being the legally valid act is the Resolution of Minister of Health and Social Care of September the 2nd 1997 on determination of a range and a kind of preventive, diagnostic, medical and rehabilitation services performed by a nurse independently without doctor's order as well as a range and a kind of such services performed by a midwife unaided. Some chosen professional activities out of a numerous nurse abilities list which are gained by pre- and postgraduate education have been placed there.

As for today the biggest professional independence has been reached by anaesthesiology nurses which is referred to rather reluctantly by anaesthesiologists, although, on the other hand, they entrust magnitude of tasks which according to a binding law belong to them, to a nurse. The reverse of the medal is that according to law in force a Polish nurse has a low occupational status [2-4].

Along with professional independence responsibility for the performed nursing services has been put upon nurses. Apart from legal acts regulating status of a nurse in Poland as well as her pre- and postgraduate education, Resolutions concerning professional responsibility came into force. It is said that a punishment can be imposed beginning with reprimand to debar her from a right of performing the job for a proved offence [5,6]. As nursing is a relatively young branch of medicine which is legally approved in Poland, for the time being there is lack of publications concerning principles of performing the profession and related rights on different levels of the qualification achieved, apart from mentioned above the list of competences of a nurse working in anaesthesiology and intensive therapy units, which was announced and approved by 1st Congress of Polish Anesthesiology and Intensive Care Nurses Society in 1999 [2,7,8].

Conclusions

1. Level of knowledge of anaesthesiology nurses concerning activities falling within their competences is unsatisfactory.
2. Gaining competence in anaesthesiology nursing is connected with the necessity of constantly raising her qualifications, especially on specialization level.
3. The necessity of differentiation of particular competence levels of anaesthesiology nurses during different forms of education should be underlined.
4. Possibility of realization of competences on a proper level by anaesthesiology nurses is connected with a necessity of improving the whole therapeutic team work.

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Table 1. **Analyse of tasks realized independently by anaesthesiology nurses depending on qualifications**

			Tasks realized by anaesthesiology nurses	I N=16		II N=67		III N=40	
				n	%	n	%	n	%
After specialization	Without postgraduate training	1.	Taking surface and central temperature	7	44	35	52	23	57
		2.	Performing pulsoxymetry	7	44	30	45	23	57
		3.	Estimation of peripheral pulse and its features	6	38	36	54	22	55
		4.	Estimation of breathing activity	7	44	33	49	19	48
		5.	Estimation of a patient's skin condition	6	38	35	52	18	45
		6.	Preliminary estimation of injury seriousness and safe transport organization	6	38	21	31	19	48
		7.	Estimation of catheters and drains' location and durability of their fixation	7	44	41	61	24	60
		8.	Taking material for diagnostic tests, according to annex no 1 to Resolution DZ. U. Nr 116	6	38	26	39	18	45
		9.	Management of water balance	6	38	37	55	12	30
		10.	Performing cannulation of peripheral veins	6	38	32	48	20	50
		11.	Restoration of patency in respiratory tract	6	38	34	51	21	52
		12.	Administration of oral, intracutaneous, subcutaneous, intravenous medication, according to doctor's order	6	38	34	51	20	50
		13.	Performing indirect cardiac massage	7	44	43	64	27	67
		14.	Insertion of gastric tube and decompression of its contents	6	38	37	55	27	67
		15.	Urinary bladder catheterisation and removing fixed catheter, according to doctor's order	8	50	36	54	25	62
		16.	Ordering patient's transport	5	31	5	7	3	8
	After qualification course	17.	Performing EKG	9	56	39	58	-	-
		18.	Performing blood tension: arterial and central	8	50	34	51	-	-
		19.	Monitoring and estimation of bioelectric heart activity from precardiacal and auscultation lead	9	56	23	34	-	-
		20.	Auscultatory estimation of breathing activity	10	62	28	42	-	-
		21.	Estimation of a patient's degree of consciousness	6	38	40	60	-	-
		22.	Estimation of a patient's pupils reaction	7	44	39	58	-	-
		23.	Estimation of body build and appearance from the point of view of abnormalities	6	38	30	45	-	-
		24.	Diagnosis of clinical death	4	25	15	22	-	-
		25.	Performing defibrillation	12	75	23	34	-	-
		26.	Performing artificial breath	8	50	37	55	-	-
		27.	Administration of medication and drip infusions during resuscitation	5	31	33	49	-	-
		28.	Performing measurement of gas concentration taking part in breathing (gasometry, capnometry)	7	44	32	48	-	-
		29.	Estimation of basic disorders in heart work in EKG image	10	62	-	-	-	-
		30.	Performing puncture of radial and femoral artery to draw blood	7	44	-	-	-	-
		31.	Sending to diagnostic tests, according to annex no 1 to Resolution DZ. U. Nr 116	7	44	-	-	-	-
		32.	Sending to tests and/or taking sample material for bacteriological tests	4	25	-	-	-	-
		33.	Estimation of blood loss	6	38	-	-	-	-
		34.	Estimation of anaesthesia degree in a patient and relaxometry	5	31	-	-	-	-
		35.	Immediate administration of oxygen and oxygen therapy	6	38	-	-	-	-
		36.	Performing endotracheal intubation in sudden situation	14	87	-	-	-	-
		37.	Estimation of readiness of apparatus and medical equipment in anaesthesiology and intensive care therapy	6	38	-	-	-	-
		38.	Estimation of complications and planning preventive actions	6	38	-	-	-	-
		39.	Organizing and running resuscitation training	10	62	-	-	-	-
		40.	Usage and implementing of secure methods in medical team work	6	38	-	-	-	-

I – nurses with specialization completed; n=16; II – nurses with qualification course completed; n=67; III – nurses without postgraduate training; n=40

Level of preparation for preventive procedures and pressure ulcer treatment in health care units from the Kujawsko-Pomorski region

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Abstract

Purpose: Prevention of pressure ulcer development is one of the most important tasks of chronic diseases management. This diseases are the risk factors of pressure ulcer development. The effectiveness of prevention depends on medical staff work organization, material resources (e.g. dressings), training system and education.

The aim of the study was to asses the level of preparation for prevention activities, risk assesment, pressure ulcer treatment and documentation in health care units from Kujawsko-Pomorski region.

Material and metods: This study was based on the questionnaire and was performed in 21 health care units. We assesed basic equipment of 1 060 beds from internal, neurological and long-term care wards.

Results: The highest risk of pressure ulcer development was identified in neurological wards. Hospitalisation longer than 10 days increases the risk. The highest morbidity was presented in long-term care wards. In 50% of hospitals there was a lack of equipment and materials used for pressure ulcer management and prevention, especially pressure-reducing matresses.

Conclusions: Hospitals are not well performed for effective prevention and management of pressure ulcers.

Key words: pressure ulcers, prevention, pressure ulcer management.

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Introduction

Pressure ulcers are a kind of chronic wounds which are a problem of many hospital wards. This wounds are treated mainly in long-lasting care wards among patients with chronic diseases. They are defined as a local tissue necrosis caused by mechanical forces and clinically they appear as superficial or deep ulcers [1]. Causative action of mechanical forces leading to ischaemia is composed of local pressure, friction and shear forces. Main role in pressure ulcers development plays long-lasting pressure which exceeds capillary pressure value and shuts vessels. Similar effect is caused by shear forces. Whereas friction leads to damage of the skin which in turn may lead to infection and further damage. Mechanical forces are caused by restricted physical activity [1,2].

Other risk factors of pressure ulcers development are: long-lasting exposure on moisture (urine, sweat, stool, wound exudate), poor pain perception, old age, metabolic disorders (diabetes), circulatory disorders (atherosclerosis), nutritional disorders (anaemia, malnutrition) [3], medicines (sedative drugs, pain killers, steroids) [1].

Long-lasting care wards such as oncology, paliative care, geriatrics, internal medicine and rehabilitation are all units where pressure ulcers risk factors are cumulated [1,4,5]. High mortality is also observed in short-term care units where lack of activity and immobilization are important risk factors. Such units are: surgery, neurology, orthopedics nad intensive care where medical and nursing procedures should also include preventive activities [5,6].

These preventive activities include identification and selection of high risk patients and providing appropriate care. Prevention should be focused on etiology which can be modified and limited [5]. Effectiveness of such activities depends on many coexistent factors which form quality of health care: number and dispose of personnel and time of care, unit's equipment (mattresses, topical agents, dressings) depending on material means, education and training which form knowledge and

***Table 1*. Characteristics of some long-term care units**

Unit	Number of beds	Time of hospitalisation	Number of patients from high risk groups*	Number of patients with pressure ulcers at the moment of admission*	Number of patients who acquired pressure ulcers*
Long-term Care Unit	20	3 month	16 (0.8)	2 (0.1)	0
Nursing Care Unit	22	42 days	43 (1.9)	39 (1.77)	4 (0.18)
Treating-care Unit	12	20 days	2 (0.16)	3 (0.25)	1 (0.08)
Long-term Care Unit	48	45 days	50 (1.04)	22 (0.46)	2 (0.041)
Chronic Diseases Unit	70	19 days	60 (0.86)	85 (1.2)	2 (0.03)
Nursing Care Unit	12	30 days	32 (2.6)	8 (0.66)	1 (0.83)
Palliative Care	7	12 days	26 (3.7)	3 (0.43)	0
Long-term Care Unit	30	28 days	26 (0.9)	3 (0.1)	0
Treating-care Ward	45	6 month	160 (3.5)	7 (0.15)	8 (0.17)
Nursing Care Unit	22	31 days	6 (0.3)	7 (0.32)	3 (0.14)
Chronic Diseases Unit	24	2-3 month	34 (1.4)	12 (0.5)	1 (0.42)
Long-term Care, rehabilitation	30	24 days	2 (0.06)	0	0
Palliative Care	25	10 days	94 (2.25)	56 (2.24)	25 (1)
ALL UNITS	***367***	***S**=46* days ***SD**=46.45*	***S**=42.4 (1.5)* ***SD**=43.65 (1.23)*	***S**=18.7 (0.05)* ***SD**=25.97 (0.69)*	***S**=3.62 (0.008)* ***SD**=6.8 (0.33)*

* number of patients / number of beds ratio (on the brackets)

motivation of medical staff, standards and guidelines, high risk patients identification, multidisciplinary teams [1,3-8].

Level of medical knowledge, acquitance of pressure ulcers etiology and availability of sources and methods of prevention should restrict mortality and incidence of pressure ulcers. They are still a serious medical problem in many units which are limited in mentioned above aspects. Thus an important part of prevention is analysis and assesment of medical units in aspects of sources and preparation for preventive activity followed by modification and correction of identified factors. These activities are facilitated by multidisciplinary team approach which develop guidelines and algorithms of effective prevention and inspire all members of staff in aspect of implementation of prevention and treatment programs [9,10].

The aim of the study was to estimate the risk of pressure ulcers development and to asses the resources of health care units from the Kujawsko-Pomorski region of Poland.

Material and methods

This study was conducted in 21 health care units in Kujawsko-Pomorski region. Total amount of analysed beds was 1 060 (from internal medicine, neurology and long-lasting care units).

We used questionnaire developed by Pressure Ulcers Prevention and Treatment Team in cooperation with Regional Nursing Consultant.

Questionnaire was composed of following parts:

– general questions (number of beds, mean time of hospitalisation, number of patients per one month, number of nurses),

– questions concerning a number of patients from high risk group, with already existed pressure ulcers and patients with pressure ulcers developed during hospital stay,

– questions concerning available resources (nursing, preventive),

– questions concerning methods of pressure ulcers prevention, documentation, number and quality of education and training in terms of pressure ulcers.

Data concerning individual patients (high risk groups, patients with already existing ulcers and patients with pressure ulcers developed during hospital stay) were divided by a number of beds because our study included various units. Thus result is presented as a "r" coefficient (*Tab. 1,2*), r – number of patients/ number of beds.

Statistical analysis was performed to obtain the results (normal distribution, t-student test). Consent of local bioethics commission was obtained.

Results

Questionnaire was posted to 25 health care units all over the Kujawsko-Pomorski region. Twenty-one questionnaires (84%) returned to authors. They came from 30 different units (internal, nerology, long-term care).

Study concerned various units. In internal units 527 beds were analysed, in neurological units – 166 and in long-term care units – 367. Total number of analysed beds was 1 060.

Duration of patient's hospital stay was depended on kind of care. In units with emergency rooms high patient's rotation was observed, patient's hospital stay was between 3 to 7 days, whereas in long-term care units hospital stay was between 1 to 6 months.

Number of patients from high risk group varied between units. This number was divided by a number of beds obtaining "r" coefficient. The highest risk of pressure ulcers development was found in neurological wards where r=0-5.2, mean

Table 2. **Short-term care units characteristics**

Unit	Number of beds	Time of hospitalisation	Number of patients from high risk groups*	Number of patients with pressure ulcers at the moment of admission*	Number of patients who acquired pressure ulcers*
Internal medicine units – all	29	2-6 month	20 (0.7)	2 (0.07)	0
	46	4 days	37 (0.8)	2 (0.04)	0
	70	10 days	50 (0.7)	2 (0.03)	0
	36	5-8 days	30 (0.8)	2 (0.06)	0
	81	9 days	60 (0.74)	18 (0.22)	0
	35	4 days	15 (0.4)	2 (0.06)	0
	35	4 days	15 (0.4)	2 (0.06)	0
	36	5 days	80 (2.2)	2 (0.08)	0
	30	5 days	0	0	0
	65	7 days	30 (0.46)	3 (0.04)	0
	35	6 days	5 (0.14)	3 (0.09)	0
	29	7 days	2 (0.07)	1 (0.03)	0
	527	***S*=15.63 SD**=32.9***	***S*=28.67 (0.65) SD**=24.66 (0.57)***	***S*=3.25 (0.0015) SD**=4.71 (0.05)***	***0***
	25	8 days	12 (0.48)	1 (0.04)	3 (0.12)
	25	8-10 days	20 (0.8)	1 (0.04)	0
	38	5-7 days	197 (5.2)	1 (0.026)	8 (0.21)
	38	12 days	0	9 (0.24)	0
	40	10 days	120 (3)	5 (0.12)	5 (0.12)
Neurological units – all	***166***	***S*=9 SD**=2.23***	***S*=69.8 (0.42) SD**=2.18***	***S*=3.4 (0.003) SD**=3.58 (0.09)***	***S*=3.2 (0.003) SD**=3.42 (0.09)***
ALL	***693***	***S*=13.68 SD**=27.5***	***S*=40.76 (0.06) SD**=40.76 (1.33)***	***S*=3.29 (0.002) SD**=4.3(0.07)***	***S*= 0.94 (0.0006) SD**=2.28 (0.06)***

* number of patients / number of beds ratio (on the brackets)

r=2.1. High risk was also observed in long-term care units where mean r=1.5. The lowest risk was observed in internal units where mean r=0.7. Comparison of groups found statistically siginificant differences between patients from neurological units and from internal units (t=2.44, p<0.01). Differences between neurological and long-term care units were not statistically significant.

All units also varied in aspect of number of patients who developed pressure ulcers during hospital stay. Long-term care units had the highest r value (r=0.008). Slightly less r value was observed in neurological units (r=0.003). In internal units r value was 0. Statistically significant differences were observed between long-term care units and internal and neurological units (t=3.9, p<0.001).

Interestingly in long-term care units number of patients with already existed pressure ulcers was high in time of admittance (mean 18-19 patients per three months, r=0.05) whereas in short-term care units (neurological and internal) patients with already existed pressure ulcers are admitted very seldom (about 3 patients per three months, r=0.002). Differences are statistically significant (t=56.9, p<0.001).

Our study also compared mortality in big and small units. In small units (7 to 24 beds, mean 17 beds) more patients developed pressure ulcers during hospital stay (r=0.014) than in big units (number of beds >29) in which r=0.003. Difference is statistically significant (t=3, p<0.001).

In every unit staff was complaining on lack of equipment, resources and instruments needed for effective prevention of pressure ulcers. The main problems of all units wes lack of special matresses. Most of all matresses available in units were static. Only some wards had air-fluidized and lowair-loss devices. Even in these wards available matresses were enough only for a half of patients from high risk group (e.g. paliative care ward with 25 beds had only 13 special matresses, whereas nursing ward with 45 beds had only 15 ones). Among other lacking resources were: rolls facilitated patients' position changing, wheel chairs, integrated bath systems, skin care products, napkins, modern dressings.

All questinnaires informed about insufficent number of staff members. Low level of employment, especially on weekends and during the nights doesn't assure patients' needs. In many units special prevention standards and documentation are implemented. Medical staff take part in training days focused on pressure ulcers prevention. Only some wards had sufficient registration of patients with pressure ulcers.

Discussion

Intensive prevention of pressure ulcers is a fundamental part of nursing care, especially in case of patients from high risk group. The highest risk group are patients with diseases requir-

ing lying in bed whose restricted activity has two aspects. First, low physical activity due to long-lasting immobility. Second, restricted possibility to change position of the body. Effect of these two aspects is long-lasting pressure which plays the main role in pressure ulcer development [6,9,11].

In our study the highest risk of pressure ulcers development had patients from neurological units. In spite of short time of hospital stay the risk in this group is high due to character of pathology and methods of treatment. Among neurological pathologies the most common causes of pressure ulcers are: paralyses (strokes, injuries) with restricted possibility of movement and perception disorders which interrupt senses of stimuli, especially pain, which suggests local ischaemia caused by pressure.

Patients from long-term care units are also in high risk group. It is caused by long-lasting pressure complicated by complex coexistent diseases. Among these complex disorders the most important are old age, senile dementia, cachexia, multiorgan failure and systemic disorders. In these units a lot of patients have already existed pressure ulcers in time of admission. Other factor which facilitate pressure ulcers development in long-term care units is a long time of hospital stay [3,8,12]. Longer hospital stay facilitate pressure ulcers development in higher number of patients. Doren Norton states that 70% of pressure ulcers develop in two weeks time after admission [13]. Bergstrom and Braden found that 34% of pressure ulcers develop during the first seven days of hospital stay (in older age population), whereas 90% of pressure ulcers develop in third week of hospital stay. In conclusion authors say that the most critical time for pressure ulcers development is 14th day of hospital stay [11]. In our studies a period longer than 10 days increases both risk and mortality.

Prevalence of pressure ulcers is often a result of the lack of special equipment and materials for prevention and treatment of pressure ulcers next to lack of staff.

One of the most important instruments of prevention are special matresses. They are very important for patients with restricted mobility. These matresses dispose weight of the body and disperse pressure all over the surface. These matresses dispose weight of the body and disperse pressure all over the surface. Level of pressure reduction and effectiveness is a result of matres' dynamics which was confirmed in the study of Cochrane Group (1999). Review of matresses, beds and pillows reported that these equipment is very useful. Similar results were obtained by Russem and Richtenstein [6,14,15].

In all units staff personnel was complaining on lack of equipment and most of all matresses. In the majority of units available matresses were enough only for 50% of patients from high risk group. Especially weak resources were observed in small long-term care units and this situation should be changed.

Conclusions

1. Health care units from Kujawsko-Pomorski region are not well performed to provide effective prevention of pressure ulcers. High risk of pressure ulcers development is observed in short-term and long-term care units.

2. The highest risk was observed in neurological wards. Hospital stay longer than 10 days increases the risk. Half of units had not enough equipment and resources for effective pressure ulcers prevention. The highest prevalence and mortality was observed in long-term care units.

Our results suggest the need for development in aspect of effective prevention and treatment of pressure ulcers. Thus Regional Consultant in cooperation with Pressure Ulcers Prevention and Treatment Team pointed out following tasks:

1. Supervise standards of pressure ulcers prevention.
2. Develop registration of high risk patients.
3. Ensure accurate equipment and resources.
4. Analyse amount of staff members, especially nurses.
5. Implement medical staff education programs.

The aim of mentioned tasks is to improve the quality of health care and increase effectiveness of pressure ulcers prevention in health care units especially in long-term care units.

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Quality of teamwork of family doctors and community nurses in primary care for the elderly in two organizational settings – opinions of the family doctors

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Abstract

Purpose: The elderly are a growing part of the society and a further growth is expected in the demand for both medical and nursing services performed by primary health care institutions.

The aim of this work is to answer the question: "Does the form of employment of community nurses in primary health care institutions influence the quality of interdisciplinary co-operation in caring for elderly patients?"

Material and methods: The research was conducted among family doctors, who provided health care in the city of Białystok under the contract with the National Health Fund. The questionnaire was answered by 104 family doctors. Of this number 69 employed a family nurse and 35 co-operated with a non-public community nursing unit. The database of institutions and doctors employed was acquired from the National Health Fund. The research tool was an anonymous questionnaire.

Conclusions: The opinions of family doctors on the quality of geriatric care provided by the nurses depend strongly on their form of employment. Family doctors' units which employ nurses have a greater scope and better quality of care services for the elderly in comparison to those, which only co-operate with nurses.

Key words: elderly, interdisciplinary co-operation.

Introduction

The elderly are a constantly growing part of the society. It is to be expected that there will be a growth in the need for geriatric medical and nursing care from basic health care institutions. Reforms in medical and social care [1] led to the division of competence between medical (family doctor and community nurse) and social (social workers) sector. Further transformation of community nursing system had a negative influence on the co-operation between doctors and nurses in primary health care system [2]. Currently, the family doctor coordinates community nursing services in two ways. The doctor may employ a family nurse, who fulfils the function of a nurse in clinic as well as performs the community tasks, or only employ a nurse for the clinic and bestow other tasks on an outside, non-public community nursing institution. The main task of a community nurse, regardless of the organizational setting (full employment in the doctor's clinic in position of family nurse or a separate contract of community nurse with the National Health Fund), is to recognize the social situation of the patients with respect to nursing-care needs, meet the patients' needs in co-operation with other health and social care institutions, provide information on the possible sources of aid and forms of aid, educate, etc. The full scope of these tasks is referred to as "competence".

In fact, most of the community nurses' competences are not performed [3]. Despite the reorganization of primary health care, modern standards have not been implemented in community nursing services for the elderly. The community nurses' opinions prove deficiencies in the performance of their tasks and insufficient co-operation with the family doctor [2]. There were problems concerning separate contracting of community nurses [4].

According to standards referring to community nursing [5], the nurse not only performs tasks assigned by a doctor, but first of all should be one's partner. The nurse should autonomously take up professional tasks and comprehensively and consistently nurse families at their life environment – in health, sickness, disability, home hospitalization and terminal care.

Partnership is not only the co-operation and co-ordination of the nurse and doctor, but also respecting and making use of their separate competences, regardless of the nurses' form

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Table 1. **Form of employment of family doctor by age (in %)**

	Collective units of family doctors (N=95)	**Individual units of family doctors** (N=9)	**Total** (N=104)
(%)	91.3	8.7	100.0
Age structure of family doctor [p=0.005]*			
Under 41 (n=46)	40.0	88.9	44.2
Over 40 (n=58)	60.0	11.1	55.8
Total	100.0	100.0	100.0

* the p value applies to the comparison between forms of employment (clinic or individual)

of employment. Nevertheless, it is to be expected, that staying in the same workplace speeds up the exchange of information about the patient and the performance of tasks. It also facilitates setting care priorities, while respecting the separate competences of team members.

The aim of this work is to answer the question: "Does the form of employment of community nurses in primary health care institutions influence the quality of teamwork in caring for elderly patients?"

Material and methods

The research was carried out among family doctors, who provided health care in the city of Białystok under the contract with the National Health Fund. The questionnaire was answered by 104 family doctors. Of this number 69 employed a family nurse and 35 cooperated with a non-public community nursing unit. The database of institutions and doctors employed by them was acquired from the National Health Fund. The research tool was an anonymous questionnaire distributed personally by the author of the work. The results were subject to statistical analysis, where an arithmetic average was calculated for measurable features, as well as standard deviation. For qualitative features their quantitative-percentage distribution was calculated. For the assessment of differences between groups, depending on conditions they met, Pearson's Chi^2 independence test was used or Fischer's exact test. The significance value was set at $p<0,05$. The statistical analysis was performed with the use of the Statistica 6.0 program.

Results

The research included all family doctors working in the city of Białystok. The majority (90%) of them were women. 91% of the doctors were employed in the collective family health care units. Significantly more often they were older and more professionally experienced doctors. Only every tenth (9%) had an individual practice – significantly more often they were younger and less experienced (*Tab. 1*).

Over three quarters of family doctors were experienced practitioners – they had at least 10 years of work experience. The average work experience was 18 years. Every second doctor (52%) declared having at least one specialization. 42% of doctors declared having two and 5% – three. One of the doctors had four specializations. Three quarters of doctors (75%) had a specialization in family medicine.

Two thirds of the doctors employed family nurses, while one third (34%) only co-operated with a non-public community nursing unit.

Almost a half (46%) of doctor rated their co-operation with nurses as good, 26% as very good. Only 15% evaluated it as acceptable and 13% as insufficient. Doctors who employed their own nurses twice as often rated their co-operation positively (86%) in comparison to those co-operating with outside institutions (45%). These data are presented in *Tab. 2A*.

Further the doctors were asked to rate the quality of nursing care for the elderly. Most answers were positive – including 12% very good and 48% good. Every third answer was "acceptable" and every tenth – "insufficient". The answers depended on the kind of co-operation (*Tab. 2B*). Among doctors employing family nurses, as many as three quarters (71%) had a very good or good opinion about the quality of nursing care for the elderly. A similar opinion was significantly less frequently (37%) expressed by doctors, who cooperated with non-public community nurses.

The frequency of nurses' home visits with older patients can be taken as a factor adding objectivity to the doctors' opinions. Home visits were performed twice more often in health care institutions which employed family nurses (regularly, at least once a year – 48%), than in those co-operating with outside nursing institution (23%). Statistically significant differences were fund (*Tab. 2C*).

A quality of geriatric care depends on the team approach to the assessment and meeting needs of the elderly. This requires regular exchange of opinions and information on individual care problems between the doctor, nurse and other practitioners.

The frequency of such debates also depended on the form of employment of nurses. "Regular" and/or "frequent" consultations prevailed in institutions employing nurses, while "sporadic" meetings were significantly more common in institutions using outside nursing services (*Tab. 2D*).

Discussion

Family doctors have already become the base of the health care system in Poland [6]. They are the fundamental link in the system of care for the elderly [1,7]. Standards of geriatric

***Table 2*. Subjective and objective indices of the doctors' and nurses' teamwork in primary care for the elderly (in % of column)**

	Units employing their own nurses (N=69)	Units cooperating with nursing centres (N=35)	Total (N=104)
A. Doctors' opinions on teamwork with community nurses [p=0.0001]*			
Very good	33.3	11.4	26.0
Good	52.2	34.3	46.1
Acceptable	10.1	25.7	15.4
Insufficient	4.4	28.6	12.5
B. Doctors' opinions on quality of nurses' care for older persons [p=0.001]*			
Very good	15.9	2.9	11.5
Good	55.1	34.2	48.1
Acceptable	24.6	40.0	29.8
Insufficient	4.4	22.9	10.6
C. Frequency of nurses' home visits with older patients [p=0.03]*			
Yes, regularly at least once a Lear	47.8	22.9	39.4
Irregularly	52.2	77.1	60.6
D. Frequency of debates on geriatric problems between doctors and nurses [p<0.0001]*			
Regular/frequent	84.1	42.8	70.2
Sporadic	15.9	57.2	29.8

* The p value applies to the comparison between forms of cooperation between doctor and community nurses

care assume comprehensive and interdisciplinary approach to solving the complex problems of the elderly in his place of living [8], which requires the active participation of other practitioners of primary health care system – first of all community nurses, who are the natural allies and partners for family doctors. Unfortunately, their place in primary health care is still not fully defined, nor appreciated. Their competences are often not utilized [2,3]. That is partly due to various forms of financing of community/family nursing services. On one hand, the services of community nurses may be realized as part of individual contracts with non-public units, financed by the National Health Fund, on the other, in the form of an employment of nurses by non-public health care institutions, which have contracts institutions providing for such services [9]. Regardless of organizational settings and financing of community nursing services, the role of nurses in primary health care did not change significantly after the reform. Community nurses, more often called family nurses, are, along with doctors, the core of geriatric care teams. Theoretically these also include a social worker, although his part is marginal, because of the separation of the health and social care sectors.

The results of the study clearly indicate the superiority of the co-operation between doctors and nurses within one health care institution. This form of teamwork is connected with a higher quality of care for the elderly. This is evident both in the subjective opinions of doctors as well as in some objective indices, like performance of comprehensive geriatric approach. It seems that the direct relations in a team member employed in one institution enhance the exchange of information, observations, and quick reply to the needs of elderly patients. Family doctors' units which use outside community nursing services have a significantly lower quality of nursing services, both in the opinion of doctors and in objective indicators. Nevertheless, the limitation of the study is missing the opinions of the community nurses themselves, referring to the co-operation with family doctor and to quality of services for elderly patients.

Conclusions

1. The opinions of family doctors on the quality of teamwork and geriatric care provided by the nurses depend strongly on their form of employment. Family doctors' units which employ nurses have a greater scope and better quality of care services for the elderly in comparison to those, which only co-operate with nurses.

2. Better geriatric care can be expected along with better interdisciplinary co-operation and partnership between health care providers, to identify and meet the complex needs of community dwelling elderly people.

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Exposure the doctors to aggression in the workplace

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Abstract

Purpose: To evaluate the frequency, source and type of aggression towards doctors, depending on their place of work and position.

Material and methods: The study was conducted among 501 doctors from the area of Podlaskie Province. To evaluate the level and type of aggression towards doctors in their workplace we used a questionnaire prepared for the needs of this study by modifying the questionnaire "The frequency and consequences of exposing nurses to workplace aggression", which had been drafted by the Institute of Labour Medicine in Łódź. The results were analysed with the application of the chi-square and the Kruskal-Wallis tests.

Results: The most common form of aggression was voice raising, which happened to 80% of doctors employed in inpatient medical centres and 91% doctors from outpatient centres. More than a half of the subjects have heard threats from their patients. Verbal aggression from doctors' superiors happened most often in surgery wards (48%), neurology wards (40%), admission rooms (33%). The causes of aggression most often quoted by doctors include: staff shortages (9%), stress – tiredness (9%).

Conclusions: Workplace aggression towards doctors may be inflicted both by patients and colleagues. The aggression in the medical environment can take on different forms and create a threat in the workplace. Doctors working in hospital wards (psychiatry, surgery, neurology) are the ones who are the most exposed to aggression.

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Introduction

The interest in workplace aggression and violence, which appeared during the last few years, is connected with the changing view on the factors conditioning the proper functioning of people in their professional and social life. These phenomena are inherent elements of human interactions, which are observed in all situations connected with the necessity of entering into relations with other people [1].

Workplace violence may take on different forms, starting from the mildest, such as: shouting, verbal abuse, intimidation, threats, blackmail, hostile behaviours, mobbing, bullying, sexual harassment and finishing with physical attacks in the form of assaults and maltreatment. Aggression may come from the outside, when it is inflicted by strangers (patients and their families) or from the inside of the institution (colleagues, superiors or subordinates). While the aggression coming from the outside is noticed and monitored, the aggression inflicted by co-workers is often ignored and treated as taboo [2].

The consequences of exposure to aggression, which are directly felt by the employee are: irritation, fear, discouragement, low spirits. The characteristic consequence of long-term violence is the lowering of one's self-esteem and feeling responsible for the existing situation [3]. Aggression victims may feel somatic ailments and long-term, recurrent acts of workplace violence may also lead to psychic disorders [4].

The objective of the study was to evaluate the frequency, source and type of aggression towards doctors, depending on their place of work and position.

Table 1. **Forms of patient-inflicted aggression in outpatient and inpatient health care centres**

The form of patient-inflicted aggression	Inpatient		Outpatient		$p_{chi\text{-}square}$	$p_{K\text{-}W}$
	%	$\overline{x}$	%	$\overline{x}$		
Raised voice	80%	2.96	91%	2.80	0.0069**	0.1567
Used threats	61%	2.59	62%	2.33	0.8591	0.0281*
Hitting attempts	24%	2.57	10%	2.10	0.0022**	0.2321
Assault, hitting	11%	2.61	1%	2.00	0.0015**	0.5519

$\overline{x}$ − point average (aggression intensity); $p_{K\text{-}W}$ – the result of Kruskal-Wallis test shows how much the difference in intensity of contacts with a given form is the question of workplace specificity; if $p<0.05$ we deal with statistical significance (*); if $p<0.01$ – there is a strong statistical significance (**), when $p<0.001$ it is a very strong statistical dependence (***)

Table 2. **Patient-inflicted aggression according to the type of workplace**

The form of patient-inflicted aggression	Departments*)								$p_{chi\text{-}square}$
	1	2	3	4	5	6	7	8	
raised voice	89%	75%	86%	79%	88%	85%	54%	92%	0.0000***
used threats	77%	46%	71%	61%	67%	63%	43%	61%	0.0019**
blackmailed	54%	14%	45%	29%	41%	30%	26%	32%	0.0002***
hitting attempts	34%	10%	34%	20%	29%	27%	11%	9%	0.0000***
were hostile	55%	41%	67%	54%	50%	52%	28%	56%	0.0027**
vulgar (in front of colleagues)	70%	46%	78%	64%	67%	48%	31%	50%	0.0000***
vulgar (in front of patients)	71%	44%	67%	59%	64%	50%	24%	46%	0.0000***
assault, hitting	23%	3%	14%	9%	12%	13%	2%	1%	0.0001***

*) 1 – psychiatry; 2 – paediatrics; 3 – admission rooms; 4 – neurology; 5 – surgery; 6 – internal medicine; 7 – obstetrics and gynaecology; 8 – family medicine

Material and methods

The study was conducted among 501 doctors from the area of Podlaskie Province. To evaluate the level and type of aggression towards doctors in their workplace we used a questionnaire prepared for the needs of this study by modifying the questionnaire "The frequency and consequences of exposing nurses to workplace aggression", which had been drafted by the Institute of Labour Medicine in Łódź. The relationship between the frequency of contacts and the given form of aggression, depending on the place of work, was analysed by means of the chi-square test. The Kruskal-Wallis test was used to measure the level of dependence between the intensity of aggression and quality variables (e.g. place of work, ward).

Results

The analysis covered the questionnaires filled in by 501 doctors employed in outpatient and inpatient medical centres on the territory of Podlaskie Province. The majority of the respondents were women (56.7%) and married people (71%). The average age was 39 years, and the average seniority – 14 years. 50% of subjects worked as junior doctors, 13% had managerial positions. Almost every second doctor had a medical specialization, 21% of them had a specialization in internal medicine and 20% in surgery. The vast majority of doctors were employed in inpatient health care (80%), and three out of ten doctors worked in two places, but the outpatient health care was always the second workplace.

Patient-inflicted aggression affected both the doctors working in inpatient and outpatient health care. The most common form of verbal aggression was voice raising (p=0.0069), which affected 80% of respondents working in inpatient medical centres and 91% of doctors from outpatient centres. A quarter of doctors have come across blackmail attempts and over 30% of doctors have encountered patients behaving in a hostile way. Such situations occurred at least several times a year.

More than a half of the subjects (61%) working in inpatient health care and 62% from outpatient health care have received threats from patients. It is worrying that 11% of doctors working in inpatient health care have also experienced physical aggression such as an assault and hitting (*Tab. 1*).

The frequency of different forms of patient-inflicted aggression was significantly dependent on the type of the ward. The most "threatened" wards are the psychiatry and admission rooms while the least – obstetrics and gynaecology (*Tab. 2*).

The analysis also covered the frequency and the forms of aggression inflicted by doctors' superiors. The most common form was the voice raising, which is the behaviour encountered by a relatively large part of respondents. Verbal aggression from the superiors happened much more often in inpatient medical centres: 33% of doctors have being addressed by the superior with a raised voice, 16% of subjects reported a vulgar behaviour of their superior in front of other co-workers, and 11% – in front of patients. The doctors working in outpatient health care

also described the forms of aggression presented by their bosses in the following way: raised voice – 17%, vulgar in front of co-workers – 6%, vulgar in front of patients – 3%.

The results of the chi-square test have confirmed the statistical relationship for superiors using the raised voice towards doctors (p=0.0012) and being vulgar towards doctors in front of other co-workers (p=0.0094). Most often, verbal aggression (raised voice) from superiors happened in the surgery ward (48%), the neurology ward (40%) and in admission rooms (33%).

The co-operating doctors quite often created situations when they used verbal aggression towards each other. Such situations occurred more often in inpatient medical centres. 12% (inpatient health care) and 5% (outpatient health care) of subjects reported threatening situations connected with fellow doctors. Good manners of doctors towards one another is a phenomenon which is worth thinking about since 17% (inpatient health care) and 7% (outpatient health care) reported vulgar behaviour in front of other co-workers. The most important appeared to be the fact of co-workers using raised voice towards doctors: 38% (inpatient health care) and 20% (outpatient health care), where p=0.0004.

The wards with the highest risk of other doctors using raised voice towards the respondents were: neurology (50%), internal medicine (48%), psychiatry (43%), and the least threatened were obstetrics and gynaecology (26%) and family medicine (20%). There was also a statistically significant relationship (p=0.0033) for verbal aggression presented by nurses working together with doctors. It happened mainly in the following wards: paediatrics, surgery and internal medicine (on average about 25% of each).

The position of the doctor influenced the percentage of people having contact with different forms of aggression. The group was divided into three subgroups: junior doctors, senior doctors, managerial positions. In the case of patient-inflicted aggression (raised voice), in 87% of cases it affected a senior doctor whereas assault, hitting was reported by 12% of junior doctors, 9% – senior doctors and 2% of managers. We observed that the lower the doctor's seniority and status the higher percentage of aggressive behaviours, e.g. raised voice: junior doctors (37%), senior doctors (28%), people on managerial positions (23%). None of the results was statistically significant to evaluate the relationship between the aggression inflicted by nurses and subordinates and the doctor's position.

The causes of aggression most often quoted by doctors included: staff shortages (9%), stress-tiredness (9%). Unfortunately, as many as 57% of respondents were not able to specify the reason of aggression in their workplace.

Discussion

Physician's job is connected with contacts with other people, patients and colleagues. We expect doctors to be professional 24 hours a day, irrespective of their disposition and biological rhythm. Among the factors of professional risk occurring in work environment we should mention the shift work intolerance syndrome, which appears in the case of overwork. Also emotional exhaustion and a negative organic reaction to stress might appear [5].

Doctors, as a profession, are exposed to psychosocial burdens resulting from practicing their profession. The research carried out among doctors employed on the territory of Silesia indicate that overwork affects 68.3% of subjects [6].

The problem which is often overlooked in the medical environment is the violence inflicted by patients and colleagues. Very little research on this issue has been done so far in Poland. Such studies have only been carried out in the group of nurses and midwives [5-8].

The study conducted in Michigan, North America, in the group of doctors employed in outpatient health care showed that the most common form of violence were verbal threats from patients (74.9%), physical assault was experienced by 11.7% of subjects. Female doctors (95%) were certainly the ones who were most often exposed to physical aggression, and the majority of doctors employed in open health care were intimidated by patients (87.5%) [9].

The present study does not indicate that there is a significant influence of gender on the frequency of aggression. What is to a certain extent surprising is that fact that these were actually men who more often complained about aggressive behaviour. Patients' threats were in 57% used towards women and in 66% towards men. Hitting attempts occurred more often in relation to men (27%), than women (16%). Also fellow doctors used raised voice more often towards men (40%) than women (31%). Nurses, however, more often raised their voice in front of female doctors (21%) than male doctors (17%).

The place of work of questioned subjects had a significant influence on the occurrence of aggression. The study conducted in Great Britain indicates that about 60% of doctors employed in psychiatric departments dealt with patients' aggression in their everyday work [4]. Also in our study, the psychiatric department proved to be one of the most often quoted places of work where there appears aggression, inflicted both by patients, bosses and colleagues. Other high-risk wards were: admission rooms, surgery and neurology wards. The most "calm" places were outpatient medical centres.

Another threat in doctor's work is the growing competition between doctors and negative interpersonal relations. The research conducted in Austria shows that 7.8% of hospital workers are or have been subjected to terror and abuse in the workplace. Most often, physical violence was experienced by people aged 36-45 years, employees of teaching hospitals and specialists. In the vast majority of cases, these problems were originated by superiors. The data have been collected in the Medical Chamber of Rhineland, Germany [10,11].

Experiencing workplace violence has a significant influence on professional functioning of medical workers. The report on psychosocial factors in Poland has started relatively recently. For many years, the psychosocial stimulus was described as „a subjective creation of an individual mind". Despite the difficulties connected with measuring psychosocial factors and determining the character of threat they pose, there is a number of reasons why it is worth-while to develop strategies of preventing their negative effects [12].

Improper relations in the therapeutic team lead to frustra-

tion, addictions and professional burn out. The research conducted by Fengler confirms that the people whose profession is to help others are chronically burdened and threatened with diseases, addictions and suicide [12,13].

According to the recommendations of WHO workplace aggression prevention should be realized by means of primary, secondary and tertiary prevention.

Conclusions

1. Workplace aggression towards doctors may be inflicted both by their patients and colleagues.

2. Workplace aggression in the medical environment may take on different forms and create a threat in the workplace.

3. Doctors working in hospital departments (psychiatry, surgery, neurology) are the most exposed to aggression.

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Urinary incontinence in women as a health and social problem

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Abstract

Purpose: Urinary incontinence is a disease due to which women have suffered for many centuries. But there is some optimistic side to the problem, too; such illnesses can be treated and prevented. The aim of the work was to evaluate the frequency of occurring such cases among women and to evaluate the chosen risk factors influencing this illness.

Material and methods: Results of studies carried through on 160 women in 2000 and 2001 at the 2nd Gynaecological Medical University of Łódź were presented here.

Results: A high frequency of urinary incontinence among the tested group was found. Almost every five respondent claimed to hale had symptoms that would prove this illness.

Conclusions: Risk factors of occurrence of urinary incontinence among the patients were: birthweight over 4000 g, gynaecological or urological operations, big body mass and physical work were significant.

Key words: urinary incontinence, risk factors, frequency of occurring.

Introduction

According to the definition accepted in 1981 by ICS – International Continence Society – urinary incontinence is a state when involuntary urine leak through urethra makes it difficult for the patient to function in society, at the same time causing problems with hygiene [1-3]. There may be several reasons for this situation. This state may accompany urological illnesses, gynaecological, neurological and also internal diseases. ICS established a division of urinary incontinence, depending on its etiology, including only the type of abnormality in operating of the lower urinary tract. According to the suggestions of ICS, there are five types of urinary incontinence. These are the following: stress urinary incontinence, urging urinary incontinence, reflexive urinary incontinence, urinary incontinence due to overflow and out of constrictor muscle urinary incontinence [4].

According to some authors, the stress urinary incontinence occurs almost only among women who delivered through the natural passage. Injuries that the inner organs, such as pelvis and perineal muscles were exposed to during a vaginal delivery, are main reasons of stress urinary incontinence. The number of deliveries is of lesser importance that the course of events. Long-lasting deliveries, especially the forceps childbirth, are a potential threat that this illness will take place [5].

To evaluate the frequency of occurring the phenomena of urinary incontinence in women and to test the influence of chosen risk factors on occurring of this illness.

Material and methods

There were 160 women tested throughout 8 months, that is from 10th October 2000 to 10th June 2001 at the 2nd Gynaecological Medical University of Łódź. An auditory survey was used here with 24 questions, 12 of which concerned women who had symptoms urinary incontinence. Correctly filled questionnaires were handed back by 159 people, that is 99.4%. Collected data was statistically treated, using descriptive methods and methods of statistic deduction. To describe the tested groups of respondents, there were structure indexes calculated. In the case o analysing small sub groups, the indexes were presented in the form of fraction (f) and for the other cases, they were

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Figure 1. **Women under study with symptoms of urinary incontinence and without such symptoms according to the number of delivered children**

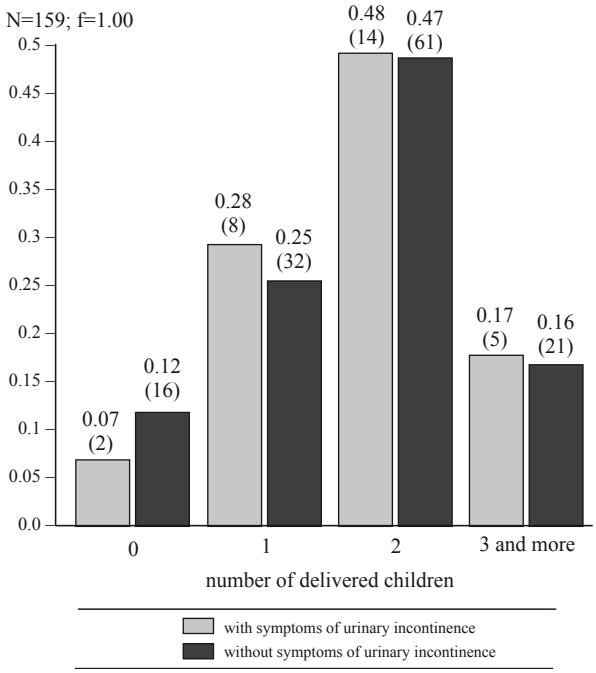
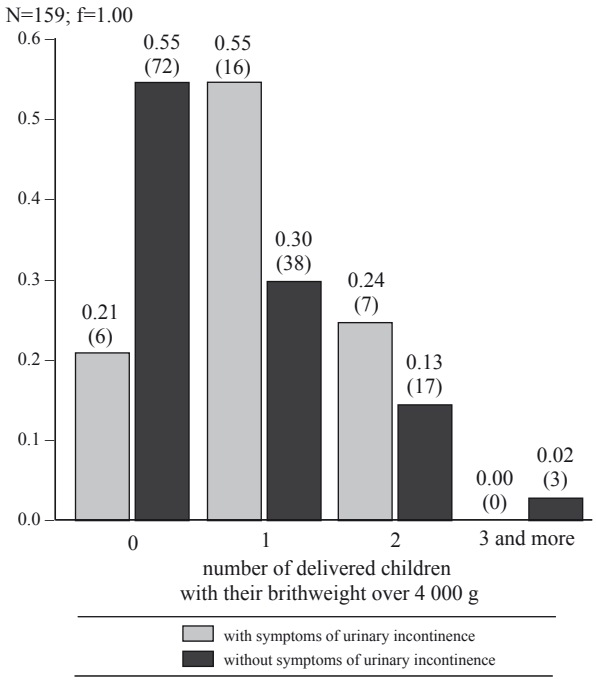


Figure 2. **Women under study with symptoms of urinary incontinence and without such symptoms according to the number of delivered children with their birthweight over 4 000 g**



presented in percentage. Index of similarity of structures was used to measure the similarity of structures:

$$w_p = \sum_{i=1}^{k} \min(w_{1i}, w_{2i})$$

Results

In the group of 159 respondents, 29 women (18.2%) answered the questions included in the survey that would confirm the urinary incontinence and answers given by 130 of the tested women (81.8%) showed lack of such symptoms. Most of women among the questioned, that is 53 people (33.3%) were around 50-59 years of age, followed by a group of 44 people (27.7%) at the age of 30-39. Among 29 people with symptoms of urinary incontinence, the biggest part, which was 16 women (f=0.55) at the age of 50-59 years of age. Majority – 70 respondents (44.0%) had high school education, then primary school only or vocational education (34.0%). Among 29 people with symptoms of urinary incontinence, 16 women (f=0.55) had primary or vocational education. Majority of the tested women, that is 85 of them (53.5%) were the ones doing clerical work, and almost 40% of them were doing physical work. In the group of 29 women with the symptoms of urinary incontinence, there were 20 (f=0.70) who were doing physical work. From among 159 of them, 141 (88.7%) had vaginal gave birth to one or more children. Among women who had problems keeping urine, 14 of them (f=0.48) gave birth to two children (*Fig. 1*) but among those with symptoms of urinary incontinence, 16 women (f=0.55) gave birth to just one child but with the birthweight over 4 000 g (*Fig. 2*). The analysis was also made considering the body mass of the responding women. It turned out that among the tested patients, great majority of them, that is 107 people (67.4%) were normally built, 39 people (24.5%) were overweight, 12 women (7.5%) were obese and one tested person (0.6%) was with weight deficiency.

In the group of respondents with symptoms of urinary incontinence, 12 women (f=0.41) were overweight (*Fig. 3*). In the group of 159 tested women, 85 of them (53.5%) had neurological disorders or operations around the area of pelvis or backbone. In the above mentioned group majority, that is 61 (71.8%) have been through gynaecological or urological operations (11 women make 12.9%). In the group of women with symptoms of urinary incontinence, majority was made of those who have been through neurological illnesses and operations (22 people, f=0.76). In this group, 12 patients (f=0.54) had gynaecological operations (*Fig. 4*).

Discussion

The results of statistical analysis of the collected data showed that age of the tested had no influence on the symptoms of urinary incontinence. Problems with urinary incontinence were more frequent among women with primary and vocational education that among women with high school or higher education, but these differences are very little. The type of job had great influence on frequency of occurrence of the analysed disorder. There were differences within the groups of women tested according to their body mass (IBM index). Women after

Figure 3. **Women under study with symptom of urinary incontinence and without such symptoms according to body mass**

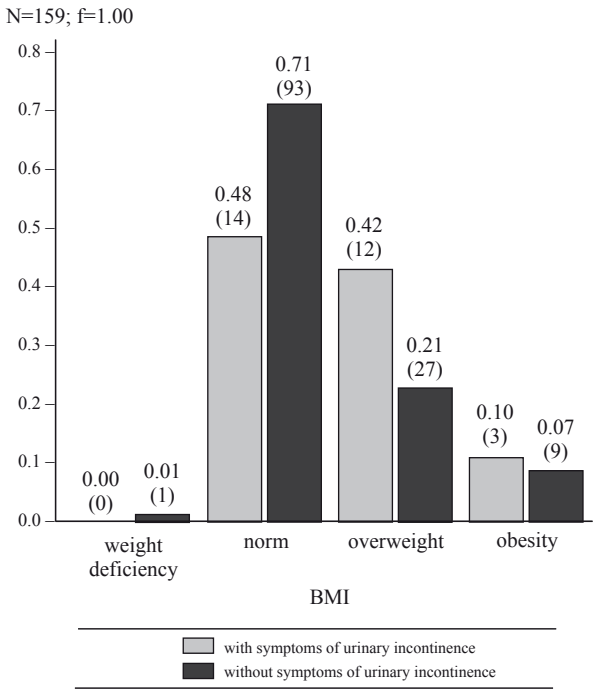
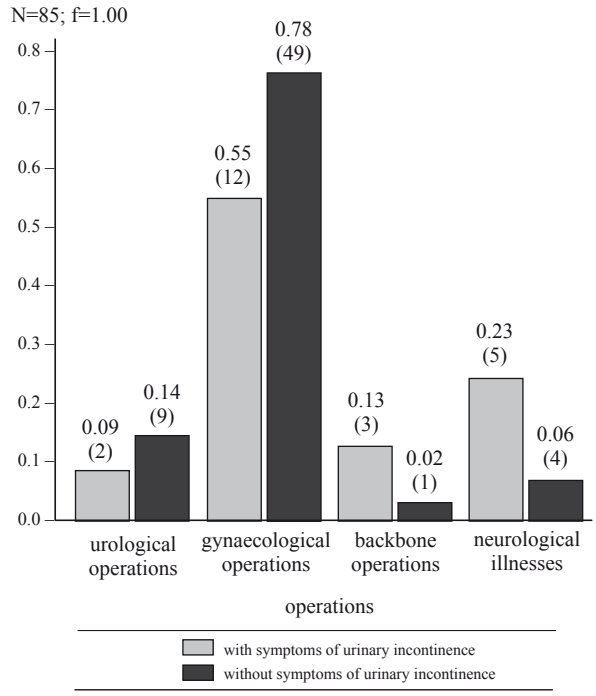


Figure 4. **Women under study with symptoms of urinary incontinence and without such symptoms according to the neurological illnesses and operations performed**



gynaecological and urological operations more frequently claimed to have had such symptoms in comparison with those who never had such operations.

Some women experience urinary incontinence a few tears after the delivery, especially before menopause. This is due to the hormone changes that take place in a woman's organism, mainly because of lowered tensity and flimsiness of the bottom of pelvis tissues. Any operations that were performed within the minor pelvis, especially extensive, such as hysterectomy may cause stress urinary incontinence. In such cases the direct cause of illness is lack of proper support for the basis of the bladder, the area of the trigone of the bladder and the nearer fragment of urethra on part of the neighbouring structures, which is at the same time the most inconvenient change of topographic relations among the parts of a minor pelvis.

Frequency of occurrence of urinary incontinence in women also depends on their life style. It is estimated that women who work physically professionally and additionally doing jobs that require lifting heavy weights, suffer from this illness much more often than their peers doing white-collar jobs or those who do not work at all. It has also been established that there are some differences between occurrence of urinary incontinence in women who live in the cities and those who live in the countryside. It is estimated that among women from urban areas, this illness occurs more often before their 50th birthday and among women from rural areas, after their 50th birthday. This difference is usually connected with the birthweight of the newborns and greater efficiency urogenital diaphragma among women living and raised in the countryside [6,7]. Among factors that are beneficial for urinary incontinence, there are also chronic bronchitis connected with persistent coughing, constipation and obesity [8]. Among obese women, due to their weight and disappearance of flexible elements of tissues, a diaphragma flimsiness may take place, which leads to urinary incontinence. According to some publications, among the risk factors leading to urinary incontinence, there are also tract infection and taking certain medicines [9]. Among the physiological states that are beneficial for urinary incontinence, are the following: pregnancy, delivery and puerperium [10] and menopause [11-13]. Urinary incontinence is an illness that has made women suffer for many centuries. Frequency of occurring given by some authors ranges according to the tested population and method of its detection. In various works it is estimated that urinary incontinence occurs on average among 10-40% of women of different ages [14]. This data is probably lowered due to the fact that it is still a problem considered by many women as 'shameful' and only few of them go to the doctor with it. According to Gidian, this pathology touches around 10% of the whole population, occurs among 30% of women over 30 years of age and almost 60% of women over 50 years of age [15]. Epidemiological studies concerning occurrence of urinary incontinence carried through in the USA by Parnell in 1981 among 1 000 women over 18 years of age showed that 22% of them have symptoms of stress urinary incontinence, urge urinary incontinence were observed among 9% of them and coexistence of the two was observed among 14% of the patients. Tomas et al. (1980), after having tested 22 000 Londoners, showed urinary incontinence among 18% of women at the age of 25-64 and among 29% of those over 65 years of age [16]. Urinary incontinence is disease that ought to be prevented and if it occurs, it can be efficiently treated [17-19].

Conclusions

1. A high frequency of urinary incontinence among the study group was found.

2. Risk factors for urinary incontinence among the patients were: birthweight over 4000 g, gynaecological or urological operations, big body mass and physical work.

3. There is a need to carry out systematic preventive and educating actions among women, which would lead to lowering frequency of occurrence of urinary incontinence.

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Psychological support of a cancer patient based on nursing care process records

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Abstract

Purpose: The care of a cancer patient undergoes considerable changes. Patients' most important need is a demand of support in dealing with somatic, psychological, emotional and social complaints. The purpose of this research is to analyse the realization of the psychological support of a cancer patient based on nursing care process records.

Material and methods: The research analysis is based on 150 nursing care case histories of cancer children and adults treated in the Independent Public Clinical Hospital No 1 of the Academic Clinical Centre at the Medical University of Gdańsk in such wards as: Paediatric Haematology, Paediatric Chemotherapy, Adults' Haematology, Oncology and Radiotherapy, Thoracic Surgery. Evaluation chart of nursing care histories and statistical methods were tools in this research. The nursing case history evaluation chart created for this very research is successfully used by members of nursing records team in all of 61 wards.

Results: The results indicate that in all analysed wards the most problematic factor for nurses was taking the patients' (children's) habits and free time planning into account while establishing the plan of action. In numerous cases a stated nursing care diagnosis was not connected with the realization of psychological support. Providing patients with the feeling of safety and contact with family was positively assessed.

Conclusion: In the care process nurses should pay more attention to the evaluation of patients and their families' need of social support.

Key words: psychological support, nursing care process.

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Introduction

The care of a cancer patient undergoes considerable changes. Patients' most important need is a demand of support in dealing with somatic, psychological, emotional and social complaints. For the purpose of the research it was estimated that support (in other words: help, assistance) is first of all acting according to patients' real needs. In the analysis the aspect of support was divided into: informative, service – material and emotional [1]. In nursing care organisation most problems are caused by patients shocked by a diagnosis of cancer. Kübler-Ross describes in detail the psychological changes occurring in great intensity in the cases when a diagnosis comes as a shock for patients [2]. It should be remembered that nurses in their work do not make use of a direct therapy, which interferes in disordered processes, opts for eliminating symptoms or causes of disorders embedded in patient's personality and not caused by hospitalisation or a somatic disease. Out of a range of psychotherapeutic methods the nurses use an indirect and a direct-supporting ones. As a result of the facts above, while evaluating the psychological support offered by nurses, the following personal skills should be taken into account: the ability of establishing a non-verbal or verbal contact and the ability to maintain this contact. Additionally, what should not be forgotten is the need of support expressed by patient's closest family which expect to be informed and given hope from the nursing staff [3]. It needs to be emphasised that in surgical wards some patients are suddenly diagnosed and immediately operated on. This results in patients' being disoriented and moreover, such situations postpone the first shock until the postoperative period. The operating procedure is treated by such patients as the final treatment stage whereas, in numerous cases it functions as a diagnostic method. Such a course of events constitutes an additional problem to be dealt with by nursing staff while nursing care planning [4]. Only a small group of patients is able to maintain a psychological balance and the ability to act properly by suppressing fear, hoping that it will not be that

bad and it is far too early to worry about anything [5]. In most cases, when a patient is informed and knows what to expect, the anxiety decreases [6]. The care and treatment process should guarantee a patient safety, the fact of being treated with dignity by the whole therapeutic team and should also give a chance of a fast recovery [7,8]. What is crucial for nurses in their work are the abilities connected with organising and leading the nursing care process, making a nursing diagnosis as well as the abilities to organise work and duties for oneself, nursing teams and the whole psychotherapeutic groups. 'Nursing care process is a work method requiring from a nurse a great initiative in the field of care, making autonomic and sensible decisions, performing logical and effective actions [9,10]. Making a diagnosis is, however, one of the basic tasks of a fundamental and unshakeable importance in nursing career [11]. Nursing diagnosis gives a basis for choosing an appropriate nursing procedure in order to obtain results a nurse is responsible for' [12]. In every case making contact with other people has a specific purpose and this can be, for example: being accepted by others, helping the people in need, giving and receiving support [13]. A nurse, as a person spending most time with a patient, should be able to answer the questions of a patient and their family, should also be able to explain, using the whole medical knowledge possessed, the procedure and purpose of the diagnostic tests being carried out. The nurse should understand patients' states, listen to them patiently, help to express their emotions, give explanations, simple advice, support [14,15].

An evaluation taking complete nursing care into account should include such aspects as: the ability to make diagnosis and to monitor (in proper medical records) the psychological conditions of a patient and their family members [16]. The fundamental function of each medical record kept for an individual case of care is to give a clear picture of what and why is currently being or will be done with reference to a given subject (patients' category). Medical record should contain information concerning medical and care services provided by a hospital at an adequate level of competence. It should also, in the best possible way, describe patients' condition and needs [17].

The purpose of this research is to analyse the realization of psychological support of a cancer patient based on nursing care process records.

Material and methods

The research analysis is based on 150 nursing care case histories of cancer children and adults treated in the Independent Public Clinical Hospital No 1 of the Academic Clinical Centre at the Medical University of Gdańsk in the following wards: Paediatric Haematology, Paediatric Chemotherapy, Adults' Haematology, Oncology and Radiotherapy, Thoracic Surgery. Evaluation chart of nursing care histories, which has been created by the authors, and statistical methods were tools in this research. The nursing case history evaluation chart created for this very research is successfully used by members of nursing records team in all of 61 wards of the Independent Public Clinical Hospital No 1 of the Academic Clinical Centre at the Medical University of Gdańsk. The chart was tried in pilot research, which additionally confirmed its usefulness as a supportive tool in the evaluation of medical care quality based on proper documentation. The chart consists of five parts. The first two parts are concerned with gathering general and detailed information respectively. The third part deals with admitting patients to a ward, the fourth part evaluates the nursing diagnosis and the realization of nursing care plan, the fifth part is a general evaluation of the records kept. The evaluation can be made both during hospitalisation and after discharge. Every assessed element of the records is associated with a relevant point value. The evaluation is to determine whether a particular element: is fulfilled (Yes), has not been realized (No), is not applicable (NA), and then assign a proper point value. The amount of points in the 'NA' section is subtracted from the total amount of points scored by a given patient. The point value in the 'No' section denotes the areas of nursing care quality not realized with reference to a patient, and the irregularities in the process of gathering information about a patient. Nursing records in hospital wards were evaluated on the basis of individual care evaluations in 15-20% of currently hospitalised patients chosen at random, that is patients with restricted physical efficiency, these requiring more complex diagnostic, therapeutic, nursing and educational procedures (according to the categorisation – patients' self-care ability). In the Independent Public Clinical Hospital No 1 of the Academic Clinical Centre at the Medical University of Gdańsk nurses use a 4-degree patients' categorisation scale: category IV – denotes patients who require intensive care, category III – patients who require intensified care, category II – patients who require moderate care and category I – patients who require minimal care.

Statistical analysis was performed by means of STATISTICA 6 package (StatSoft, Inc) licensed for the Medical University of Gdańsk. Statistical description was produced with the use of the mean, statistical deviation and frequency. Statistical conclusion depending on the scale and distribution type was made by means of t-Student, ANOVA, Scheffe post-hoc test, chi-square and r-Spearman nonparametric correlation.

Results

In order to ensure the anonymity of the wards evaluated, for the research need the wards were numbered in the following way: O1, O2, O3, O4, O5. The evaluation in all the wards was made with reference to patients' categorisation scale, which is presented in *Tab. 1*.

In the analysed records there were 50 people classified to Category IV, 60 people classified to Category III, 35 people classified to Category II, and 5 people classified to Category I. Thus, the records of patients requiring intensive or intensified care constituted the largest group. There were statistically significant differences between wards and the evaluation of patients' self-care abilities – x^2=63.95; df=4; p≤0.001; V=0.135

Two elements from the first part of the chart were subject to evaluation: 1. Patient's habits (for example sleep) were determined – problem value – 1 point. 2. Patient's psychological condition was assessed – problem value – 3 points. In O3 ward while gathering general information nurses took patients' hab-

Table 1. **The list of evaluated records in relation to patients' category**

	N of evaluated categories				
	Category IV	**Category III**	**Category II**	**Category I**	
01	20	10	0	0	30
02	10	15	5	0	30
03	5	15	10	0	30
04	10	0	20	0	30
05	5	20	0	5	30
Total	50	60	35	5	150

Table 2. **Gathering general information**

	r-Pearson correlation coefficient between the evaluated aspect and the analysed group, records (n=150)				
	Ward 01	**Ward 02**	**Ward 03**	**Ward 04**	**Ward 05**
Patient's habits (i.e. concerning sleep) were specified	0.62	0.69	0.59	0.71	0.74
Patient's psychological state was evaluated	0.58	0.62	0.57	0.73	0.74

$p<0.01$

Table 3. **Patient's admission to a ward**

Evaluated aspect	Ward	Mean value of points scored	Standard mistake	Significance level – p
Admission-related psychological problems of patients and their families were identified and action plan was established	01	45.28	0.831	p<0.001
	02	39.33	0.963	
	03	15.37	0.749	
	04	6.57	0.859	
	05	12.06	0.624	
On admission, action plan connected to patients' social problems was established	01	42.33	0.756	p<0.001
	02	38.22	0.956	
	03	21.34	0.755	
	04	39.23	0.942	
	05	20.35	0.742	
On admission action plan connected to patients' habits and free time organisation was established	01	10.06	0.512	p<0.001
	02	15.31	0.736	
	03	18.22	0.859	
	04	9.21	0.8550	
	05	15.09	0.731	

its into consideration in 100%, while in O4 ward only in 20% and in O5 ward – in 50%. In O2 ward in 100% of records the above aspect was not mentioned whereas in O1 ward – in 90%. In wards O1, O2, O3 and O5 patients' psychological condition was assessed in 100% of records, and in O4 ward – in 80%. *Tab. 2* presents the correlation coefficient between the evaluated aspect and the analysed group, records.

Further analysis was concerned with selected aspects from the third part of the evaluation chart – patient's admission to a ward (part II containing physical examination's results was omitted for the research need). The following aspects were evaluated: 1. Action plan resulting from the necessity of ensuring patients' safety was established; 2. Admission-related psychological problems of patients and their families were identified and action plan was established; 3. On admission, action plan connected to patients' social problems was established; 4. On admission action plan connected to patients' habits and free time organisation was established. Satisfying conditions 1 and 2 of the evaluation aspect did not cause problems in any of the wards. Nurses in their documentation most often recorded the presence of negative feelings, such as: fear, depression, or anger, and rarely – positive feelings: happiness or satisfaction. As far as conditions 3 and 4 of the evaluation aspect, there were considerable differences between the wards, which is presented in *Tab. 3*.

Part IV of the evaluation chart concerning nursing diagnosis and realization of psychological support, was to assess whether the diagnosis was connected with the realization of psychological support. As far as the realization of informative support is concerned, the following elements related to ensuring patients' safety were evaluated: familiarizing patients with their rights, personnel and other patients in the ward, the presentation of

Table 4. **Nursing diagnosis and support realisation**

Analysis of variance, one-way ANOVA				
Support	**Group**	**Sum of quadrants**	**Df**	**Significance level – p**
Informative	Between groups	6.190	4	p<0.05
	Within groups	49.407	124	
	Total	55.597	128	
Service-material	Between groups	0.361	4	p<0.001
	Within groups	6.319	148	
	Total	6.680	152	
Emotional	Between groups	2.039	4	p<0.01
	Within groups	35.029	148	
	Total	37.059	152	

Figure 1. **Realization of support in the whole analysed group**

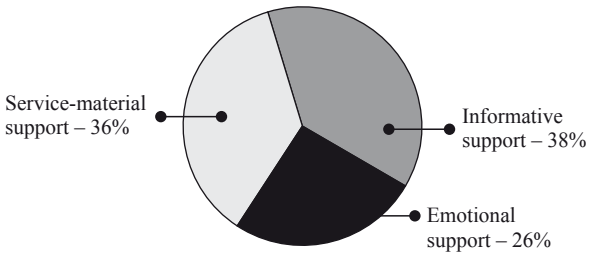
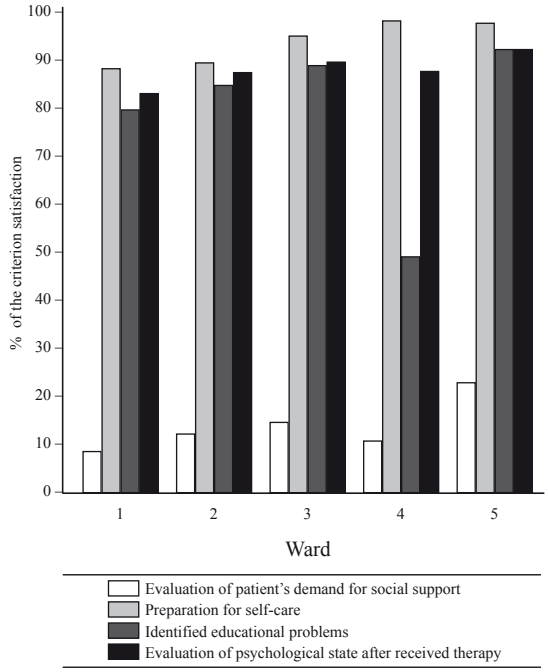


Figure 2. **Preparing patient for discharge**



the rules and regulations in the ward, informing patients about pastoral – psychological care.

As far as the realization of material and service support is concerned the following elements were evaluated: preparing for self-care, health education, solving care-related problems, preparing for discharge.

As far as the realization of emotional support is concerned the following elements were evaluated: actions reducing anxiety resulting from admission to the ward – entering a new group, psychological preparation for a medical procedure – examination, talks explaining the aim of the instrumental and care actions undertaken, support in reducing negative effects of a therapy (pain, nausea, vomiting), ensuring contact with a family. Between informative, emotional, and service-material support there were marked differences both between the groups analysed and also within the groups. This may indicate certain freedom in realization of tasks connected with psychological support. The above relations are presented in *Tab. 4* and *Fig. 1*.

The assessment of preparing a patient for discharge constituted an important element in which the degree of demand for social support, preparation for self-care, identified educational problems, and psychological state after received therapy were subject to evaluation. *Fig. 1* shows how little attention nurses pay in order to assess patient's demand for social support on discharge. The highest realization level was obtained while evaluating patients' preparation for discharge, but even here the results were not satisfactory – *Fig. 2*.

The criterion concerning a general evaluation of patients' psychological condition after received therapy was partially satisfied, which seems to correlate with a considerable disproportion in ability to determine patents' emotional states noticed by the authors. The results indicate that in all analysed wards the most problematic factor for nurses was taking the patients' (children's) habits and free time planning into account while establishing the plan of action. In numerous cases a stated nursing care diagnosis was not connected with the realization of psychological support. Providing the patients with the feeling of safety and contact with family was positively assessed.

Discussion

Noticeable transformations in Polish nursing indicate constant changes, innovations aiming at further development of nursing care concept by putting contemporary nursing ideas in practice [17]. Thanks to this, nursing services offered are fully

professional and include all bio-psycho-social and health needs of a person. Thus, the emphasis is shifted away from performing individual nursing actions towards the idea of complete care of a patient [11]. The research reveals that information from medical records presents actions undertaken in the case of each patient, the way of solving their problems, providing psychological support and educating. One has to realise the fact that every medical record reflects, in more or less clear way, how the people who were keeping it understand the idea of nursing including the concept of nursing as a combination of practical activities [4,16]. While preparing care plans nurses should remember that the day patients are discharged from hospital, they will need support in home environment [5]. To determine the need of such kind of support seems quite appropriate due to an increasing number of successfully run mutual-aid societies, groups and non-governmental organisations. The problem concerning certain inability to record nursing procedures related to psychological support of a cancer patient is far too often neglected or even ignored by people controlling the quality of nursing services. Determining patient's habits during the initial stage of gathering information should play a major role, especially in paediatric wards. Unfortunately, according to what has been revealed in research, this is not always realized. As it is correctly observed, the quality of medical service is influenced by a human factor [9], however, what the authors emphasise, care of a cancer patient undergoes significant changes in which nurses play a key role. Health care reform currently taking place in Poland requires from nurses paying more attention to patients' needs. As it is highlighted in the literature on the subject, the aspect of guaranteeing all patients the best possible medical and nursing care has to constitute the main strategy for the management and personnel's everyday activities [8,10]. The management has to possess effective tools for evaluating the quality of services offered, including psychological support. This research is an attempt of presenting the possibilities of evaluating the realization of psychological support in relation to cancer patients, based on nursing care process records. The results presented should be treated as an initial report, since the authors are aware that the tendencies and regularities have to undergo analysis in a larger-scale research project.

Conclusions

1. The evaluation chart of nursing care history is a tool which makes it possible to analyse the realization of psychological support in nursing care process.

2. The results of the analysis concerning the realization of supporting cancer patients should form the basis of a current evaluation of the quality of care offered and its improvement.

3. In the care process nurses should pay more attention to the evaluation of patients and their families' need of social support.

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Estimation of the psychological load in the performance of nurses' work based on subjective fatigue symptoms

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Abstract

Purpose: The performance of ergonomic analyses for workplaces is justified by the fact that safe and comfortable working conditions for employees are required. The obtained results may be used to facilitate the implementation of organizational changes in health care centres. A complex assessment of occupational load is not always possible. In this paper it is limited to one factor, constituting the psychological component. The aim of this paper is to assess the psychological fatigue of nursing personnel.

Material and methods: The only indicator analysed in the study concerns the activity of nurses working on two or three shift schedules on two clinical wards. To measure psychological fatigue one of the available scales was used, i.e. the Japanese questionnaire. In total 108 subjective survey records of fatigue were obtained.

Results: The obtained results show that overall activity decrease was between small and average. On the 12-hour shift schedule this decrease amounted to 29.34% (cardiology) and 34.77% (surgical), whereas on the 8-hour shift schedule it was 24.58% and 17.36%.

Conclusions: With a more significant activity decrease recorded for the 12-hour shift schedule, it should be assumed that the quality and efficiency of work performance on 8-hour shifts is higher and the risk of error decreased.

Key words: psychological load, nurse, physical fatigue.

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Introduction

Psychological load, as well as fatigue resulting from physical discomfort, is a factor of work performance. In the case of nurses, it results primarily from the specificity of working among sick and suffering people [1].

If we assume that psychological load refers to the subjective responses of employees to the requirements of their job, the level of this load depends on the difficulty of a task, the impact of both the internal and the external working environment, and individual capabilities [2].

Both in the past and at the present time the possibilities of improving work performance and the reduction of its biological cost remain the focus of researchers' attention.

The relationship between the employees and the elements of their work environment are the scope of the field of ergonomics. Ergonomics is aimed at the reduction of workload consequences and concurrent risks with the maximum possible application of technological achievements [3]. The term *ergonomics* was used for the first time by the Polish naturalist, Jastrzębowski (1857) to describe the science concerning the powers and skills given to a human being by the Creator [4]. The term *ergonomics* was created by the combination of two words of Greek origin: *ergon* meaning work, and *nomos* meaning a rule or law. Krauze has defined ergonomics from the medical point of view by reformulating its name as industrial ecology. In such a meaning ergonomics is no longer limited to describing and analysing the work environment, but also endeavours to adapt the environment to the anatomical and physiological requirements of the body of a working individual by the utilization of all available measures.

Ergonomic methods and techniques are willingly applied in the rationalization of work processes. Currently the analysis of the work process performed by workers fails to succeed without the prior conducting of ergonomic surveys.

Nursing work has been considered as the most difficult and most responsible. It entails the saving of human health and life,

and demands ongoing availability and coping with the requirements of a work position. Inevitably, a psychological load, both mental and emotional, occurs [5]. The purpose of this paper is an attempt to estimate the psychological load in nursing work positions based on subjective fatigue symptoms. Activity, as one of three criteria, was analysed.

The major question concerning the research has been formulated as follows:

What is the workload in the nursing position based on subjective fatigue symptoms?

The major question has been supplemented by detailed questions:

1. To what degree does the activity of nurses working in the 12- and 8-hour shift systems decrease in particular time intervals?
2. Does work in two different wards (cardiology and surgical) have an influence on the degree of decrease in the activity of nurses?
3. What is the total activity decrease concerning particular work shifts?

Material and methods

The survey was based on the standardized method of a Japanese questionnaire [6]. The questionnaire enables the analysis of the psychological load based on subjective fatigue symptoms within the scope of three reported types of symptoms: 'A' – activity, 'B' – motivation, 'C' – projection of physical fatigue. Such a type of measurement concerning general and sensitive factors provides essential information regarding the type of psychological load [7]. The questionnaire was prepared by Yoshitake in 1967 for the survey needs of the Industrial Fatigue Research Committee of the Japanese Association of Industrial Health [6]. The Japanese questionnaire, when applied in the authors' own research for the estimation of psychological load in nurses, was modified with respect to the original. The modification concerned the number of questions and their contents [2]. The questionnaire includes 30 expressions identifying the current subjective feeling of a surveyed individual. A surveyed nurse, when estimating subjective symptoms of fatigue, identifies current feeling on a scale from 5 to 1 of the research instrument. The factor of the total fatigue is calculated based on the frequency index concerning the incidence of fatigue in per cent according to the equation:

$$\text{\% frequency index of fatigue symptoms} = \frac{\text{number of entries}}{\text{max. number of entries}} \text{ X } 100\%$$

where: number of entries is the score for particular symptoms A, B, or C; max. number of entries equals 4x10x number of surveyed individuals

The survey was carried out in January, 2007 in two clinical wards, i.e. cardiology and surgical. It included nurses working in the 12-hour (daytime shift) and 8-hour (morning shift) systems. 108 subjective reports on fatigue symptoms were obtained as a result. The survey was conducted with the involvement of female students of post-graduate extramural studies from the Faculty of Nursing of the MU of Białystok. Nurses working in the two-shift system evaluated their fatigue: at the beginning of a shift, in the middle of the shift and at the end of the shift, whereas the nurses working in the three-shift system evaluated fatigue at the beginning of a shift and at the end. The age of surveyed individuals in both groups was similar. The most numerous group included nurses aged 31 to 40 (40% in the surgical ward and 45% in the cardiology ward). Regarding the employment period, the most numerous group of nurses consisted of those with 16 to 25 years' employment in both wards. Their share in the cardiology ward amounted to 50%, and in the surgical ward 40%.

Table 1. **Estimation of workload based on subjective fatigue symptoms in per cent in A group – activity decrease. 12-hour shift schedule**

Work in 12-hour schedule		
Time of survey	**Cardiology**	**Surgical**
Beginning of shift 7.00 a.m.	11.07%	15.22%
In the middle of shift 1.00 p.m.	18.92%	31.13%
End of shift 7.00 p.m.	58.03%	57.95%
Total activity decrease	29.34%	34.77%

Results

The first group of fatigue symptoms, concerning activity, i.e. 'A' was analysed. Questions contained in the A section of the questionnaire referred to the following symptoms: I want to lie down, I feel drowsy, I feel dizzy, my eyes are tired, my whole body feels heavy, I get tired in the legs, I get clumsy in motion, my whole body feels tired, my head is heavy, I yawn. The calculation of activity decrease in nurses was calculated according to the applied equation for identification of the index of total fatigue, with time intervals during the shifts taken into account. The interpretation of the fatigue index calculated in per cent for the A group concerning the activity of nurses working in the 12-hour schedule (*Tab. 1*) has revealed an index of activity decrease (A) at the beginning of a shift amounting to 11.07% on the cardiology ward, and 15.22% on the surgical ward. The most significant activity decrease at the beginning of work was reported for the 8-hour schedule (23.75%) on the cardiology ward. This indicates decreased activity already at the beginning of work. An activity decrease by 5.2 times was recorded after the 12-hour shift in the cardiology ward, and slightly lower, however, also considerable, in the surgical ward. The indexes calculated in per cent for activity decrease attained 58.03% (cardiology ward) and 57.95% (surgical ward). The analysis of data concerning activity decrease collected at 7.00 a.m., 1.00 p.m. and 7.00 p.m. revealed the most significant activity decrease occurring between 1.00 p.m. and 7.00 p.m. During the 8-hour shift the most significant activity decrease occurred after work (27.78%) with respect to the beginning of the shift (6.94%) and it was recorded in the surgical ward (*Tab. 2*).

Table 2. **Estimation of workload based on subjective fatigue symptoms in per cent in A group – activity decrease. 8-hour shift schedule**

Work in 8-hour Schedule		
Time of survey	**Cardiology**	**Surgical**
Beginning of shift 7.00 a.m.	23.75%	6.94%
End of shift 2.35 p.m.	25.41%	27.78%
Total activity decrease	24.58%	17.36%

A more significant total activity decrease was found in nurses working in the 12-hour schedule. The calculated index was double for the surgical ward (*Fig. 1*).

Discussion

The present paper has focused on the analysis of only one group of fatigue symptoms, i.e. group 'A', concerning activity. Therefore, the identification of the total psychological load requires the analysis of another two groups of symptoms, i.e. 'B' concerning motivation, and 'C', concerning the projection of physical fatigue. The 12-hour shift schedule is preferred by the predominating part of the nursing personnel. Employers are also concerned with benefits resulting from such a shift schedule, owing to the possibility of a reduced demand for staff [1,8]. The preferences regarding the duration and time of shifts are mainly connected with non-occupational issues. Yet the fact remains that the work in the two shift schedules results in a more significant load, both physical and psychological, in the position of a nurse. The psychological weariness and increased tiredness result in a deterioration of performed work and an increased number of error incidents [8].

The carried out surveys presented the activity decrease, and the concurrent increase in fatigue, to be more significant in nurses working on 12-hour shifts. This finds confirmation in the results of surveys carried out by Gaweł, identifying the average response time concerning mental and physical diligence in nurses working according to both schedules. The longest average response time was recorded in the group of nurses employed on a 12-hour shift, and particularly concerned the night shift.

The research in the work process carried out in medical care centres implies that nurses are exposed to excessive physical and psychological load, and this is essentially influenced by work organization, technical equipment and the conditions created by premises [6].

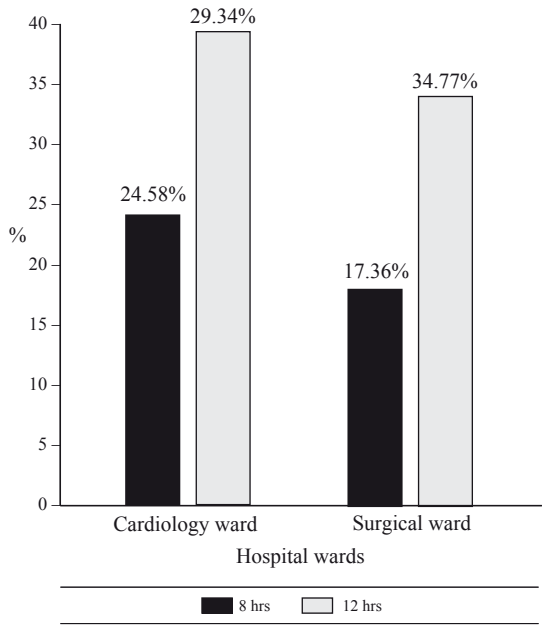
A combined application of both the Japanese questionnaire and an assessment method ignoring subjective determinants would enable a more meticulous analysis of psychological load concerning workplaces [2,10].

Conclusions

The total index for activity decrease in nurses employed in the 12-hour shift schedule amounted to 29.34% (cardiology ward) and 34.77% (surgical ward). Regarding the 8-hour schedule the results obtained were 24.58% and 17.36%, respectively. Total activity decrease was determined on the border of low and average. Activity decrease in cardiology and surgical wards was similar. The degree of activity decrease was irrespective of the type of wards.

With a more significant activity decrease recorded for the 12-hour shift schedule, it should be assumed that the quality and efficiency of work performance on 8-hour shifts is higher and the risk of error decreased.

Figure 1. **Total activity decrease in two shift schedules**



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The analysis healthy behavior among elderly people in Juczyński's Inventory of Healthy Behavior

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Abstract

Purpose: The aim of our research was the analysis healthy behavior in people, who continued their education in the third age group at Universities and elderly hospitalized patients.

Material and methods: The study group included students in the third age group at Universities and Senior Clubs and patients hospitalized in the Department and Clinic of Geriatrics, there were 87 women and 37 men, in total 124 people. The mean age of the evaluated people group was 67.6 years. The research was carried out by diagnostic poll method with the application of Juczyński's Inventory of Healthy Behavior (IoHB).

Results: The studied people group showed a high level of health behavior, obtaining higher scores than standard for older people. This difference was statistically significant for all studied rates. In our study, the standardized rate was in general 6.50, including 6.39 for women and 6.76 for men. Such rate value of health behavior should be considered as average rather than high.

Conclusions: The older people in the present report have a high level of healthy behavior compared to the average for adult population.

Key words: health behavior, elderly, quality of life.

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Introduction

The second half of the 20th century was a significant period of changes in the demographic structure in Poland and in the world. The main characteristic was a transition from high birth and death rate to a low population growth rate and also low mortality rate. The demographic prognosis predicts further increases especially of the number of people in advanced old age [1].

Ageing is a dynamic process, to which every human is subjected. It is also a physiological stage following biological, psychological and social transformations. In the old age period changes in social areas ensue, new perspectives for further human development also open up in this age. Longer professional, family or social activity is dependent on the state of health [2-5]. Various factors have influence on the lengthening of a human's life, firstly, civilization's development, next, advanced medical achievements, and lastly the improvement in the quality of older people's treatment and care, the general improvement of living conditions, and a greater awareness of health displayed in the taking care of health and preferring pro-health [2,4,6,7]. Life style in old age is conditional on earlier acquired attitudes to one's health and habits related to proper nutrition, physical activity, the ability to cope with stress and the restriction of the usage of stimulants. The positive influence of these behaviors on health and quality of life has already been documented by scientists studying this area of knowledge [8-11]. Although the ageing of organs inevitably takes place, by our own conduct we can have an influence on retaining psychological and physical independence from our surroundings longer, this is so important especially in this age.

Nutritional mistakes and low physical activity resulting have implications on health and are most often confirmed by scientific research as anti-healthy behavior areas [12-15].

The aim of our research was the analysis of the increase of healthy behaviors in people who take up education in the 3rd Age Universities and elderly hospitalized patients.

Material and methods

The study group was made up of students in the III Age Universities, Senior Club and patients hospitalized in the Department and Clinic of Geriatrics in Bydgoszcz. The research included 87 women and 37 men, in total 124 people. Sixty people who studied at the 3rd Age University and Senior Club, while 64 people were patients at the Department of Geriatrics. The mean age of the studied people was 67.6. Among the respondents there were 14 people under the age of 60, between age 60 and 74 there were 70 people, between age 75 and 90 – 21 people, 14 people did not give their age. Most respondents lived in cities (80.6%), while 19.4% in the country. There were 51.6% of the people who had technological and elementary education, 34.7% who had a secondary education and 13.7% who had higher education. 78.2% defined their economical status as good, while 21.8% defined it as difficult. The marital status of the study group presented as follows: there were 77 married people was while 7 declared an unmarried status and 40 people were widows and widowers. 78.5% co-habitated with families, while 21.5% of the respondents lived alone.

The study was carried out by diagnostic poll method with the application of Juczyński's Inventory of Healthy Behavior. This questionnaire includes 24 statements defining groups of behavior connected with health. While collating the results, the general intensification of pro-health behaviors is counted and separated into four levels of health behavior categories: proper nutrition habits, prophylaxis behavior, health practices and positive psychological attitudes. Statements describing prophylaxis behavior are related to the observance of health recommendations and obtaining information about health and disease. Health practices show everyday habits related to sleep, recreation and physical activity. The area of human psychological functioning. An inventory may be used to examine both healthy and sick adults. The research results deliver knowledge related to the actual behavior of the group examined and may serve as an action program promoting health and prophylaxis [16]. The results were notified in the statistical analysis using Chi-square test and Student's t-test for average.

Results

The health behavior rate was counted; its outcome restricted to the whole study group came out on average 89.6. Separate outcomes were obtained for women 90.08 and for men 88.54. The mean for all population studied in individual categories of healthy behavior show higher scores than in standardized researches.

A significant difference was observed in the positive psychological attitude category in men, while for women it was in prophylaxis behavior. We can state, with only a 5% risk of error, that health behavior in the people group people with good material status was higher (rate 6.70) than those without. Using information about health from different sources really influenced higher rates, in all cases, general as well as detailed. People using information about health have significantly higher general Health Behavior Rate (HBR=6.76) than other people (HBR=5.54) and also a significantly higher rate in all categories except the healthy practices category.

Table 1. **Mean outcomes for specific behavior categories in the study group beside the standard outcome**

Behavior categories	PNH	PB	PPA	HP
Research outcome	3.50	3.75	3.86	3.82
Standard outcome	3.22	3.42	3.52	3.32

PNH – Proper nutrition habits; PB – Prophylaxis behavior; PPA – Positive psychological attitude; HP – Health practices

Our results show that the rate for healthy practices significantly increases with age. These findings also show that the healthy practices of people living in cities are significantly higher than those in the country. Statistically, the other rates do not change in any radical way.

Marital status did not have any influence on healthy behavior in the study group. There also was no significant difference between the group of the 3rd Age University students and the hospitalized patients although the rates for the first group were a higher.

Discussion

Healthy behaviors are the result of an attitude to health, acquired during our whole life, especially important is the feeling of being responsible for one's own health and someone else's [6]. The older people studied showed quite high levels of healthy behaviors compared with the standard for adults (81.82 – general rate) 84.03 for women and 78.50 for men, higher outcomes were obtained [16]. This difference is statistically significant for all mentioned rates. In our studies the standardized rate (according to IoHB: temporary polish norms 1998-1999) generally came to 6.5, 6.39 for women and 6.76 for men. These results should be considered as average, close to high (from 7-10 is high) [16].

The men studied showed greater psychological adaptation characterized with the ability to avoid negative emotions, stress and psychological tension, than the women. Unfavorable psycho-social situations, restricted social roles, limited new life targets and isolation in old age has a direct influence on the degradation of health status [5]. That is why an important aspect of good health is attributed to the psychological aspects of healthy behavior [5,16].

Regular physical activity has great importance in keeping healthy, which is a factor contributing to successful ageing [9].

Systematic physical activity in older people has influence on the extension of the physical fitness and independent living period, so improves quality of life. Regular physical activity results in measurable benefits in the form of reducing costs for health care, improving the ability of older people to work, as well as promoting a positive outlook in older people. With older people who live in a home environment and have an increased physical activity level, the general number of upper respiratory infections decreases. Physical activity also lowers the risk

***Table 2*. Mean outcomes for specific health behavior categories depending on gender**

Category	PNH	PB	PPA	HB
Women	3.56±0.142	3.84±0.135	3.77±0.141	3.84±0.139
Men	3.37±0.197	3.54±0.197	4.08±0.127	3.77±0.186

PNH – Proper nutrition habits; PB – Prophylaxis behavior; PPA – Positive psychological attitude; HP – Health practices

***Table 3.* The influence of education on health behavior categories in the studied group**

Category	PNH	PB	PPA	HP	General state
People using health education	3.63	3.84	3.95	3.83	6.76
People not using health education	3.02	3.42	3.54	3.79	5.54

PNH – Proper nutrition habits; PB – Prophylaxis behavior; PPA – Positive psychological attitude; HP – Health practices

of cardiovascular system diseases [8,9]. The people studied showed a high level of healthy practices related to their habits of rest, recreation and physical activity. In the study group healthy practices significantly increased with age and most often were related to people living in the city rather than in the countryside.

Improper nutrition connected with a too high or insufficient supply of nutrients lead to metabolism disorders and civilization-related diseases [11,15]. Obesity was more often found than malnutrition, which results in certain health problems. Older people very often eat incorrectly, yet they have special nutritional needs and require help in working out a proper diet, taking into consideration quantitative and qualitative requests as well as health status. Lowering the caloric intake in view of reduced physical activity is invaluable [10,11,15].

From the all-Polish research it follows that one in every three Polish adults is overweight, while one in every eight is obese. In recent years it has been observed that the occurrence of adult women who are overweight has lessened. The rate of overweight women is now 27% of all women vs 33% of all men. At the same time women more often have body weight deficiency (underweight), especially younger women (under 30 years) [17]. Studies of the older population in Poznań showed, however, definitely higher outcome [15]. In our research the rate, related to nourishment of people studied, came to 3.5 and was higher than the standard outcome.

Conclusions

Older people were characterized with a higher healthy behavior level than the mean for the adult population. The rate of healthy practices in areas of rest, recreation and physical activity characteristically improved with age and was mostly related to people living in cities rather than in the country. Educational training in the area of proper nutrition, disease prophylaxis and improvement of psychological functioning especially in elderly women should be increased. Promoting healthy actions should also be aimed at the older population.

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Quality of life and depression in schizophrenic patients

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Abstract

Purpose: The aim of the study was to assess depressive symptoms, and to establish their influence on the subjective and objective quality of life (QOL) in schizophrenia patients.

Material and methods: Seventy four subjects: 46 male and 28 female, aged 24.7±6.7 years, were enrolled for the study. World Health Organization of Life Instrument – Bref (WHO-QOL-BREF), Social Functioning Scale (SFS) and Calgary Depression Scale for Schizophrenia (CDSS) were used.

Results: Severity of depressive symptoms showed moderate correlation with objective and strong correlation with subjective measures of QOL.

Conclusions: Detection and appropriate treatment of depressive symptoms in schizophrenic patients may affect their functioning and perception of own health.

Key words: schizophrenia, depression, quality of life.

Introduction

Depression rate among schizophrenic patients ranges from 6%-75% in the course of psychosis in general. In first psychotic episodes and psychotic relapses the prevalence of depression varies from 65-80% and in the psychosis-free intervals from 4-20% [1]. Several authors reported negative correlation between depression and quality of life QOL. However, these studies concerned mainly subjective QOL. Recently, Reine at al. [2] found a strong association between depressive symptoms and overall QOL in schizophrenic patients in a stabilized phase of the disease (mean duration of schizophrenia: 11.3 yrs). Also, the influence of depression on QOL appeared to be stronger than psychotic symptoms. Previous studies [2,3] have shown that the correlation between subjective and objective assessment of QOL is rather weak and that is why it should be examined simultaneously from subjective and objective perspective. The latter is usually subsumed under the categories of functioning (e.g. frequency of social contacts, occupational status, income, living conditions). In our earlier research we found that depressive symptoms were significantly correlated with subjective QOL but not with objective QOL, although these results concerned patients in the early stage of the disease (13 months after a first hospitalization) [3].

The present paper is a continuation of the above study, which is a longitudinal observation of the cohort of first – episode schizophrenia patients, started in 1998. The purpose of this analysis was to evaluate the relationships between depression and objective and subjective quality of life in the context of the psychopathological symptoms.

Material and methods

Ninety six patients were qualified for the study after their first hospitalization due to the episode of psychosis. At discharge, all study subjects met the diagnostic criteria for schizophrenia and signed the informed consent for the study. The patients were assessed three times: 1 month (T1), 13 months (T2) after hospitalization and 4-6 years after T1 (T3). During the first, second and third examination, respectively, 8, 2 and 12 patients refused to participate, resulting in final group of 74 subjects: 46 male and 28 female; aged 24.7±6.7 years (range 16-47). In this paper we present the results from T3 examination only.

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Table 1. **Comparison between non-depressed and depressed schizophrenic patients for QOL scores and PANSS scores (Mann-Whitney U-test)**

	Non-depressed (CDSS<6) *n*=40	**Depressed** (CDSS≥6) *n*=34	**Mann-Whitney U-test**
Objective QOL			
Social Functioning Scale global	113.6 ±8.6	99.3±11.7	<0.001
Social engagement (SE)	113.0±10.6	98.4±10.5	<0.001
Interpersonal communication (IC)	126.3±18.0	105.2±14.0	<0.001
Social activity (SA)	115.4±13.2	97.6±17.0	<0.001
Recreational activity (RA)	114.6±14.0	100.0±17.8	<0.001
Independence performance (IP)	106.0±12.7	93.8±17.0	<0.001
Independence competence (INC)	113.0±11.3	102.2±16.5	<0.01
Occupational activity (OA)	109.3±11.3	97.5±12.4	<0.001
Subjective QOL			
Overall quality of life (Q1)	3.8±0.9	2.6±1.0	<0.001
Self-evaluation health status (Q2)	3.8±0.9	2.4±1.0	<0.001
Physical domain (PH)	16.3±1.9	12.1±2.7	<0.001
Psychological domain (PS)	15.3±10.0	10.0±2.3	<0.001
Social relationships domain (SR)	14.1±3.1	11.3±3.0	<0.001
Environment (E)	14.6±1.8	12.1±2.2	<0.001
PANSS score			
Total	60.1±29.3	112.7±27.1	<0.001
Positive subscale	12.5±5.9	22.9±7.0	<0.001
Negative subscale	14.8±8.6	28.7±10.5	<0.001
General psychopathology subscale	32.8±16.2	60.3±15.0	<0.001

Values are given as mean ±SD

Abbreviations: Quality of Life (QOL), the Positive and Negative Syndrome Scale (PANSS)

Instruments

Objective QOL was assessed with Social Functioning Scale (SFS) [4]. The scale asks the patient about performance in seven areas: Social Engagement (SE), Interpersonal Communication (IC), Recreational Activities (RA), Social Activities (SA), Independence Competence (INC), Independence Performance (IP) and Occupational Activity (OA). Subjective QOL was measured using the Polish version of World Health Organization of Life Instrument – Bref (WHOQO-BREF). The WHOQOL-BREF [5] is an international quality of life instrument which produces a profile with four domains scores: Physical (PH), Psychological (PS), Social relationships (SR), Environment (E) and two separately scored items about the individual's perception of quality of life (Q1) and health (Q2). According to WHO quality of life is "'individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" [6]. Depression was evaluated with the Calgary Depression Scale for Schizophrenia (CDSS). CDSS is a 9-item questionnaire (depression, hopelessness, self-depreciation, pathological guilt, guilty ideas of reference, morning depression, early awakening, suicidal, observed depression). The range of the global score is 0-27 and according to Addington et al. [6], schizophrenic patients with a CDSS global score ≥6 were considered depressed. Psychpatological symptoms was assessed with the Positive and Negative Syndrome Scale (PANSS) which includes a structured interview to assess patients on 30 items covering positive, negative and general symptoms [7]. For each item, ratings are made on a 1-7 scale of symptom severity. Demographic and clinical variables were measured with a structured interview.

The protocol of the study was accepted by Bioethical Committee of Poznań University of Medical Sciences.

Statistical analysis

The relationships between QOL scores and clinical variables (CDSS, PANSS,) were studied using Spearman's correlation coefficient. QOL of depressed and non-depressed patients was compared with Mann-Whitney U test. ANOVA was performed to compare QOL in depressed and non-depressed patients with respect to PANSS total score, excluding the depression item (G 6). The significance level was set at $p<0.05$.

Results

Comparison of depressed and non-depressed patients

Thirty three patients (45.9%) were considered depressed (CDSS score ≥6). With regard to quality of life, the depressed group scored significantly lower than non-depressed subjects, both in objective and subjective QOL. PANSS total and all PANSS subscales scores were significantly higher for the depressed than non-depressed patients (*Tab. 1*).

Table 2. **Spearman correlation between objective quality of life (SFS scores) and clinical variables: PANSS, CDSS**

PANSS	SFS global	SFS subscales						
		SE	IC	SA	RA	IP	INC	OA
Total	-.74**	-,68**	-.56**	-.51**	-.50**	-.64**	-.49**	-.50**
Positive	-.67**	-.62**	-.50**	-.49**	-.45**	-.55**	-.47**	-.49**
Negative	-.72**	-.66**	-.59**	-.47**	-.42**	-.59**	-.55**	-.54**
General	-.72**	-.65**	-.52**	-.50**	-.51**	-.63**	-.48**	-.44**
CDSS	-.58**	-.60**	-.46**	-.49**	-.45*	-.43**	-.44*	-.42**

Significance: *P<0.05; ** P<0.001

abbreviations: Social Functioning Scale global (SFS), SFS subscales: Social engagement (SE), Interpersonal communication (IC), Social activity (SA), Recreational activity (RA), Independence performance (IP), Independence competence (INC), Occupational activity (OA), the Positive and Negative Syndrome Scale (PANSS), Calgary Depression Scale for Schizophrenia (CDSS)

Table 3. **Spearman correlation between subjective quality of life (WHOQOL scores) and clinical variables: PANSS, CDSS**

PANSS	WHOQOL-BREF					
	Q1	Q2	Domains			
			PH	PS	RS	E
Total	-.46**	-.56**	-.64**	-.65**	-.40**	-.48**
Positive	-.48**	-.51**	-.60**	-.60**	-.37*	-.45**
Negative	-.42**	-.56**	-.58**	-.58**	-.39**	-.47**
General	-.42**	-.54**	-.61**	-.62**	-.39**	-.49**
CDSS	-.60**	-.60**	-.75**	-.84**	-.48**	-.69**

Significance: ** P<0.01

abbreviations: Overall quality of life (Q1), Self-evaluation health status (Q2), domains: Physical (PH), Psychological (PS), Social relationships (SR), Environment (E), Calgary Depression Scale for Schizophrenia (CDSS)

Correlations between QOL, PANSS and CDSS

All domains of objective and subjective QOL were significantly negatively correlated with the total PANSS, and all its subscales *(Tab. 2* and *Tab. 3)*. The highest correlation between PANSS and SFS were found in the Social engagement, Interpersonal communication and Independence performance. Regarding subjective QOL, the highest correlations were noticed in Physical and Psychological domains. Severity of depressive symptoms correlated higher with subjective than with objective QOL scores.

When adjusted on the PANSS total score excluding the depression item (G 6) (ANOVA) the above results concerning differences between QOL of depressed and non-depressed patients, remained consistent for the Psychological domain of the subjective QOL (WHOQOL PS domain) ($p<0.02$) and overall QOL (WHOQOL – Q1) ($p<0.01$). The ANOVA indicated significant association between PANSS total score and all SFS and WHOQOL subscales ($p<0.05$), except for the WHO--QOL PS domain.

Discussion

Results of this study suggest, that both current symptoms of schizophrenia (measured with PANSS) and of depression (measured with CDSS) may influence subjective and objective quality of life in schizophrenic patients in 4-6 years after the first hospitalization.

The relationship between PANSS score and objective and subjective quality of life was previously observed in short-term follow-up [3], which indicates that influence of psychopathology on measurement of QOL remain constant feature of schizophrenia. This may indirectly confirm the usefulness of QOL questionnaires as outcome measures in this disorder.

The association between depressive symptoms measured with CDSS and subjective QOL was earlier described by Reine et al. [2] who found that, in patients with schizophrenia, depression was a stronger predictor of QOL than extrapyramidal symptoms. The major advantage of both studies is the use of Calgary Depression Scale for Schizophrenia, which was specifically designed for this clinical population. The higher correlation observed between depression severity and subjective quality of life than between depression and objective QOL may suggest, that the latter is less affected by personal perception of one's own situation.

We observed, that almost half of patients with schizophrenia, in 4-6 years of follow-up after the first hospitalization, suffer from significant depressive symptoms. They are associated with lower subjective and objective quality of life. After adjustment for the severity of schizophrenic symptoms (PANSS score) these results remained significant for Psychological domain of subjective QOL and overall QOL, which suggest that these two dimension are mostly influenced with depressive and not other symptoms.

The major limitation of this study is measurement of three constructs, which show partial overlap. Symptoms of depres-

sion, negative symptoms of schizophrenia and indicators of quality of life can be correlated, because they refer to the same behaviors and mental states [8]. Moreover, depression may cause distortion in individual's perception of own situation, which subsequently leads to lower score in QOL questionnaires. That's why the results of the subjective QOL evaluation should be interpreted not only on overall level but also on the subdomain level, as was done in the present study.

In conclusion, this study shows that symptoms of depression, which are present in about half of schizophrenic patients significantly affect their quality of life. This may be particularly relevant in subjective QOL, thus detection and appropriate treatment of depressive symptoms may improve outcome in patients with schizophrenia.

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Seasonal variation in ischaemic stroke frequency in Podlaskie Province by season

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Abstract

Purpose: The aim of the present study was to assess seasonal differences in ischaemic stroke among patients hospitalized in Department of Neurology in Białystok during 2002-2005.

Material and methods: To examine the seasonal incidence of ischaemic stroke, we analyzed data from the Department of Neurology in Białystok in a retrospective study. The year was divided into four seasons: spring (March, April, May), summer (June, July, August), autumn (September, October, November), and winter (December, January, February). Seasonal differences were studied in relation to the following clinical characteristics: age, gender, history of stroke, and time of stroke onset.

Results: Age of patients with ischaemic stroke ranged 19 between 101 years, a mean age was 72.4±12 years. Incidence of ischaemic stroke increased in the last years. We noted a higher incidence of ischaemic stroke in older patients (mean 74.36 years old) during winter months than in patients (71.40 years) in summer months. Gender had no effect on incidence of ischaemic stroke. Significant seasonal variation of ischaemic stroke in all years (p=0.0010) and for 2005 year (0.0090) were found. Incidence of ischaemic stroke was depend on month of year. Significant increase of ischaemic stroke was noted in December. The lowest incidence of stroke was observed in August and September.

Conclusion: Incidence of ischaemic stroke increased in the last years. The present findings suggest an increase in the incidence of ischaemic stroke in winter in December.

Key words: ischaemic stroke, seasonal variation, year.

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Introduction

In recent years, many studies have been conducted to elucidate seasonal differences in stroke incidence [1-3]. These studies demonstrated that strokes, intracerebral hemorrhage in particular, occur most frequently in winter [3-5]. Seasonal variation of ischaemic stroke, however, has not been the focus of much research [4,5]. It was reported [1,4] that the incidence of ischaemic stroke peaked in winter, but others [6] demonstrated that ischaemic stroke increased during the warmer months. In contrast to these studies, Rothwell [7] showed that frequency of ischaemic stroke did not differ with season. The aim of the present study was to assess seasonal differences in ischaemic stroke among patients hospitalized in Department of Neurology in Białystok during 2002-2005.

Material and methods

To examine the seasonal incidence of ischaemic stroke, we analyzed data from the Department of Neurology in Białystok in a retrospective study. Patients with transient ischaemic attack and haemorrhagic stroke were excluded from the study. Clinical characteristics, including age, sex, history of stroke, risk factors, time of stroke onset, stroke severity on admission, and outcome at discharge were recorded. Risk factors for ischaemic stroke include hypertension, diabetes mellitus, hyperlipidemia, current smoking, and atrial fibrillation. The year was divided into four seasons: spring (March, April, May), summer (June, July, August), autumn (September, October, November), and winter (December, January, February). Seasonal differences were studied in relation to the following clinical characteristics: age, gender, history of stroke, risk factors, time of stroke onset, and health status at the discharge. We used the chi-square test for analysis of seasonal differences for stroke occurrence.

Table 1. **Number of ischaemic stroke during 2002-2005**

Years	*N*	%
2002	217	18.5
2003	283	24.1
2004	325	27.7
2005	348	29.7

Table 2. **Number of ischaemic stroke during seasonal periods during 2002-2005**

Season	*N*	%	*N**	*N* – *N**
Winter	292	24.9	293	-1
Spring	321	27.4	293	28
Autumn	303	25.8	293	10
Summer	257	21.9	293	-36

Table 3. **Incidence of ischaemic stroke in patients in particular months during 2002-2005**

Month	Years									
	2002		2003		2004		2005		Total 2002-2005	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%
1	20	9%	23	8%	18	6%	28	8%	89	8%
2	11	5%	15	5%	21	6%	25	7%	72	6%
3	20	9%	27	10%	26	8%	26	7%	99	8%
4	28	13%	27	10%	31	10%	26	7%	112	10%
5	21	10%	19	7%	38	12%	32	9%	110	9%
6	16	7%	37	13%	23	7%	39	11%	115	10%
7	22	10%	22	8%	26	8%	26	7%	96	8%
8	18	8%	20	7%	33	10%	21	6%	92	8%
9	13	6%	25	9%	28	9%	22	6%	88	8%
10	20	9%	20	7%	26	8%	25	7%	91	8%
11	13	6%	19	7%	18	6%	28	8%	78	7%
12	15	7%	29	10%	37	11%	50	14%	131	11%
p^1	0.2463		0.1387		0.0787		0.0090**		0.0010***	

[1] chi-square test

Results

The present study included 1 173 patients with ischaemic stroke during 2002-2005 years.

Age of patients with stroke ranged 19 between 101 years, a mean age was 72.4±12 years.

Incidence of ischaemic stroke increased in the last years. Gender had no effect on incidence of ischaemic stroke. We noted increase number of strokes more than 11% in 2005 year compared to 2002 year. Results are shown in *Tab. 1*. In non-parametric test we found seasonal variation (winter, spring, summer, autumn), of ischaemic strokes (chi^2 test p=0.0592) (*Tab. 2*). We noted a higher incidence of ischaemic stroke in older patients (mean 74.36 years old) during winter months than in patients (71.40 years) in summer months (data are not presented).

Hypothesis on differences of ischaemic stroke in the particular months of year was tested (for an each year and all years). Significant seasonal variation of ischaemic stroke in all years (p=0.0010) and for 2005 year (0.0090) were found (*Tab. 3*). Incidence of ischaemic stroke was depend on month of year. Significant increase of ischaemic stroke was noted in December. The lowest incidence of stroke was observed in August and September (*Tab. 3*).

Discussion

In the present study, we demonstrated that the frequency of ischaemic stroke was higher in winter compared to other seasons. We noted that ischaemic stroke occurred more frequently in December. The lowest frequency of stroke was observed in August and September. No significant differences in the frequencies of ischaemic stroke were observed among summer, autumn, or spring. It was previously reported that ischaemic stroke occurred more frequently in winter than in other seasons [1,5]. These data are consistent with our findings. In contrast Ogata et. [8] found significantly higher incidence of ischaemic stroke in summer. Incidence of ischaemic stroke is reported to be associated with enhanced platelet aggregation and blood hyperviscosity [9]. Furthermore, hyperviscosity may be particularly important in the pathogenesis of lacunar stroke [10]. As temperature rises in summer, dehydration is more likely to occur, leading to hyperviscosity and enhanced platelet aggregation [9,11]. In the present study ischaemic stroke was seen more often winter. It is well known that infectious respiratory diseases are more common during winter. Infection increases plasma fibrinogen concentration and anticardiolipin antibodies and decreases protein C level, leading to a hypercoagulable state [12]. These coagulation abnormalities can promote the formation of intracardiac thrombi, contributing to the occurrence

of cardioembolic stroke [13]. It is likely that the frequency of ischaemic stroke would peak in the winter. A winter excess of ischaemic stroke of the order of 20-30% is a consistent finding in mortality and hospital based studies [14,15]. However, mortality is partly determined by complications of stroke, some of which, such as pneumonia, are seasonal. “Indeed, mortality due to stroke is particularly high after influenza epidemics”. Hospital based studies, on the other hand, may simply be measuring variation in the likelihood of hospital admission.

Conclusions

In conclusion, incidence of ischaemic stroke increased in the last years. The present findings suggest an increase in the incidence of ischaemic stroke in winter in December. Ischaemic stroke may be associated with infection, occurs most frequently in winter.

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Familial and social conditions of alcohol drinking in children and adolescents

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Abstract

Purpose: The aim of the study was to evaluate the frequency of alcoholic beverage use among children and young people of Białystok city and to assess the influence of familial and environmental factors on this phenomenon.

Material and methods: The study included 894 pupils in the city of Białystok. An anonymous questionnaire, prepared in the Department of Pediatric Nursery of the Medical University of Białystok was used in the study.

Results: The examinations revealed that alcohol use among adolescents of Białystok increases with the increasing age of pupils (33.2% – the first grade of middle school, 63.4% – the third grade of middle school, and 79.9% – the second grade of high school). The first experience with alcohol took place in the 5-10 age bracket, but the greatest alcohol initiation (35% of young people) was reported in the 10-15 age bracket; 16% of children were not capable of establishing proper relations with their parents. The examined pupils observed destructive behavior most frequently among their friends (38%) and in people with whom they had no direct contact (36.8%). Adolescents were revealed to use alcohol for company (21.6%), due to lack of safety feeling (18.4%), and the ability of free time organizing (23.4%).

Conclusion: 1. Alcohol use by children and adolescents from the city of Białystok increases with the age and the biggest alcohol initiation takes place in the age of 10-15 brackets. 2. Familial and social conditioning/factors influence alcohol use by children and adolescents.

Key words: children and adolescents, alcohol, familial and social conditioning.

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Introduction

The development of civilization creates numerous positive possibilities of the intellectual, physical, and psychosocial development of a young man. However, it can also bring about situations that influence negatively on his health [1].

The school age is a period of a child's dynamic development, in which behavior and abilities are created. It is also the period in which many disorders appear or are deepened and then are brought to the adult life.

The health potential, from childhood and adolescence, determines health, quality of further life, and proper functioning in the society [2].

According to the World Health Organization, alcohol use is one of the main risk factors for the health of young people [3]. The results of various studies, both in Poland and other countries, point to the fact that more than 80% of adolescents start drinking alcohol before 18 years of age [4-7]. Over 25% of examined pupils admit at least 4 alcoholic intoxications, treating it as "the life success" [8]. The National Agency for Alcohol Problems Solution in Poland stresses that each year the number of young people consuming alcohol increases and the age of alcohol initiation decreases [9]. The relation between the familial and social factors and children's drinking alcohol has been stressed in many studies. The relation to alcohol in adolescents' social environment as well as general situation in their families attracts a particular attention [9]. A detailed analysis of these factors can contribute to the establishment of effective prophylactic strategies in order to diminish the number of children and adolescents drinking alcohol.

The aim of the study was to evaluate the frequency of alcoholic beverage use among children and young people of Białystok city and to assess the influence of familial and environmental factors on this phenomenon.

Material and methods

The study included 894 pupils of the first grades (319 pupils) and of the third grades of middle schools (284 pupils), and the second grades of high schools (291 pupils) from schools randomly chosen in the city of Białystok in 2006. Girls comprised 52.5% while boys – 47.5% of the examined population. An anonymous questionnaire, worked out in the Department of Pediatric Nursing, was used in the study. The part entitled "You and your family" consisted of 25 questions concerning family and social conditions of alcohol consumption by children and adolescents while the part entitled "You and alcohol" was made up of 14 questions. Children's parents, adolescents above 16 years old, the Board of Science and Education in Białystok, the headmasters of randomly chosen schools as well as the Bioethical Committee of the Medical University of Białystok gave their consent for the study.

The results were presented in correlation tables containing absolute numbers and appropriately counted percentage values, with the use of Statistica 5.0 program.

Results

The present study revealed that alcohol use among children and adolescents increases with the age. The percentage of young people consuming alcohol in the first grade of middle school equaled 33.2%, in the third grade, the use was two-fold higher, and almost 80% drank in the second grade of high school. The first experience with alcohol took place in the 5-10 age bracket, but the greatest alcohol initiation (35% of young people) was reported in the 10-15 age bracket.

Pleasure of alcohol use was stated by 30.7% of adolescents. It is a way of spending free time for 23.4% of examined young people. Other causes of drinking were the need of acceptation of a peer group (21.6%) and the escape from reality (18.4%).

The vacations and meetings with friends are favorable period for alcohol use according to 11% of young people, and for 6% of the questioned each occasion is good for drinking.

The study showed that 14.4% of children are brought up in abstinent families. In 15.8% of families, alcohol is drunk whenever there is an occasion while in 5.2% families alcohol is drunk without occasion. Alcohol consumption among siblings of the surveyed presented the similar percentage: 5.6% of siblings drink frequently and without a special occasion and 11% – always whenever there is an occasion. Full families were stated in 83.2% of pupils and one-parent families – in 16.1%. The examination revealed that 58.1% of adolescents have good contact with both their parents, 21% have better relations with their mothers, and 6.3% could not establish good relations with their parents. Every 5 child (18.8%) admits that they underwent various kinds of violation at home. According to young people, the model of bringing up should include: increased mutual trust (33%), the system of rewards (32%), decreased parents interference as far as school and free time were concerned (29%). As for the system of punishment, 18.3% of pupils supported the idea, 13.2% think that excessive strict discipline should be eliminated, and 7.1% of adolescents claims their parents spend too much time working. The pupils observed negative standards most frequently among their peers (38%) and people with whom they have no direct contact (36.8%). Young people also observed destructive behavior in their familial environment – father (7.1%), siblings (5%), and mother (1.9%). More than half of children (63.4%) have problems with conflicts solution and 19.7% were unsatisfied with their lives.

Despite the statuary ban on selling alcohol to minors, only 5% of the examined reported that a shop assistant asked each time for the identification document. It was also stated that 18% of examined adolescents obtained alcohol at parties, 15% bought it themselves, and 7% counted on older mates to buy it.

According to the study, alcohol was very easily accessible as young people buy it most frequently in the neighborhood (21.7%) or in a shop, where no one knew them (12.1%). It turns out that only 70.8% of parents talk about bad habits with their children.

Discussion

The results showed that the number of young people consuming alcohol increased with age (33.2% – the first grades of middle school, 63.4% – the third grades of middle school, and 79.7% – the second grades of high school) and each year the age of alcohol initiation decreased. It was also confirmed by national questionnaire studies ESPAD of 2003. According to them, alcohol was tested by 92.5% of the third grade of middle school pupils and 96.7% of the second grade of high school pupils [10]. The family takes the moral and legal responsibilities for the health of their children. According to Muszalik and Bartuzi, the family should be a model and ally of school in the creation of pro-healthy behavior [1].

One of the watchwords of the World Health Organization, "Health starts at home", points to a significant role that is played by a family in the promotion of health of its members [1].

Woronowicz has stressed that, bringing up children in sobriety, presenting information of bad habits and creating a proper life style, is of great importance in prophylactic actions [11]. Parents should comment on the cases of alcohol abuse observed by children in the street or on TV and instill proper behavior standards in their children [12-14].

Thus, the system of preventive bringing up is based on the rational appropriate activities and creation of such a conduct of a young person, which could be deprived of inappropriate behavior and deviations and should also concentrate on egoistic and asocial conduct [15].

Moreover, the studies revealed that approximately 20% of parents of the examined pupils did not try to discuss the problem of alcohol with their children due to lack of competence and knowledge on alcohol use and abuse. It was also confirmed by studies carried out in Wrocław. The results of these studies stressed that a large amount of parents (37%) is interested in gaining information concerning bad habits and ways of helping young people having drinking problem [1]. Therefore, it is required to conduct wide and detailed education of not only among young people but also their parents. It is important for them to know causes and mechanism of habit formation in order to recognize the danger and take up prophylactic actions.

Among familial factors, conditioning alcohol consumption by adolescents, the parents relation to the phenomenon plays a great role. According to studies conducted by Niełacny, 37% of parents do not realize that their children drink alcohol. Moreover, 15% of those who knew, accepted such a behavior while 14% were indifferent [16]. The results of many studies give a warning that young people, whose parents drink a lot, use alcohol more often than those whose parents do not drink [12,17,18]. Thus, it is alarming that 16% of the examined young people can observe their parents drinking alcohol always whenever there is an occasion to drink and 5% – parents drinking even without an occasion. It can lead to the conviction that drinking is common and is accepted in the society as children take the models from specific behaviors of their parents than on what others say [19,20].

Young people state that mutual understanding, the system of rewards, more toleration of their parents regarding school and free time are the issues they expect from their parents.

The studies by Jelonkiewicz and Kościńska-Dec showed that support and control as the factors of familial process are connected with drinking by adolescents [21]. It was observed that the weak support and a poor control of parents are strictly connected with the intensified drinking by young people. Our study revealed that 7.2% of young people has difficulty with establishing good relations with their fathers, 2.5% – with their mothers, and 6.3% are not able to establish proper relations with both their parents.

According to Lowe et al. drinking alcohol by young people is connected with improper mother-child or father-child relations [22]. It was confirmed by Chassin and DeLucia [23]. Young people abuse alcohol more frequently in families, where parents are not emotionally connected with their children and are not consequent in their bringing up practices. Simultaneously, Stępień stresses that in girls – the most important is emotional relation to their parents while in boys – decisive and conventional rules of the familial life [24].

Conflicts in family (separation, divorce, violence in family), pathological ways of problems solving, lack of interest of parents in their children life and behavior, use of improper bringing up methods – the passive conduct of the parents, their tolerance, urging children to drink or buy alcohol, financial problems, the breakdown of familial rituals (shared meals, holidays and vacation), feeling of danger, lack of a strong model of mother or father in the family are other negative factors that influence drinking alcohol by children and young people [12,23,25,26].

Besides familial factors, the environment and peers have also an effect on drinking alcohol by adolescents. Raundner claims that too much tolerant social conduct to that kind of phenomenon is another supporting factor of drinking alcohol by young people [26].

Kobrzyńska and Marcinkowski add that teachers and tutors are frequently too tolerant to alcohol drinking by their charges and such a tolerance can sometimes take the form of consent and is manifested with lack of interest in the problem and liberal treatment of the alcohol-influenced pupils [27]. Moreover, easy access to alcohol undoubtedly benefit the intensification and distribution of drinking alcohol by children and adolescents.

Despite the statuary ban on selling alcohol to minors, more than 30% of the examined reported that a shop assistant did not ask for the identification document. Inefficiency of rules that limit the access to alcohol for young people was also confirmed by ESPAD studies [10].

As it was shown in the studies, young people from Białystok city use alcohol most frequently not to stand out from the group, lack of safety, self-confidence, and certain skills, such as organizing free time and getting to know new people. Thus, they drink because they have problems with social, family, and emotional life, and the acceptation in the environment.

According to Bartnicka, these are the main factors that favor, initiate, and consolidate alcohol use by adolescents [25]. It was observed that destructive behavior was most frequently seen by young people among their friends (38%).

Muszalik et al. stressed that the number of drinking young people who adopt the standards from their peers increases [28]. It happens due to the fact that the child treats alcohol as the means of gaining the acceptation and contacts in the group.

Other social factors affecting alcohol use by young people are as follows: local destructive environment, school concentrated on the didactic function and no or minimum bringing up function, lack of appropriate knowledge concerning properties, action, and effects of alcohol use, and specifically knowledge that alcohol is a substance not necessarily harmful for young people.

Many authors claim that alcohol use by young people should be openly countered due to health and bringing up considerations and should not be tolerated in the society.

According to Muszalik and Bartuzi, introducing the consistent programs of bringing up without bad habits, raising young people and teachers' attention as well as cooperation with the family could bring expected results [1].

Conclusions

1. Alcohol use among children and young people from Białystok city increases with the age, and the biggest alcohol initiation is in the 10-15 age brackets.

2. Familial and social conditioning have the influence on alcohol use by children and young people.

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Attitudes of medical staff in delivering women's opinion

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Abstract

Purpose: The growing competitiveness between various health centres in the scope of offered medical services is accompanied by growth of patients' expectations concerning the quality of the abovementioned services. That is why knowledge of the patients' needs and expectations concerning medical services may significantly contribute to the improvement in the quality of the services to be rendered. The aim of the study was to analyse the evaluation of attitudes of medical staff by delivering women.

Material and methods: Self-invented questionnaire was used in order to examine the patients for the purposes of present research. The obtained results were subject to statistical analysis by means of chi-square test for uniformity. A 5% inference error risk was assumed and $p<0.05$ was considered as statistically significant.

Results: It has been proved that that largest percentage of delivering women was referred to as "Ms". 93.33% of the interviewed delivering women obtained complete information from the medical staff. However, no significant interrelation between the information the delivering women obtained from the medical staff and their age. Level of education and place of residence was proved.

Conclusions: The study shows that the delivering women with a university degree evaluated the medical staff's attitude as positive more frequently than the women with primary or secondary level of education. The research indicates that in contacts with the delivering women and when informing the delivering women. The delivery block medical staff must pay particular attention to the women without higher education.

Key words: delivery, attitudes of medical staff, delivering women's opinion.

Introduction

The competitiveness between various health centres in the scope of offered medical services is accompanied by growth of patients' expectations concerning the quality of the abovementioned services. That is why knowledge of the patients' needs and expectations concerning medical services may significantly contribute to the improvement in the quality of the services to be rendered.

According to the binding patient's rights and recommendations of the World Health Organisation woman admitted for labour and delivery has a right for benignant care and respect as well as complete information from the medical staff concerning the medical procedures during the labour and delivery [1-4].

The aim of the study was to analyse the evaluation of attitudes of medical staff by delivering women.

Material and methods

The studied group consisted of 150 delivering women in Department of Obstetrics and Gynecology Stefan Kardynał Wyszyński District Specialist Hospital. The age of the patients fluctuated between 18 and 40. Among the studied group 64 (42.6%) women were between 26 and 30 years of age, 43 (28.7%) women were between 18 and 25 years of age, and 43 (28.7%) were between 31-40 years of age. The studied group 85 (56.6%) women had a university degree, 54 (36.0%) women had secondary or post-secondary education and 11 (7.4%) of them had primary or vocational education. 85 (56.6%) the stud-

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***Table 1*. The interrelation between how the women were referred to by the medical staff and their age, level of education and place of residence**

AGE	Referred to women by the medical staff									
	called by name (without their consent)		**called by name** (upon their request)		**impersonally**		**as "Ms"**		**OVERALL**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
18-25	1	2.33	15	34.88	2	4.65	25	58.14	43	100.00
26-30	4	6.25	23	35.94	4	6.25	33	51.56	64	100.00
31-40	2	4.65	8	18.60	3	6.98	30	69.77	43	100.00
OVERALL	7	4.67	46	30.67	9	6.00	88	58.67	150	100.00
Significance				χ^2 =5.37	p=0.49	p>0.05				
EDUCATION	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
primary/vocational	0	0.00	3	27.27	2	18.18	6	54.55	11	100.00
secondary/postsecondary	2	3.70	18	33.33	2	3.70	32	59.26	54	100.00
university degree	5	5.88	25	29.41	5	5.88	50	58.82	85	100.00
OVERALL	7	4.67	46	30.67	9	6.00	88	58.67	150	100.00
Significance				χ^2 =4.33	p=0.63	p>0.05				
PLACE OF RESIDENCE	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
city, under 50 thousand city dwellers	3	8.57	10	28.57	0	0.00	22	62.86	35	100.00
city, over 50 thousand city dwellers	4	4.71	28	32.94	5	5.88	48	56.47	85	100.00
village	0	0.00	8	26.67	4	13.33	18	60.00	30	100.00
OVERALL	7	4.67	46	30.67	9	6.00	88	58.67	150	100.00
Significance				χ^2 =7.86	p=0.24	p>0.05				

ied women were city dwellers over 50 thousand inhabitants, 35 (23.4%) women were city dwellers under 50 thousand inhabitants, and 30 (20.0%) delivering women were village dwellers.

Self-invented questionnaire was used in order to examine the patients for the purposes of present research. The participation in the research was voluntary and anonymous. The obtained results were subject to statistical analysis by means of chi-square test for uniformity. A 5% inference error risk was assumed and $p<0.05$ was considered as statistically significant.

Results

Tab. 1 shows the interrelation between how the women were referred to by the medical staff and their age, level of education and place of residence.

The study shows that the medical staff referred to 88 (58.66%) of the interviewed women as "Ms". 46 (30.66%) of the interviewees were called by name (upon their request), 7 (4.66%) delivering women were also called by name (but without their consent), and 9 (6.00%) were referred to impersonally.

No significant interrelation between how the women were referred to by the medical staff and their age, level of education and place of residence was proved.

Tab. 2 shows the interrelation between the positive attitude of the medical staff towards the delivering women and their age, level of education and place of residence.

In the opinion of 145 (96.67%) interviewed women the medical staff had a positive attitude towards the delivering women, and only 5 (3.33%) of the interviewees were of different opinion.

The research showed statistically significant interrelation between the positive attitude of the medical staff towards the delivering women and level of education ($p<0.05$). No significant interrelation between the positive attitude of the medical staff towards the delivering women and their age and place of residence was proved.

Delivering women with a university degree evaluated the medical staff's attitude as positive more frequently than the women with primary or secondary level of education.

The results of the analysis of interrelation between the information the delivering women obtained from the medical staff and their age, level of education and place of residence were shown in *Tab. 3*.

The study shows that 140 (93.33%) of the interviewed women obtained complete information from the medical staff. 9 (6.00%) delivering women obtained only superficial information and 1 (0.67%) interviewee obtained no information. No significant interrelation ($p<0.05$) between the information the delivering women obtained from the medical staff and their age, level of education and place of residence was proved.

Discussion

Recommendations concerning childbirth care included in "Childbirth with Dignity" Decalogue make the delivering women aware of their rights, including the right to be treated as an individual and fully respected by the medical staff. One of the forms of showing respect is keeping the right form of referring to the delivering woman [5].

The research shows that the largest percentage of delivering women was referred to as "Ms". However, no significant inter-

Table 2. **The interrelation between the positive attitude of the medical staff towards the delivering women and their age, level of education and place of residence**

AGE	The positive attitude of the medical staff towards the delivering women					
	yes		no		OVERALL	
	n	%	n	%	n	%
18-25	42	97.67	1	2.33	43	100.00
26-30	61	95.31	3	4.69	64	100.00
31-40	42	97.63	1	2.33	43	100.00
OVERALL	145	96.67	5	3.33	150	100.00
Significance			χ^2 =0.63 p=0.72 p>0.05			
EDUCATION	**n**	**%**	**n**	**%**	**n**	**%**
primary/vocational	9	81.82	2	18.18	11	100.00
secondary/postsecondary	52	96.30	2	3.70	54	100.00
university degree	84	98.82	1	1.18	85	100.00
OVERALL	145	96.67	5	3.33	150	100.00
Significance			χ^2 =8.77 p=0.01 p<0.05			
PLACE OF RESIDENCE	**n**	**%**	**n**	**%**	**n**	**%**
city, under 50 thousand city dwellers	35	100.00	0	0.00	35	100.00
city, over 50 thousand city dwellers	82	96.47	3	3.53	85	100.00
village	28	93.33	2	6.67	30	100.00
OVERALL	145	96.67	5	3.33	150	100.00
Significance			χ^2 =2.25 p=0.32 p>0.05			

Table 3. **The interrelation between the information the delivering women obtained from the medical staff and their age, level of education and place of residence**

AGE	The information the delivering women obtained from the medical staff							
	complete information		superficial information		no information		OVERALL	
	n	%	n	%	n	%	n	%
18-25	40	93.02	3	6.98	0	0.00	43	100.00
26-30	60	93.75	4	6.25	0	0.00	64	100.00
31-40	40	93.02	2	4.65	1	2.33	43	100.00
OVERALL	140	93.33	9	6.00	1	0.67	150	100.00
Significance			χ^2 =2.69 p=0.60 p>0.05					
EDUCATION	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
primary/vocational	9	81.82	2	18.18	0	0.00	11	100.00
secondary/postsecondary	50	92.59	4	7.41	0	0.00	54	100.00
university degree	81	95.29	3	3.53	1	1.18	85	100.00
OVERALL	140	93.33	9	6.00	1	0.67	150	100.00
Significance			χ^2 =4.24 p=0.37 p>0.05					
PLACE OF RESIDENCE	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
city, under 50 thousand city dwellers	34	97.14	1	2.86	0	0.00	35	100.00
city, over 50 thousand city dwellers	80	94.12	5	5.88	0	0.00	85	100.00
village	26	86.67	3	10.00	1	3.33	30	100.00
OVERALL	140	93.33	9	6.00	1	0.67	150	100.00
Significance			χ^2 = 5.58 p=0.23 p>0.05					

relation between how the interviewed women were referred to by the medical staff and their age, level of education and place of residence was proved.

In the opinion of 96.67% of the interviewed women the medical staff had a positive attitude towards the delivering women. The significant interrelation between the positive attitude of the medical staff towards the delivering women and level of education was noticed. No significant interrelation between the positive attitude of the medical staff towards the delivering women and their age and place of residence was proved. Delivering women with a university degree evaluated the medical staff's attitude as positive more frequently than the women with primary or secondary level of education.

The delivery block staff may not limit their duties to the essential minimum [5,6]. Keeping the delivering women informed about the progress of labour and the medical procedures to be applied is one of the tasks and duties of the delivery block staff [7,8]. The results of the research indicate that

93.33% of the interviewed delivering women obtained complete information from the medical staff. No significant interrelation between the information the delivering women obtained from the medical staff and their age, level of education and place of residence was proved.

Doing research in the scope of the patients' needs and expectations concerning medical services has become essential in the conditions of growing competitiveness between various health centres and may contribute to the improvement in the quality of the services to be rendered.

Conclusions

1. Delivering women with a university degree evaluated the medical staff's attitude as positive more frequently than the women with primary or secondary level of education.

2. In contacts with the delivering women and when informing the delivering women.

3. The delivery block medical staff must pay particular attention to the women without higher education.

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The influence of selected factors on the quality of life of children with headaches

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Abstract

Purpose: Headaches are one of frequent complaints diagnosed in children and adolescents. Due to their recurring character, they influence the bio-psycho-social functioning of the children. The aim of the study was to learn about the factors influencing the quality of life of children with headaches.

Material and methods: The research was conducted on 140 children with headaches, ages 8 to 18, treated at the Chair and Department of Developmental Neurology, Karol Marcinkowski University of Medical Sciences in Poznań. The research tool was the Pediatric Quality of Life Inventory – PedsQL questionnaire.

Results: In the studied group 85 (60.7%) children had tension headaches, 25 (17.8%) had migraine with aura and 30 (21.5%) had migraine without aura. Analyzing the particular domains of the quality of life from the PedsQL questionnaire, significant differences were noticed in the evaluation of the domain "physical functioning", depending on gender, age and the duration of pain, and in the domain "emotional functioning" depending on gender. The duration of pain additionally influenced the evaluation of their social functioning by the patients.

Conclusions: The difference in the evaluation of the quality of life depended on the gender and the age of the children, the duration of headaches and the severity of pain. The indicated factors influenced different domains of the quality of life of the adolescents participating in the study.

Key words: headache, children, quality of life.

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Introduction

Headaches are one of frequent complaints reported by children and adolescents. Prevalence of migraine in children and adolescents oscillates between 2.7% and 10.6%, while the frequency of autonomous tension headaches ranges from 40.7% to 82.9% [1]. Prolonged complaints or frequently recurring episodes restrict children's bio-psycho-social functioning. They lead to poorer relationships with peers, frequent absence from school and lower self-esteem. They significantly influence the evaluation of the quality of life done by the children and their parents. Flanagan [2] described five significant areas around which the measurement of the quality of life should be made: physical and financial well-being; relationships with other people; social activity, self-development; leisure time. Lately the evaluation of the quality of life as a therapeutic effect has been of growing importance. Research conducted following this trend is based on the assumption that the quality of life is connected to health. General tools used are called Health Profile, for example SF-36, Sickness Impact Profile or Child Health Questionnaire, and specialized tools like Migraine Specific Questionnaire. The opponents of this research concept stress that there are big differences in the evaluation of the quality of life done by health care professionals and the feelings of patients that often are omitted in this evaluation. They suggest that the evaluation of the quality of life be based on general questionnaires that include the assessment of satisfaction with life in areas considered important by the majority of people, e.g. QOLS – Quality of Life Scale or PedsQL – Pediatric Quality of Life Inventory, along with scales evaluating the influence of a disease or its symptoms on person's functioning or the quality of life, for example Beck Depression Inventory. Regardless of the research concepts, we are trying to find variables influencing the evaluation of the quality of life. The aim of the study was to learn about the factors influencing the quality of life of children with headaches.

Material and methods

The study was conducted on 117 children with headaches, ages 8 to 18 years, treated at the Chair and Clinic of Developmental Neurology. The research tool was the Pediatric Quality of Life Inventory – PedsQL v. 4.0 questionnaire. The questionnaire contains two identical versions – one for the parents and one for the children. It enables the measurement of the quality of life of children from the age of 7 onwards [3]. It is based on the analysis of physical, emotional and social functioning, functioning at school and well-being. Additional questionnaire for collecting clinical and demographic data was used. The Kruskal-Wallis and the U Mann- Whitney tests were used for statistical analysis.

Results

The research was conducted on 69 (58.97%) girls and 48 (41.03%) boys. There were 21 (17.95%) respondents in the age group under 12 years old, 39 (33.33%) respondents ages 12-15 and 57 (48.72%) older than 15. In the studied group 76 (64.96%) children had tension headaches, 17 (14.53%) had migraine with aura and 24 (20.51%) had migraine without aura. 46 (39.32%) children located pain in the forehead area, 53 (45.30%) in the temples area, and 40 (34.19%) in the whole head. Most frequently it was a throbbing pain (60.68%), sharp pain (36.75%), pain experienced as a ring around the head (35.04%) and piercing pain (26.50%). The duration of the headache in 67 (57.26%) children was the whole day, in 42 (35.90%) up to two hours and in 8 (6.84%) over 48 hours. Daily headaches were reported by 19 (16.24%) children. While analyzing the functioning of children in different areas we found out that the feeling of sluggishness was present in 70 (59.83%) respondents. The feeling of fear accompanied 88 (75.21%) children, anger – 73 (62.40%). Difficulties in falling asleep or nightmares were indicated by 54 (46.15%) children. Among problems at school, usually stressed by the adolescents, was lower concentration (24.79%) and receiving unsatisfactory grades (17.25%). Because of the headaches 26 (22.22%) respondents sometimes did not participate in classes. The satisfaction with their life was declared by 64 (54.70%) children. Significant difference in the evaluation of children's physical functioning depending on age ($p<0.0366$) was found. Depending on gender, a difference in the evaluation of physical ($p<0.024422$) and emotional functioning ($p<0.009931$) was confirmed. Depending on the duration of headaches a difference was noted in the evaluation of physical ($p<0.0123$) and social functioning ($p<0.475$). No difference was noted in the evaluation of different areas of functioning depending on the type of headaches.

Discussion

In the research group adolescents over the age of 15 prevailed, and the number of girls increased with age. Similar observations were made by Powers et al. [4]. The frequency and the duration of headaches influenced the evaluation of physical and social functioning. In our study, as well as in the research of Powers et al. [4], Carlsson et al. [5] and Bandell-Hoekstra et al. [6] it was noted that the consequences of headaches were felt more by adolescents over the age of 15. The decrease in physical activity of children is often caused by additional complaints felt by them: feeling constantly tired, the lack of appetite, feeling cold all the time, stomach aches, feeling of sultriness [5,6]. Our own studies, as well as the research conducted by other authors show that the duration of pain influenced the way children's functioning was evaluated [5,6]. The lowest ratings were given by children who experienced pain during the whole day. A significant element, noticed by many authors is the difficulty in child's functioning at school. Zgorzalewicz [1], during a neurophysiological examination, noted elongated latencies P300 and N1 and an increase in the value of the amplitudes N1-P2, P2-N2, N2-P3 in people suffering from migraine headaches. Observed changes confirm the existence of perturbations in cognitive processes, especially in the field of memorizing information and decision-making. In our own research about 1/5 of the studied group reported problems at school. Carlsson et al. [5]. Powers et al. [3] observed, that children with headaches miss school more frequently and are less satisfied with their school achievements in comparison with healthy children. The child's age is also of great importance. Older children had more extracurricular activities and they reported more psychophysical problems such as back and neck pain, anxiety. Situations related to higher emotional tension before the start of a headache were more often reported by older children [5]. Powers et al. [3] comparing the functioning of children with headaches with their healthy peers and Hunfeld et al. [7] with children with other disorders noted, that adolescents with headaches are more frequently absent from school, are more stressed and depressed and also more frequently report other somatic complaints. In accordance with our findings Nodari et al. [8], did not find a statistical difference in the evaluation of the quality of life between children depending on the type of headache. Carlsson [5] noted that children with tension headaches more frequently had additional somatic complaints and more emotional tension than children with migraine.

Conclusions

Concluding, the difference in the evaluation of the quality of life depended on the gender and the age of the children, the duration of headaches and the severity of pain. The indicated factors influenced different domains of the quality of life of the adolescents participating in the study.

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The analysis of dehydroepiandrosterone sulphate concentration in elderly age women depending on coexisting disease states

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Abstract

Purpose: The aim of the study was evaluation of dehydroepiandrosterone sulphate (DHEA-S) serum concentration in elderly women and determining interdependence between DHEA-S levels and occurrence of diseases typical for this period of life.

Material and methods: The study was conducted on 103 elderly women (mean age 70.7±7.3 years). The control group consisted of 25 young and healthy women (mean age 33.5±1.7 years). The elderly patients were fully functional, well nourished, and only periodically required medical care due to chronic illnesses such as coronary heart disease, arterial hypertension, type 2 diabetes, osteoporosis, depression. DHEA-S serum concentration was determined by Spectria DHEA(S) RIA radioimmunological kit. Statistically significantly important decrease of DHEA-S serum concentration was determined in elderly women compared with the control group.

Results: Mean blood serum DHEA-S concentration in elderly group was significantly lower compared to controls. Mean blood serum DHEA-S concentration was statistically significantly lower in the group of patients suffering from coronary heart disease, osteoporosis, and depression. Statistically significantly lower DHEA-S concentration was observed in patients with benign disorders of cognitive functions and depression compared with patients with correct MMSE and GDS results.

Conclusions: In elderly women DHEA-S concentration can turn out to be useful aging biomarker. Concentration of this hormone significantly decreases together with age, especially with coexisting diseases typical for this period of life.

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Key words: dehydroepiandrosterone sulphate, aging, elderly age illnesses.

Introduction

Aging leads to progressive involutional changes concerning structure and functioning of multiple systems and organs including endocrine system.

Mentioned changes differ in amplitude as far as different endocrine glands are concerned.

Secretion of some hormones does not change, can be handicapped or increased [1]. However, together with age we can observe significant decrease of concentration of the main adrenal androgen – dehydroepiandrosterone (DHEA) [2].

Dehydroepiandrosterone and its sulphate (DHEA-S) are endogenic hormones synthesized in adrenal cortex, gonads and central nervous system. DHEA secretion is stimulated by adreno-corticotropin (ACTH). ACTH secretion does not change together with age, so the reasons for decreasing DHEA secretion in elderly age remain unexplained [3]. The open question as well is the participation of this hormone deficiency in aging process and influence on occurrence of elderly age diseases. It was proved that low DHEA concentration increases intensification of atherosclerosis. It was also determined that low DHEA concentration increases the risk of myocardial infarction in men [4]. At present, it is thought that the relation between DHEA concentration and cardiovascular diseases is different depending on age where menopause is the borderline [5]. It was demonstrated that DHEA deficiency in premenopausal women can be the risk factor for coronary heart disease development or may be the indicator of early stage of atherosclerosis development [6]. Other authors claim that high DHEA concentration protects against cardiovascular diseases in men, but not in women [7]. There is no agreement concerning DHEA concentration influence on carbohydrate and lipid metabolism. Some authors claim that DHEA decreases glycaemia and it is

Table 1. **Illnesses occurring in groups of patients in early and late elderly age**

Illness		YES		NO		P
		N	%	N	%	
Hypertension	early old age	48	67.6	23	32.4	
	late old age	23	71.9	9	28.1	p=ns
Coronary heart disease	early old age	56	78.9	15	21.1	
	late old age	30	93.8	2	6.2	p<0.05
Osteoporosis	early old age	42	59.2	29	40.8	
	late old age	28	87.5	4	12.5	p<0.01
Depression	early old age	39	54.9	32	45.1	
	late old age	25	78.1	7	21.9	p<0.05
Diabetes	early old age	6	8.5	65	91.5	
	late old age	3	9.4	29	90.6	p=ns

advantageous for lipid concentration, others negate this positive influence [8,9]. DHEA belongs to the group of so-called neurosteroids, which are locally produced in central nervous system and modulate neural conduction [1]. It was also observed that above mentioned hormone shows antidepressive properties [10]. Decreased concentration of DHEA was observed in patients suffering from Alzheimer's disease [11].

Another important aspect of DHEA action is its advantageous influence on bone mass increase and lowering bone tissue resorption markers [12]. DHEA influence in the immune system was also observed. Some advantageous changes in some immunological parameters were observed in DHEA treated elderly patients [13]. Another important factor of DHEA activity is its anti-neoplastic action, which might be connected with antioxidative properties of this hormone [5]. On the other hand, DHEA may activate development of estrogen and androgen dependent neoplasms, as it is the precursor for these hormones. Despite many advantageous effects of DHEA action in human body it is still not certain what the connection between the concentration of this hormone and occurrence of old age diseases is. What remains controversial problem is supplementation of DHEA in elderly patients. For that reason the aim of the study was evaluation of blood serum dehydroepiandrosterone sulphate (DHEA-S) concentration in elderly women and determining interdependence between DHEA-S levels and occurrence of diseases typical for this period of life.

Material and methods

103 women aged 60 to 83 (mean 70.7±7.3 years) were included in the study. Among included there were patients in good condition, physically fit, service-independent, only periodically requiring ambulatory treatment due to chronic diseases such as: coronary heart disease, primary arterial hypertension, type 2 diabetes, osteoporosis without fractures, depression. In the selected group 2 sub age groups were isolated – 71 women in early elderly age (aged 60 to 70 years) and 32 women in late elderly age (aged 75 to 89 years). Control group consisted of 25 healthy women aged 30 to 36 (mean 33.5±1.7 years).

All the patients underwent subjective and objective study. Elderly women were subjected to complex geriatric assessment. In order to do this, standardized measurements such as: functional efficiency, ADL scale (Activities of Daily Living) and IADL scale (Instrumental Activities of Daily Living) were applied. To evaluate cognitive functions MMSE scale (Mini-Mental State Examination) [14], and for emotional functions GDS scale (Geriatric Depression Scale) [15] were used.

7 ml of blood from basilic vein was taken from all the included in the study in order to determine dehydroepiandrosterone sulphate (DHEA-S) blood serum concentration. The concentration was determined by Spectria DHEA(S) RIA radioimmunological kit. Coated sample technology by Orion Diagnostica (Finland) was used in the study. The kit is used to *in vitro* quantitative determining whole blood serum DHEA-S concentration. All the samples were detected in gamma radiation detector, Wallac (Finland). Statistical analysis was conducted with one-way ANOVA. The statistically significant level of significance was set at $p<0.05$.

Results

The results of 6 point ADL scale showed that all the examined patients got 6 points which means that they all were efficient. On the basis of IADL scale it was determined that most of the examined elderly patients functioned in their environment without any help (97.1%) or with a little help (2.9%). On the basis of MMSE test it was observed that 93 patients (90.3%) had mild disorders of cognitive functions and 10 patients (9.7%) had correct MMSE results. According to GDS it was observed that 62 patients (60.2%) suffered from mild depression, 5 patients (4.9%) suffered from profound depression and 36 patients (35%) had no depression. Illnesses in early and late elderly patients are shown in *Tab. 1*.

Mean blood serum DHEA-S concentration in elderly group (0) was significantly lower compared with controls (K) ($p<0.001$).

Mean blood serum DHEA-S concentration in late elderly group (00) was significantly lower than in the early elderly group (Y0) ($p<0.05$). The results are presented in *Tab. 2*.

Mean blood serum DHEA-S concentration was statistically significantly lower in the group of patients suffering from coronary heart disease, osteoporosis, and depression ($p<0.05$).

Table 2. **Mean values of serum dehydroepiandrosterone sulphate (DHEA-S) concentration in elderly women (0) in early old age (Y0) and late old age (00) compared with controls (K)**

	N	DHEA-S [ng/ml]			p
		mean ± SD	Minimum	Maximum	
O	103	655±261	49	1 264	p<0.001
OY	71	691±273	49	1 264	p<0.05
OO	32	574±214	112	988	p<0.05
K	25	2 526±796	1 148	3 887	p<0.001

Table 3. **Occurrence of illnesses in elderly women vs mean dehydroepiandrosterone sulphate (DHEA-S) concentration values**

Illness		N	DHEA-S [ng/ml]			p
			Mean ±SD	Minimum	Maximum	
Arterial hypertension	YES	71	648±260	49	1 186	p=ns
	NO	32	671±267	112	1 264	
Coronary heart disease	YES	86	632±247	49	1 171	p<0.05
	NO	17	772±304	268	1 264	
Osteoporosis	YES	70	614±253	49	1 186	p<0.05
	NO	33	742± 261	96	1 264	
Depression	YES	64	611±258	49	1 186	p<0.05
	NO	39	727±254	138	1 264	
Diabetes	YES	9	502±241	96	922	p=ns
	NO	94	669±259	49	1 264	

Table 4. **Mean dehydroepiandrosterone sulphate (DHEA-S) concentration vs Geriatric Depression Scale (GDS) results**

	DHEA-S [ng/ml]				
	N	Mean	SD deviation	Minimum	Maximum
No depression	36	752*	246	138	1 264
Mild depression	62	612	255	49.21	1 186
Profound depression	5	482*	265	274	922

* statistically significant difference (p<0.01)

However, there was no statistically significant difference in the group of people suffering from primary arterial hypertension, and type 2 diabetes compared with the patients free from these diseases (*Tab. 3*).

Statistically significantly lower DHEA-S concentration (628±252 ng/ml) was observed in patients with benign disorders of cognitive functions compared with patients with correct MMSE result (902±219 ng/ml) (p<0.01).

Mean blood serum DHEA-S concentration depending on GDS result is presented in *Tab. 4*. It was shown that together with intensification of depression, the concentration of the hormone was lower. The difference of the mean DHEA-S concentration in the group of women suffering from profound depression compared with the group free from depression was statistically significantly lower (p<0.01).

Discussion

Dehydroepiandrosterone as well as growth hormone or melatonin belongs to the group of so-called youth hormones. By now there has not been any universal concept which could explain pathomechanism of the changes in secretion of these hormones in senile age. Characteristic lifelong DHEA secretion profile, and especially its age related gradually lowering levels caused naming it the biomarker of aging [16].

In own research it was determined that blood serum DHEA-S concentration in elderly women was lower compared with younger controls. Moreover, mean DHEA-S concentration in early elderly group was significantly higher than in late senile group of women. Age related DHEA-S concentration decrease is also confirmed by other authors [17].

In own research significant decrease of DHEA-S concentration was also observed in some of the elderly women in some coexisting illnesses. Lower DHEA-S concentration was observed in patients suffering from primary arterial hypertension and type 2 diabetes, however, the differences were not statistically significant. Moreover, statistically significant lower mean DHEA-S values were observed in patients suffering from coronary heart disease, osteoporosis, and depression.

Literature confirms decreased DHEA-S concentration in patients suffering from arterial hypertension, coronary heart

disease, and diabetes [18]. It was proved that the decreased DHEA-S concentration and hyperinsulinaemia can be risk factors for development of atheromatic changes in coronary arteries area. Moreover, it was proved that total mortality caused by ischaemic heart disease in women after menopause correlates negatively with DHEA-S concentration [4]. Other researchers have not determined correlation between low DHEA-S concentration and progression of atheromatic changes in coronary arteries in women after menopause [4,19].

The interesting finding was determining such relationship in middle aged men group, which enabled the researchers to conclude that the DHEA metabolism in men and women is regulated differently. It was proved that DHEA may protect men against cardiovascular diseases, however, this does not concern women. It is confirmed by Rancho Bernardo Study [20]. In the course of research concerning prevention and complications of dyslipidaemia and chronic hyperglycemia in badly monitored diabetes it was found out that the aimed benefits can be achieved after administering overphysiological doses. The explanation of this phenomenon can be the fact that DHEA is characterized by short half life period (about 15 to 30 minutes). It seems that administering preparations with longer half life period and free metabolism in physiological doses in the future would be more justified and safer [5]. In own research decreased DHEA-S concentration in women's osteoporosis was shown. It is also confirmed by other authors [21]. Beneficial DHEA tissue action in bone tissue may be connected with a few mechanisms. One of them is direct DHEA influence on testicular receptors, which was determined in lymphocytes and osteoblasts. Through these receptors the hormone produces anabolic and anti-glycocorticoid action. Research conducted by many authors has proved bone mass hypertrophy, decrease in bone resorption markers and increase in osteocalcine level in IGF-1 in women after menopause [12].

In own research significantly decreased DHEA-S concentration was observed in elderly women with depression and mild cognitive function disorders. The relation between DHEA-S levels and function of central nervous system may result from the fact that DHEA within this system plays role of the neurotransmitter. Wolkowitz [10] observed antidepressive DHEA action. Nasman et al. [22] showed lower concentration of this hormone in patients suffering from Alzheimer's disease. Beside direct DHEA action of neurosteroid modulating neuronal functions, there is significant antagonistic action against cortisol in central nervous system. It was proved that long-lasting maintenance of increased blood glucocorticoid concentration (cortisol in human) in stress may have neurotoxic effect in neurons in hippocampus and other brain areas. As it is widely known, cortisol level on contrary to DHEA and DHEA-S does not decrease together with age, which may lead to so-called relative hypercortisolemia.

Kalmijn et al. [23] showed significant interdependence between relation of DHEA/cortisol and the level of cognitive function disorders in elderly people.

Summing up, our own research confirms decreased blood serum dehydroepiandrosterone sulphate concentration in elderly women, especially in case of coexisting illnesses typical of this period of life. Blood DHEA level can be recognized as the important aging biomarker. In this situation DHEA substitution in elderly women seems to be reasonable. However, at present there is no convincing evidence proving that such therapy would positively influence modification of aging process, protecting against accelerated development of many illnesses.

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Strain on the spine – professional threat to nurses' health

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Abstract

Purpose: The aim of the research was to investigate correlation between strain on the spine, work place and years spent in work.

Material and methods: Research was carried out on a group of 937 nurses working in health care units in the Warsaw district area. The study was conducted using the method of diagnostic survey and as a research tool a questionnaire sheet including 70 questions divided into 6 categories was used. Research was carried out voluntarily and anonymously.

Results: The case study confirmed earlier hypotheses that strain on skeleton and muscles, non psychological and constrained body positions in relation to years worked in profession have significantly statistical correlation on a level of 0.005, χ^2=16.768. Strain on the spine is also dependent upon ward in which nurses work and upon characteristic of executed work. 79% of tested people fears of degenerative changes of the spinal column. Health problems that are connected to lower back pain are reported by 61% of nurses. 67% of ward nurses and 79% of scrub nurses, more often than departmental nurses and these working in other basic and specialised units, complain about pain symptoms after duty. The greatest strain placed on the spine affects tested nurses working in gastrology department (74%), department of internal medicine and neurology department (70%).

Conclusion: Strain on the spine is a serious issue as it creates a vast number of health problems which results in decreasing the work quality.

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Introduction

Professional threats to health are serious medical and social problems. Nurses while conducting professional activities are exposed to strain on the spine. It results in aversion towards work, discomfort and frequent low back pain. Nursing personnel work is characterised by physical activity connected to being in constant move inside the ward and hospital [1,2]. Nursing professional tasks are conducted in constrained body positions what cause most often static strain during work. Nurses get slanting and deeply slanting position most frequently while executing nursing and health tasks performed by patient's bed (washing, shaving, changing wound dressing, giving injections, taking blood pressure, taking blood for tests etc.). The main reason for getting these body positions is bad work post's adjustment in terms of ergonomics such as: bed and couch without the height-adjust feature or with mechanical height adjustment system (crank, treadle) which require additional forward leaning position and physical force, too low furniture, bad state of installation and devices, rooms with limited space, bad acquired habit [1,3]. Standing, slanting and deeply slanting position can be easily corrected or changed for sitting position [3]. As women are most numerous in nurses profession it is worth mentioning currently binding law regulations (Regulation of the Council of Ministers of 30 July 2002 – Journal of Laws No 127, item 1092 [4]). Regulations define limitations for women's health regarding execution of jobs connected to physical effort and transporting heavy materials and constrained body position [3]. Limitation of strain due to physical effort put on employees can be obtained most of all through analysis of current situation on work posts and specification of factors which contribute most to the level of strain placed on employees [1]. The main element of muscular – skeletal system with the highest risk of strain during conducting professional

Table 1. **Occurrence of tiresome tasks in work environment in relation to years spent at work**

N=937	yes	1-2 years	3-6 years	7-10 years	11-15 years	16-25 years	over 25 years	answer refusal
		A**	B*	C	D	E	F	G**
		2%	8%	13%	23%	38%	14%	2%
		N=23	N=75	N=125	N=217	N=354	N=127	N=16
patients' lifting	65%	48%	68%	68%	68%	63%	57%	50%
objects' lifting	22%	9%	13%	22%	23%	23%	23%	0%
nursing tasks	22%	22%	35%	30%	19%	20%	9%	6%
operational tasks	26%	22%	28%	29%	26%	25%	17%	13%
others	13%	4%	9%	10%	16%	14%	18%	13%

Proportions/Means: Columns lested (5% risk level) – A/B/C/D/E/F/G; * small base; ** very small base (under 30) ineligible for sig testing

tasks is spine, which performs a function of body posture's stability and securing considerable freedom of moves (bending, straightening, side bending, twists).

The aim of the research was to investigate correlation between low back pain, work place and years spent at work.

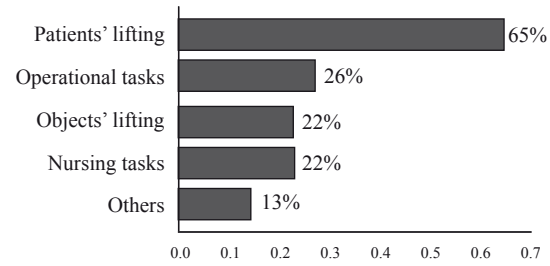
Material and methods

A group of 937 nurses (75%) out of 1252 enrolled in non-stationary 1st and 2nd degree studies of Health Science Department of Medical University in Warsaw participated in the research. Most of nurses (99.1%) were employed in Health Care Units in the Warsaw district. The study was conducted in January 2007 among students during planned classes. It was carried out using the method of diagnostic survey and as a research tool a questionnaire sheet including 70 questions divided into 6 categories was used. 4 questionnaire categories are author's categories, the other 2 were created on the basis of ergonomics control list published by International Work Office together with International Ergonomics Association. The list included 128 questions, 14 of them dealing with transport and transfer of patients and 5 dealing with manual transfer of patients were used. Research was carried out voluntarily and anonymously. All people were informed of the goal and the way of completing the questionnaire sheet. Values of analysed data measured in nominal scale were subjected to statistical analysis. Chi-square test for independence was used to evaluate correlation between two variables. 5% error analysis was determined. A value of probability of p=0.005 was assumed to be statistically significant. As a basis for strain on the spine non physiological, constrained body positions and too big pressure on skeleton and muscles together with work years were assumed.

Results

The study group consisted above all of women (99%). Two most numerous age brackets were 31-35 years (23%) and 36-40 years (24%). The lest numerous age bracket was 21-25 years (4% of tested group). Most respondents were married (67%). Almost 47% of the tested group lived in Warsaw and 28% in Warsaw neighbourhood. Only 17% came from the country. 77% of all respondents works in hospital. 51% of respondents has from 16 to 25 years work experience, 23% – from 11 to 15 years work experience, 14% over 25 years work experience and 2% from 1 to 2 years.

Figure 1. **Strenuous activities in work environment N=937**



Strenuous activities occurring in work environment are listed in *Fig. 1.* and *Tab. 1.* 65% of tested people complain about frequent patients' lifting, 26% about operational tasks and 22% about nursing tasks. Patients' lifting is reported to be the heaviest burden for nurses of all the age brackets. Groups of nurses with very small work experience of 1-2 years and 2-6 years consist of lest people and are not eligible for statistical analysis. *Tab. 2* analyses strenuous activities occurring in work environment in relation to ward in which nurses work. Respondents working in surgical, internal ward and in cardiology lift patients more often than nurses working in pediatry. Nurses employed in internal ward complain more often than other nurses about nursing tasks. 77% of tested group presents the opinion that strain on skeletal and muscular system, and non physiological constrained body positions are great threats to spine. Nurses of 11-15 years work experience bracket regard these two threats to be equally dangerous to spine (81% and 82% accordingly) and the same was reported by nurses of 3-6 years work experience bracket (81% and 83% accordingly) (*Fig. 2*). Statistical correlation between strain on skeletal and muscular system and years spent in work was claimed, p=0.005, chi-square =16.768. Almost 45% of the tested group refused to answer the question "what is the most frequent reason for inconveniences' occurrence?" (*Fig. 3*) 38% as a reason names uncomfortable body positions, 11% lists lack of help from co-workers. It is striking and should be taken into consideration that only 4% of tested group lists as a burden too little staff and 2 % – vast number of responsibilities. Almost 61% of respondents suffers from low back pain (*Fig. 4*), 50% from headaches, 40% from pain in cer-

***Table 2*. Occurrence of tiresome tasks in work environment in relation to work position**

N = 937	Internal ward	Pediatry	Cardino-logy	Nephro-logy	Gastro-logy	Hekato-logy	Neuro-logy	Infectious diseases ward	Surgical ward	Others	No data
	L*	M*	N*	O**	P**	Q**	R**	S**	T	U	V**
yes	6%	6%	5%	2%	2%	1%	3%	1%	12%	59%	3%
	N=54	N=56	N=45	N=19	N=19	N=14	N=29	N=11	N=113	N=550	N=28
patients' lifting	85%	52%	73%	78%	63%	93%	96%	82%	85%	61%	40%
objects' lifting	22%	21%	29%	44%	5%	29%	11%	9%	23%	22%	4%
nursing tasks	31%	30%	31%	28%	16%	50%	26%	18%	19%	19%	20%
operational tasks	24%	39%	31%	11%	42%	29%	7%	27%	20%	27%	8%
others	9%	5%	11%	0%	5%	0%	4%	0%	9%	16%	28%

Proportions/Means: Columns lested (5% risk level) – L/M/N/O/Q/R/S/T/U/V; * small base; ** very small base (under 30) ineligible for sig testing

***Figure 2*. Threats feared by tested group in relation to years spent at work N=937**

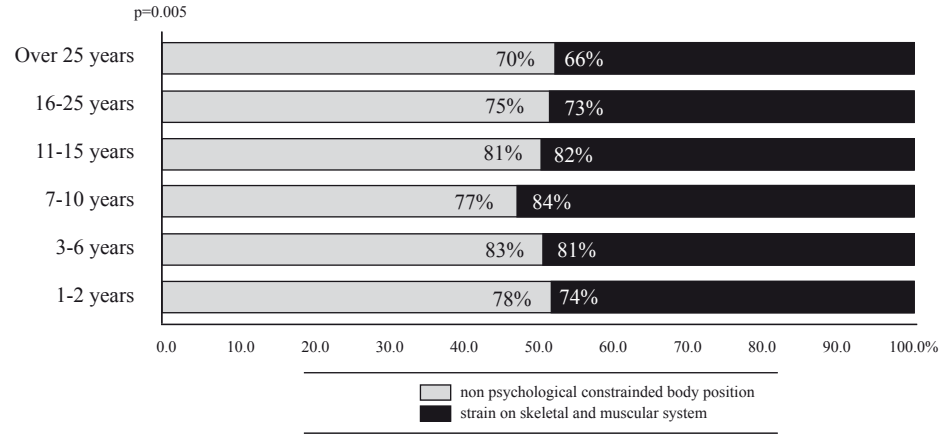


***Figure 3*. Reasons for inconveniences' occurrence N=937**

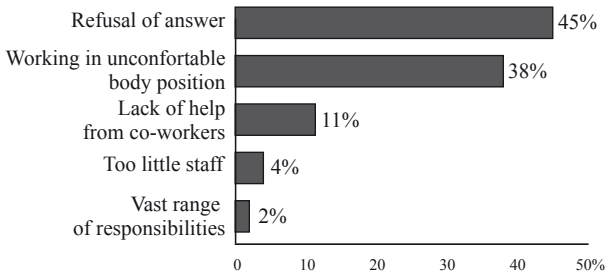
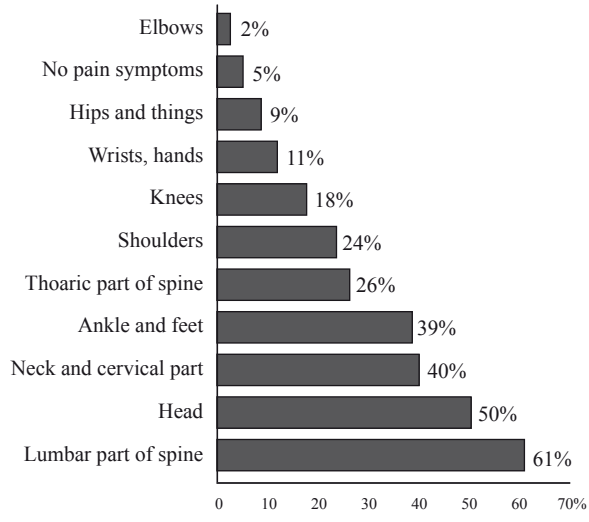


***Figure* 4. Pain symptoms suffered after duty N=937**



vical part of spine and 39% from pain in feet and ankles. Only 5% of respondents does not complain about any pain symptoms at all. Spine diseases were reported by more than 1/3 of nurses (37%) (*Fig. 5*). Back aches are suffered most by nurses working in such departments as: gastrology (74%), infectious diseases (73%), internal (70%), neurology (70%), nephrology (67%), and surgical (65%) (*Fig. 6*). Almost 2/3 of ward nurses and co-ordinating nurses suffers from similar symptoms (67%) and only a little less of anaesthesiology nurses claim to have the same painful symptoms (62%) (*Fig. 7*).

***Figure* 5. Diseases suffered by nurses N=937**

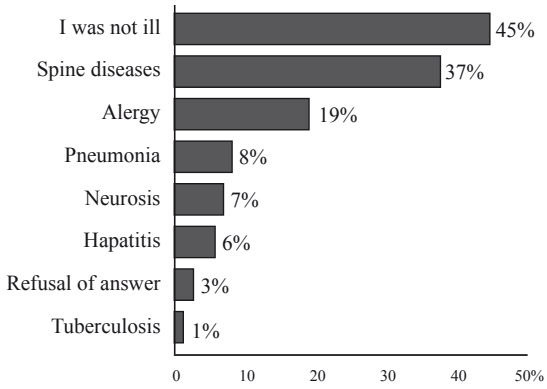
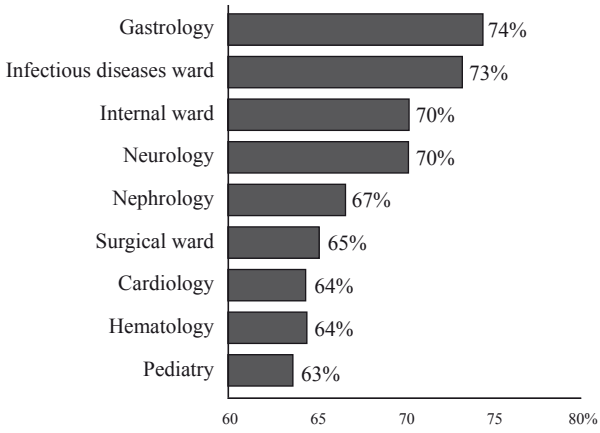


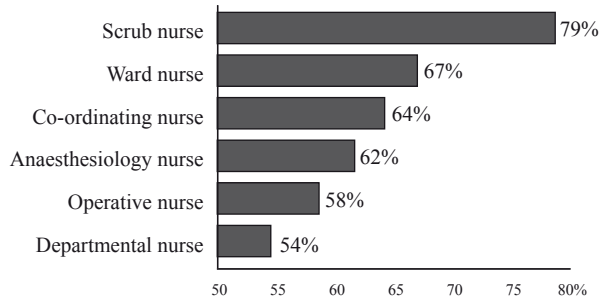
***Figure* 6. Lower back pain vs ward in which respondents work N=937**



Discussion

Spine is a base for human body and we and our habits work for spine shape through all life. Spine diseases are suffered by people in every age. According to directive (90/269) of the European Council, manual transportation of heavy objects can threaten much vertebral column's well-being [5]. In tested group 65% of nurses complain about patients' lifting and 22% about object's lifting. Lifting devices, biomechanical training, bigger rooms, adequate set-up and additional staff are suggested improvements [6]. Almost 60% of adults complains about back ache. Handicap of spine's function is especially tiresome and painful and acts as a obstacle in work in leading normal life and in active life. Strain on the spine is professional threat to nurses health because of frequent taken slanting and deeply slanting position during executing work tasks, which causes this strain on skeletal and muscular system. Research made among Dutch and Greek nurses shows that in both countries similar risk factors were associated with the occurrence of low back pain. Cross-national differences were less important for the risk factors and musculoskeletal complaints than for the consequences of musculoskeletal disorders [7]. According to the European Agency for Safety and Health at Work people working in EU report that their work force them to repeating hands' and shoulders' movement (57%), working with no brakes for rest (42%) [according to: European Agency for Safety and Health at Work]. The opinion of 77% of tested group that strain on the spine and work in constrained body positions are threat to skeletal and muscular system is of no correlation to work experience. When reaction of threats elimination out of work environment is belated, it contributes to professional diseases development and decreasing work quality. Employer is responsible for proper work post organisation. Work conditions should be safe for everyone at work and evaluation of professional risk serves a purpose of keeping the conditions in this way [2]. Threats linked to strain on the spine are easily investigated and assessed by ergonomics control lists which are widely known method for analysing work conditions. For securing safe work post for skeletal and muscular system ergonomics solutions (these limiting strain occurrence and therefore securing work quality and effectiveness) should be used [1].

***Figure* 7. Lower back pain vs work character of tested group N=937**



Spine diseases connected to work are European priority. In 1996 European Foundation for the Improvement of Living and Working Conditions conducted 2nd experts research in most of European countries, data analysis showed that main problems occurring in work environment are back aches and muscle aches, hands and feet aches. Back aches are also most frequent reason for absence at work (according to: European Agency for Safety and Health at Work). In the tested group 61% of respondents suffers from low back pain. In year 2000 European Week for Safety and Health at Work was run by 15 European Union Member States under the slogan: "Turn your back on musculoskeletal disorders". Healthier schedules, less overtime and reducing work on days off would minimize risk and recovery time [8].

Headache, neck ache and pain in chest can all accompany back aches (according to Central Institute of Labour Protection). In tested group headaches were reported by 50% of respondents, pain in cervical part was claimed by 40% and pain in thoaric part of spine by 26%. According to Work Code (art. 226), employer must inform employees of professional threats to health. Research conducted for a couple of years in the Institute of Work Medicine in Łódź shows the occurrence of pain symptoms by nurses due to disorders of skeletal and muscular system. Whenever strain on the spine is considered, we must remember the importance of preventive actions.

Conclusions

In conclusion**,** non physiological body positions and strain on skeletal and muscular system put great stresses on the spine of tested group and it is of no correlation to work post characteristics and work experience. Strain on the spine is bigger for nurses working from 6 to 10 years in hospital than in other health care units. Tested group rather unwillingly lists reasons for inconveniences' occurrence in work environment.

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A study to ascertain the patients' satisfaction of the quality of hospital care in Greece compared with the patients' satisfaction in Poland

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Abstract

Purpose: The aim of this study is to evaluate the satisfaction of elderly patients, of the hospital care's quality, based on the literature evidence on results of a qualitative research and on a previous developed conceptual frame.

Material and methods: We developed the Elderly Patient Satisfaction Scale (EPSS) by using a combination of qualitative and quantitative research. In this study participated 320 elderly patients from Greece (182 male, 138 female) and 240 patients (136 male, 104 female) from Poland (mean age 74.16 ±6.14 years). Most of elderly patients were married. Inclusion criteria were: elderly patients over 65 years old, being able to be interviewed, hospitalized for at least three days and not to be suffering from severe mental disease.

Results: There was no correlation among age and global patients' satisfaction. Men in both of groups were expressed greater satisfaction with perceived quality of doctor care than women. Age positively correlated with question who estimate the satisfaction with the time that doctor spends for medical history taking. Patient's education correlated with question (satisfaction with availability of nurses night). Patient's depression found that affects the quality of hospital care and the satisfaction. Elderly patients were most satisfied with the technical care ability of nurse. The time period of hospital stay is correlated negatively with patient's global satisfaction.

Conclusions: No significant difference between the patients from Greece and Poland in majority of dimensions: the satisfaction of elderly patients, of the hospital care's quality was noted.

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Key words: quality of care, patient satisfaction, reliability, validity, satisfaction scale.

Introduction

A lot of studies has been done in that field stating the importance of developing alternative scales of patients' satisfaction measurement. SERVQUAL appears to be the most widely used scale in health care service, since it has been tested in practice and has a theoretical support [1]. The literature on elderly patients' satisfaction with quality of care is sparse. This could indicate a low priority to the investigation of elderly patients' view of their care. Although patient satisfaction has been assessed across various patient groups and care setting only few studies have been done in elderly patients. In the meta-analysis of 221 studies reported that only 7% were on elderly patients [2]. Ware et al. [3]; Donabedian [4] suggest that patient satisfaction is considered to be an important indicator of quality of care for all patients people. A lot of studies have supported age, to be associated with greater satisfaction [5-8] reported health status to be a casual determinant of satisfaction. Also Fox et al. [6] supported a positive relationship between satisfaction and utilization, on the other hand, Roghman [9] did not find the same results between the two factors. One problem with assessing preferences is that patients' decisions about what is important in health care often reflect their individual experience rather than a general view. Interaction between patients in focus groups can help over come this [10].

Material and methods

We analyzed field notes by identifying grouping themes and coding, classifying, and developing categories. The first level categorization intended to reduce data to more manageable proportions. We identified 5 categories: food, nursing care,

Table 1. **Patient's career path and satisfaction with quality of care**

Level of satisfaction	Patient's career	
	Successful	Failed
High	Type I "Double satisfaction"	Type II "Episode satisfaction"
Low	Type III "Threshold satisfaction"	
Non	Type IV "Limbic satisfaction"	

doctor care, room, and treatment/diagnosis. The second level categorization included patients' judgments regarding each category (positive, negative, neutral and indifferent). The third level categorization contained direct comments for each category. We asked patients to answer two main questions: "what does satisfaction means for you" and "what are the factors that cause you feelings of satisfaction or dissatisfaction". Groups were "naturally occurring" as we selected patients from the same room of the same clinic. Accordingly to the *Tab. 1*, if we try to typify "attributable satisfaction" by means of different aspects, we must at first distinguish between different levels of expressed satisfaction (high, low, non) and the patient's life (successful, failed). Since all possible combinations often do not exist in reality, we can summarize single fields a procedure called "typological operation" of reduction [11]. For example, in case that level of satisfaction is low, patient perceives a "threshold satisfaction" whether his life path is successful or failed. This is usually attributed to the tension of elderly patients not to criticize their care as their "core" life (treatment) depends on their "positive behavior" during hospitalization (positive or neutral comments).

Results

Details of patients presents *Tab. 1*. There were no significant statistical different between the patients from Greece and Poland in majority of dimensions. We found that the elderly patients between 65-75 years old estimated quality of life who offered from doctors and from nurses 91.7% of patients from Greece and 92.2% of Poland were satisfied with hospital care, 95.2% were satisfied with doctor care, and 94.6% with nursing care. There was no correlation among age and global patients' satisfaction. In Greece 79.3% was satisfied with hospital food, in Poland the rate was 81.3%. Men in both of groups were expressed greater satisfaction with perceived quality of doctor care than women (p=0.008). Age correlated with question who estimate the satisfaction with the time that doctor spends for medical history taking, (p=0.000). Patient's education correlated (p=0.000) with question (satisfaction with availability of nurses night). The time period of hospital stay is correlated negatively with patient's global satisfaction (p=0.004). Patient's depression found that affects the quality of hospital care and the satisfaction. We found significant satisfaction differences between patients of the two groups related with pain management. Almost 79.4% of the elderly patients in Greece reported experience of extremely strong or strong pain, on the other hand in Poland only 29.2% of the patients reported strong pain experiences. Global satisfaction with care (*Tab. 3*) varies across regions with 91.7% of patients reporting that they were very satisfied with hospital care, 21% with food, 40.8% with doctor care and 43.4% with nursing care. By dividing patients' judgments in two major categories, we found that 91.7% of patients were satisfied and 0.3% dissatisfied with hospital care. 79.6% were satisfied with hospital food and 9% dissatisfied. 95.2% were satisfied with doctor care and 0.6% dissatisfied, 94.6%

Table 2. **Patients' characteristics**

	N	%
Gender		
Male	182	56.9
Female	138	43.1
Age groups		
65-74	201	62.8
75-84	96	30
85 +	23	7.2
Education		
None	56	17.5
Some elementary	209	65.3
High school	29	9
College/University	11	3.4
Marital Status		
Single	9	2.8
Married	208	65
Divorced	10	3.1
Windowed	93	29.1
Number of children patients have		
0	25	7.8
1-3	232	72.5
> 4	63	19.7
Nationality		
Greek	316	98.8
Other	4	1.3
Past Occupation		
Blue color	112	35
White color	47	14.7
Agriculture	83	25.9
Housewife/ househusband	78	24.4
Place of permanent residence		
Athens	82	25.6
Urban	238	74.4

Table 3. **Global satisfactions across all regions**

Region	8	7	6	5	4	3	2	1	0
Total Athens									
Hospital stay	36.5	28.7	6.1	16.5	4.3	0.3	0	0	7
Food	17.4	21.7	9.6	29.6	9.6	7.8	0	0.9	3.5
Doctor	44.3	27.8	7.8	16.5	2.6	0	0.9	0	0
Nurse	47	25.2	4.3	18.3	0	2.6	0	0	2.6
Total Urban									
Hospital stay	32	37.1	15.5	9.3	5.7	0	0	0	0.5
Food	23.2	19.1	22.2	16	9.3	7.2	1	1	1
Doctor	38.7	37.1	12.4	6.2	5.2	0	0.5	0	0
Nurse	41.2	32.5	12.9	7.7	3.6	2.1	0	0	0
Total									
Hospital stay	33.7	34	12	12	5.2	0.3	0	0	2.9
Food	21	20.1	17.5	21	9.4	7.4	0.6	1	1.9
Doctor	40.8	33.7	10.7	10	4.2	0	0.6	0	0
Nurse	43.4	29.8	9.7	11.7	2.3	2.3	0	0	1

satisfied with nursing care and 2.3% dissatisfied with nursing care. We grouped the seven hospitals in two major categories: Athens hospitals and urban (data are not shown). There was found no significant correlation between each scale and grouping category except for the way pain was treated with patients from Athens being more satisfied with pain management and nurse's response. Comparisons of the scores of men and women on the perceived quality of care and patient satisfaction scales were revealed that women scored significant higher than men on global satisfaction with food and global satisfaction with doctor care. Elderly patients were most satisfied with the technical care ability of nurse, with no out of pocket doctor care, with feeling secure in hospital, with the real interest of nurse and doctor for patient as a person and with availability of doctors when needed. Patients tended to be less satisfied with the management of caregivers' visiting hours from the personnel and with food variety. Men were more satisfied with care room characteristics (clean room, bathroom and toilet, pillows, mattresses) and with nurses' and doctors' empathy. Gender did not play a significant role in determining older people's assessment of care. Patients' age was correlated with their quality of doctor care (p=0.003) and with their intention to recommend the hospital to a friend (p=0.002) (data are not shown). After grouping age we found a correlation between age group (p=0.001) and intention to recommend the hospital indicated that with increasing age group, patients tended more to recommend the global patient satisfaction, or satisfaction with nursing and doctor care. Patient's occupation before retiring was correlated with global satisfaction with care (p=0.002). Days of hospital stay and patients income correlated negatively with patient's global satisfaction with care.

Discussion

Our findings are in accordance with the associated literature which suggests that the majority of elderly patients are reporting high satisfaction with the most aspects of care and with the quality of care they receive [12,13]. Within the health domain, there was found a positive and strong relationship between demographic characteristics and patient satisfaction. The vast majority of our patients expressed overall satisfaction with care and with nursing and doctor care. This is a common finding that emphasizes a dependency, which exists between patients and their caregivers [14]. Elderly are unwilling to express their dissatisfaction with care evaluation a difficult task that needs expertise. Greek patients have low expectations from care and so, they experience the same attitude (as it expressed through their satisfaction) towards what is provided to them. The casual relation of global quality of care to global satisfaction that we found in this research was also supported from other researchers [15,16]. This finding combined with the fact that for most elderly patients their satisfaction with care was greater than their level of quality of care could be attributed to their inability to clarify what quality of care really means for them. As a result they tend to express more favorably their global satisfaction with care due to their doctor or nurse dependency instead of rating more their global quality of care that is usually defined by health care providers. Lee et al. [12] support that the negative relationship between favorable assessment and age was especially striking for patient rating of physician's technical skills. High reliability scores are a common finding in patient's satisfaction literature. Fitzpatrick [17] emphasizes that it is usual in health care research because patients tend to express high values of satisfaction with most items that make difficult to have confidence in correlations between items as a measure of reliability of patient satisfaction scores. For elderly patients "halo effect" explains better this remark. Increasing participation of patients and the public in health is desirable. The length of stay in hospital correlated negative with patient's satisfaction and this finding was supported from other studies. Also we found that this group age are unwilling to express their dissatisfaction with care evaluation. The most of patients report that they would return back to the same hospital if the will be have

any problem with their health and recommend it to a friend. The majority of patients (67.1%) felt an extreme or much pain. From the compare between gender men expressed greater satisfaction with perceived quality of doctor care than women. In this point Lee et al. [12] reported that gender did not play a significant role in determining older people's assessment of care. Also patient's income correlated negatively with global satisfaction with care with global satisfaction with doctor care and with nursing care.

Conclusions

Concluding, in this study elderly patients rated the quality of care very well. Elderly patient satisfaction is an important indication of quality of care also is very important today that the majority of researchers acknowledge the importance of the views of users in developing services and their preferences for the care.

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Comparative analysis of quality of life women in menopause period in Poland, Greece and Belorussia using MRS scale. Preliminary report

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Abstract

Purpose: The aim of this study was the assessment of climacteric symptoms, the activity and quality of life of women in menopausal period from Poland, Greece and Belorussia using a Menopause Rating Scale (MRS).

Material and methods: The study was conducted among women in age after 45 years, from Poland (55), Belorussia (50) and Greece (85). MRS was obtained from the Professor Heinemann from Center of Epidemiology and Health Studies in Berlin. The scoring scheme is simple, i.e. the score increases point by point with increasing severity of subjectively perceived symptoms in each of the 11 items (severity 0 – no complaints, 4 scoring points – severe). The respondent provides her personal perception by checking one of 5 possible boxes of "severity" for each of the items.

Results: Mild and no complaints in similar degree were reported by all women from these three countries. We found significant ($p<0.001$) differences between severe complaints reported by Greek women compared with complaints respondents from Belorussia and Poland. Moderate complaints were reported more frequently by women from Poland (32.56%) and Belorussia (34%) compared with women from Greece (28.55%).

Severe complaints were noted more rarely in 1.6% Greek women compared with 2.6% Belorussian and 3% Polish respondents. No significant differences between no complainants, mild, moderate, marked and severe between women from Belorussia, Poland and Greece.

Conclusions: Generally we did not observe significant differences between reported complaints by women from Belorussia, Poland and Greece.

Key words: menopause, scale MRS, Poland, Greece, Belorussia.

Introduction

Menopause is the time in woman's life when her period stops. It usually occurs naturally, bridge often after age 45 years. Menopause happens because the woman's ovary stops producing the hormones the estrogen and progesterone. Changes and symptoms can the start several years earlier. They include: change in periods – shorter or longer, lighter or heavier, with more or less time in between; hot flashes and/or night sweats; trouble sleeping; vaginal dryness, mood swings, trouble focusing and less hair on head, more on face [1,2]. Women, as to men, experience an age-related decline of physical and mental capacity. They observe symptoms such as periodic sweating or hot flushes, depression, insomnia, impaired memory, lack of concentration, nervousness, and bone, and joint complaints. Menopause has an impact on women quality of life. The Menopause Rating Scale (MRS) is the lack of standardized scales you developed in response this measure the severity of aging-symptoms and their impact on the health-related Quality of Life (HRQoL) in the 1990. Scale can easily be completed by women, notes their physician [2,3]. The original MRS is used since 1992. It documents climacteric symptoms and their changes during the treatment [2,4]. Based on this investigation, the revised and final version of the MRS we used. The aim of this study was the assessment of climacteric symptoms and quality of life of women in menopausal period from Poland, Greece and Belorussia using the MRS scale.

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Table 1. **Menopause symptoms in MRS scale in women from Belorussia**

N=50	No	Mild	Moderate	Marked	Severe
	N/%	N/%	N/%	N/%	N/%
Hot flushes	2 4%	15 30%	30 60%	3 6%	0
Hart discomfort	13 26%	25 50%	7 14%	4 8%	1 2%
Insomnia	7 14%	20 40%	18 36%	5 10%	0
Depression	20 40%	22 44%	8 16%	0	0
Irritability	2 4%	10 20%	25 50%	13 26%	0
Anxiety	5 10%	20 40%	21 42%	4 8%	0
Fatigue	10 20%	20 40%	13 26%	6 12%	1 2%
Sexual problems	11 22%	21 42%	18 36%	0	0
Urogenital problems	5 10%	18 36%	21 42%	4 8%	2 4%
Vaginal dryness	5 10%	22 44%	20 40%	3 6%	0
Muscles and joints problems	32 64%	10 20%	8 16%	0	0
Mean percentage	20%	37%	34%	9%	2.6%

Material and methods

The study was conducted among women in age after 45 years, from Poland (55), Bialarussia (50) and Greece (85). The Menopause Rating Scale (MRS) scale was obtained from the Professor Heinemann from Center of Epidemiology and Health Studies in Berlin. The MRS is psychometric rules formally standardized according. It consists of and letter of 11 symptoms which have been answered. The respondent have and choice among 5 categories: no symptom, mild, moderate, marked, and severe. During the standardization of this instrument, three independent dimensions were identified explaining 58.8% of the total variance (factor analysis): psychological, somato-vegetative, and urogenital subscale. The means (SD) of the scoring points of the total scale (and the three subscales), Wilcoxon signed rank test was used. The statistical analyses were performed with the commercial statistical package Statistica 6.0.

Results

Mild and no complaints in similar degree were reported by all women from these three countries. We also found that almost 14.4% of women from Greece had marked complaints in MRS scale compared to complaints of 9% respondents from Belorussia and Poland 9.5%. These differences were significant ($p<0.001$). Moderate complaints were reported more frequently by women from Poland (32.56%) and Belorussia (34%) compared with women from Greece (28.55%). Severe complaints were noted more rarely in 1.6% Greek women compared with 2.6% Belorussian and 3% Polish respondents. These findings were not significant. Furthermore, a half of respondents from Poland, Belorussia and Greece reported hot flushes (in moderate degree). In contrast 70% of Greek women declared hot flushes, from Poland 54.4% and 60% from Belorussia. Insomnia was reported more frequently by women from Poland (34.6%) and Belorussia (36%) than by respondents from Greece (17.6%). No significant differences between no complainants, mild, moderate, marked and severe between women from Belorussia, Poland and Greece. Generally we did not observe significant differences in reported complaints between women from these countries.

Discussion

In the present study, generally we did not significant differences in reported complaints in MRS scale. We noted also that more Greek women reported marked complaints in MRS scale compared with complaints of respondents from Belorussia and Poland. To our knowledge it is the first study comparing MRS complaints among women from different countries.

The validation of the MRS began some years ago [3-7] with the objectives (1) to enable comparisons of the symptoms of aging between groups of women under different conditions, (2) to compare severity of symptoms over time, and (3) to measure changes pre- and post-treatment.

Schneider et al. [6] evaluated the Menopause Rating Scale (MRS) for scoring menopausal symptoms by comparison with other instruments relevant for women in their menopausal transition: the Kupperman index and the quality-of-life scale SF-36. In population sample of 306 of German women (aged 40-60) they conducted the study. A comparison of the MRS with the Kupperman index produced a high correlation of raw scores ($r=0.91$). The authors found a strikingly good association between the subscales of the SF-36 and the MRS. The Menopause Rating Scale is a valuable modern tool for the assessment of menopausal complaints. It combines in practice excellent applicability and good reliability, and there are normal values for the population available. The MRS could serve as an adequate diagnostic instrument for menopausal quality of life.

Although the Kupperman index is the monitor menopausal symptoms is validated according this psychometric standards it is still in use in the medical practice. Generic Quality of Life scale SF 36, two subscales of the multidomain Quality of Life scale SF36 was compared with the MRS: the somatic sum score (with somatic domain of MRS) and the psychologic subscales

Table 2. **Menopause symptoms in MRS scale in women from Poland**

N=55	No	Mild	Moderate	Marked	Severe
	N/%	N/%	N/%	N/%	N/%
Hot flushes	2 3.6%	20 36.4%	30 54.4%	3 5.5%	0
Hart discomfort	13 23.6%	27 49.1%	9 16.4%	4 7.3%	2 3.6%
Insomnia	8 14.5%	21 38.2%	19 34.6%	6 10.9%	1 1.8%
Depression	22 40%	23 41.8%	9 16.4%	1 1.8%	0
Irritability	2 3.6%	13 12.7%	26 47.3%	13 23.6%	1 1.8%
Anxiety	7 12.7%	22 40%	21 38.2%	5 9.1%	0
Fatigue	10 18.2%	22 40%	14 25.5%	8 14.5%	1 1.8%
Sexual problems	14 25.5%	23 41.8%	18 32.7%	0	0
Urogenital problems	5 9.1%	20 36.4%	22 40%	4 7.3%	4 7.2%
Vaginal dryness	5 9.1%	26 47.3%	20 36.3%	3 5.5%	1 1.8%
Muscles and joints problems	35 63.6%	11 20%	9 16.4%	0	0
Mean percentage	20.32%	36.7%	32.56%	9.5%	3.01%

Table 3. **Menopause symptoms in MRS scale in women from Greece**

N=85	No	Mild	Moderate	Marked	Severe
	N/%	N/%	N/%	N/%	N/%
Hot flushes	8 9.4%	3 3.5%	60 70.6%	12 14.1%	2 2.4%
Hart discomfort	17 20.1%	35 41.2%	20 23.6%	12 14.1%	0
Insomnia	42 49.4%	23 27.1%	15 17.6%	5 5.9%	0
Depression	22 25.9%	50 58.9%	13 15.2%	0	0
Irritability	2 2.4%	12 14.1%	43 50.6%	28 32.9%	0
Anxiety	18 21.2%	33 38.8%	21 24.7%	12 14.1%	1 1.2%
Fatigue	18 21.2%	33 38.8%	21 24.7%	12 14.1%	1 1.2%
Sexual problems	22 25.9%	50 58.9%	13 15.2%	0	0
Urogenital problems	18 21.1%	35 41.2%	20 23.6%	12 14.1%	0
Vaginal dryness	15 17.6%	35 41.2%	23 27.1%	12 14.1%	0
Muscles and joints problems	44 51.8%	23 27.1%	18 21.1%	0	0
Mean percentage	21.18%	35.53%	28.55%	14.4%	1.6%

of both instruments. Both somatic domains were sufficiently good and significant associated: Kendall's tau-b=0.43 (95% CI 0.52-0.35). That means, the higher the score in the somatic dimension of the MRS, the lower the quality of life according to the somatic sum-score of the SF36. Similar was the results of the comparison of the psychological scores of both instruments: Kendall's tau-b=0.49 (95% CI 0.56-0.41); Pearson correlation coefficient r=0.73 (95% CI 0.81-0.65) [5,6].

Norm values from different populations were presented showing that a direct comparison between Europe and North America is possible, but caution recommended with comparisons of data from Latin America and Indonesia. But this will not affect intra-individual comparisons within clinical trials [10].

The currently available methodological evidence points towards a high quality of the MRS scale to measure and to compare HRQoL of aging women in different regions and over time, it suggests a high reliability and high validity as far as the process of construct validation could be completed yet [8].

In the previous study [10] it was observed an unexpected good sensitivity/specificity: sensitivity (correct prediction of a positive assessment by the physician) 70.8% and specificity (correct prediction of a negative assessment by the physician) 73.5%. The authors assumed that in many cases the true treatment effect is better reflected by the self-administered MRS then by this form of clinical judgement.

In recent report [11] the MRS scale was applied with additional patient related information (age at menopause, level of education, working/non-working and exercising or not). The results were evaluated for psychological, somatic, and urogenital symptoms. A significantly higher percentage of women (36%) showed a psychological score of >7; while a higher percentage of postmenopausal showed somatic score and urogenital score >7 (>40%). Working women had more psychological symptoms whereas non-working women showed a greater incidence of somatic symptoms. The authors concluded that age, level of education and working/non-working status may also contribute to significant variations in menopausal symptoms.

A critical methodical assessment by one of the participants in the development of this new scale showed methodical deficiencies which theoretically as well as practically limited the use of the scale [3].

Heinemann et al. [4] reviewed the current state of the instrument particularly concerning versions of the scale in different languages. The MRS translations were performed following

international methodological recommendations for the linguistic and cultural adaptation of HRQoL instruments. The first translation was done from the German original scale into English (UK and USA). The English version was used as the source language for the translations into French, Spanish, Swedish, Mexican/Argentine, Brazilian, Turkish, and Indonesian languages. The currently available 9 language versions have been translated following international standards for the linguistic and cultural translation of quality of life scales. Assistance is offered to help interested parties in the translation process.

Conclusions

Concluding, the Menopause Rating Scale is a easy and useful tool to measure the severity of age-/menopause-related complaints by rating a profile of symptoms. Generally we did not find significant differences in reported complaints in MRS scale between women from Belorussia, Poland and Greece.

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Quality of life and its relationship to the degree of illness acceptance in patients with diabetes and peripheral diabetic neuropathy

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Abstract

Purpose: Assessment of quality of life, especially from the psychological point of view, is likely to be strongly influenced by the degree of acceptance of one's own illness and the resultant negative emotional reactions associated with the illness itself. The aim of the present study was to determine the relationship between quality of life and the degree of acceptance of illness in diabetic patients with and without peripheral diabetic neuropathy.

Material and methods: 59 patients with diabetes were included in the study; they consisted of patients both with and without peripheral diabetic neuropathy. The degree of acceptance of illness was assessed using the Acceptance of Illness Scale (AIS) and quality of life (HRQOL – health-related quality of life) was measured using the SF-36v2.

Results: Quality of life in people with diabetes was reduced and related to their levels of illness acceptance. Factors affecting illness acceptance in patients with peripheral diabetic neuropathy included feelings of being a burden to their family and friends ($p \leq 0.05$) and the belief that people in their company are made anxious by the patient's illness ($p \leq 0.05$). These patients also defined their health status as being worse than that of diabetic patients without additional disease complications.

Conclusions: Quality of life and illness acceptance were found to be strongly related. In general, patients with chronic peripheral diabetic neuropathy express lower degrees of acceptance of their illness than diabetic patients without peripheral diabetic neuropathy. Their subjective assessment of health status is also significantly worse than that of diabetic patients without neuropathy.

Key words: diabetes, diabetic neuropathy, quality of life, illness acceptance.

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Introduction

Diabetes is a metabolic illness requiring regular medical care, education in order to improve self-care and ability on the part of the patient to monitor his/her own condition. It is also a condition that has a significant influence on quality of life for those suffering from it [1].

The notion of illness acceptance is considered to manifest itself in a reduction in the strength of negative emotions associated with the current condition on the part of the patient. Lack of illness acceptance, on the other hand, results in submission to the limitations imposed by the illness, a decrease in self-sufficiency, feelings of dependence on other people and a diminished belief in one's sense of self-worth [2].

Health-related quality of life (HRQOL) is based on the notion that factors determining the assessment of quality of life are directly related to matters of health. Thus measurement of quality of life, and in particular its psychological aspects, are determined by strategies for coping with stress, social support and acceptance of one's own illness [2].

The aim of the present study was to determine the relationship between quality of life and degree of illness acceptance in diabetic patients both with and without peripheral diabetic neuropathy.

Material and methods

The study was carried out with the help of 59 patients with well controlled diabetes types I and II from the Department of

Table 1. **Quality of life and acceptance of illness in diabetic patients studied**

	Diabetic neuropathy N=22 (37.3%) Men=8 (13.6%) Women=14 (23.7%)		**Diabetes without neuropathy** N=37 (62.7%) Men=13 (22%) Women=24 (40.7%)	
	Mean ±SD	Max.-Min.	Mean ±SD	Max.-Min.
Age (in years)	60.5 ± 10.1	79-40	62.0 ± 13.6	81 - 24
Durtation of diabetes (yrs)	16.6 ± 11.3	42-3	13.0 ± 9.3	40 - 1
Physical Functioning (PF)	40.1±13.8	59.7-19.2	41.8±12,2	57-14.9
Physical Role Functioning (RP)	41.0±11.9	56.9-17.7	41.1±10.8	56.9-17.7
Bodily Pain (BP)	42.4±13.6	62.1-19.9	45.8±14.1	62.1-19.9
General Health (GH)	33.9±7.9	56.7-21.0	35.5±9.7	55.3-18.6
Vitality (VT)	44.9±10.1	61.5-24.0	45.6±7.5	64.6-33.4
Social Functioning (SF)	44.6±12.4	56.8-18.7	40.6±11.4	56.9-13.2
Emotional Role Functioning (RE)	44.7±11.6	55.9-20.9	41.7±11.4	55.9-20.9
Mental Health (MH)	39.6±11.0	58.5-16.2	39.8±8.1	58.5-24.7
Physical Functioning (PCS)	39.2±10.8	61.9-23.6	42.2±9.7	58.2-23.3
Mental Functioning (MCS)	44.5±9.4	60.6-19.2	41.5±9.3	63.5-23.7
Acceptance of Illness Scale (AIS)	26.6±8.4	40-13	29.6±8.1	40-10
AIS (Q.5)*	3.6±1.6	5-1	4.2±1.2	5-1
AIS (Q.8)*	3.8±1.4	5-1	4.4±1.2	5-1
Subjective assessment of health (Q.1, SF-6v2)**	3.5±0.9	5-1	4.0±0.8	5-1

* $p<0.05$ for Q.5. "As a result of my illness I am a burden to my family and friends"; for Q.8. "I think that people in my company are frequently made to feel anxious as a result of my illness"; ** $p<0.05$ for Q.1. "In general, would you say your health is: excellent, very good, good, fair, poor"

Table 2. **Pearson correlation coefficients for Acceptance of Illness Scale and different domains of Quality of Life (QoL) as measured on the SF-36v2**

QOL SF-36v2	**Acceptance of Illness Scale (AIS)**
Physical Functioning (PF)	0.409**
Physical Role Functioning (RP)	0.519**
Bodily Pain (BP)	0.431**
General Health (GH)	0.307*
Vitality (VT)	0.526**
Social Functioning (SF)	0.481**
Emotional Role Functioning (RE)	0.499**
Mental Health (MH)	0.616**
Physical Functioning (PCS)	0.451**
Mental functioning (MCS)	0.568**

* $p<0.05$; ** $p<0.01$

Endocrinology, Diabetes and Internal Medicine of the Medical University of Białystok, Poland. There were 11 (18.3%) patients with type I and 48 (81.7%) patients with type II diabetes. Of these, 37 (62.7%) did not have additional polyneuropathy, while the remaining 22 (37.3%) had developed complications in the form of chronic peripheral diabetic neuropathy. The mean disease duration for the group of patients without neuropathy was 13 years and for those patients with peripheral neuropathy it was 16.6 years.

The degree of illness acceptance was measured using the Acceptance of Illness Scale (AIS) which consists of statements describing the negative consequences of ill-health [2,3]. Health related quality of life (HRQOL) was assessed with the aid of the SF-36v2, which consists of 8 subscales designed to measure the following dimensions of quality of life: physical functioning (PF), social functioning (SF), physical role functioning (RP), emotional role functioning (RE), bodily pain (BP), general health (GH), vitality (VT) and mental health (MH). The SF-36v2 is constructed so as to allow a conglomerate measure to be constructed for two dimensions of functioning: physical functioning (PCS) and psychological or mental functioning (MSC) [4]. Data analyses were conducted using the Statistical Package for Social Sciences (SPSS) version 12.0 for Windows. Correlations between variables were determined using Pearson's correlation coefficients and in order to test hypotheses concerning the differences between the two groups of patients, with and without neuropathy, the student's t test for independent samples was used. Levels of $p<0.05$ were accepted as being statistically significant values. Permission for carrying out the research was obtained from the Bioethics Committee of the Medical University of Białystok.

Results

Basic demographic data for the two groups of diabetic patients with and without peripheral neuropathy are shown in *Tab. 1*. The groups were well matched for age, sex and duration of illness. The health related quality of life (HRQOL) scores for each of the eight domains measured by the subscales of the SF-36v2 and the Acceptance of Illness Scale (AIS)are also shown in *Tab. 1*. For both the SF-36v2 and the AIS, lower scores indicate a greater impairment in HRQOL and illness acceptance respectively. The Pearson correlations between scores on the AIS and the individual domains of HRQOL are shown in *Tab. 2*. It can be seen that illness acceptance is associated with all domains of the HRQOL.

For the purposes of statistical analysis, comparisons were made between the two groups of diabetic patients with and

without peripheral diabetic neuropathy with respect illness acceptance and different aspects of quality of life as measured by the SF-36v2. Although there was a tendency for patients with peripheral diabetic neuropathy to express lower rates of illness acceptance, there were no significant differences between two groups with regard to the overall measure of illness acceptance as given by the Acceptance of Illness Scale (AIS). The groups differed, however, with respect to two of the items on the scale. It was found that patients with diabetic neuropathy were more likely to express the view that they were a burden to their family and friends ($t=-1.99$; $df=56$; $p\leq0.05$) and felt that people who spent a lot of time in their company were made anxious as a result of their illness ($t=-2.01$; $df=56$; $p\leq0.05$) (see *Tab.1* for comparison of mean values).

No differences between the groups were found for reported quality of life as measured by the SF-36v2. However, patients with peripheral diabetic neuropathy described their own health as being significantly worse than patients without neuropathy ($t=-1.934$; $df=57$; $p\leq0.05$).

Overall with reference to normative data for SF36v2 [4], it may be inferred from the results of the present study that diabetes reduces quality of life across all the dimensions of HRQOL measured. The patients examined in this study demonstrated difficulties in adaptation to diabetes as an illness and to its long-term complications in the form of peripheral diabetic neuropathy. The results obtained show a close relationship between illness adaptation and health related quality of life.

Discussion

It has been suggested that the consequences of failing to accept one's own illness include submitting to the limitations imposed by the illness, a decrease in self-sufficiency, feelings of dependence on other people and a diminished belief in one's sense of self-worth [2]. The results of the present study confirm these suggestions, particularly in the group of diabetic patients with peripheral neuropathy, who demonstrated greater difficulties in accepting their illness than diabetic patients without additional complications. Juczyński [2] found even lower rates of illness acceptance among the diabetic patients they studied. As a result of the illness, the social situation of patients frequently deteriorates as they are forced into a situation of greater dependency on others [5]. Evidence for this was also found in the present study where diabetic patients with peripheral neuropathy reported that they consider themselves to be a greater burden to their family and friends as a result of the illness. They were also concerned that their illness caused people who spent time with them to be more anxious.

Several studies have shown that foot-related complications in diabetic patients have a significant impact on their quality of life [6,7]. Benbow et al. have shown that diabetic patients with peripheral neuropathy reported lower levels of quality of life in comparison to other patients with uncomplicated diabetes and a normal control group [8]. Moreover, reduced levels of quality of life were reported by diabetic patients in general in comparison to a normal control group [8,9] a finding that is confirmed by the results of the present study. Overall, it appears that the differences between the two groups of diabetic patients, with and without peripheral neuropathy, are strongest in relation to patients' subjective evaluation of their health status as an indicator of their quality of life. Subjective assessment of health status has been noted to be of importance in relation to functioning in a range of chronic illnesses [10]. The psychological well-being of patients has a major impact on virtually all aspects of therapeutic and nursing care; an extremely important role for members of the therapeutic team is in helping patients develop a sense of mastery of their own illness and enabling them to create and maintain coping styles which are oriented towards solving the problems associated with living with diabetes.

Conclusions

Patients with peripheral diabetic neuropathy express lower levels of illness acceptance in relation to concerns about being a burden to their family and friends, as well as fearing that their illness causes people in their company to experience heightened levels of anxiety, in comparison to diabetic patients without neuropathy. These patients also define their health status as being overall worse than that of diabetic patients without additional disease complications. These results suggest that different aspects of quality of life may mirror various manifestations of diabetes at different stages of the illness. They provide support for the notion that chronic and progressive conditions are likely to follow a dynamic course in which the patient's adjustment to the illness will vary accordingly and thus require different types of therapeutic and nursing support at different stages of the illness. Future work needs to address this problem requiring that interventions are tied more specifically to the course of the illness.

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Nursing problems of patients with systemic sclerosis

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Abstract

Systemic sclerosis (SSc) is a chronic autoimmune disease connective tissue and one of the most common collagen diseases. There are several clinical types of scleroderma which differ in their course, possible complications and prognosis. The most characteristic form SSc is limited and diffuse systemic sclerosis. The SSc is characterized by the progressive fibrosis of the skin and internal organs, leading to their failure, morphology and blood vessels disorders.

Purpose: The aim of our work is to identify the main health problems of patients suffering from systemic sclerosis depending on its clinical form: limited systemic sclerosis (lSSc) and diffuse systemic sclerosis (dSSc); to determine the influence of disease duration on symptom intensification in patients with lSSc and dSSc.

Material and methods: The study group consisted of 63 patients with systemic sclerosis diagnosed according to the criteria of the American Rheumatism Association (ARA), 47 of whom had limited systemic sclerosis (lSSc) (74.6%) and 16 – diffuse systemic sclerosis (dSSc) (25.4%).

Conclusions: The key thing in the complex therapy is to recognize the individual care problems of the patient, to assess his ability to cope with the disease in daily life and to plan care, support, education and help of other professionals. The main aim of individual nursing care is to alleviate ailments, prevent infections, observe life-threatening conditions and to educate the patient as regards self-care and self-observation.

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Key words: clinical forms of systemic sclerosis, disease duration versus symptom intensification.

Introduction

Systemic sclerosis (SSc) is a systemic connective tissue disease, characterised by a progressive fibrosis of the skin and internal organs leading to their failure, changes of organs morphology and their blood vessels as well as the immune system dysfunction [1].

The SSc most often affects people aged from 30 to 50. Women develop scleroderma 3-4 times more often than men.

Limited systemic sclerosis – lSSc, previously known as CREST syndrome, which is an acronym for its clinical symptoms: calcinosis – calcification in soft tissues, Raynaud's Phenomenon, which usually significantly (a few years or longer) precedes the disease, esophageal dysfunction, sclerodactylia – hardening of finger skin and teleangiectasia – the occurrence of blood-vessel lesions on the skin. Skin lesions affect the face and upper limbs – distal to elbows, and lower limbs – distal to knees. It is a milder form of SSc and particularly chronic. At first, it was believed that in this form of SSc the systemic lesions are limited only to the oesophagus, but it has now been proved that there are also lesions in other organs [2].

Diffuse systemic sclerosis dSSc was previously known as progressive systemic sclerosis. Symmetrical, widespread and quickly progressing skin lesion affect not only the face and limbs, sometimes except for fingers, but also the corpse. The hardening of limb skin involves the areas proximal to elbows and knees. Other characteristic features dSSc include fatigue, arthralgia, polyarthritis with swelling and itching fingers and toes and frequent joint contractures. The Reynaud's Phenomenon usually appears simultaneously with skin thickening. Diffuse systemic sclerosis is characterised by a greater than lSSc dynamics of the involvement of skin and internal organs: most often concern lungs, less frequently – kidneys and heart, very

Table 1. **Data of examined groups**

Age	**to 40 of years**		**41-60 of years**		**≥61 of years**	
	N	%	N	%	N	%
	12	19%	35	55.6%	16	25.4%
Education	**no more than the elementary education**		**at least the average education (college)**			
	29	46%	34		54%	
Civil status	**married**		**not married**			
	46	73%	17		27%	
Place of residence	**town**		**village**			
	38	60.3%	25		39,7%	
Duration of disease	**to 4 of years**		**5-14 of years**		**≥ 15 of years**	
	17	27%	29	46%	17	27%
Profesional activity	**working**		**not working (pensioner)**			
	23	36.5%	40		63.5%	

often – the alimentary tract. The onset of disease may be quite rapid, especially in the first stage (the first 3 years). The most dramatic complications dSSc include renal involvement in the form of scleroderma renal crisis – 80% within the first 4 years. As a result, dSSc is much more severe than lSSc [2,3].

A patient with systemic sclerosis requires permanent medical care, specialised diagnostics, monitoring of basic life parameters for life-threatening systemic complications, a systematic treatment and nursing. The patient and his family should be involved in the educational processes aiming at their preparation to non-professional care [4].

The objective of this study is to identify the main health problems of patients suffering from systemic sclerosis, with a differentiation between the limited and diffuse form, as well as to determine the influence of disease duration on symptom intensification in patients with lSSc and dSSc.

Material and methods

The study group consisted of 63 patients with systemic sclerosis diagnosed according to the criteria of the American Rheumatism Association (ARA), 47 of whom had limited systemic sclerosis (lSSc) (74.6%) and 16 – diffuse systemic sclerosis (dSSc) (25.4%). There were 60 women and 3 men. The basic research tool was a survey questionnaire drafted for the needs of this study. The analized data were presented in the statistical package 6.0, being parameters like percent, average, standard deviation for the studied parameters.The results were verified with the test t-student and χ^2.

Results

The majority of our group were patients aged 41-60 (55.6% of all subjects), with at least secondary education (54%) and married (73%). Over 60% of subjects came from towns. The patients who had been ill for 5-14 years constituted 46% of all our subjects. There were 36.5 % professionally active and 63.5 % inactive persons. Among the professionally inactive, 28 were pensioners (44.4%) and 12 were retired (19%) (*Tab. 1*).

It was observed that in the group with a longer disease duration, there were more professionally inactive persons. In the population with disease duration ≥15 years all the subjects were pensioners ($p \leq 0.05$).

Health problems of patients with systemic sclerosis

The Reynaud's Phenomenon was present in almost all subjects (93.7%), both in the case of limited systemic sclerosis (lSSc) and the diffuse form (dSSc), irrespective of disease duration.

The vast majority (61.3% of total) of patients with both forms of SSc reported *dysaesthesia in fingers,* which depends on disease duration. *Ulceration of fingers and toes* affected 53.2% of subjects; 48.9% of subjects of the lSSc group , and 66.7% of the dSSc group.

In over 65% subjects the *hardening of skin* was observed. Morning stiffness occurred in 43.5% of all patients, with no significant differences between the two types. It was noticed that morning stiffness occurs much more often in patients with shorter disease duration of 0-4 years (in the dSSc group – 100% of subjects, in the lSSc group – 72.7%), than in patients with longer duration of the disease.

Over 55% of patients reported difficulties with performing everyday tasks and claimed to need help. The longer the patient suffered from systemic sclerosis, the bigger self-care problems they had, especially in the case of limited type of SSc ($p \leq 0.05$).

The inability to cope with the disease had tendency to increase ($p=0.08$) in group of patients with lSSc (52.5%), especially in the first stage of the disease (72.7% in the group with 0-4 years of disease duration), in relation to the subjects with dSSc, where only 26.7% of patients reported the above mentioned inability.

The subjects, irrespective of disease type, declare that they do not smoke (82.3%), and a vast majority of dSSc patients do not drink alcohol (86.7%), the remaining 13.3% drink occasionally. More patients 53.2 % with lSSc declare that they do not drink alcohol at all and 46.6% that they do it occasionally.

Symptoms involving the alimentary tract

Alimentary tract problems affected much more the patients with limited systemic sclerosis than dSSc. The main problem

***Table 2*. Alimentary tract problems**

Alimentary tract problems	limited systemic sclerosis (lSSc)		diffuse systemic sclerosis (dSSc)		in all	
Appetite	**N**	**%**	**N**	**%**	**N**	**%**
lack of the appetite	18	38.3%	4	25.0%	22	34.9%
no appetite problem	29	61.7%	12	75.0%	41	65.1%
Swallow						
difficulties in the swallow	32	68.1%	6	(37.5%)	38	60.3%
no swallow problem	15	31.9%	10	62.5%	25	39.7%
Significance	$p \leq 0.05$					
Heartburn						
no problem	11	23.4%	6	37.5%	17	27.0%
feels the heartburn	36	76.6%	10	62.5%	46	73.0%
Diarrhoeas/constipations						
problems with emptying	26	55.3%	5	31.3%	31	49.2%
no problem	21	44.7%	11	68.7%	32	50.8%

***Table 3*. Health problems involving the respiratory system**

Problems on the respiratory system	limited systemic sclerosis (lSSc)		diffuse systemic sclerosis (dSSc)		in all	
Effort dyspnoea	**N**	**%**	**N**	**%**	**N**	**%**
does not appear	19	40.4%	6	37.5%	25	39.7%
feels the difficult breathing	28	59.6%	10	62.5%	38	60.3%
Cough						
heaps of times coughs	8	17.0%	2	12.5%	10	15.9%
seldom coughs	39	83.0%	14	87.5%	53	84.1%

***Table 4*. Blood pressure in patients with systemic sclerosis**

Blood pressure	limited systemic sclerosis (lSSc)				diffuse systemic sclerosis (dSSc)				in all
	Duration of disease				Duration of disease				
	in all	to 4 of years	5-14 of years	≥ 15 of years	in all	to 4 of years	5-14 of years	≥ 15 of years	
increased blood pressure	14 29.8%	3 27.3%	6 27.3%	5 35.7%	6 37.5%	1 20.0%	3 42.9%	2 50.0%	20 31.8%
regular blood pressure	33 70.2%	8 72.7%	16 72.7%	9 64.3%	10 62.5%	4 80.0%	4 57.1%	2 50.0%	43 68.2%

of all subjects were difficulties with swallowing (dysphagia), with statistically significant differences between the groups with lSSc and dSSc ($p \leq 0.05$). In the lSSc group with disease duration of 5-14 years, these ailments were particularly intensive (81.8%). Patients with lSSc also more often in comparison to dSSc reported the feeling of heartburn and problems with defecation (*Tab. 2*).

Symptoms involving the respiratory system

No statistically significant differences have been observed between lSSc and dSSc as regards the intensity of symptoms involving the respiratory system. More than half (60.3 %) of the persons with SSc studied suffer from effort dyspnoea (*Tab. 3*), which is more frequent in patients with 5-14 years of disease duration.

Over 80% of subjects, especially in the diffuse SSc (93.3%), reported quick fatigability and the feeling of tiredness, irrespective of disease duration.

Increased *blood pressure* was reported by 32.3% of subjects, more by dSSc patients (40% of subjects, with an increase related to disease duration) than those with the limited type (29.8% of subjects) (*Tab. 4*).

Pain is one of the dominating problems of patients with systemic sclerosis. Over a half of subjects with both types of SSc (67.7%) reported a very frequent feeling of pain, especially in the first stage of the disease (0-4 years). The sensation of pain affected most of all the joints of arms and legs (96.8%) (*Fig. 1*).

Psychological problems. 42.9% of patients (48.9% of subjects with the limited type and 25.0% of patients with the diffuse type reported bouts of low spirits, irrespective of disease duration. The vast majority of subjects in both groups (71.4%) reported a negative influence of their physical and mental health on social activity (in the lSSc group – 76.6%; dSSc – 56.2%). Disease duration has a significant influence on lowering social activity of patients with diffuse systemic sclerosis ($p \leq 0.05$).

Figure 1. **The location of pain in patients with systemic sclerosis**

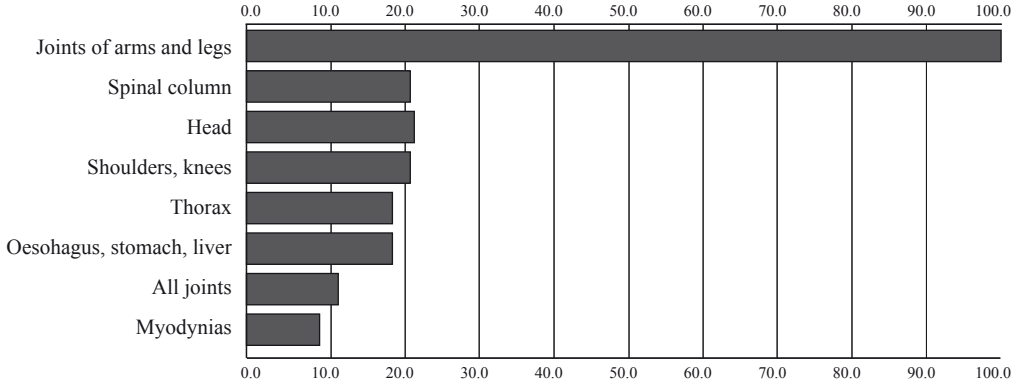

Table 5. **Psychological problems in patients with systemic sclerosis**

Psychological problems	limited systemic sclerosis (lSSc)		diffuse systemic sclerosis (dSSc)		in all	
Spirits	**N**	**%**	**N**	**%**	**N**	**%**
decreased spirits	23	48.9%	4	25.0%	27	42.9%
no problem	24	51.1%	12	75.0%	33	57.1%
Avoid people						
yes	27	57.4%	6	37.5%	33	53.2%
no	20	42.6%	10	62.5%	30	47.6%

Social activity	limited systemic sclerosis (lSSc)				diffuse systemic sclerosis (dSSc)				in all
	Duration of disease				Duration of disease				
	in all	to 4 of years	5-14 of years	≥ 15 of years	in all	to 4 of years	5-14 of years	≥ 15 of years	
problems with social activity	36 76.6%	7 63.6%	18 81.8%	11 78.6%	9 56.2%	1 16.7%	5 71.4%	3 100.0%	45 71.4%
no problem	11 23.4%	4 36.4%	4 18.2%	3 21.4%	7 43.8%	5 83.3%	2 28.6%	0 0%	18 28.6%
Significance	$p \leq 0.05$								

Over a half of subjects, especially those with lSSc (57.4%), declare that they avoid people (*Tab. 5*).

Patients believe that the biggest problems connected with their disease are chronic and progressive character (35% of all subjects), pain (31%), general weakness (27%) and difficulties in moving (26%). Patients also reported problems of psychological nature, bouts of low spirits, anxiety, fear (14%).

Discussion

Rheumatic diseases are one of the major health problems of the contemporary society due to the consequences arising from the dysfunction of numerous organs and systems. Systemic sclerosis is one of the diseases which causes numerous biological as well as psychological and social problems [5].

Out of 5 clinical types of SSc, the most frequent ones are the limited type (lSSc) and the diffuse type (dSSc) [2].

Both in the limited and diffuse form of SSc skin lesions undergo 3 stages: swelling, hardening, disappearance. At first, patients have difficulty to bend their fingers due to swelling, which poses the risk of dermatorrhexis. Later on appear partial contractures of fingers due to skin hardening, which makes bending and straightening of fingers difficult. Patients (especially those with limited SSc) often complain on pain connected with easily inflicted skin injuries and ulcers which are difficult to heal [6].

Reported 53.2% of patients finger and toe ulceration. A vast majority of patients (61.3% in total) with both types of SSc reported dysaesthesia in fingers, which is related to disease duration.

The Reynaud's Phenomenon is defined as episodic, usually bilateral, paroxysmal contractions of vessels in distal body parts and, in some cases, also the vessels of internal organs, as a reaction to inductive factors, which most often include cold, stress or medication. Patients complain on the sensation of cold in finger area, which is sometimes accompanied by pain, especially in winter [2]. The Reynaud's Phenomenon occurred in almost of all our subjects (93.7%), with both types of systemic sclerosis, irrespective of disease duration.

Joint symptoms of SSc typically accompany lesions in the skin and periarticular subcutaneous tissue. Our patients

complain on jointache of changing location, which is usually symmetrical; morning stiffness of fingers, wrists, elbows and knees, as well as temporary swelling [1,2]. Morning stiffness was observed in 43.5% of all subjects, without significant differences between the two types. It has been noticed that morning stiffness occurs much more often in patients with disease duration of 0-4 years.

Over a half of subjects with both types of SSc (67.7%) reported a very frequent feeling of pain, especially in the first stage of the disease (0-4 years). The sensation of pain affected most of all the joints of arms and legs (96.8%), and, to a smaller extent, joints of the spine, knees and head (22.2% of subjects).

The longer the patient suffered from systemic sclerosis, the bigger self-care problems he had, especially in the case of the limited type of SSc ($p \leq 0.05$). The inability to cope with the disease was more often reported by patients with limited SSc (52.5%), especially in the first 4 years.

The feeling of tiredness is a general symptom of SSc, where in 1/3 of patients with the diffuse form (dSSc) in its early stage (<3 years) and the advanced stage of the limited form (lSSc) (>10 years) the occurrence of tiredness is characteristic [2].

Quick fatigability and the feeling of tiredness were particularly frequent in the group with diffuse SSc (93.3%), irrespective of disease duration.

Numerous studies have shown that SSc patients present dysfunctions of internal organs, especially lungs, heart, alimentary tract and kidneys [6,7].

Problems involving the alimentary tract include difficulties with opening the mouth, pain during swallowing of food and a swallowing disorder (dysphagia), ill-being connected with the feeling of heartburn and belching, patient's discomfort due to problems with defecation (diarrhoea/constipation) [6].

Problems involving the alimentary tract, diagnosed in self-examination, affected more the patients with limited systemic sclerosis. The main problem of subjects were the difficulties with swallowing. In the lSSc group with disease duration of 5-14 years, these ailments were particularly intense (81.8%). Patients with limited SSc also suffered more from heartburn and defecation problems, which intensified together with disease duration.

Respiratory problems include the difficulties with breathing (dyspnoea, first during effort and in advanced stages also at rest, weakness, quick fatigability), patient's discomfort caused by a chronic, dry, non-productive cough, a risk of pulmonary arterial hypertension (a later stage of the limited SSc) [2].

We did not observed statistically significant differences between both clinical forms of SSc as regards the intensity of symptoms involving the respiratory system. Subjects, especially in the diffuse SSc (93.3%), reported quick fatigability, irrespective of disease duration and effort dyspnoea, which occurred in both studied clinical types of SSc (59.7%) and is more frequent in patients with 5-14 years of disease duration.

Scleroderma renal crisis develops in about 80% of dSSc patients within the first 4 years of SSc. It is manifested by quickly increasing arterial hypertension, sometimes accompanied by strong headache, vision disorders, convulsions, acute left ventricular failure and the symptoms of renal failure. Some patients with TPN have normal blood pressure and the crisis is manifested by the symptoms of quickly progressing acute renal failure [1].

Increased *blood pressure* was reported by 31.8% of subjects, more by dSSc patients (37.5% of subjects, with an increase related to disease duration) than those with the limited type (29.8% of subjects). It was reported that the awareness of the consequences of systemic sclerosis causes a worse psychic functioning of the patient, who goes through periods of resignation, bouts of low spirits, fear and depression. Especially women may suffer because of the changes in their facial appearance, which is so characteristic for systemic sclerosis and make them similar to other persons suffering from this disease [5,6,8,9].

Irrespective of disease duration 42.9% of patients, especially those with the limited form of SSc, reported bouts of low spirits. A vast majority of subjects in both groups (71.4%) reported a negative influence of their physical and mental health on social activity. Disease duration has a significant influence on lowering social activity of patients with diffuse systemic sclerosis ($p \leq 0.05$). Over a half of subjects, especially those with lSSc (57.4%), declare that they avoid people.

The biggest problem identified by patients is the chronic and progressive character of systemic sclerosis, the feeling of pain, general weakness and difficulties in moving. Patients also reported problems of psychological nature such as bouts of low spirits, anxiety and fear.

Conclusions

1. Skin hardening, ulceration, pain and morning stiffness of joints cause difficulties in self-care, which intensify with disease duration.
2. Patients in the first stage of limited systemic sclerosis presented an inability to cope with the disease.
3. An important problem of patients with diffuse systemic sclerosis are quick fatigability and the feeling of tiredness.
4. Problems involving the alimentary tract affect most of all patients with the limited type, in particular those with disease duration of 5-14 years.
5. Effort dyspnoea may indicate on lung lesions connected with systemic sclerosis.
6. The chronic and progressive character of systemic sclerosis has a great influence on the psychic conditions of patients as well as their social and professional activity, which decreases together with disease duration.

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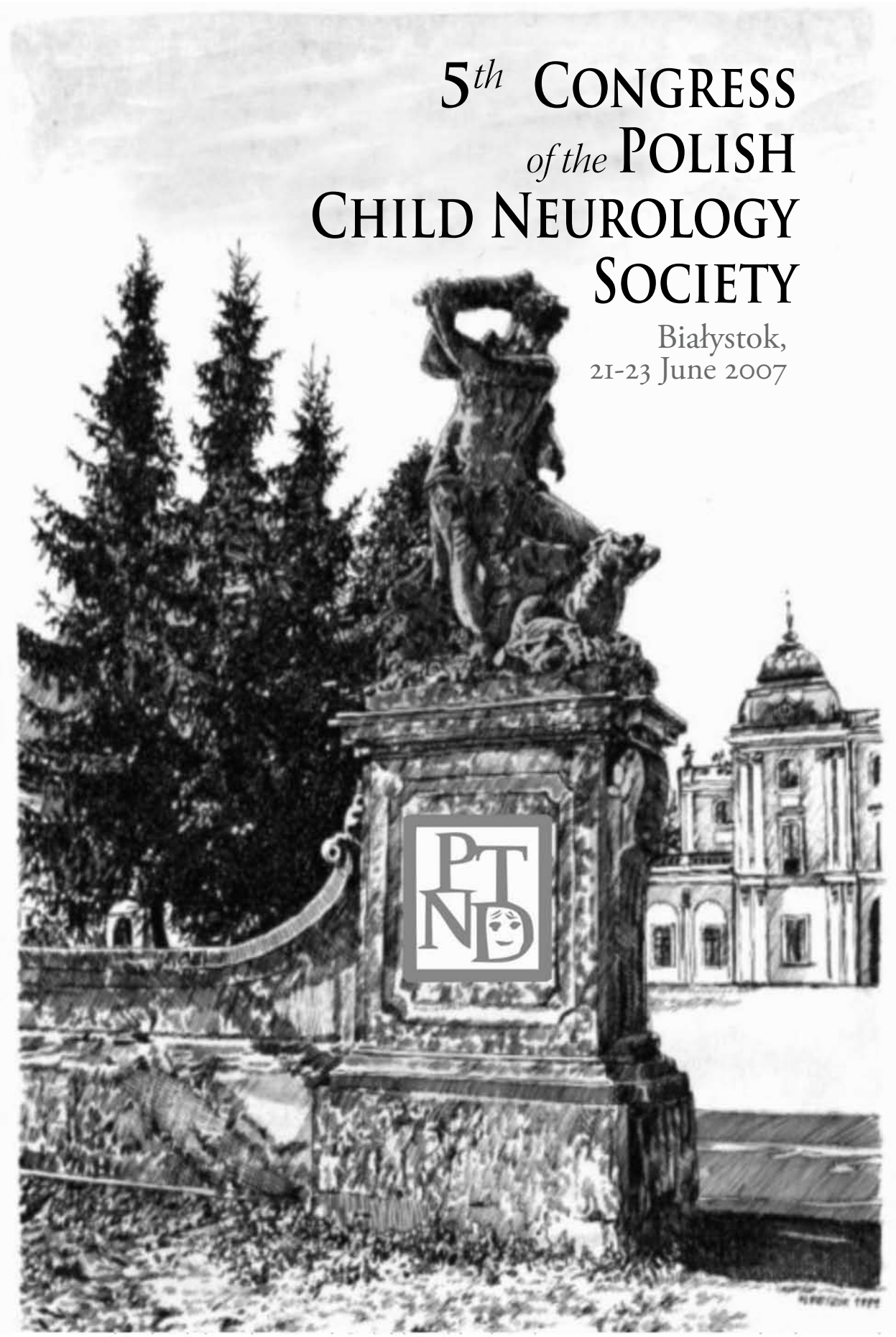

Myopathy as the first symptom of hypokalemic periodic paralysis – case report of a girl from a Polish family with CACNA1S (R1239G) mutation

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Abstract

Purpose: Presenting the case of unusual onset hypokalemic periodic paralysis (HypoPP) where myopathy had developed two years before paralysis occurred.

Material and methods: A Polish three-generation family with HypoPP and mutation in CACNA1S (R1239G) has been investigated. Clinical presentation with unusual onset of the disease, biopsy results and genetic research in one family member were described.

Conclusion: HypoPP is a rare disease it needs to be taken into consideration not only in cases of paroxysmal weakness but also when there is myopathy of unknown origin.

Key words: HypoPP, myopathy, CACNA1S.

Introduction

Hypokalemic periodic paralysis (HypoPP) is a rare inherited disorder with the overall incidence in the general population of about 0.4-1 cases per 100 000 [1]. HypoPP is a channelopathy caused by mutations in calcium or sodium channels [2]. The disease usually starts in the first or second decade of life and paroxysmal muscle weakness, usually induced by strenuous effort or carbohydrate-rich meal, is the most common symptom. Typically, myopathy develops several months or years after the onset of muscle weakness episodes and the background of its development is uncertain. Frequent alterations in intracellular and extracellular ionic concentrations could be responsible for muscle injury, yet the correlation between the frequency of weakness attacks and myopathy development has not been observed. Interestingly, in one member of a Polish family with HypoPP myopathy symptoms had been detected two years before the onset of muscle weakness attacks. The article includes clinical case presentation and the results of genetic investigation of the patient and of her family members.

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Material and methods

A 10 year old girl was hospitalized in Department of Developmental Neurology in Poznań University of Medicine Sciences because of Achilles tendons' shortening which had been first observed during a periodic school check-up two years earlier. The girl had not experienced any walking related problems earlier and her parents did not notice tendon shortening. The girl was admitted to hospital with suspicion of cerebral palsy. She was born from a second pregnancy – the pregnancy course during the first and second trimester was normal, yet during the third trimester her mother had suture put on under general anaesthesia because of uterine cervix insufficiency. The girl was born in 40th week of gestation with body weight of 2 750 g and scored 10 in Apgar scale. Her subsequent development was normal – the onset of sitting and walking occurred at usual time and intellectual development was also normal. Family history was meaningful for the occurrence of HypoPP (*Fig. 1*).

Until hospitalization no muscle weakness had occurred, but the reduction of Achilles tendons, finger gait, bilateral absence of plantar reflex, leg cramps – especially in the right leg – and reduction of diameter of right calf were all found on neurological examination. Because of earlier suspicion of cerebral palsy cranial and vertebral NMR scans were performed which revealed no abnormalities, and neither did EMG. Genetic examination was carried out and the presence of mutation of α1 calcium channel R1239G was confirmed.

Figure 1. **The patient's family genealogical tree. The reported patient is marked "K" (full black circle in the lowermost line)**

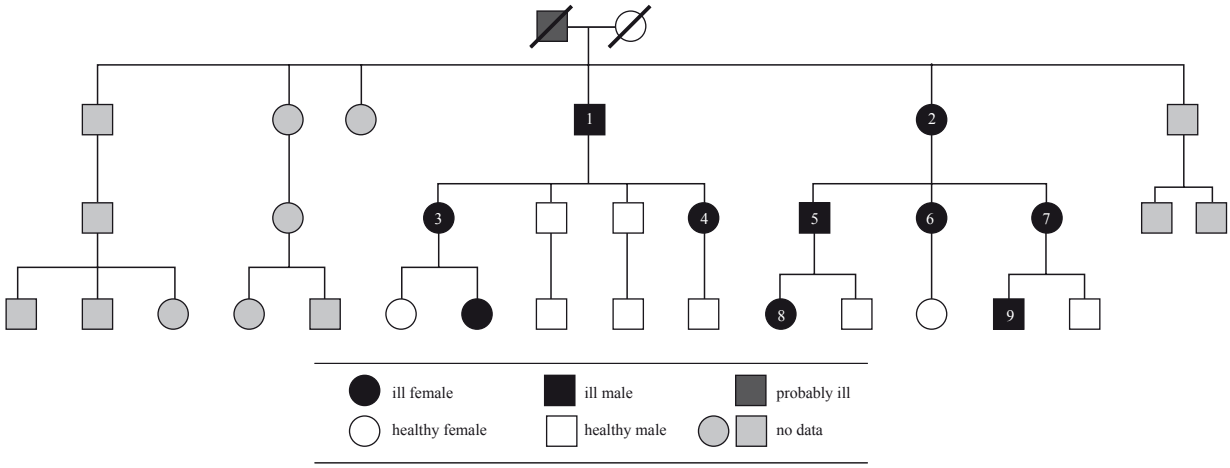

Table 1. **The history of the attacks and beginning of the disease in the patient's family**

Patients	Age Sex	Age at onset	Frequency of paralysis	Other symptoms
1	70 male	About 14	1-2 times per year	One generalised attack with arrested breathing. Attacks after intake of carbohydrate rich meals or alcohol.
2	63 female	11	Very often, mainly at night or early in the morning	The patient cannot walk.
3	40 female	11	Especially in the week before menstruation	Now the attacks occur mainly after stress or strenuous physical exercise. Attacks were very frequent when she was a teenager and occurred mainly at night.
4	34 female	12	1-3 times per month	Attacks occur mainly after stress or strenuous physical exercise. Some attacks induced problems with breathing, mainly when she was teenager and occurred mainly in the morning.
5	35 male	9	Very often, everyday	During attacks he experiences generalised weakness and has problems with sitting. Attacks occur mainly afternoon and early morning.
6	32 female	9	Almost every day	Worse attacks before menstruation, mainly at night; some days she cannot get up in the morning.
7	30 female	7	Almost every day	Worse attacks before menstruation, mainly at night; some days she cannot get up in the morning.
8	15 female	3	Rare attacks	First symptoms she described as feeling of "heavy" legs; especially during summer months and after exercises.
9	12 male	11	1-2 times per month	Weakness in the whole body, mainly afternoon and early morning.
K	10 female	10	Very often, almost every day	Myopathy developed before muscle weakness attacks.

A few weeks after the genetic diagnosis the attacks of paroxysmal weakness occurred and the remaining family members underwent neurological and genetic examination. In this family the disease usually started between 3 and 14 years of age and muscle weakness occurs mainly after big efforts, carbohydrate-rich meals, alcohol, before menstruation and during exposure to stress. Total or partial paralysis has been observed in each family member and the episodes occurred mainly at night or early in the morning. The incidence of episodes occurrence ranged from 1-2 times per year to daily. The lowest incidence of occurrence could be noted in Patient 1 but in this case the incidence had been higher in the past. The most severe attack was noticed in Patient 1 after intravenous administration of glucose when paralysis of respiratory muscles developed (*Tab. 1*).

Microscopic examination was performed for Patient 7 which revealed HypoPP characteristic vacuolar myopathy and irregular tubular aggregates.

Discussion

HypoPP is a rare autosomal dominant disorder with the estimated occurrence of about 0.4-1/100 000 in the general population. The disorder is caused by mutations in calcium (CACNA1S) or sodium (SCN4A) channels; the mutations comprise intramembrane subunit and thus impair muscle cells excitability. The type 2 of HypoPP is caused by mutation in sodium channel (R669H, R672G, R672C or R672S) [3]. The most popular type 1 of HypoPP is caused by calcium channel mutations (70%) on 1q31-31 chromosome. The mutation impairs α1 subunit of Ca channels [4]. R1239H, R528H and R1239G (rarest) mutations have been described [5]. So far R1239G mutation has been found in two families. The basic symptoms of HypoPP are paroxysmal, total or partial weakness of skeletal muscles. Severity, incidence and duration of weakness differ between individuals depending on the type of affected channels and on the type of genetic defects in the same channel. Besides, phenotypic manifestations of the same genetic defect and in the same ion channel can differ between members of the same family as was the case in our study. Disease onset occurs in the first or second decade of life, most often between 15 and 35 years of age. Weakness can be provoked by carbohydrate-rich meals, sodium-rich meals, stress, alcohol, insulin intake and, particularly, the rest that follows strenuous physical effort from the preceding day [6,7]. Usually the attacks occur at night time and early in the morning. Increased incidence of the attacks during menstruation has been noticed. Weakness is most pronounced in the most recently exercised muscles. Involvement of respiratory muscles and arrhythmias are rare [8]. Onset, frequency and character of weakness observed in the family we have investigated is similar to earlier descriptions. Myopathy that occurs independently of frequency and severity of attacks can sometimes be observed [9] and it usually develops in advanced stage of the disease. The causes of the myopathy are not clear, though a probable cause could involve alterations in ionic concentrations, especially in intra- and extracellular Na and K concentrations. The case we report on confirms that myopathy can occur irrespective of the weakness attacks and changes in muscle cells can progress in the absence of persisting weakness. On the other hand, myopathy can develop before onset of periodical paralysis and not produce any symptoms at that stage. Although HypoPP is a rare disease it should be included in differential diagnosis not only if there is paroxysmal weakness but in all cases of myopathy of unknown origin.

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Neuropsychological assessment in newly diagnosed cryptogenic partial epilepsy in children – a pilot study

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Abstract

Purpose: Cryptogenic epilepsy (CE) is defined as a partial or generalized epilepsy syndromes in which we can not point out any underlying cause. The role of neuropsychological assessment of "non-lesional" epilepsies is crucial not only to better control of different medical treatment but also to understanding the role of epilepsy for cognitive functions. The aim of the study was to compare the intellectual and cognitive functions between children with newly diagnosed cryptogenic partial epilepsy (CPE) children and the control healthy group.

Material and methods: 184 participants, 89 patients with cryptogenic partial epilepsy and 95 healthy children and adolescents, with ages ranging from 6-16 years were assessed on neuropsychological tests of general intellectual functioning and selected cognitive skills.

Results: There were significant differences found between groups for four examined functions. Children with CPE scored significantly lower in verbal and categorial fluency, visuoconstructional tasks, learning and memory than group of healthy children. There was no differences in general IQ level.

Conclusions: Study of neuropsychological profile in newly diagnosed CPE can get us an information of influence of stable, related to illness factors and the paroxysmal activity on cognitive function. Neurological follow-up of children with CPE at the very beginning of diagnosis should include screening evaluation of cognitive functions to provide appropriate intervention.

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Key words: cognitive functions, cryptogenic epilepsy.

Introduction

Cryptogenic epilepsy (CE) is defined as a partial or generalized epilepsy syndromes in which we can not point out any underlying cause. Cryptogenic epilepsies generally are well-controlled in pharmacological treatment [1]. There were popular also opinions that epilepsy of that etiology is not accompanied by impairment of cognitive functions. The association between childhood and adolescent epilepsy and neuropsychological impairments has been long and well documented [2-4]. Theoretically, the results of our study can bring us closer to the denouement of the problem of influence of the underlying seizure condition on cognition at the formal beginning of the illness and treatment. In practice, the results may contribute to the formation of neuropsychological intervention and treatment that will improve the recovery of this children. The aim of the study was to evaluate systematically the cognitive function in a group of the children with newly diagnosed cryptogenic partial epilepsy (CPE) before the pharmacological treatment. Our study had screening character.

Material and methods

Children with newly diagnosed (CE, n=89) and group of healthy children (control, n=95) were selected from group of patience at The Chair and Department of Developmental Neurology in University of Medical Sciences in Poznań. Criteria for the patients with epilepsy included: chronological age between 6-16 years, no other developmental disabilities (e.g. learning disorder, mental retardation). Epilepsy participants met criteria for classification of cryptogenic partial epilepsy in that they no identifiable lesions on MRI. Patients were interviewed by psychologist before pharmacological treatment. Each partici-

Table 1. **Neuropsychological test results and p value for: t-test, Mann-Whitney test and χ^2**

Neuropsychological tests	CPE patients (SD)	Control (SD)	t (df)	χ^2 (df=1)	z	p value
Raven Matrix [a]	49.14 (28.09)	58.69 (30.09)	-	-	2.24	n.s.
Verbal fluency [b]	9.47 (4.32)	12.36 (4.27)	4.18 (155)	-	-	**
VF errors	0.01 (0.11)	0.04 (0.26)	-	-	0.22	n.s
VF perseverations	0.15 (0.49)	0.06 (0.25)	-	-	- 0.35	n.s
Categorial Fluency [b]	15.15 (5.30)	17.63 (4.93)	3.02 (154)	-	-	**
CF errors	0.02 (0.23)	0.04 (0.33)	-	-	0.96	n.s
CF perseverations	0.10 (0.42)	0.20 (0.61)	-	-	0.62	n.s
10 word experiment [b]	33. 93 (6.11)	37.55 (5.74)	3.84 (162)	-	-	**
I Trial	4.62 (1.73)	5.36 (1.48)	-	-	2.88	**
II Trial	6.39 (1.51)	7.09 (1.58)	-	-	2.97	**
III Trial	7.29 (1.7)	7.89 (1.42)	-	-	2.44	*
IV Trial	7.78 (1.50)	8.44 (1.41)	-	-	2.90	**
V Trial	7.89 (1.60)	8.85 (1.18)	-	-	3.92	**
Primary effect (%)	49 (28.16)	53 (30.46)	-	.01	-	n.s.
Recency effect (%)	43 (24.71)	50 (28.73)	-	.33	-	n.s.
Bender [b]	7.5 (5.00)	5.52 (3.99)	-	-	- 2.71	**
elaborations	2.58 (2.21)	1.75 (1.68)	-	-	-2.28	*
perseverations	0.25 (0.52)	0.04 (0.21)	-	-	-1.91	n.s
reduction	0.67 (1.42)	0.60 (1.40)	-	-	-0.38	n.s
enlargement	0.34 (0.93)	0.17 (0.54)	-	-	-0.77	n.s
rotations	0.48 (0.90)	0.34 (0.64)	-	-	- 0.54	n.s
incorrect integration	1.23 (1.29)	0.86 (1.10)	-	-	- 2.01	*
redrawing	0.88 (1.35)	1.02 (1.51)	-	-	0.34	n.s

[a] scaled scores; [b] raw scores; * $p<0.05$; ** $p<0.01$

pant underwent neuropsychological evaluation, that included: Raven Standard Matrices as a non-verbal reasoning ability test, Verbal and Categorial Fluency Test. Verbal learning and memory was assessed with 10-words experiment. In our study we assessed both quantitative and qualitative aspects of learning and memory e.g. we were interested in the serial position effect. Visuoconstructional task was measured by the quantity and quality of reproduction in Bender-Gestalt. Performance on the Bender-Gestalt was reducible to 6 characteristic distortions: elaboration, rotation, redrawing, integration, perseveration, size changes (reduction, enlargement).

Results

Neuropsychological results of scaled, raw scores and statistic analysis are showed in *Tab. 1*. There were significant differences found between groups for four exanimate functions. Children with CPE scored significantly lower in verbal and categorial fluency, visuoconstructional tasks, learning and memory than group of healthy children. The analysis of the dynamic of learning showed a significant improvement in all trials in control group that was not found in group of CPE children. There were no differences in serial position effect between the groups. The quality of mistakes in verbal fluency and categorial fluency was not statistically important. Qualities analysis of errors in Bender-Gestalt showed significant difference between group in the number of elaborations and incorrect integrations. Difference of the level of non-verbal reasoning ability was no significant.

Discussion

Studies of the intellectual and cognitive abilities in patients in CPE have yield contradictory results. Even thought, researches show that there is a lot of subtle impairments in specific cognitive function [5-8]. The most often are learning disability, selective deficits in memory and attention with poor concentration. Children with CPE are more likely to have lower school achievement and suffer behavioral and affective disorders, particularly depression. Less educational achievement is due to the dominant impact of underlying brain damage, as well as seizure etiology, age of onset and AEDs [6-8]. Children with newly diagnosed cryptogenic partial epilepsy, even if otherwise neurologically normal, appear to be at high risk of adverse outcomes. Possible explanations for this include seizure effects with cognitive co-morbidity. In our study the general intellectual functioning in both group was in the normal range. The statistical important differences of the results in cognitive functions between groups has given cause for concern. We can come to the conclusions, that there are some cognitive problems in CPE at the very beginning of the illness. Our results may suggest a weakness in CPE group in studied function caused purely by process underlying epilepsy. Continuation of our study can bring us closer to the answer of the risk factors for appearance

of cognitive functions, and positive or negative result on them during pharmacological treatments. We can also understand better the character of the developmental changes in cognition in group of children with CPE.

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Topiramate as a neuroprotectant in the experimental model of febrile seizures

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Abstract

Purpose: The aim of the study wad to estimate a potentially neuroprotective effect of topiramate (TPM) in the experimental model of FS.

Material and methods: 24 young male rats divided in 4 groups were involved in the study. Febrile seizures were induced by placing the animals in 45°C warm water bath for four consecutive days. TPM at the dose 80 mg/kg b.m. was administered: before the FS and immediately after the FS. FS group and control rats received only normal saline. Thereafter hippocampal slices were prepared to performing histological and morphometric examination.

Results: Morphometric investigations revealed that FS caused death of 60% of the neurons in sector CA1 and a half of them in sector CA3. Histological examinations of hippocampal slices showed that TPM at a dose of 80 mg/kg b.m., administered before the seizures, considerably improved CA1 and CA3 pyramidal cell survival. Similar neuroprotective effect, but in a markedly lesser degree was observed when TPM was administrated after the FS.

Conclusions: Our findings seem to confirm that FS exert a strong destructive effect on the sensitive hippocampal neurons and on the neuroprotective properties of TPM in this process, which may have practical implications. It can be assumed that in children with recurrent and prolonged FS, prophylactic drug administration could prevent hippocampal sclerosis and development of symptomatic epilepsy.

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Introduction

Febrile seizures (FS) occur between 6 months and 5 years of age at body temperature above 38.5°C, usually during infection with fever [1]. FS are the most common form of convulsions in childhood and have been associated with an increased risk of epilepsy in the future life. It has long been known that the risk of epilepsy in children with a past history of FS episodes is higher than in general population [2]. Temporal lobe epilepsy (TLE) due to its frequent drug-resistance remains a challenge for the epileptologist. TLE is the most prevalent type of epilepsy, but its origin is still not well understood. Intractable TLE is often associated with specific hippocampal cell loss termed mesial temporal sclerosis. This pathology is characterized by neuronal loss and gliosis, most prominent in the hippocampal CA1 and CA3 sectors [3]. A number of studies have shown a significant relationship between a history of FS, particularly of the complex type, in childhood and the presence of mesial temporal sclerosis, as identified on magnetic resonance imaging [4,5]. Some retrospective studies have shown that FS are the most frequently cited etiology of hippocampal sclerosis, especially when coexisting with additional risk factors [4,6]. Animal models support the association as well. For instance, immature rats exposed to hyperthermic seizures during infancy develop significantly reduced hippocampal seizure thresholds to chemical convulsants and electrical stimulation during adult life [7].

Pharmacological prevention of neuronal damage induced by various damaging factors (i.e. neuroprotection) has been intensively investigated in recent years. A search has been conducted for a neuroprotectant that would prevent hippocampal sclerosis caused by prolonged FS, and thus hinder epilepsy development in high risk patients. In experimental models, new generation antiepileptic drugs, e.g. topiramate (TPM), appear

to be effective neuroprotectants [8-10]. TPM is a novel antiepileptic drug that is effective in the treatment of various types of epilepsy [11]. Its neuroprotective action has been described in many models of neuronal damage, among others epilepsy [12], epileptic state [13] or global ischemia [14]. Since there are no literature reports concerning the potential neuroprotective action of TPM in FS-induced damages, we decided to perform the current research.

The aim of the study was to estimate potentially neuroprotective effects of TPM in the experimental model of febrile convulsions.

Material and methods

Model of febrile seizures

The experiment used 24 young Wistar rats aged 22-30 days. The degree of brain maturity in such rats corresponds to that of 1- or 2-year-old children. Prior to the experiment, the animals were kept in cages (6 in one cage) with free access to food and water at 12-hour cycles of light and darkness. For the needs of the experiment, the animals were divided into 4 groups, 6 rats in each. Hyperthermia was induced by placing the animals in a 30x30x60 cm water bath filled with 45°C warm water to such a depth that a rat standing on its hind legs and leaning against a container wall had its head above water surface. Water temperature was maintained at the same level. Rats were put into water for 4 minutes or until convulsions appeared and then moved to a separate container lined with lignin [15]. The rats (except for control) were placed in water for four consecutive days. Topiramate (80 mg/kg b.m. dissolved in 2 ml normal saline) was administered with an intragastric tube, 90 minutes before the animals were placed in the water bath (group TPM+FS). In the FS+TPM group, the drug was administered in the same way and at the same dose, immediately after the each convulsion episode. Control rats and FS group received only normal saline. The dose of the drug was chosen according to literature references [13,16].

Histological analysis Seventy-two hours after the last convulsion episode, the rats were anesthetized with Nembutal (25 mg/kg b.w., i.p.) and transcardially perfused with 200 ml of 4% paraformaldehyde in phosphate-buffered saline under pressure of 80-100 mmHg [17,18]. The brains were removed from the skulls and fixed in the same fixative for 24 h. Next, the brains were embedded in paraffin and representative coronal sections (6-μm thick), which included the hippocampus, were obtained with a rotary microtome. The sections were stained with hematoxylin and eosin and cresyl violet as well. A blinded investigator performed the histological examination.

Morphometric study Five randomly chosen non-overlapping high-power fields (original magnification x 400, light microscope) from the hippocampal CA1 and CA3 areas were examined separately from each section. Only normal-appeared neurons in the five high-power fields were counted and the number of cells per high-power field was calculated. All data are presented as the mean. Images were collected using an Olympus camera. Statistical analysis was conducted using the chi^2-test. A level of $p<0.05$ was considered statistically significant.

Results

Histopathological findings

FS group Febrile seizures induced histopathological changes in three areas of the Ammonal cortex: CA1, CA3 and hilum. In half of all cases these changes were diffused, in the others showed a tendency to blend and involved extensive fragments of the hippocampal gyrus cortex. Neurons with features of chronic lesions and sclerosis were numerous, had sharpened profiles and were shrunken in appearance. They resembled dark polymorphous lumps with invisible intracellular structures (*Fig. 2*); dendrites of some of them had a wavy course. Degenerated cells represented even up to 30% of all neurons within these three areas. Distinct neuronal desertion areas were observed in the pyramidal layer (*Fig. 2*), being most pronounced in CA1 and less in CA3 sector. In the closest proximity, disintegrating neurocytes and shadows of disintegrated cells were seen (*Fig. 3*). Close to most damaged fragments of the hippocampal gyrus cortex, the structure of white matter was sometimes markedly loosened (*Fig. 2*).

FS+TPM group Macroscopically, the animals which after experimentally induced febrile convulsions received TPM had structural abnormalities qualitatively similar to those observed in group FS (*Fig. 4, 5, 6*). However, fewer cells were affected and the changes were more diffused. Degenerated, mainly sclerotic neurons were found in the pyramidal layer of the CA1 and CA3 sectors. Such cells accounted for approximately 25% of all neurons in the amonal cortex. The neuronal "balding" areas were visible but they were less common than in FS group. They were found mainly in the CA3 sector (*Fig. 5*).

TPM+FS group The histological picture of the hippocampal cortex of the animals receiving TPM prior to FS showed only slight abnormalities as compared to the control group. Besides well preserved neurons, few dark-staining and shrunken neurocytes could be seen, especially in the CA3 sector (*Fig. 7*). However, the neuronal "balding" areas were sporadic, indistinct and diffused.

Morphometric investigations Morphometric investigations of the hippocampus sections were conducted routinely, by assessing the number of neurons in the high power field in the CA1 and CA3 sectors separately in the control group and in each experimental group. Findings referring to the CA1 sector and CA3 sector are presented in *Tab. 1*. Statistical significances between control and experimental groups have been presented in the same *Tab. 1*. Experimentally induced febrile convulsions resulted in the death of 60% of the neurons in this Ammonal cortex area as compared to the control group. In the rats receiving TPM before FS, the number of survival neurons was markedly higher (the death of only 22% of neurons was observed). In the CA3 sector, febrile convulsions led to the death of 50% of neurons as compared to the control group. The loss of 28-43% of neurons was observed in the other two experimental groups.

Figure 1. **Well-preserved neurons in the CA1 sector. Control group. Cresyl violet x400**

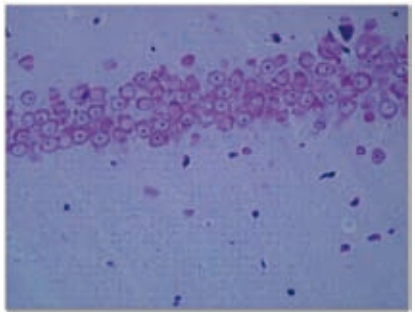


Figure 2. **Sector CA3. Picture of lethally damaged sclerotic pyramidal cells. Extensive neuronal desertion areas. Structural loosening of white matter. Group [FS]. H,E x400.**

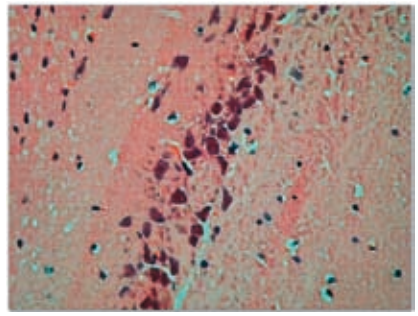


Figure 3. **Sector CA3. Substantial extension of desertion area enclosed by neuronal shadows. Group [FS]. Cresyl violet x400**

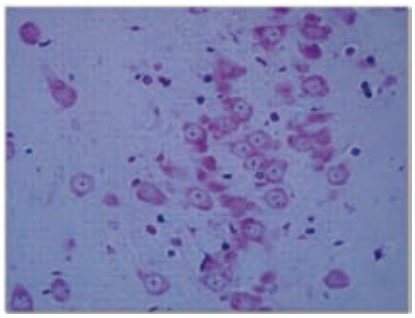


Figure 4. **Sector CA1. Besides normal neurons, dark-staining neurons with features of chronic lesion and sclerosis are visible. Group [FS+TPM]. H,E x200**

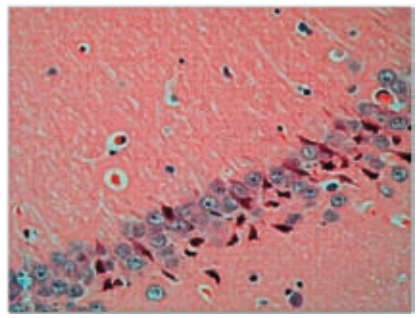


Figure 5. **Sector CA3. Distinct neuronal desertion areas. Single neurons are shrunken and very dark. Disintegrating shadows left after neurons are visible in the vicinity. Group [FS+TPM]. Cresyl violet x400**

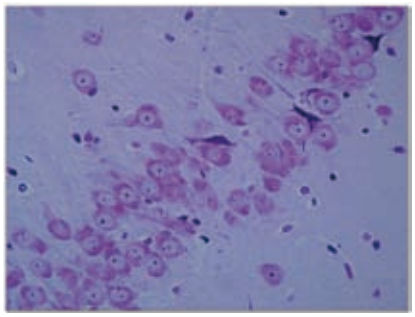


Figure 6. **Sector CA3. In the vicinity of small areas of neuronal desertion areas, markedly degenerated cells with features of chronic lesion and dendrites taking a wavy course are observed. Group [FS+TPM]. Cresyl violet x400**

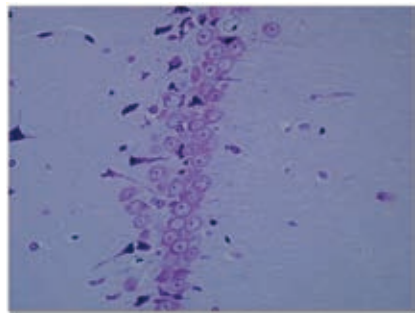
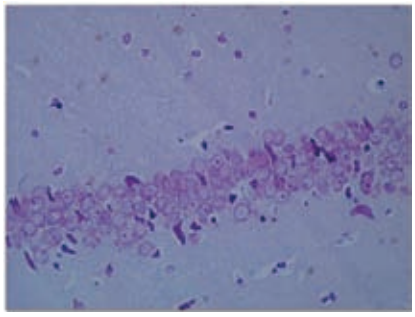


Figure 7. **Sector CA1. Diffused degenerated neurons with features of sclerosis are visible among the population of relatively well preserved neurons. Group [TPM+FS]. Cresyl violet x400**



Discussion

Recent researches have demonstrated that epilepsy and seizures (including FS) are often associated with neuronal lesions and neuronal cell loss [15,19]. It is believed that many different mechanisms are involved in the central nervous system damage. One of the crucial mechanisms leading to neuronal cell death is glutamate-induced excitotoxity [20]. The latest studies seem to verify the opinion that the mechanism of neuronal cell death occurs in the form of necrosis or apoptosis. It has been increasingly recognized that cell death molecular mechanisms are highly diverse. These two processes often occur simultane-

***Table1*. Results of morphometric investigation in sector CA1 and sector CA3 of hippocampal cortex. The mean number of pyramidal neurons in the high power field (hpf) is presented**

	Control group	TPM+FS group	FS+TPM group	FS group
CA1 sector	88	69	53*	36***
CA3 sector	68	49	39*	34**

Statistical significance vs control group: *p<0.05; **p<0.01; ***p<0.001

ously and are referred to as aponecrosis [21,22]. The existence of multiple cell death pathways with both overlapping and distinct molecular mechanisms suggests that neuroprotective strategies should optimally be directed at multiple targets. Therefore, the choice of TPM, a compound with a potential neuroprotective effect, for our experiment was not incidental. TPM has several mechanisms of action that may contribute to its anticonvulsivant and neuroprotective activity [23], including antagonistic effects on glutamate receptors of the kainate/AMPA subtype, which play essential role in the excitotoxic neuronal damage [24,25].

It has been shown in experimental models that prolonged or recurrent convulsions may lead to the death of sensitive hippocampal neurons and that the risk of such complications correlates with the duration of convulsion incidents. It has been observed in the limbic model of the epileptic state in rats that the longer the epileptic state the more severe neuronal damage and that the greater loss of neurons the more frequent convulsion episodes [26].

In our experiment, extensive areas showing loss of pyramidal neurons was the predominant pathology in the histological picture, especially in the CA1 and CA3 sectors. In the morphometric investigations we demonstrated that hyperthermia-induced convulsions caused loss of 60% of neurons in the CA1 sector and death of 50% in the CA3 sector. In rats receiving TPM before FS, the loss of neurons was considerably smaller (20 and 28% of pyramidal neurons of CA1 and CA3 sectors respectively), which confirms the neuroprotective properties of the drug. Only very small neuroprotective effect was observed when TPM was administrated after the FS. Our results are comparable to the findings obtained by Rigoulot et al., who assessed neuroprotective properties of TPM in the experimental model of epilepsy [27]. In our study, neuronal abnormalities most frequently presented as dark shrunken pyramidal cells with features of sclerosis, more seldom with features of chronic lesion. Sclerotic neurons were most numerous in the animals not receiving the drug, while in the remaining two groups, such cells were fewer and more diffused. Hippocampal neurons were sometimes enclosed by white matter whose structure was loosened. Neuronal changes visualized in the current experiment are consistent with those described by Jiang et al. [15]. We also observed differentiated pathomorphological changes and lack of enhanced glial reactions in the CA1 and CA3 sectors of the hippocampal cortex. Similar changes were described by Gadamski and Lasocki in another model of hyperthermic damage in rabbits [28]. There are numerous reports on the neuroprotective effect of TPM in various models of neuronal damage, but not to febrile seizures. The current study seems to be the first report on neuroprotective effects of TPM in the experimental model of febrile seizures.

Conclusions

Our findings indicate a very strong unfavorable effect of FS on the hippocampal cortical neurons in young rats. Induced FS caused advanced neurodegenerative changes in the pyramidal neurons of the hippocampal CA1 i CA3 sectors, with more than 50% neuronal loss. We also showed a beneficial effect of TPM on this process. TPM exerts a neuroprotective effect on the Ammonal cortex neurons in the rat, especially when administered before FS. Its beneficial action is mainly reflected in a higher number of survival neurons as compared to the untreated animals. Our results are very promising and may have clinical implications. Topiramate could be applied to prevent the effects of long-lasting and recurrent FS in children, thus extending the list of currently used preparations (benzodiazepine, phenobarbital).

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Translocation form of Wolf-Hirschhorn syndrome – assessment of recurrence rate probability

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Abstract

Purpose: The families experienced by occurrence of child with Wolf-Hirschhorn syndrome (WHS: OMIM # 194190) and by other unfavourable pregnancy outcomes (miscarriages or stillbirths/early deaths and partial trisomy 4p imbalance leading to intellectual disability in live born progeny) are asking for genetic counseling. In order to obtain the recurrence probability rates for the particular forms of unfavourable pregnancy we collected the empirical data and evaluated pedigrees of reciprocal chromosome translocations (RCT) carriers involving 4p. Results were applied to family of carrier of t(4;11)(p16.1;q23.3) ascertained by four miscarriages, in which latter the girl with WHS was born.

Material and methods: Total empirical data about 170 pregnancies of 46 carriers were collected from 25 pedigrees RCT at risk for single segment imbalance. Classification was based mostly on cytogenetic methods. The probability rates of particular type of pathology related to total number of pregnancies after ascertainment correction have been calculated according to the method of Stengel-Rutkowski and Stene.

Results: The risk figures for unbalanced offspring after 2:2 disjunction and adjacent-1 segregation for whole group of pedigrees were calculated as 15.2±3.5% (16/105), for unbalanced fetuses at second trimester of prenatal diagnosis as 50±13.4% (7/14), for miscarriages about 19±3.8% (20/105) and for stillbirths/early death as 15.2±3.5% (16/105). The higher probability rate for RCT carriers at risk for distal 4p – shorter segment imbalance (28.6±12%, 4/14) in comparison to the rate for proximal (medium) one as 15.4±4.5% (10/65) and to more proximal (longer) one as 7.7±5.2% (2/26) were found.

Conclusions: Our results confirm that the recurrence probability rates are different for particular categories of unfavourable pregnancy outcomes and dependent on size and genetic content of unbalanced 4p segments.

Key words: chromosome 4p, partial monosomy 4p, partial trisomy 4p, reciprocal chromosome translocation (RCT), Wolf-Hirschhorn syndrome (WHS).

Introduction

Monosomy of the short arm of chromosome 4 has a strong effect on phenotype resulting as a rule in the phenotype of Wolf-Hirschhorn syndrome (WHS) with characteristic facial appearance, microsomy, several malformations, neurological changes, motor developmental delay, and distinct developmental profile [1]. Phenotype WHS is known since mid-1960' as a result of simple deletion. However, phenotype of WHS may be associated with complex unbalanced chromosome rearrangements, involving both 4p and another chromosome as the result of meiotic malsegregation of a parental chromosome translocation [2,3]. In such cases families with balanced reciprocal chromosome translocations (RCT) should be referred to genetic counseling to get informed about their probability for unbalanced offspring at birth and at prenatal diagnosis or other types of unfavourable pregnancy outcomes (miscarriages, stillbirths/early deaths of newborn) [4-6]. Those estimates can be done on the basis of clinical and cytogenetical data following by segregation analysis of pedigrees [4,7,8]. We collected empirical data of the particular forms of unfavourable pregnancy outcomes in families with RCT with breakpoint positions at 4p (RCT4p) to obtain the risk figures for single segment imbalances.

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Table 1. **References for familial reciprocal chromosome translocations leading to single segment imbalance considered for the genetic risk assessment**

Breakpoint	Nº	Translocation	References
4p16	1.	t(4;15)(p16;p13)	De Die Smulders (Maastricht), 2003, (unpublished data)
4p16. 1	2.	t(4;21)(p16.1;q22.3)	Narahara et al., Jpn J Hum Genet, 1984; 29: 403-13
4p15	3.	t(4;18)(p15.2;q23)	Petit et al., Genet Couns, 1990; 38(2): 179-84
	4.	t(4;22)(p15;p11)	Lurie et al., 1980, Clin Genet, 1980: 17(6): 375-84
	5.	t(1;4)(q44;p15)	Stengel-Rutkowski et al., DFG, München 1992
4p14	6.	t(1;4)(p36;p14)	[4]
	7.	t(4;6)(p14;p25)	[4]
	8.	t(4;9)(p14;p24)	Crane et al., Am J Med Genet, 1979; 4(3): 219-29
	9.	t(4;10)(p14;q26)	[4]
	10.	t(4;11)(p14;p15)	[4]
	11.	t(4;12)(p14;p13)	Mortimer et al., Hum Hered, 1978; 28(2): 132-40
	12.	t(4;15)(p14;p12)	Schröcksnadel et al., Humangenetik, 1975; 29: 329-35
	13.	t(4;17)(p14;p13)	Yardin et al., Ann Genet, 1997; 40(4): 232-4
	14.	t(4;17)(p14;q25)	del Mazo et al., Hum Genet, 1984; 66: 370
	15.	t(4;18)(p14;p11)	[4]
	16.	t(4;18)(p14;qter)	Schinzel et al., Humangenetik, 1972;15(2):163-71
	17.	t(4;20)(p14;q13)	[4]
	18.	t(4;21)(p?14;p11)	Owen et al., J Med Genet, 1974; 11(3): 291-5
	19.	t(4;22)(p 14;p12)	Dallapiccola et al., Clin Genet, 1977; 12(6): 344-56
	20.	t(4;22)(p14;p11)	Schwanitz et al., Ann Genet, 1973; 16(4): 263-6
	21.	t(4;22)(p14;q13)	Sartori et al., Acta Pediatr Scand, 1974; 63: 631-5.
4p13	22.	t(4;10)(p13;q26)	Hedner et al., Clin Genet. 1977; 12(2): 101-3.
4p12	23.	t(4;7)(p12;qter)	Andrle et al., Hum Genet, 1976, 33: 155-60
	24.	t(4;16)(p12;p13)	Bauknecht et al., Hum Genet, 1976, 34: 227-30.
	25.	t(4;21)(p11;p12)	Darmady et al., J Med Genet, 1975; 12: 408-11.

Material and methods

Based on the cytogenetic interpretation performed on chromosomes from lymphocyte cultures of peripheral blood according to standard procedures using GTG, RBG banding techniques or exceptionally fluorescence *in situ* hybridisation technique (FISH), we selected 25 pedigrees of carriers of RCT at risk for a single 4p segment imbalance (RCT4p) in progeny from total available data of 137 RCT [9]. Empirical data of 170 pregnancies of 46 carriers of RCT 4p were evaluated (*Tab. 1*). The probability rates of the unbalanced progeny at birth and at second trimester of prenatal diagnosis as well as of unkaryotyped miscarriages and stillbirths/early deaths of newborn for RCT carriers related to total number of pregnancies after ascertainment correction have been calculated according to the method of Stengel-Rutkowski et al. [4,5].

Results

Probability estimation for different categories of unfavourable pregnancy outcomes and ascertainment correction

Totally forty-three unbalanced offspring at birth and seven unbalanced foetuses at second trimester of prenatal diagnosis were found among 170 pregnancies of 46 carriers. Twenty--seven children that were single index cases, three stillbirths/ /early deaths and ten miscarriages and one malformed child belonging to index siblings were omitted due to ascertainment correction. Finally, 16 unbalanced live born children out of 105 pregnancies, 7 unbalanced foetuses out of 14 pregnancies observed at prenatal diagnosis, 16 stillbirths/early deaths out of 105 pregnancies and 20 miscarriages out of 105 pregnancies were accepted for risk estimation. Results are presented in *Tab. 2* and *Fig. 1*.

Application of risk assessment in families at risk for double segment imbalances

A family was ascertained by four miscarriages and a balanced chromosomal translocation t(4;11)(p16.1;q23.3)GTG, RBG, FISH (III;2) was found (*Fig. 2a*), in which later a child with WHS was born. However, numerous members with normal karyotype make the pedigree not informative for risk estimation by direct analysis (*Fig. 2b)*. Based on data described above (*Tab. 2, Fig. 1*) the probability rates estimated and proposed for the family were 3.45% (low risk) for unbalanced progeny at birth and about 30% for miscarriages (*Fig. 2c, d*).

Discussion

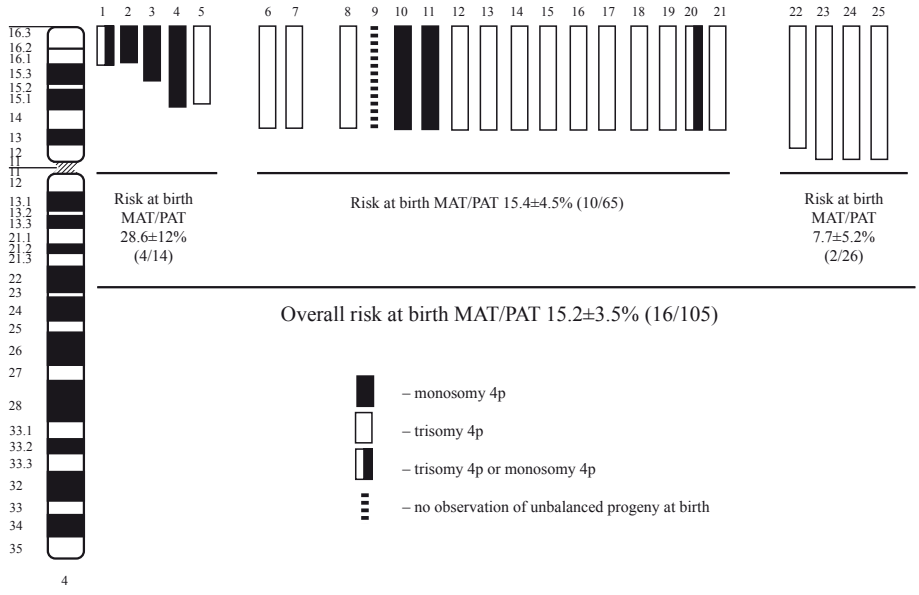
We found that there is a high risk (about 15%) for occurrence of translocation form of WHS. In general, this correspond to a previously published rate about 17% (high risk) by Sten-

***Table 2*. The probability rates for unbalanced offspring after 2:2 disjunction and adjacent-1 segregation at birth and at 2nd trimester of pregnancy (prenatal diagnosis) and for unkaryotyped pregnancy outcomes (miscarriages, stillbirths/early deaths) of maternal, paternal and unknown sex RCT rarriers with different breakpoint position (bp) in the short arm at the chromoseme 4 related to total pregnascies after ascertainment correction**

Type of progeny	Parental sex	Segment 4p…pter						Total	
		distal bp		proximal bp					
		segment 4p15→pter		segment 4p14→pter		segment 4p11→pter			
		rate	risk	rate	risk	rate	risk	rate	risk
Unbalanced – at birth	MAT	1/7		1/19		2/10		4/36	11±3.1%
	PAT	3/5		8/36		0/16		11/57	19.3±5.2%
	MAT?PAT?	0/2		1/10		-		1/12	8.3±7.9%
	Total rate	4/14	28.6±12%	10/65	15.4±4.5%	2/26	7.7±5.2%	16/105	15.2±3.5%
– at 2nd trimestr	MAT	2/3		1/4		-		3/7	
	PAT	1/1		3/6		-		4/7	
	MAT?PAT?	-		-		-		-	
	Total rate	3/4	?	4/10	40±15.5%	-	-	7/14	50±13.4%
Unkaryotyped – miscarriages	MAT	4/7		3/19		-/10		8/40	20±6.3%
	PAT	-/5		8/36		4/16		12/57	21.1±5.5%
	MAT?PAT?	-/2		1/10		-		1/12	8.3±7.9%
	Total rate	4/12	33.3±13.6%	12/65	18.5±4.8%	4/26	15.4±7.1%	20/105	19±3.8%
– stillbirths/ /early deaths	MAT	-/7		1/19		4/10		5/36	13.9±3.4%
	PAT	-/5		4/36		6/16		10/57	17.5±5%
	MAT?PAT	1/2		-/10		-		1/12	8.3±7.9%
	Total rate	1/14	7.1±6.9%	5/65	7.7±3.3%	10/26	38.5±9.5%	16/105	15.2±3.5%

Legend: MAT – maternal carrier; PAT – paternal carrier; MAT? PAT? – unknown sex of carrier; "-" no observations; 0 – obtained after ascertainment corrections; ? – not enough data

***Figure 1*. Synopsis of cytogenetic data of 25 reciprocal chromosome translocations involving short arm of chromosome 4 and probability rates for single – segment imbalance (trisomy/monosomy)**



The vertical bar indicates the actual unbalanced 4p segment observed in live born child with the identification of breakpoint position. There are shown probability rates at birth dependent on size of involved segments (4p15→pter, 4p14→pter, 4p11→pter) for 2:2 disjunction and adjacent –1 segregation and overall probability rate at birth (down frame) with indication of sex of parental carrier. Each translocation is numbered on the bottom from 1 to 25 according following references (see *Tab. 1*): **1** – Maastricht (C. De Die Smulders), 2003; **2** – Narahara et al., 1984; **3** – Petit et al., 1990; **4** – Lurie et al., 1980**; 5** – DFG, 1992**; 6, 7, 9, 10, 15, 17** – Stengel-Rutkowski et al., 1988; **8** – Crane et al., 1979; **11** – Mortimer et al.; **12** – Schröcksnadel et al., 1975; **13** – Yardin et al., 1997; **14 –** del Mazo et al., 1984; **16 –** Schinzel et al., 1972; **18** – Owen et al., 1974; **19** – Dallapicola et al., 1977; **20** – Schwanitz et al., 1973; **21** – Sartori et al., 1974; **22** – Hedner et al., 1977; **23** – Andrle et al., 1976; **24** – Bauknecht et al., 1976; **25** – Darmady et al., 1975

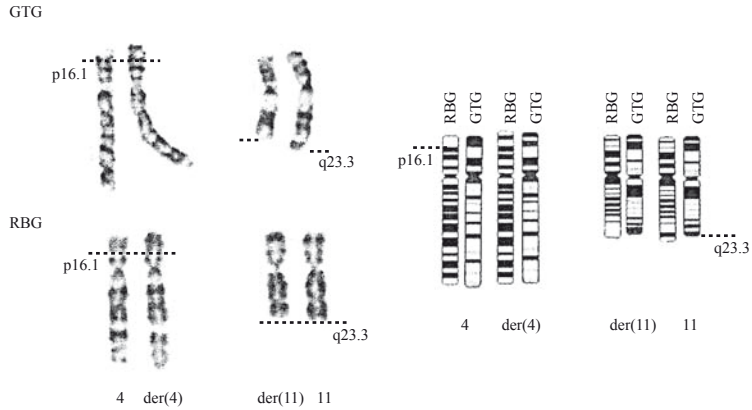
***Figure 2*. Risk chart of the t(4;11)(p16.1;q23.3) carrier family**

LOW RISK (<5%)

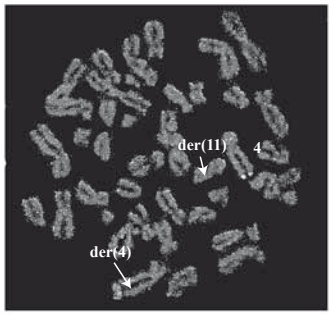
t(4;11)(p16.1;q23.2)

A. Cytogenetic results

Left – Partial karyotype demonstrating the breakpoint position localization on chromosomes involved in translocation studied by GTG and RBG methods. Schematic representation of the breakpoint positions according to ISCN 2005. Right – FISH with probe for critical region of WHS

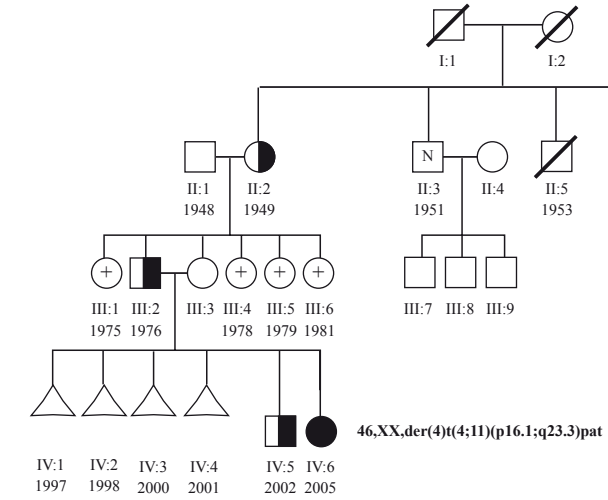


FISH-WHSCR probe

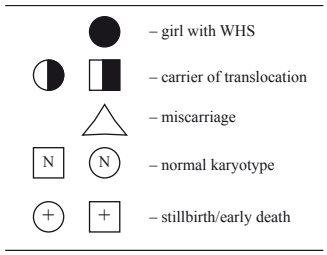


ish t(4;11)(p16.1;q23.2)(WHSCR-;WHSCR+)

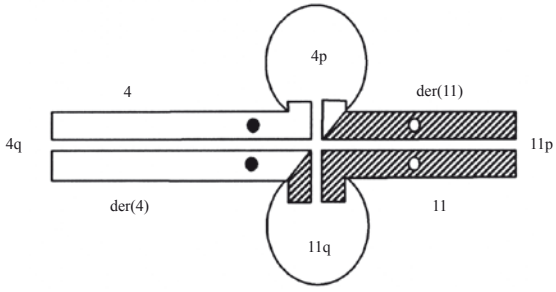
B. Investigated pedigree with indication of ascertainment by arrow



asc. four miscarriages



C. Scheme of meiotic quadrivalent with visualisation of predicted form of imbalance compatible with survival from 2:2 disjunction and adjacent-1 segregation



D. Predicted assessment for probability rate of unbalanced offspring at birth and for miscarriages

Risk for double segment imbalance
monosomy 4p16.1→pter and trisomy 11q23.3 →qter, or
trisomy 4p16.1 →pter and monosomy 11q23.3 →qter
after 2:2 disjunction and adjacent-1 segregation

segment: 4p16.1 →pter	segment 11q23.2 →qter
risk: 28.6±12% (4/14)*	risk: 6.9±3.8% (3/43) [4]

MAT/PAT: 6.9 : 2 ~3.45%

Probability for unbalanced offspring: MAT/PAT: 3.45% – low risk
Risk for miscarriages – about 30%

gel-Rutkowski et al. [4] evaluated this same methods. In this way we confirm, that the applied method is efficient and the way of collection of our data was proper to obtain risk figures. The probability rate for carriers RCT with distal breakpoint (segment 4p15→pter), is of higher risk compared to rates for unbalanced progeny of carriers of RCT with more proximal breakpoints leading to longer 4p imbalances (4p14→pter and 4p11→pter) (*Tab. 1* and *Fig. 1*). The similar results were obtained from the original data [4] and by others authors [7]. It confirm that risk is dependent on genetic content of imbalance. Our data were differentiated enough to test the probability rates for unbalanced progeny depending on parental origin of carrier: the risk value was higher for paternal carrier. It is worth to notice, that the number of male carriers having offspring with imbalance (29 male carriers) after 2:2 disjunction was higher than the corresponding of female carriers (18 carriers) in our collection. These differences can be explained by chromosome 4 segmental uniparental disomy Mat 4p16-15 [10]. Interestingly, the rate of unbalanced fetuses is about three times higher in comparison to the rate of unbalanced progeny at birth and can be explained by diminished survival rate for unbalanced fetuses leading to stillbirths, early death of newborns and miscarriages [7]. It is supported by our observation of a relatively high frequency of miscarriages and stillbirths/early deaths in total collective (*Tab. 2*). Worthy to notice, that probability rates obtained for families of RCT at risk for single segment imbalance may be useful for calculation the risk for double segment imbalances as demonstrated in the individual risk assessment in carriers t(4;11)(p16.1;q23.3) (*Fig. 2*). In that family empirical data were not enough statistically representative to make direct calculation of risk figures. Recently the precision of identification of breakpoint's position in the involved chromosomes is more advanced. It would be interesting to verify our conclusions in a new data collection with RCT carriers risk identified on basis of methods of higher resolution, e.g. FISH and/or using the different specific BAC and PAC probes for breakpoint identification with use of the same method of pedigree evaluation [11].

Conclusions

Our results confirm that the recurrence probability rates are different for particular categories of unfavourable pregnancy outcomes and dependent on size and genetic content of unbalanced 4p segments.

Acknowledgements

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Cortical somatosensory evoked potentials and spasticity assessment after Botulinum Toxin Type A injection in children with cerebral palsy

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Abstract

Purpose: The mechanism of Botulinum Toxin Type A (BTX-A) action at the neuromuscular junction is well known. But from the introduction of BTX-A, some authors have suggested a central action of BTX-A and possible side effects far from the site of injection. Some studies demonstrate an improvement of cortical SEPs associated with reduction of spasticity after BTX-A injection. The aim of the present study was to determine the effect of BTX-A treatment on cortical somatosensory potentials (SEP).

Material and methods: A group of twenty nine children ranging from 2 to 17 years old with cerebral palsy were studied. Each patients spasticity level was evaluated before, 2 weeks and 6 weeks after BTX-A injection by the Modified Ashworth Scale and modified Gait Physician's Rating Scale. The SEPs from lower and upper extremities were performed before and between 2 and 6 weeks (19.34±8.82 days) after BTX-A administration.

Results: The mean spasitity level was significantly lower 2 and 6 weeks after BTX-A injection. The gait analysis by modified Physician's Rating Scale (PRS) showed significant improvement two weeks and six weeks after BTX-A injection. SEPs results were abnormal before BTX-A injection in 25 children with cerebral palsy. However we didn't find any significant changes of SEPs latencies after BTX-A injection.

Conclusions: The results of SEP after BTX-A administration in children with cerebral palsy do not confirm the central action of BTX-A on somatosensory pathways. We did not find any significant changes of SEP latencies associated with clinical reduction of spasticity. It seems that SEP results could support the opinion, that BTX-A does not have any direct central effect on sensory pathways. Remote side effects may be explained by an indirect mechanism due to modification of the central loops of reflexes or to hematogenous spread of BTX-A.

Key words: Botulinum Toxin Type A, cerebral palsy, somatosensory evoked potentials, spasticity.

Introduction

Cerebral palsy (CP) is a chronic disorder of movement and posture caused by nonprogressive damage to the developing brain [1]. CP was classified into spastic diplegia, spastic hemiplegia, spastic tetraplegia, extrapyramidal and mixed types [2]. Spastic diplegia is the most common form of CP. The use of Botulinum Toxin Type A (BTX-A) for treating spasticity and in particular the motor problems of children with CP, has attracted much attention in the last years. BTX-A treatment has a sound scientific basis and enough data regarding successful clinical experience [3]. Therefore, it is commonly accepted as a safe and effective treatment of spasticity [4]. Side effects are uncommon, and usually mild and transient. They are restricted to pain at the injection site, local functional weakening of the injected muscle or adjacent muscles [5]. A transient flu-like syndrome lasting a few days has been reported in a number of patients, but the cause for this is not known. There have also been few reports of aspiration pneumonia due to pharyngeal dysfunction, temporary urinary incontinence [6], positive effect on constipation [5] and dysphagia [7]. Two patients with limb spasticity developed features of generalised botulism [8]. The mechanism of BTX-A action at the neuromuscular junction by inhibiting the release of the acetylocholine (Ach) is well known. However, since the introduction of BTX-A, some authors have suggested a central action of BTX-A, probably by reversible transport [9,10]. This action could help to explain some side effects far from the site

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Table 1. **Muscle spasticity assessment by Modified Ashworth Scale after Botulinum Toxin Type A (BTX-A) injection**

	Left lower limb		Right lower limb	
	Mean ±SD	P	Mean ±SD	P
Before BTX-A injection	2.15±0.87		2.36±0.76	
Two weeks after BTX-A	1.80±0.61	<0.001	1.94±0.64	<0.001
Six weeks after BTX-A	1.84±0.46	<0.001	1.95±0.63	<0.001

Table 2. **Gait analysis by Physician's Rating Scale (PRS) after Botulinum Toxin Type A (BTX-A) injection**

	Left lower limb		Right lower limb	
	Mean ±SD	P	Mean ±SD	P
Before BTX-A injection	1.45±0.92		1.25±0.06	
Two weeks after BTX –A	1.71±0.71	<0.001	1.67±0.86	<0.001
Six weeks after BTX-A	1.72±0.75	<0.001	1.61±0.97	<0.001

of injection. These conclusions are mostly based on experimental data. Somatosensory evoked potentials (SEP) are used as a very sensitive diagnostic test to identify dysfunction in sensory pathways. The aim of the present study was to determine the effect of BTX-A treatment on cortical SEP with median and tibial nerve stimulation.

Material and methods

A group of twenty nine children (15 girls and 14 boys) with CP was studied. Patients ranging from 2 to 17 years old (6.26±3.74 years) were assessed. They included 18 patients (62.5%) with spastic diplegia, 8 patients (27.5%) with spastic tetraplegia and 3 (10%) with spastic hemiplegia. Informed consent was obtained following a full explanation of the procedures undertaken. Our general indication for botulinum toxin injection in spasticity treatment was the presence of a dynamic contracture interfering with function, but in the absence of a fixed myostatic contracture [11]. The patient's selection criteria, target muscles, injection sites, dosage and dilution of toxin were based on commonly accepted recomendations [3,11]. The subjects were not previously treated with BTX-A. We injected the lower limb muscles, including the hip flexors and adductors, the hamstring group and the calf muscles (gastrocnemius and soleus). We used DYSPORT (Beaufort Ipsen) in 27 children and BOTOX (Allergan Inc.) in 2 children. The total dose of BTX-A was 20 IU/kg body weight (range 300-1 600 IU per patient) for DYSPORT, and 6 IU/kg body weight (100 IU per patient) for BOTOX. Each patient's spasticity level was evaluated before, 2 weeks and 6 weeks after treatment by the Modified Ashworth Scale [12]. Gait analysis was tested by the modified Physician's Rating scale [5]. The Somatosensory Evoked Potentials (SEP) from lower and upper extremities were performed before BTX-A injection and between 2 and 6 weeks (19.34±8.82 days) after BTX-A administration. All the children were tested in full conciousness without sedation, both for ethical reasons and in light of the known effects of sedatives on cortical SEP components. We used MEDELEC Sapphire Premiere to record SEP. Tests were performed according to standards accepted by most clinical laboratories [13,14]. However, due to apparent difficulties in obtaining reliable SEPs components, we used a modified method. Only cortical responses were recorded. The band-pass 20-100Hz was used. Recordings in response to unilateral median nerve stimulation were obtained from the contralateral cortex (C3' or C4') referred to Fpz [15]. The surface electrode for tibial nerve stimulation was placed on Cz referred to Fpz [16]. It was difficult to achieve stable wave forms in children with CP without sedation. We decided to identify wave components N1, P1, N2, P2. Only the latencies of SEP components were measured. Due to developmental changes of SEP waveforms, this wide age ranged group was divided in three subgroups: A) 1-3 years old, B) 4-8 years old and C) 9-17 years old. Data were compared with STATISTICA 6.0 PL. Wilcoxon signed-rank test was used.

Results

Spasticity level changes evaluated by a Modified Ashford scale are presented in *Tab. 1*. Mean spasticity level was significantly lower two and six weeks after BTX-A injection. The gait analysis by modified Physician's Rating Scale (PRS) showed significant improvement two weeks and six weeks after BTX-A injection. PRS results are presented in *Tab. 2*. The SEPs responses were flat in 2 patients, with no identifiable responses in one children. Therefore, we calculated SEP data for 26 patients. The abnormal latencies were defined as changes above the mean plus 2 standard deviations. In 25 children SEPs results were abnormal before BTX-A administration. The results of cortical SEPs before and after BTX-A injection are presented in *Tab. 3* and *Tab. 4*. We didn't find any significant changes of MedianSEPs and TibialSEPs latencies after BTX-A injections.

Discussion

In pediatric neurology, the use of SEPs to assess somatosensory pathways is of particular relevance, as the clinical examination of the sensory system is often difficult in young

***Table 3*. Tibial Somatosensory Evoked Potentials (SEP) Latency Before and After Botulinum Toxin Type A (BTX-A) injection**

Group of patients	Tibial SEP Latency (ms)	Preinjection	Postinjection	P value
Group A: Age 2-3 years N=16	N1	18.40± 5.58	17.51±4.83	0.63 NS
	P1	22.85±5.44	20.75±4.66	0.17 NS
	N2	27.20±6.33	24.85±4.90	0.39 NS
	P2	32.91±6.06	32.41±4.39	0.97 NS
Group B: Age 4-8 years N=24	N1	19.24±4.96	20.48±6.71	0.16 NS
	P1	24.39±5.79	24.67±6.75	0.65 NS
	N2	28.07±5.69	28.04±6.91	0.69 NS
	P2	34.02±6.72	34.25±7.10	0.81 NS
Group C: Age 9-17 years N=12	N1	22.35±4.61	21.95±5.53	0.58 NS
	P1	27.09±5.02	25.85±6.33	0.28 NS
	N2	32.16±7.52	30.58±8.84	0.44 NS
	P2	37.36±7.97	34.29±8.87	0.11 NS
TOTAL Age 2-17 years N=52	N1	19.77±5.20	19.98±6.05	0.71 NS
	P1	24.62±5.62	23.82±6.31	0.31 NS
	N2	28.84±6.54	27.74±7.13	0.33 NS
	P2	34.53±6.94	33.71±6.81	0.59 NS

P value from Wilcoxon signed-rank test vs preinjection. NS – not significant

***Table 4*. Median Somatosensory Evoked Potentials (SEP) Latency Before and After Botulinum Toxin Type A (BTX-A) injection**

Group of patients	Median SEP Latency (ms)	Preinjection	Postinjection	P value
Group A: Age 2-3 years N=16	N1	13.53±3.37	12.09±4.12	0.75 NS
	P1	18.18±5.08	16.37±5.51	0.07 NS
	N2	25.18±8.12	22.83±6.07	0.60 NS
	P2	30.93±9.22	29.39±7.93	0.86 NS
Group B: Age 4-8 years N=24	N1	15.23±2.47	15.81±2.59	0.08 NS
	P1	19.43±3.56	20.43±3.61	0.25 NS
	N2	27.31±5.03	27.83±5.95	0.96 NS
	P2	33.32±7.05	34.44±7.47	0.42 NS
Group C: Age 9-17 years N=12	N1	15.30±2.79	16.62±0.63	0.39 NS
	P1	19.64±3.22	20.88±1.09	0.57 NS
	N2	27.74±5.35	29.95±1.93	0.27 NS
	P2	33.23±6.58	37.79±2.50	0.18 NS
TOTAL Age 2-17 years N= 52	N1	14.71±2.90	14.96±3.34	0.18 NS
	P1	19.09±3.99	19.40±4.25	0.93 NS
	N2	26.74±6.19	26.94±5.89	0.79 NS
	P2	32.50±7.65	33.83±7.34	0.12 NS

P value from Wilcoxon signed-rank test vs preinjection. NS – not significan

patients. The alterations in wave form occur with growth and development [15,17]. The latencies of each component depend on the maturation of myelination, the length of an axon, the synaptic delay and the distribution of an electric field. Of these factors, the first two may have the greatest influence on the developmental changes of the peak latencies [17]. The sensory pathways were not thought to be involved in children with cerebral palsy. However, some studies in children with the spastic diplegic form of CP have revealed that their somatosensory transmission from the lower extremity was significantly abnormal. A significant difference of N13-N20 conduction time of SEPs was found between the subjects with CP and the control group [18]. SEPs were positively correlated with mental retardation in CP children [19]. Furthermore, prolonged N20 and P25 latencies of SEPs in children with Developmental Coordination Disorder were found [20]. SEP waveforms after selective posterior rhizotomy showed a noteworthy improvement [21,22]. SEP waveforms improved also after taking diazepam as the spasticity decreased [23]. These results have suggested that the lesions of patiensts with CP might be not limited strictly to the motor system. Abnormal cortical SEPs stimulated from involved limbs have also been recorded in other patients with pure motor descending-pathway dysfunction like lateral sclerosis [24,25] and hereditary spastic paraparesis [26,27]. Our observations that abnormal SEPs responses are common in children with spastic forms CP are consistent with previous reports [21,22]. The reasons for these abnormal SEPs are unclear. The results of studies concerning the central action of BTX-A as assessed by evoked potentials are controversial. In the Park et al. study [28], SEPs were recorded before and 7 days after the Botulinum Toxin Type A injection in children with CP. They found that the normal response of cortical SEP increased after

injection. The SEPs exhibited more frequent improvement in the limbs with greater improvement of spasticity in grade and in younger patients. The latency was significantly shortened in the P1, N2 and P2 wave of the affected limbs tibial SEPs, and in the N1 and P1 wave of the affected limbs median SEPs in children with CP. However, latency and amplitude of SEPs from unaffected limbs did not differ significantly after BTX-A injection [28]. They suggested that the improvement of cortical SEPs with associated reduction of spasticity after BTX-A injection indicates that spasticity itself might partly contribute to the abnormal cortical SEP responses. These authors [28] found significant change in SEP latency after botulinum toxin injection. It was reported that the amplitude of cortical SEP was decreased during muscle contraction [29,30], but the change of SEPs latency during normal voluntary muscle contraction was not observed in other reports.

In our study, we didn't find any significant changes of SEPs latencies after BTX-A injections, although the level of spasticity was improved in Modified Ashford Scale and modified Physician's Rating Scale (PRS). We didn't assess the waveform amplitudes. The amplitude of the potential obtained from primary sensory area is very small and variable [17]. Additional problems arise with clinical recording in non co-operative young patients. Therefore, amplitude seems not to be a valuable parameter of SEPs, and normalised data in children were not established [15,17,32]. In adult patients with cervical dystonia, the amplitude of the pre-central P22/N30 component, recorded contralaterally to the direction of head deviation was significantly higher in patients before BTX-A treatment than after injection [33]. These changes of SEP after BTX-A presumably could be the result of higher excitability of the pre-central cortex contralateral to head rotation and its change after successful BTX-A treatment [33]. To find out whether BTX-A alters the excitability of cortical motor areas, Gilio et al. [34] studied intracortical inhibition with transcranial magnetic stimulation in patients with upper limb dystonia. One month following BTX-A injection patients had a test response inhibition similiar to that of normal subjects, whilst 3 months they showed less inhibition than normal subjects. These data suggest that BTX-A can transiently alter the excitability of cortical motor areas by reorganising intracortical circuits though peripheral mechanisms. In another study of the central effects of BTX-A which measured the SEP in 23 adult patients with idiopatic cervical dystonia, the authors did not find any statistically significant differences in latency and interlatency of N9, N13, N20 and P25 of SEP before and after BTX-A administration [35]. Also Brainstem Auditory Evoked Responses (BAER) did not significantly alter after BTX-A treatment in patients with cervical dystonia [35-37]. However, some authors reported a prolonged latency of wave III and shorter III-V interlatency of BAER after BTX-A treatment [38,39]. These controversial results of electrophysiological studies in BTX-A treatment seem to depend on a number of factors including different evoked potentials techniques, attachment of recording electrodes, different parameters assessed, varying periods following BTX-A injection. The studied groups of patients were small. Using transcranial magnetic stimulation over the motor cortex in patients with writer's cramp, reduced M response 2 to 4 weeks after BTX-A was recorded, and no other measures of motor system excitability showed significant changes [40]. The vibration induced facilitation of Motor Evoked Potentials in spasmodic torticollis decreased six weeks following BTX-A application, and demonstrated an increase in the value of amplitude after twelve weeks [41]. These observations suggest the denervation and reinnervation of the muscle spindles after BTX-A injection. BTX-A's effects on motor system excitability seems to be based mainly on its peripheral mechanisms of action [40]. Deafferentation of stimuli from muscle spindles after BTX-A injection could modify the central loops of reflexes and change the excitability of spinal neurons [42]. The haematogenous spread of small portions of BTX-A to distant muscles is also suggested [9,43].

The results of SEP after BTX-A administration in children with CP do not confirm the central action of BTX-A on somatosensory pathways. We did not find any significant changes of SEP latencies associated with clinical reduction of spasticity. It seems that SEP results could support the opinion that BTX-A does not have any direct central effect on sensory pathways. Remote side effects may be explained by an indirect mechanism due to modification the central loops of reflexes, or to haematogenous spread of BTX-A.

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Imaging examinations in children with hydrocephalus

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Abstract

Hydrocephalus is characterized by an imbalance of cerebrospinal fluid (CSF) formation and absorption. It is manifested as a dilatation of the ventricular system. About 55% of all hydrocephalus cases have congenital origin. There are two types of hydrocephalus: communicating and non-communicating with subarachnoid space and the diagnosis depends on the computed tomography (CT) and magnetic resonance (MR) images. The treatment is different for each type of the hydrocephalus. Causes and symptoms of hydrocephalus are changing with the patient's age. Before the age of two we can observe progressive enlargement of the head and widened anterior fontanel. Ophthalmological examination reveals optic nerves atrophy. Children older than two years with hydrocephalus and obliterated anterior fontanel have normal head circumference. They may often present clinical symptoms such as the atrophy of optic nerves and papilloedema of optic disc. The most common reason of hydrocepahalus in children before two years of age is intraventricular haemorrhage in the perinatal period whereas in children older than two years is inflammatory process. Imaging examinations are needed not only to diagnose hydrocephalus but also to assess enlargement of the ventricular system during the therapy.

Key words: hydrocephalus, brain, congenital malformation central nervous system (CNS).

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Diagnosis of the hydrocephalus is based on a correlation between clinical symptoms of elevated intracranial pressure and the image of dilated ventricular system. Hydrocephalus is a result of an imbalance of cerebrospinal fluid (CSF) formation over its absorption [1]. Hydrocephalus is not a disease but a dynamic process which proceeds with changes of the ventricular system size [2]. From the diagnostic standpoint and the therapeutic methods the hydrocephalus can be divided into; communicating hydrocephalus whereas narrowed place of CSF outflow exists outside ventricular system and non-communicating hydrocephalus whereas the location of obstruction lies intraventriculary. In the second case it is accompanied by narrow subarachnoid space [3]. Hydrocephalus can accompany ventriculomegaly as a secondary process. Ventriculomegaly is a result of brain tissue atrophy and malfunction of CSF circulation [4]. In some cases it is very difficult to identify primary hydrocephalus which leads to regressive changes and secondary hydrocephalus. Causes and clinical symptoms of hydrocephalus are changing with the patient's age but 55% of all cases have congenital origin [3]. Children before the age of two present with symptoms of hydrocephalus like large head circumference, wide anterior fontanel with dilated scalp veins. Increased muscle tone and paralysis of upward gaze are frequent at clinical examination. In ophthalmological examination atrophy of the optic nerves are presented.

Children older than 2 years with obliterated fontanel tend to present with neurological symptoms of the increased intracranial pressure while normal head size. When dilated third ventricle compresses hypothalamic structures hormonal dysfunctions such as sexual maturation abnormalities, gigantism, diabetes mellitus can be the first symptoms of hydrocephalus. Dilated ventricular system coexists with slightly dilated subarachnoid space in infants up to six months of age [4]. This condition may result from transitory immaturity of choroid plexus. The most common cause of ventriculomegaly in children before age of two is atrophy of brain tissue as well congenital anomalies of corpus callosum, holoprosencephalon and lissencephalia [5].

Figure 1. **CT examination of the head. Massive subependymal calcifications with dilated ventricular system**

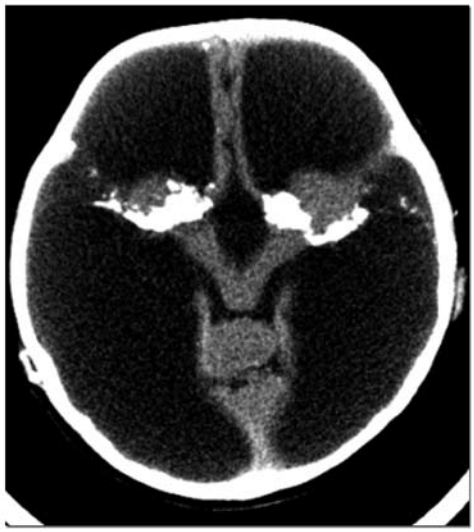
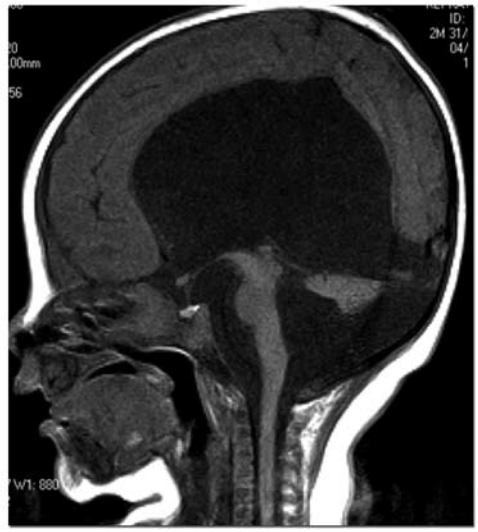
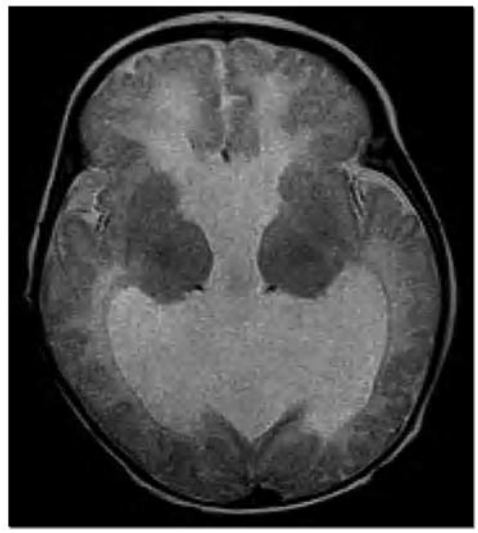


Figure 2. **MRI of the head. Sagittal T1-weighted (a), axial (b) T2-weighted images. Agenesis of the vermis of cerebellum with hypoplastic cerebellar hemispheres. Agenesis of corpus callosum**

a)



b)



The most frequent cause of hydrocephalus with elevated ICP (intracranial pressure) in children before age of two is intraventricular haemorrhage in perinatal period [2]. The next causes are the congenital inflammatory process of the CNS such as TORCH (toxoplasma, rubella, cytomegaly, herpes simplex) which lead to brain damage (*Fig. 1*). Hydrocephalus as a symptom can coexists with such developmental anomalies like Dandy-Walker syndrome, myelomeningocele or narrowed Sylvian aqueduct (*Fig. 2*) [5]. Hydrocephalus is often the result of head injury with intracranial haemorrhage in this group of age.

One of the causes of hydrocephalus are CNS toumors (the second common neoplasm disease in children beside leukemia) filling the ventricular system [6,7]. The level of ventricular system enlargement depends on the tumour localisation. Metastases in the subarachnoid space and inside the ventricular system may occur in children treated from primary CNS neoplasm. They often block CSF outflow and may result in hydrocephalus.

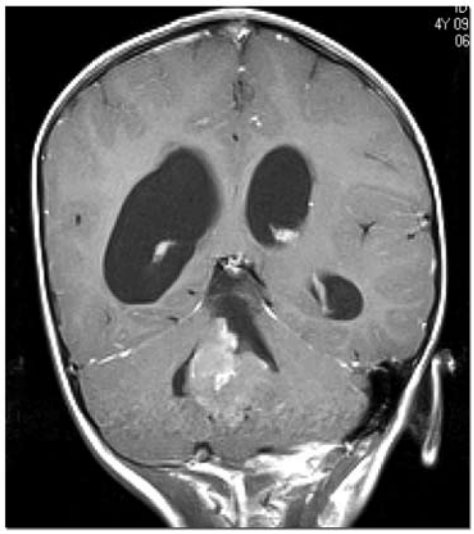
Children older than 2 years have another sequence of causes. First of all we should list inflammatory process of the brain which can include meningitis. Hydrocephalus can be an outcome of complicated or improper treated inflammation [8]. It can develop as a result of secondary scar lesions in a subarachnoid space. The next cause of hydrocephalus is subtentorial neoplastic process [7]. Posterior fossa tumours such as medulloblastoma, ependymoma and astrocytoma result in symmetric supratentorial ventricular system enlargement due to their localisation (*Fig. 3*).

Among the causes of hydrocephalus in the group of elderly children congenital anomalies of CNS such as arachnoidal cyst which gives delayed neurological symptoms of elevation of the intracranial pressure can be found [9]. Imaging examinations make possible both diagnosis and establishing causes of hydrocephalus. Performing a computed tomography (CT) examination or magnetic resonance imaging (MRI) we can estimate the degree of ventricular system dilatation [10]. Some measurements should be done; the width of the temporal horn in relation to the width of the body of lateral ventricle [2]. Enlargement of the temporal horn commensurately with the bodies of the lateral ventricles is a sign on differentiation of hydrocephalus to atrophy. Reduced ventricular angle made by line going through the medial wall of the frontal horn to the long axis of the brain is a sign of hydrocephalus. Imaging examinations differentiate the normal pressure and the elevated ICP hydrocephalus [11]. They reveal zone of periventricular brain tissue oedema which can be seen at the level of frontal horns of lateral ventricles. Another symptom of dilated ventricular system is smoothing out of cerebral cortex [4]. On sagittal MR images we can measure the distance between mammilary bodies and brainstem or the size of recesses of the third ventricle.

Treatment of hydrocephalus is based on two surgical methods; ventriculoperitoneal shunt insertion in the case of communicating hydrocephalus and endoscopic third ventriculostomy

***Figure 3*. MRI of the head. Sagittal (a), coronal (b) T1-weighted contrast-enhanced images. Tumour filling the fourth ventricle with supratentorial hydrocephalus**

a)



b)

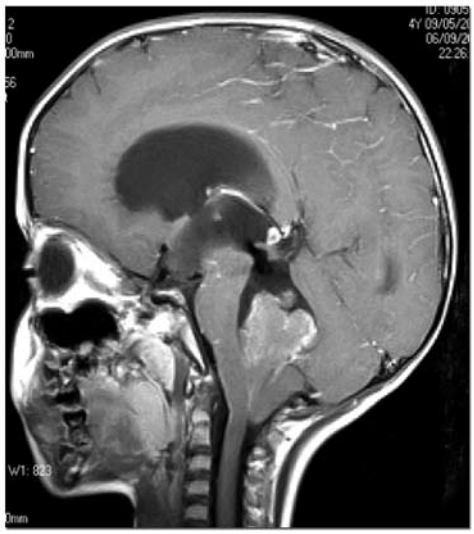
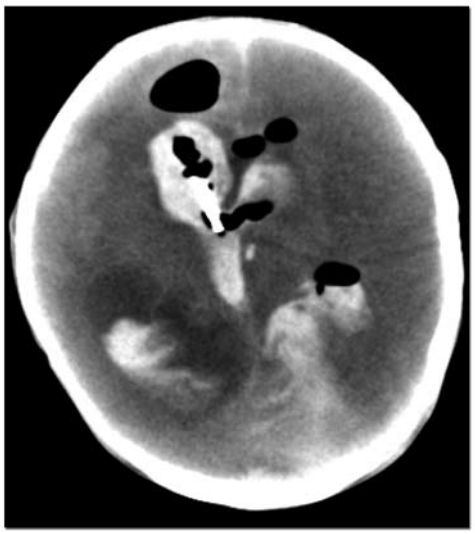


Figure 4. CT examination. Blood and air pockets in the ventricular system as a complication after the ventriculoperitoneal shunt insertion. Cerebral oedema



in the case of non-communicating hydrocephalus [12]. The most often place of ventriculostomy is perforation the floor of the third ventricle just anterior to the maxillary bodies [8]. It makes possible gradual decrease in size of the ventricles. To control shunt function or ventriculostomy condition imaging examinations are performed [13].

Beside assessing the size of ventricular system we can assess route and location of the intracranial proximal segment. Insertion of the ventricular shunt may result in large numbers of complications which present within six month from surgery.

The overall rate of shunt malfunction is 40% for patients before the age of two and 30% in older age group [2]. These complications can concern both shunt tips; intracranial and distal shunt catheters [3].

The most severe complication of ventricular tip insertion is intracranial haemorrhage as a result of procedure or rapid decompression of the ventricular system (*Fig. 4*) [4].

During the insertion of the proximal segment anatomical structures can be damaged or focal neurological deficits can occur such as hemiparesis if the catheter transverses the internal capsule. Meningeal fibrosis may occur as a reaction to chronic subdural hygromas which can be the consequence of shunt insertion [1]. Inflammatory changes around the proximal intracranial segment of shunt catheter penetrating into ependyma and subependymal zone of ventricular system are observed with rate of 5 to 10% of all children with chronic ventricular shunt (*Fig. 5*) [8]. Chronic shunt placement can cause craniosynostosis in the youngest children with separated sutures. A slit ventricle syndrome can become a problem in a small subset of 1% to 5% of older children chronically shunted [4]. These patients present symptoms of intracranial hypertension although they have small ventricles in CT findings. Another complication in shunted patients with non-communicating hydrocephalus is the isolated fourth ventricle [14].

There is no physicodynamic condition for CSF to outflow through Sylvian aqueduct due to shunting of the lateral ventricles. Cerebrospinal fluid produced in the fourth ventricle can outflow neither from obstructed aqueduct of Sylvius nor through subarachnoid space [4]. It leads to cystic dilatation of the fourth ventricle observed on imaging studies.

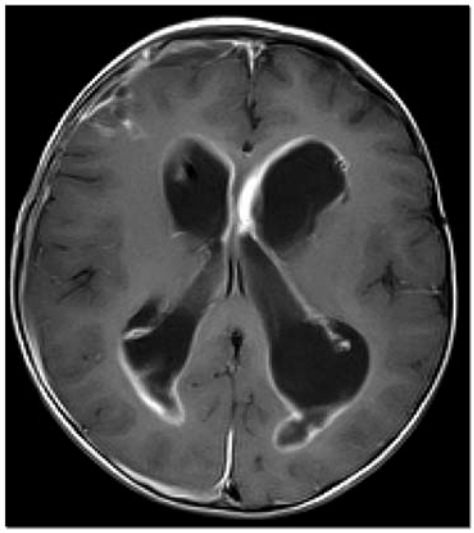
Among the complications of distal catheter are observed: limited fluid cysts, peritonitis, hepatic abscesses, fistulas and perforations of gastrointestinal tract [3].

In the end we need to mention about other radiological examinations carried out to assess hydrocephalus treatment results [11]. Transcranial Doppler ultrasonography sometimes is performed in infant with hydrocephalus [15]. This method allows to evaluate maturity of autoregulation of blood flow in the cerebral vessels. These vessels could be partly or completely damaged in a long lasting treatment with ventricular shunt.

Children with shunt insertion may have MR ventriculography performed [16]. Inserting the needle into the catheter and injecting paramagnetic contrast agent we can observe the flow

Figure 5. **MRI of the head. Axial (a), sagittal (b) T1-weighted contrast-enhanced images. Inflammatory changes of the brain tissue located around the zone of the inserted catheter and ependyma of the ventricular system**

a)



b)

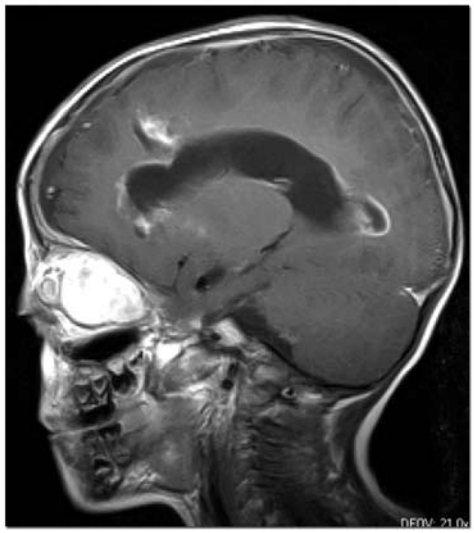
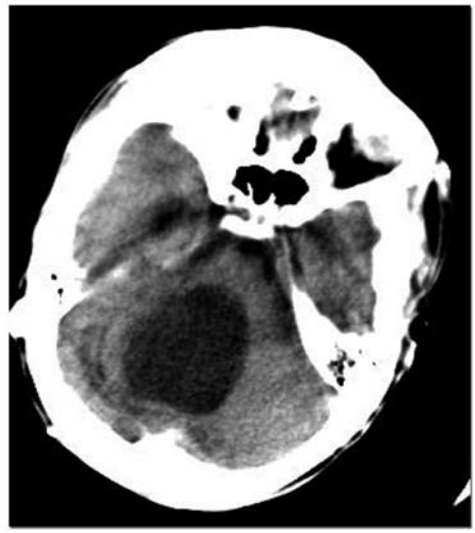


Figure 6. **CT examination. Cystic enlargement of the fourth ventricle**



of this agent in every image. We can also inject isotopic agent (99 m) Tc into ventricular system and evaluate CSF circulation with single photon emission computed tomography (SPECT), [17]. Among all examinations MR imaging has the best diagnostic value due to excellent quality images and no evidence of harmful effect on the living organism.

Using rapid sequences technique we can eliminate the need for child sedation and reduce examination to the one projection only in follow-up studies.

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Magnetic resonance imaging of the cerebellum and brain stem in children with cerebral palsy

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Abstract

Purpose: The study aimed to examine the volumes of cerebellum and the brain stem in children with cerebral palsy (CP).

Material and methods: The present study included 21 children with spastic diplegic CP (11 girls and 10 boys). Twenty-one patients with CP were age- and gender-matched with the control patients. All subjects were free from neurological or psychiatric disease, had normal intellectual development, and their brain magnetic resonance imaging (MRI) scans were normal. MRI of forty-two patients were reviewed prospectively.

Results: The CP group had significantly smaller mean of the cerebellar hemispheres and the brain stem than did the control group. The cerebellar volumes were positively correlated with age of children with CP and the control group. No significant correlations between gender and the volumes of cerebellar hemispheres and the brain stem in controls and in the CP group were found. No significant correlations between asphyxia and the volumes of cerebellar hemispheres and the brain stem in the CP group were noted. Positive correlation between the cerebellum volume and IQ scores in children with CP was found. Negative relationship between the cerebellar hemispheres volume and Gross Motor Function Classification System in patients with CP was found. No significant correlation between the brain stem volume and IQ scores in the CP group was detected.

Conclusion: Our data demonstrate that children with CP had smaller volumes of the cerebellum and the brain stem as compared to controls.

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Key words: cerebellum, brain stem, MRI, cerebral palsy.

Introduction

The cerebellum integrates these pathways, using the constant feedback on body position to fine-tune motor movements [1]. Moreover, chronic cerebellar stimulation applied to the superio-medial cortex reduces generalized cerebral spasticity, athetoid movements, and seizures [2,3]. The brain stem controls body functions: blood pressure, swallowing, breathing, heartbeat are all managed by this area of the brain. The brain stem also connects the forebrain and the cerebellum with the spinal cord. Cerebellar injury has been implicated in cognitive, social, and behavioral dysfunction among older patients and may contribute from 25% to 50% incidence of long-term cognitive, language, and behavioral dysfunction among formerly preterm infants [4-8]. In previous report Bodensteinen et al. [9] reviewed brain MRI of preterm born children with CP. They examined fifty scans and there were four totally normal scans. Moreover, cerebellar abnormalities were found in 32 children. The cerebellar findings included destruction of major portions of the cerebellum and focal or unilateral loss of cerebellar tissue. Currently, limited information is available regarding the nature and consequences of cerebellar injury in children with spastic diplegia born in term [10-12]. In the prospective study reported here, we now present quantitative MRI measurements of the cerebellar hemispheres and the vermis in children with spastic CP in relation to clinical status.

Material and methods

The present study included 21 children with spastic diplegia CP with a mean age 9.29±4.86 years (11 girls and 10 boys). A group of 21 healthy right-handed children 10.15±4.90 years old, matched for age and sex, were recruited as a comparison

***Table 1*. Relations between the volumes of cerebellum hemispheres and brain stem and gender, age, asphyxia, IQ and GMFCS**

Groups		Variable	r – value	p – value
CP (n=21)				
Girls	vs	Cerebellar hemispheres	-0.31532	NS
Girls	vs	Brain stem	-0.0159	NS
Boys	vs	Cerebellar hemispheres	0.13532	NS
Boys	vs	Brain stem	0.01590	NS
Age	vs	Cerebellar hemispheres	0.48261	0.0026
Age	vs	Brain stem	0.31970	NS
Asphyxia	vs	Cerebellar hemispheres	-0.1490	NS
Asphyxia	vs	Brain stem	-0.3590	NS
IQ	vs	Cerebellar hemispheres	-0.4860	0.0255
IQ	vs	Brain stem	0.44321	0.0441
GMFCS	vs	Cerebellar hemispheres	-0.6293	0.0025
GMFCS	vs	Brain stem	-0.2219	NS
Controls (n=21)				
Girls	vs	Cerebellar hemispheres	0.13413	NS
Girls	vs	Brain stem	-0.2070	NS
Boys	vs	Cerebellar hemispheres	-0.1341	NS
Boys	vs	Brain stem	0.2070	NS
Age	vs	Cerebellar hemispheres	0.65905	0.0011
Age	vs	Brain stem	-0.1627	NS
IQ	vs	Cerebellar hemispheres	0.4860	0.0255
IQ	vs	Brain stem	0.44321	0.0441
GMFCS	vs	Cerebellar hemispheres	-0.6293	0.0025
GMFCS	vs	Brain stem	-0.0236	NS

CP – cerebral palsy; r= Spearman's test; NS – not significant; GMFCS – Gross Motor Function Classification System; IQ – intelligence quotient

group. Asphyxia was confirmed among 6 patients with CP, none of healthy children had asphyxia. Nine children with CP were born as prematures was found in 9 children with CP, while all subjects group were born at term. Spastic diplegia was defined as motor disabilities caused by non-progressive damage of the developing brain with a more pronounced spasticity in lower limbs [14]. The children were each assigned a Gross Motor Function Classification System (GMFCS) according to [15] level by physical terapeutist. All the children in this group had one or more formal psychological assessments (the typical Wechsler Intelligence Scale for Children).

All MRI scans were obtained using a 1.5 T MR scanner (Picker Edge Eclipse) with the use of a standard circularly polarized head coil. The cerebellar hemispheres were aligned in the axial plane along the line drawn perpendicular to the vertical that ran tangential to the dorsal brain stem on the mid-sagittal slice [13] Total volumes of the cerebellar hemispheres (mm^3) and brain stem volumes (mm^3) were obtained by outlining these structures on all coronal slices in which they were visible. Descriptive analysis, matched *t* tests were used, as appropriate. Non-parametric statistics were used to assess the significance between CP and healthy patients. The critical level for all tests of significance was <0.05.

The study was approved by the Ethical Committee at the Medical University of Białystok.

Results

Sixteen spastic diplegia children had hypoxic-ischaemic lesions with patterns of periventricular leukomalacia, subcortical lesions or cortical infarction in MRI. Five patients had normal MRI scans. All healthy subjects had normal MRI. The CP group had a significantly smaller mean volume of cerebellum hemispheres than did the control group (107,009.2 mm^3 ±18,022.59 vs 128,755.2 mm^3 ±34,535.01; p=0.03255). The mean difference was approximately 17%. The CP group also had a significantly smaller mean volume of brain stem than did the control group (12,311.76 mm^3 ±4,463.21 vs 16,959.14 ±2,426.71; p=0.00236). The volume of cerebellum was positively (R=0.6590; p=0.00116) correlated with age of controls (*Tab. 1*). Similarly, we found the significant (R=0.4826; P=0.0266) relationship between the cerebellum volume and age of children with CP. No significant correlation between the brain stem volume and age of controls and CP patients were found. No relationships between gender and the volumes of cerebellar hemispheres and the brain stem in CP patients and in controls were found. Similarly, we did not find relations between gender and the volumes of cerebellar hemispheres and the brain stem in the CP group. We did not observe significant correlations between asphyxia and the volumes of cerebellar hemispheres and the brain stem in the CP group were found. No asphyxia was noted in controls. Small delay – 70-84 IQ had 10 children

with CP, moderate – 50-69 IQ (1 patient with CP), and severe <50 IQ (none). Normal children had IQ> 90. Normal intelligence had 10 children with CP and all healthy subjects. Positive correlation between the cerebellar volume and IQ scores in children with CP was noted (R=0.482; p=0.023). Similarly, we did find significant correlation (R=0.44324, p=0.0441) between the brain stem volume and IQ scores in CP patients. Negative correlation (R=-0.6239, p=0.0025) between the cerebellar hemispheres volume and GMFCS in patients with CP was found. Most of children with spastic CP were classified into the I and II levels of GMFCS compared to the control. On the other hand, the healthy subjects were classified only into a I level of GMFCS. No significant relationship between the brain stem volume and GMFCS in the CP group was found.

Discussion

In this study, we demonstrated that smaller volumes of the cerebellar hemispheres and the brain stem were common findings in the children with spastic diplegia. We also demonstrated no correlations between asphyxia and the volumes of cerebellar hemispheres and the brain stem in the CP group. Positive relationship between the cerebellar volume and IQ scores in children with CP. We found negative correlation between the cerebellar hemispheres volume and GMFCS in patients with CP. Our findings are in partially consistent with Bodensteiner et al. study [9]. They found common cerebral abnormalities such as decreased white-matter volume without gliosis, periventricular leukomalacia, and a thin corpus callosum. Similar findings described Srinivasan et al. [15] determining the absolute cerebellar volumes in term and preterm infants in correlation with risk factors. The median cerebellar volume of preterm was significantly smaller as comparing to term-born infants. Moreover, in the multiple regression analysis of perinatal variables showed that only infants with supratentorial lesions were significantly associated with the reduction in cerebellar volumes. These data are in accordance with results of the present study. The cerebellar abnormalities have been also described in three children with unilateral cerebellar aplasia by Swiss authors [16]. Neuroradiological investigations revealed complete aplasia in one child and subtotal aplasia in two patients. There was contralateral underdevelopment of the brain stem. The infant with hemiplegic CP had an additional supratentorial periventricular parenchymal defect, contralateral to the cerebellar hypoplasia. The authors concluded that unilateral cerebellar aplasia has presumably resulted from a prenatal destructive lesion, possibly an infarct, but the timing and exact nature was unknown [16]. Recently Booth et al., [1] in functional MRI showed that the cerebellum has reciprocal connections with both left inferior frontal gyrus and left lateral temporal cortex, whereas the putamen has unidirectional connections into these two brain regions. Our data demonstrate that children with CP had smaller volumes of the cerebellar hemispheres and the brain stem compared to controls.

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Brain metabolic profile obtained by proton magnetic resonance spectroscopy HMRS in children with Down syndrome

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Abstract

Purpose: Down syndrome (DS), or trisomia 21, is one of the most common autosomal mutations, with mental impairment as the constant symptom. Proton magnetic resonance spectroscopy (^{1}HMRS) allows evaluation of this metabolism in DS children. The study objective was the morphological evaluation of the brain in magnetic resonance imaging (MRI) and assessment of the metabolic profile obtained by HMRS in children with DS.

Material and methods: The study involved 34 children, including 14 with DS, aged 7-17 years. All of them were patients of the Department of Pediatric Neurology and Rehabilitation, Medical University of Białystok, and of its Outpatient Clinic. Age-matched healthy children (n=20) served as control. MRI scans of the head were performed in DS children using a 1.5T MR scanner in standard conditions, in three planes (saggital, axial and coronal), in T1, T2, PD and FLAIR series. HMRS investigations were also conducted to assess metabolic changes in the frontal lobes. Such metabolites as Glx, NAA, Cho, mI and GABA were determined in both temporal lobes with reference to the internal marker Cr. Results were compared to the control group.

Results: The MRI revealed no structural changes in children with DS. We found a decrease in Glx/Cr, NAA/Cr, Cho/Cr and mI/Cr ratios in our DS patients as compared to the control group. The differences for the first two markers were statistically significant. However, no differences were found between GABA/Cr ratio in the two frontal lobes in patients with DS as compared to the control group.

Conclusions: Our findings seem to confirm the abnormal metabolism of stimulatory amino acids with developmental disorders and "precocious brain aging" in children with DS.

Key words: Down syndrome, magnetic resonance spectroscopy, frontal lobes.

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Introduction

Down syndrome (DS) belongs to the most common autosomal genome mutations [1,2]. Disorders observed in DS are due to the presence of an additional chromosome 21 or its segment containing the so-called "critical region" [3,4]. Mental impairment is a constant symptom [5,6]. Further impairment of the cognitive functions that begins at the age of 35-40 is ascribed to dementia. There is evidence for a common genetic and pathophysiological background of dementia in DS and Alzheimer disease (AD). One of the early-onset AD genes is found in chromosome 21. Single base mutation in the amyloid precursor protein (APP) gene in chromosome 21 leads to accumulation of amyloid protein in senile cells. A similar mechanism of "precocious aging" of the brain has been observed in DS. Magnetic resonance imaging (MRI) and proton magnetic resonance spectroscopy (^{1}HMRS) provide new possibilities for the evaluation of brain "precocious aging" in DS. ^{1}HMRS allows non-invasive *in vivo* determination of brain metabolite content, or rather of the proportions of the metabolites in the respective structures of the brain. Spectroscopy facilitates assessment of such metabolites as N-acetylaspartate (NAA), choline (Cho), creatinine (Cr), myoinositol (mI) and gamma-amino butyric acid (GABA), which are known to play a key role in the function of the nervous system, e.g. in the processes of memory and learning. ^{1}HMRS is used in the diagnosis of metabolic disorders of the central nervous system, ischemic-hypoxemic conditions, brain tumors and Alzheimer disease [7-10]. Spectroscopy is also applied for DS diagnostics in association with brain "pre-

Figure. 1. **[1]HMRS spectrum in a 12-year-old boy with Down syndrome (voxel vol. 2x2x2 cm3) in the left and right frontal lobe**

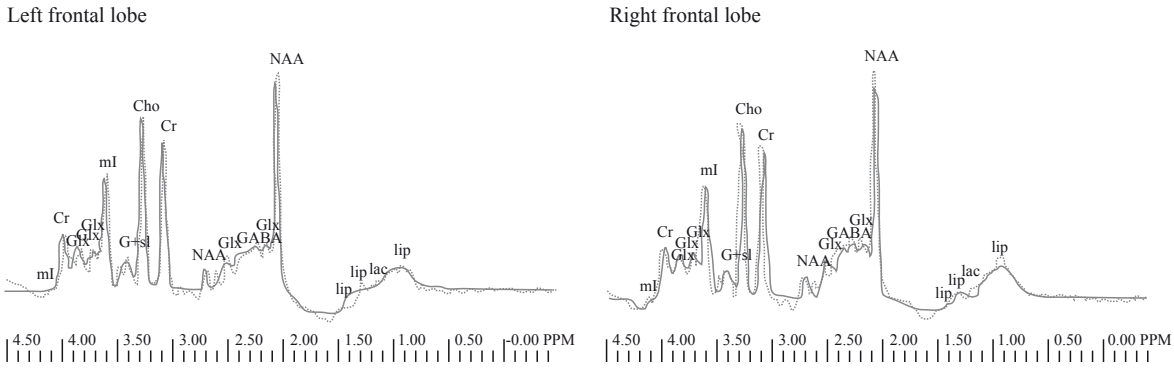
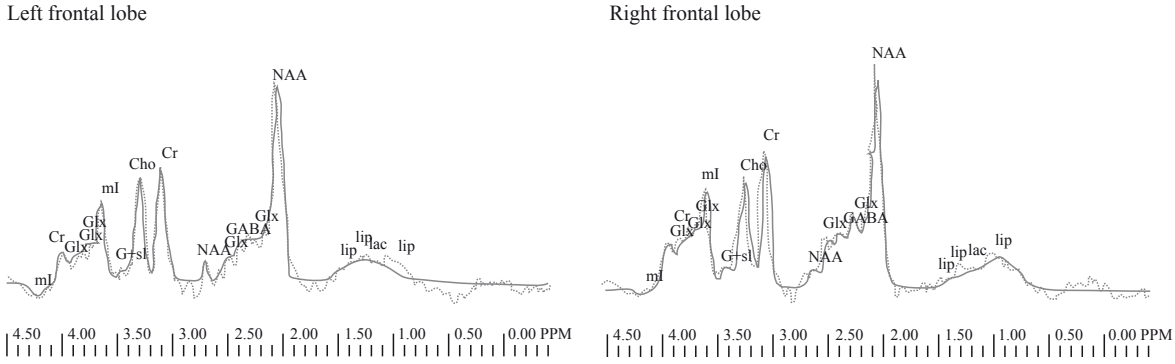


Figure 2. **[1]HMRS spectrum in a 13-year-old healthy boy (voxel vol. 2x2x2 cm3) in the left and right frontal lobe**



[1] HMRS spectra did not differ between the right and left lobe

cocious aging" processes and symptoms of dementia of the Alzheimer type [11]. The available literature is not abundant and refers to adults with Down syndrome. Most authors have conducted measurements of the respective metabolites in the hippocampal region, in the basal ganglia, and in the parietal and occipital lobes [10-12]. Berry et al. [13] showed a significant increase in the mI level in the basal ganglia (striatum) in DS children as compared to the control group.

In the present study, we decided to carry out similar measurements in the frontal lobes, i.e. in the structures never before assessed with respect to brain metabolite content.

Thus, the study objective was the morphological evaluation of the brain in magnetic resonance imaging (MRI) and assessment of the metabolic profile in the two frontal lobes in HMRS in children with Down syndrome.

Material and methods

Thirty-four children were recruited for the study, including 14 with DS (7 girls and 7 boys aged 6-17, mean 10.92±3.49) and 20 healthy children (11 girls and 9 boys aged 7-17, mean 11.78±3.92). All of them were patients of the Department of Pediatric Neurology and Rehabilitation, Medical University of Białystok, and of its Outpatient Clinic. MRI scans of the head were performed in DS children using 1.5T MR scanner in standard conditions, in three planes (saggital, axial, coronal), in T1, T2, PD and FLAIR series. In all the cases, [1]HMRS investigations were also conducted to assess the metabolic profile in the frontal lobes. NAA, Cho, Glx, mI and GABA markers were determined with reference to the internal marker Cr. The voxel volume was 2x2x2 cm^3. The results were compared to the control [1]HMRS findings.

Results

The imaging of the brain revealed no structural changes in children with DS as compared to the control group.

Fig. 1 and *Fig. 2* present [1]HMRS spectrum in the two frontal lobes in a patient with Down syndrome and in a healthy control subject.

Table 1. presents the proportions of metabolites in the two frontal lobes in children with Down syndrome and in the control group.

The frontal lobes of DS children showed reduced NAA/Cr, Glx/Cr, Cho/Cr and mI/Cr ratios. The differences between the ratios of the first two markers to creatine were statistically sig-

Table 1. **Metabolite proportions in the two frontal lobes in children with Down syndrome (n=14) and in the control group (n=20)**

Index	Down syndrome	Control	p value
	(n=14)	(n=20)	
Glx/Cr	2.17 ± 0.97*	3.38 ± 1.41*	p= 0.011
NAA/Cr	1.66 ± 0.56	1.95 ± 0.5	p= 0.0354
Cho/Cr	1.08 ± 0.23	1.15 ± 0.23	NS
mI/Cr	1.52 ± 0.36	1.75 ± 0.47	NS
GABA/Cr	1.92 ± 0.19	1.99 ± 0.33	(-)

NAA – N-acetylaspartate; Cho – choline; Cr – creatinine; mI – myoinositol; Glx – glutamate-glutamine complex; GABA – gamma-amino butyric acid; NS – lack of statistical significance; Wilcoxon test; * The presented values are means of 28 and 40 estimations

nificant (*Tab. 1*). However, no differences were found between GABA/Cr ratios in the two frontal lobes in patients with DS as compared to the control group.

Discussion

We found a reduction in the NAA/Cr, Glx/Cr, Cho/Cr and mI/Cr ratios in both frontal lobes of DS children as compared to healthy controls. The differences for the first two markers were statistically significant. NAA, Glx and Cho belong to the stimulatory amino acids of the central nervous system. They play a significant role in stabilization and maintenance of the so called long-term potentiation (LTP), which is a learning and memory exponent observed in neurons *in vitro* [14]. It is believed that approximately 70% of neurotransmissions in the brain occur via stimulatory amino acids. During acute hypoxia of the whole brain or its respective structures, neurons release increased amounts of stimulatory amino acids, showing a strong destructive cytotoxic action. Stimulatory amino acids play a key role in the pathogenesis of psychotic disorders (anxiety, depression) and neurodegenerative diseases (epilepsy, stroke, post-traumatic brain damage, Alzheimer disease, Parkinson disease, Huntington chorea) [15,16]. We revealed a significant reduction in the Glx/Cr ratio in both frontal lobes in DS children. Glx is a neurotransmitter of the glutaminergic system, which is the major stimulatory system in the CNS [16,17]. It plays a key role in neuron maturation as it regulates the processes of proliferation and migration of neural precursors and immature neurons during brain development. It has an important function in learning and memory processes, and regulates pain signal transduction in the spinal cord and brain. According to Castillo et al. [18], Glx is also involved in mitochondrial metabolism, in detoxification processes and in the regulation of the activity of other neurotransmitters. The significant reduction in the Glx/Cr ratio observed in the current study in frontal lobes in DS children as compared to healthy controls indicates disorders in the system of stimulatory neurotransmitters and may suggest impaired neuronal maturation during brain development, and in consequence disorders in learning and memory processes.

We also found a significant drop in the NAA/Cr ratio in DS children. NAA is another stimulatory amino acid. It is found in neurons, neuroglial precursor cells and immature oligodendrocytes, and being an intracellular amino acid, it is considered to be a neuronal density marker. NAA is involved in many biochemical processes, e.g. in aspartate metabolism, lipid synthesis and osmotic cell regulation. Considering the correlation of NAA concentration with the number of cells and their metabolic efficiency, NAA has been regarded as a marker of metabolic fitness of neurons. According to Hsu et al. [19], there is some evidence of NAA involvement in the myelinization processes. Disturbances in the level of NAA have been observed in epilepsy, multiple sclerosis, amyotrophic lateral sclerosis, neurodegenerative diseases and brain ischemia [20,21]. ^{1}HMRS has been applied many times in studies concerning dementia of the Alzheimer-type. Hsu et al. in 2001 [19] described in dementic patients a reduction of NAA level and NAA/Cr ratio in the frontal, parietal and occipital lobes, as well as in the centrum semiovale and hippocampus. Valenzuela et al. [22] found an approximately 15% drop in NAA level, which is an early phenomenon and is not always associated with the structural changes visualized by MRI. Jessen et al. [23] based on the analysis of the NAA/Cr and Cho/Cr ratios in the brain regions undergoing degeneration in subsequent phases of dementia, revealed differences between these markers which confirmed the order of development of neurodegenerative changes (the median temporal lobe, the primary motor and sensory cortex). Correlations have also been found between changes in the level of NAA in spectroscopy and enhancement of Alzheimer-type pathology (number of amyloid plaques and neurofibril degeneration) [24].

In most patients with DS, symptoms of Alzheimer disease appear earlier, i.e. already around 40 years of age [25]. It has been also found that activity of the gene responsible for the production of amyloid is increased in DS patients. Dementia symptoms may be observed in 0-4% of DS patients under 30 and in 29-75% of cases between 60-65 years of age [26]. Patel et al. [27] showed more frequent occurrence of Alzheimer disease in patients with mental impairment, and especially with trisomia of chromosome 21. The neuropathological Alzheimer-type changes in DS patients suggest that the genetic defect in familial Alzheimer disease is also associated with chromosome 21. In our DS group, we noted a significant reduction in the NAA/Cr ratio, which is consistent with reports of other authors and may indicate an ongoing neurodegenerative process with myelinization disorders. This finding, because of a very young age of our patients, seems to confirm our previous assumption that NAA decrease appears early and is a very sensitive phenomenon preceding structural changes in the brain. We observed a tendency of Cho/Cr reduction in DS children. Choline and choline-containing compounds are considered to be the marker of degradation products of myelin that builds up the sheaths of the neural processes. The role of Cho in the development of dementia is not completely clear and there are some divergent opinions concerning its level in patients with cognitive dysfunction. Some researchers, including Kantarci et al. [28], Chantal et al.

[29], Du et al. [30] showed an age-progressing increase in the level of cholinic compounds and their higher concentrations in Alzheimer patients. We observed a tendency towards lower Cho values in DS children as compared to the control. Our data seem to be consistent with reports of such authors as Berry et al. [13], Shonk et al. [31], Huang et al. [12] and Beacher et al. [32]. The changeability of Cho concentrations suggests that these results may reflect both brain aging itself and the ongoing degenerative disease. A relatively young age of our patients as compared to elderly subjects or those with the Alzheimer-type may also play an important role. We also found lower values of the mI/Cr ratio in DS children. Myoinositol is a cyclic alcohol referred to as a glial marker. It is responsible for changes in brain osmolality and maintains normal volume of neuron. Myoinositol is associated with cell membrane metabolism, and its increase suggests gliosis. It can be found only within the astrocytes of the nervous system and is considered to be the astrocytic index and a marker of early brain damage. Shonk et al. [33] showed an increase in mI concentration in the frontal, parietal and temporal lobes, and in the temporal-parietal region in adults with DS and in Alzheimer disease. Berry et al. [13] revealed an increase in the level of mI in striatum in DS children. However, data regarding mI levels are contradictory, which has been demonstrated by Parnetti et al. [34] and Rose et al. [35]. Our findings are consistent with their reports. We found no differences in the GABA/Cr ratio between children with DS and healthy controls. GABA is the major inhibitory neurotransmitter in the central nervous system [14,36]. It is distributed within three pools in the brain. The first pool refers to the presynaptic nerve endings, the second to glial cells and the third to postsynaptic neurons. GABA synthesis takes place in the presynaptic GABA-ergic endings due to glutamate acid decarboxylation. The mechanism of GABA action is based on its reaction with specific receptors: GABA-A, GABA-B and GABA-C. In the available literature there are no reports concerning GABA concentration in ^{1}HMRS in DS patients. Our findings confirm dissociation of the stimulatory and inhibitory processes and the relationship between the content of stimulatory amino acids and disorders of maturation and "precocious aging" of the brain in DS children.

In physiological conditions, a balance exists between destruction and repair in the central nervous system. This is associated with brain plasticity observed in developmental and repair changes, as well as in the process of learning and memory. It is believed that in DS patients, destructive processes predominate over the repair ones. The apoptosis process, i.e. genetically programmed cell death, is more enhanced in patients with trisomia of chromosome 21. These data have been confirmed by our research findings [37] as well as by other authors [38,39] studying free radicals in DS patients. The elevated level of free radicals in patients with Down syndrome enhances cell destruction by, e.g. dissociation of the respiratory chain in mitochondria or destabilization of lysosomal membranes [40,41].

Proton magnetic resonance spectroscopy provides deeper insight in the chemical composition and in the ongoing metabolic processes in the brain of children with DS. It allows better understanding of pathogenesis of the disease and gives a chance of earlier and better directed rehabilitation of DS children.

Conclusions

In comparison to the control group, in the frontal lobes of children with Down syndrome MRI and ^{1}HMRS of the head revealed: 1. lack of structural changes in the brain in all DS children; 2. a statistically significant reduction in the proportion of NAA/Cr and Glx/Cr 3. decreased mI/Cr and Cho/Cr ratios; 4. unchanged GABA/Cr ratio. The findings indicate brain metabolic disorders in children with DS.

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Severity of dysarthric speech in children with infantile cerebral palsy in correlation with the brain CT and MRI

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Abstract

Purpose: Dysarthria is a sequel of reduced motor functions and refers to the sound aspect of the language. In children suffering from cerebral palsy, CT (computer tomography) and MRI **(**magnetic resonance imaging**)** examinations provide data on the relationship between the range of structural changes detected by neuroimaging investigations and the severity of motor dysfunction. The aim of study was to assess the severity of dysarthria in children with cerebral palsy in correlation with the pattern of morphological changes revealed on CT and MRI.

Material and methods: The study involved 48 children with the pyramidal form of infantile cerebral palsy aged 3-15 years, treated in the Department of Pediatric Neurology and Rehabilitation in Białystok. All the patients underwent CT examination, 29 of them also had MRI. Severity of speech dysfunction was established based on "Dysarthria profile" by Robertson. The degree of damage severity in the respective brain structures was determined according to the scale Kraegeloh-Mann. Statistical analysis was performed using % calculations, the arithmetic mean, standard deviation, the chi-square test of independence or t-Student test to compare the means of two samples.

Results: Significant differences were shown in dysarthria severity depending on lesions seen on CT and their intensity revealed by MRI, which were found to correlate positively with the severity of articulation disorders.

Conclusions: The results indicate that CT and MRI are useful for predicting prognosis of severity of speech disturbances in children and for early programming of the therapeutic process.

Key words: cerebral palsy, dysarthria, neuroimaging investigations.

Introduction

All pathologies that manifest themselves in dysfunctions of the muscular groups involved in the production of speech (respiratory, phonatory, articulatory), responsible for phonation, mainly cerebral palsy, are usually accompanied by dysarthria. Dysarthria is a sequel of reduced motor functions and refers to the sound aspect of the language [1]. In children suffering from cerebral palsy, CT and MRI examinations provide data on the relationship between the range of structural changes detected by neuroimaging investigations [2,3]. The few studies on the speech of children suffering from cerebral palsy performed in correlation with MRI findings refer to the linguistic functions and do not confirm such a relationship [3].

The aim of the study was to assess the severity of dysarthria in children with pyramidal form of cerebral palsy in correlation with the pattern of morphological changes revealed on CT and MRI.

Material and methods

The study involved 48 children with the pyramidal form of infantile cerebral palsy aged 3-15 years, treated in the Department of Pediatric Neurology and Rehabilitation in Białystok. All the patients underwent CT examination, 29 of them also had MRI. Severity of speech dysfunction was established based on "Dysarthria profile" by Robertson [4]. Dysarthria severity

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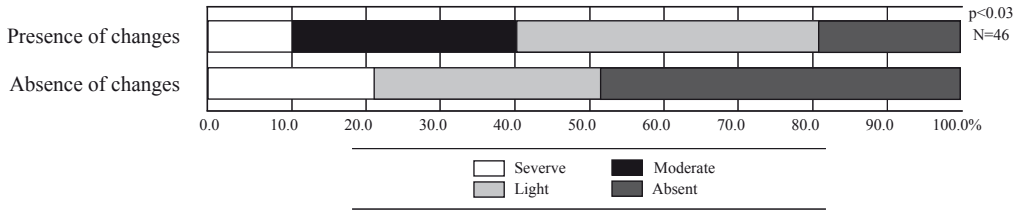
Table 1. **Differences in dysarthria severity in relation to the occurrence of changes on CT (computer tomography)**

Severity of dysarthria	Changes on CT	
	absent	present
Standard deviation	0.64	0.77
Mean value	3.272	2.779
Statistical analysis (t-Student test)	p<0021	

Figure 1. **Severity of articulatory disorders in relation to the presence and absence of changes on CT**



was expressed by the total score obtained from evaluation of the respective speech levels: articulation, articulatory motor activity, reflex actions, respiration, phonation and prosody. The degree of damage severity in the respective brain structures was determined according to the following scale Kraegeloh--Mann [5]: 1 – slight changes, 2 – moderate changes, 3 – marked changes. Statistical analysis was performed using % calculations, the arithmetic mean, standard deviation, the chi-square test of independence or t-Student test to compare the means of two samples. H1 hypothesis (correlation between features or differences between means) was considered true at $p<0.05$.

Results

In the study group of 48 children with cerebral palsy only 20% had no speech dysfunction, 37% presented with light dysarthria, 30% had moderate and 13% severe dysarthria. CT examination revealed changes in 28 (61%) children. In MRI, changes were slight in 17 (61%), moderate in 9 (32%) and severe in 2 (7%) children. No relationship was severity of dysarthric speech and changes seen on CT – $p>0.074$ was observed. Differences in dysarthria severity in relation to the occurrence of changes on CT presented (*Tab. 1*) ($p<0.021$). However, statistically significant differences were noted in the severity of articulatory disorders depending on morphological changes in the brain seen on CT ($p<0.03$). Data are presented in (*Fig. 1*). In relation to the other speech functions examined, correlations were insignificant. *Tab. 2* lists differences in moderate dysarthria with respect to the severity of morphological changes revealed on MRI. Differences in dysarthria severity on the range of changes revealed by MRI, revealed by t-Student test were considered significant at $p<0.004$. A statistically significant correlation was found between the severity of articulatory disorders and neuroimaging changes detected on MRI ($p<0.024$). Results are presented in (*Fig. 2*).

Discussion

In the study group of 48 children with the pyramidal form of cerebral palsy, 37% demonstrated only slight dysarthria and 20% had no speech dysfunction. In most of them, no damage was revealed on CT or only slight changes were detected on MRI.

Statistical analysis showed significant differences in the severity of dysarthrias, first of all in articulation disorders, in children with cerebral palsy, depending on the presence of changes on CT and their intensification degree on MRI. Bania Naeser ML et al. [6] indicate that damage to these regions, including nuclei and capsule and extending over the anterior/superior white matter and its posterior parts may, though not always, cause serious disturbances in verbal expression, such as subcortical dysarthria, transcortical motor aphasia and even total aphasia. In a patient with severe acquired dysarthria, functional MRI revealed cortical reorganization of articulation but not of the linguistic functions [7].

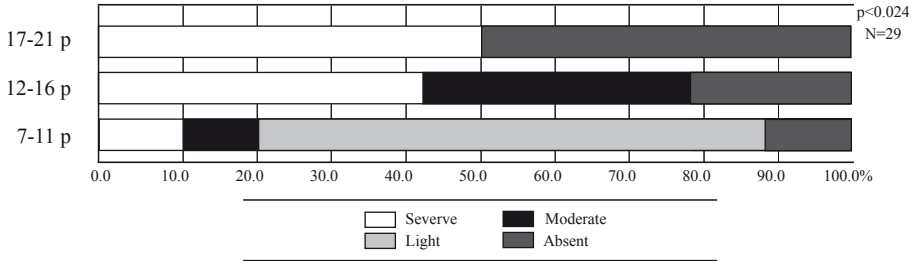
Worthy of note are some atypical cases, in which despite lack of damage on CT and only slight lesions on MRI, dysarthric disorders were severe, or those in which no speech abnormalities were observed although damage seen on MRI was substantial. Coleman L et al. [8] described two cases of children with marked changes on MRI – in one of them speech development was normal while in the other serious disorders were observed. The authors suggest that even when damage is serious, speech may remain intact. However, as shown by statistical analysis, dysarthric disorders in children with moderate changes on MRI are significantly more severe as compared to those observed in slight disorders.

Early symptoms of future speech disorders in children with cerebral palsy include difficulty with sucking, swallowing, mastication, retarded and poor cooing [9,10]. Analysis of CT and MRI findings with reference to these symptoms will facilitate early and proper decisions concerning programming of speech therapy in children with cerebral palsy already in infancy.

Table 2. **Dysarthria severity in relation to MRI (magnetic resonance imaging) findings**

Severity of dysarthria	MRI (changes)		
	slight	moderate	1 marked
Standard deviation	0.54	0.76	1.43
Mean value	3.281	2.614	2.925
Statistical analysis (t-Student test)	p<0.014		
	p>0.452		
	p>0.654		

Figure 2. **Severity of articulatory disorders in relation to the range of damage revealed by MRI**



Conclusions

Severity of dysarthric disorders, especially of articulatory defects, correlates with structural changes revealed on CT and with their intensity detected on MRI. CT and MRI findings can be useful for the prognosis of the severity of speech dysfunction in children with cerebral palsy, allowing early programming of the therapeutic process.

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The usefulness of Quality of Life Childhood Epilepsy (QOLCE) questionnaire in evaluating the quality of life of children with epilepsy

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Abstract

Purpose: Evaluation of quality of life has become a frequently used method in treatment effects supervision. Quality of Life Childhood Epilepsy (QOLCE) questionnaire, which is completed by patients' parents, has been prepared for children with epilepsy. It enables to determine the quality of life in children aged 4-18 years.

The aim of the study was to show the usefulness of QOLCE questionnaire in evaluating the quality of life of children with epilepsy.

Materials and methods: 160 epileptic children, aged 8-18 years and their parents were examined in the Chair and Department of Developmental Neurology, K. Marcinkowski University of Medical Sciences in Poznań. QOLCE questionnaire was completed by parents and "Young people and epilepsy" questionnaire was designed for children.

Results: Reliability index of the complete questionnaire in own research and in the original amounted to 0.93 Cronbach α coefficient. Epileptic, drug-resistant children constituted 28% of the examined group. Parents of children with controlled seizures evaluated children's functioning in analyzed areas of quality of life higher.

Conclusions: 1. QOLCE questionnaire is a suitable tool to evaluate the quality of children's and adolescents' life. 2. The most significant differences in functioning of epileptic, drug-resistant patients and those with controlled seizures were observed in areas of cognitive processes and social activity.

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Key words: children, epilepsy, quality of life, QOLCE.

Introduction

In medical research the index of treatment effects was the only coefficient considered important, which consisted in eliminating or alleviating painful disease symptoms. Now, there have been significant changes introduced. The attention has been attracted to the necessity of holistic perception of the human being [1]. It has resulted in the development of research on quality of life area. Ambiguity of the concept caused various conceptual assumptions of research. There are general – Medical Outcomes Study Short Form (SF-36), and specific tools used to estimate Health Related Quality of Life. There have been specific scales designed for children with epilepsy: Adolescent Sigma Scale, Hague Restrictions in Childhood Epilepsy Scale, Quality of Life for Adolescents with Epilepsy (QOLIE-AD-48), Quality of Life in Childhood Epilepsy Questionnaire (QOLCE) [2,3].

The aim of the study was to show the usefulness of QOLCE questionnaire in evaluating the quality of life of children with epilepsy.

Materials and methods

160 children with epilepsy, aged 8-18, and their parents were included into the examination, being held in the Chair and Department of Developmental Neurology, K. Marcinkowski University of Medical Sciences, Poznań. Criteria for the group: 8-18 years of age, Intelligence Quotient (IQ) – within limits or light mental impairment; types of seizures – partial or generalized epileptic seizure; treatment – monotherapy or politherapy; seizure incidence; therapeutic effects – drug-resistance or seizure control; absence of other chronic diseases or psychiatric episodes; education – the form of school obligation realization; parents' approval for examination participation.

Research tools:

– Quality of Life in Childhood Epilepsy questionnaire for parents. Seven aspects were analyzed with the use of the questionnaire: child's physical activity, general feeling, cognitive processes, child's social activity, behavior, general health condition and general evaluation of quality of life [4]. Reliability index of the complete questionnaire in own research and in the original amounted to 0.93 Cronbach α coefficient.

– "Young people and epilepsy" questionnaire, completed by children enables collection of clinical information (e.g. when the first fit occurred, how often fits appeared, what medications are applied) and information concerning the knowledge of epilepsy symptoms and characteristics, necessary for both children and parents. Mann-Whitney test, Chi-Square test Fisher-Freeman-Halton test were used to verify the collected data.

Results

The examined group consisted mostly of children aged 8-13 (54 %). The ratio of girls and boys was equal to 1:1. 61 (51%) children presented primarily-generalized seizures, 22 (18%) patients had partial (simple and complex) secondarily generalized, partially complex occurred in 19 (16%), partially simple appeared in 12 (9%) and 6 (5%) patients were not classified at all. With the consideration to treatment effects, two groups were isolated: 34 (28%) children constituted a group of drug-resistant patients and 86 (72%) a group of controlled seizures. The analysis of particular QOLCE questionnaire parts resulted in the isolation of two, mentioned above, groups.

The "physical activity" of questionnaire part showed that children with drug-resistant epilepsy felt tired more frequently in comparison to children with controlled epilepsy and did not present physical fitness on the same level as peer – group members.

In " social activity" part, parents 25 (73%) of drug-resistant children and 71 (82%) of controlled seizures thought that their children did not talk about their disease with their peers.

The feeling to be accepted in peer-groups, was confirmed by their care-givers for 60 (70%) children with controlled seizures and 31 (36%) with drug-resistant epilepsy.

Parents 21 (62%) of drug-resistant children and 34 (40%) of controlled seizures confirmed difficulties in concentrating on any task for a longer period of time. The "Behavior" part, demonstrated that parents 29 (86%) of drug-resistant children and 58 (68%) of controlled seizures reported easiness of their children to irritate.

Application of Mann-Whitney test indicated statistically significant differences between drug- resistant and controlled seizures epileptic children's functioning in all analyzed areas: general feeling ($p=0.0015$), cognitive processes ($p=0.0133$), social activity ($p=0.0001$), child's behavior ($p=0.0073$). The statistical dependence between seizure incidence and school problems (Fisher-Freeman-Halton test $p<0.05$) and seizure incidence and acceptance (Chi-square test $p<0.05$) were indicated.

Discussion

QOLCE questionnaire, among many research tools, designed to measure the quality of life in children, is considered to demonstrate high psychometric values, e.g., reliability index for a complete questionnaire (Cronbach α coefficient) amounted to 0.93 [2-4]. Similar value was obtained in Polish version [5].

The usefulness of a tool by Sabaz et al. [4] for the measurement of quality of life of children with epilepsy is confirmed by obtained results of statistical analysis, e.g. dependence between children's quality of life and seizure incidence and polytherapy. Own research also demonstrated the dependence between seizure incidence and general evaluation of quality of life and acceptance in a peer group. Moreover, parents of the drug-resistant children with epilepsy estimated all analyzed areas of life lower than parents of children with controlled seizures.

Obtaining results are similar to those included in other authors' papers may constitute the indirect index of tool reliability. Sabaz et al. [4] received the highest indices of reliability in areas of social activity and cognitive processes.

The importance of social functioning in general evaluation of quality of life was also underlined by Henriksen [6], Owczarek and Jędrzejczak [7], Artemowicz et al. [8].

Walańczyk [9] defines epilepsy as one of the most frequent social diseases which impairs such areas of activities as education, professional work, family life, everyday life activities, social contacts, friendship and leisure time activities. The own research proved that 1/5 of drug-resistant children felt rejected by peers. Artemowicz et al. [8] remark that peers accept epilepsy in a friend when he himself accepts it, has extra interests and good results at school.

Parents of 1/3 of all examined patients with epilepsy reported school problems which were the results of disturbed memory and attention. Similar results were obtained by Aldenkamp et al. [10] and Devinsky et al. [11].

Conclusions

1. QOLCE questionnaire is a suitable tool to evaluate the quality of life in children and adolescents.

2. The most significant differences in functioning of drug-resistant patients and of controlled-seizure-patients were observed in cognitive processes and social activity.

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The sleep habits and sleep disorders in children with headache

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Abstract

Purpose: The study was conducted to examine the sleep habits and sleep disorders in children and adolescents with headache.

Material and methods: Three hundred children with headache were qualified to a headache group (HG) and 284 children from schools and kindergartens without headache to a control group (CG).

Results: In our study, 27.7% children of the HG slept together with other person in the bed; 18.7% of the CG. In the HG, 11.7% of children had physical contact with parents when falling asleep, in the CG 19.7%. In the HG, watching TV and listening to the radio when falling asleep occurred more frequently. About 20% of parents in the HG read aloud to children before putting them to sleep, in the CG 32.4%. Day naps occurred in 32.7% of the HG children and in 20.1% of the CG. Sleep disorders reported in the study group as parasomnia symptoms included: sleep talking 48.3% (CG 38.7%); bruxism 23.3% (CG 16.5%); leg movement 20.3% (CG 18.0%); nightmares 16.7% (CG 7.4%) and sleep breathing disorder symptoms like snoring 27.3% in the HG group (CG 19.0%) and breathing pauses 5.7% (CG 1.4%). Awakenings from the night sleep were observed in 43.7% children of the HG and in 36.4% children of the CG.

Conclusions: Sleep habits in children with headache were considerably different from sleep habits in the CG. The prevalence of sleep disorder symptoms like: snoring, sleep talking, bruxism, sleep terror, nightmares, breathing pauses and awaking from night sleep was higher in the HG group than in the CG.

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Key words: headache, sleep disorder, sleep habits, children.

Purpose

Sleep disorders are very common in the population of children [1]. The etiology of sleep problems is very complicated and depends on many varied factors. The psychological factors concerning the family life and general state of health have a significant impact on children. It is known by clinical experience that various kinds of sleep disorders are more frequent in that group of children than in the general population of children [2]. There are only several professional publications discussing the epidemiology of sleep disorders in children and adolescents with headache. This study was conducted to examine the sleep habits and sleep disorders in children and adolescents with this chronic neurological syndrome.

Material and methods

From May 2005 to October 2006, 1 100 children and adolescents from Poznań area were investigated using a specially developed questionnaire. The first part of the survey was conducted in the Chair and Department of Developmental Neurology, Poznań University of Medical Sciences. All patients admitted to the Department were examined using the questionnaire. There were 300 children and adolescent who matched the criterion of migraine headache or tension type headache equal to The International Classification of Headache Disorders 2nd edition (ICHD-2) qualified to the study group [3].

There were 284 children from schools and kindergartens without headache qualified to a control group. The control group consisted of approximately 5% of the whole population of children in Poznań. The questionnaire used in the survey was a sleep questionnaire developed by the authors, filled in by the parents. Each questionnaire was accompanied with a letter

Table 1. **Group characteristic**

	HG	CG
N	300	284
Mean age	12.6	8.6
Age standard deviation	4.0	4.4
Girls	53.3% (n=160)	52.7% (n=147)
Boys	46.7% (n=140)	47.3% (n=132)

HG – Headache group; CG – Control group

Table 2. **General health state**

	HG	CG
Very good	9.0%**	48.9%**
Good	47.0%	43.7%
Fairly good	32.7%**	6.3%**
Rather bad	5.0%*	1.1%*
Bad	0.7%	0.7%

Significant results are indicated: *p<0.05; ** p<0.005;
HG – Headache group; CG – Control group

***Table 3*.** **Sleep habits and naps**

	HG	CG
Sleep in one bed with somebody	27.7%*	18.7%*
Sleep in one room with somebody	57.7%	58.1%
Physical contact	11.7%*	19,7%*
Watching TV	20.3%**	8.1%**
Listening to the radio	26.7%**	15.1%**
Parents reading	20.0%**	32.4%**
Day naps	32.7%**	20.1%**

Significant results are indicated: *p<0.05; ** p<0.005;
HG – Headache group; CG – Control group

describing the study. Most of the questions referring to children's sleep were answered by ticking a correct yes/no box. The questionnaire consisted of points relating to the child's sleeping habits (e.g. co-sleeping, daytime naps); sleep disorders (e.g. sleepwalking, sleep talking, bruxism, leg movements, snoring, breathing pauses, etc.); frequent night-time awakenings, daytime sleepiness, family sleep disorder history and demographic data. The parents were assisted with the questionnaire by the investigators. The investigators were all trained to ask questions and record answers to ensure the quality of responses. Before conducting the study, the sleep questionnaires were pilot tested on a sample of 100 patients of the Department of Developmental Neurology. The study was approved by the Institutional Review Board at Poznań University of Medical Sciences and the local Chief Education Officer of Poznań. The chi^2 test was used for statistical analysis. All statistical analyses were made using the Statistical Program for the Social Sciences (SPSS) for Windows. The statistical significance was set at P<0.05. There were 160 girls (53.3%) and 140 boys (46.7%), from 1 to 18 years of age in the study group. The control group consisted of 147 girls (52.7%) and 132 boys (47.3%) in the same age range. The mean age in the study group was 12.6 ± 4.0 years and in the control group 8.6±4.4 years.

Results

In the HG, 98.9% of parents described the general health state of their children as "very good", "good" or "fairly good", when only 88.7% in the HG. The difference was significant in the "very good", "fairy good" and "rather bad" categories. The general health state is shown in *Tab. 2*.

Sleep habits and naps

In our study, 27.7% children of the HG slept together with another person in the bed; while only 18.7% in the CG. The difference was significant. About 57.7% of children in the HG slept in one room with other members of the family, in the CG 58.1%; the difference was not significant. Co-sleeping was more frequent in case of younger children, particularly in the preschool group 85.7%, and was disappearing in the secondary school group. In the HG 11.7% of children had physical contact with parents when falling asleep, in the CG 19.7%. In the HG, watching TV and listening to the radio when falling asleep were more frequent and those differences were also significant. Approximately 20% of parents in the HG read aloud to children before putting them to sleep, while 32.4% in the CG; this difference was significant. The day naps occurred in 32.7% of the HG children, 20.1% of healthy children slept during the day. This difference was significant. The sleep habits and naps are shown in *Tab. 3*.

Prevalence of Sleep Disorders

The presence of various symptoms connected with sleeping disorders (at least one symptom) was noticed by parents in 220 children (73.3%) in the HG and 65.8% in the CG. The most frequent of sleep disorders reported in the study group as parasomnia symptoms were: sleep talking 48.3% (38.7% in the CG); bruxism 23.3% (16.5% in the CG); leg movement 20.3% (18.0% in the CG); nightmares 16.7% (7.4% in the CG) and sleep breathing disorder symptoms like snoring 27.3% in the HG group (19.0% in the CG) and breathing pauses 5.7% (1.4% in the CG). Differences concerning snoring, sleep talking, bruxism, sleep terror, nightmares and breathing pauses were significant. Awakenings from the night sleep were observed in 43.7% children of the HG and in 36.4% children of the CG; those differences were statistically significant. The prevalence of sleep disorder symptoms in different groups of age is shown in *Tab. 4*. In our study 64 children (21.3%) have migraine headache. We try to compare the tension type headache and migraine headache to control group. But there were no significant differences between these groups.

Discussion

Sleep disorders are often not described, particularly in children. They are estimated to occur in 25%-30% of the popula-

***Table 4*. Prevalence of sleep disorder**

	HG	CG
Snoring	27.3%**	19.0%**
Breathing pauses	5.7%*	1.4%*
Sleep talking	48.3%*	38.7%*
Bruxism	23.3%*	16.5%*
Leg movements	20.3%	18.0%
Enuresis	7.7%	6.3%
Sleep terror	9.0%*	4.6%*
Sleepwalking	7.0%	3.9%
Nightmares	16.7%**	7.4%**
Awakening	43.7%**	31.7%**

Significant results are indicated in bold type; *p< 0.05;
** p<0.005; HG – Headache group; CG – Control group

tion [1,4,5]. Due to the frequency of sleep disorders in children the subject should be thoroughly researched. The parents of children with headache reported that their children had various problems with the night sleep, what was a direct reason for conducting this study.

In our study, the sleep habits and prevalence of sleep disorder symptoms (snoring, sleep talking, bruxism, sleep terror, nightmares and breathing pauses) in children with headache were significantly higher than in the CG. In our study we were particularly interested in sleep habits due to a shortage of studies on the subject in children with headache. The prevalence of sleep habits, like bed co-sleeping; watching TV and listening to the radio during falling asleep was significantly higher in the HG group than in the CG but in the CG physical contact with parents during falling asleep and parents reading were observed more frequently than in the HG. There were no significant differences between results in children with migraine headache and tension type headache. One of the basic method of sleep disorders treatment in children is parents education and implementation of the correct sleeping habits [6-9]. Discussing sleep patterns with parents provides an opportunity to learn more about the child and family and gives a possibility to evaluate the behavioral and family interventions. It allows to educate the parents about sleep hygiene and prevent more serious sleep problems [10].

Conclusions

Sleep habits in children with headache were considerably different than sleep habits in the CG. The prevalence of sleep disorder symptoms like: snoring, sleep talking, bruxism, sleep terror, nightmares, breathing pauses and awaking from night sleep was higher in the HG group than in the CG. It is necessary to conduct an additional research on a larger group of patients with headache to correlate the prevalence of sleep disorder symptoms with the type of primary headache (migraine and tension type headache) and other symptoms.

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Past and present of the children's electroencephalography in Toruń

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Abstract

The beginnings of children's electroencephalography in Toruń can be seen in the period after the Second World War**.** On 15th May 1945 scientific researchers from the Faculty of Medicine of Stefan Batory University in Vilnius came to Toruń in hope of recreating the faculty at NCU (Nicolaus Copernicus University). The assistant professor Janina Hurynowicz started the organisation of the Neurophysiology and Comparative Physiology Institute at the Faculty of Mathematics and Natural Sciences of the newly created NCU. In 1949, along with the liquidation of the Institute's Branch, the Central Regional Psychic Health Centre was created, where the management was taken over by Prof. Hurynowicz. Thanks to the efforts of Hurynowicz, one of the first EEGs in Poland came to Toruń. It was an American Rham 6. The students of Hurynowicz in the field of EEG were the professors Leszek Janiszewski, Władysław Traczyk and also Juliusz Narębski, who after the death of Hurynowicz was managing the laboratory for children and teenagers. The students of Prof. Narębski were Genowefa Olearczuk and Wanda Waczyńska. In 1987 the first EEG laboratory for children was organised in the Specialist Clinic in the Children's Hospital in Toruń by the chief of the Developmental Neurology Clinic Marian Łysiak, PhD, M.D. The lab was managed by Jolanta Kujawska. She underwent trainings in the first EEG Laboratory for Children and Teenagers in Poland organised in the Mother and Child Institute in Warsaw in 1950 under the supervision of Prof. Anna Koślacz-Folga and Michaela Pakszys, M.D. In 1988, after having been moved to the newly built children's hospital complex of the Children's Hospital and the obtaining of a modern Pegasus, the children's EEG made another leap in its development. Kukawska qualified for the licence (1994).

Key words: EEG diagnostics in Toruń, EEG Laboratory for children.

Within a hundred-year history of electroencephalography the discipline itself became commonly acceptable [1]. Many years later its younger sister, children's electroencephalography, started to evolve. Its development took place after the WWII [2].The war paradoxes of human and institutional fates caused that the beginnings of the specialisation should be seen behind the medical universities. On 15th May, 1945, along with the transport of emigrants from Vilnius, numerous scientific researchers from the Faculty of Medicine of Stefan Batory University came in hope of recreating the faculty in Toruń.

The assistant professor Janina Hurynowicz, M.D. (1894--1967), 51 then, was particularly passionate about the idea [3]. Soon she started the organisation of the Neurophysiology and Comparative Physiology Institute at the Faculty of Mathematics and Natural Sciences of the newly created Nicolaus Copernicus University in Toruń. In 1946 the Branch of the National Institute of Psychic Hygiene in Warsaw was created by the Ministry of Health. Among the others the care of children and teenagers belonged to the tasks of the Institute. In 1949 along with the liquidation of the Institute's Branch, the Central Regional Psychic Health Centre (Centralna Wojewódzka Przychodnia Zdrowia Psychicznego) at 24/26 Mickiewicza Street was created, where the management was taken over by Prof. Hurynowicz.

In 1949 one of the first EEGs in Poland was introduced, Rham 6, one of those that were brought from the USA by Kazimierz Dąbrowski, a friend of Prof. Hurynowicz. The most distinguished students of the professor in the field of EEG were the professors Leszek Janiszewski, Władysław Traczyk and also Juliusz Narębski (1927-1995), who after the death of Huryno-

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wicz was managing the laboratory for children and teenagers. He was born on 5th January, 1927 in Włocławek. Next year his parents with three kids moved to Vilnius, where his father was working as a city's main architect till 1937 and later as a professor of interior design at the Faculty of Arts of Stefan Batory University. After the war he came to Toruń with his family and other researchers from Stefan Batory University. The father, Stefan Narębski, took the position at the Faculty of Arts of the newly created Nicolaus Copernicus University. Juliusz Narębski, the son, studied at Medical University in Gdańsk (1947-1952). His first 9-month training he took in the Instituto Superiore di Sanita in Rome in the laboratory of neuropharmacology and biochemistry led by Prof. Ernest. B. Chain (Nobel Prize Laureate) and Prof. V. G. Longo. He wrote PhD thesis in 1960 in the Institute of Animal Physiology at the Faculty of Biology and Earth Sciences, NCU, by the title of *The Bioelectrical Functions (EEG) of Rabbits in Latent Repetitive Anaphylactic Shocks during Chronic Allergic States* („Czynność bioelektryczna mózgu (EEG) królików w poronnych powtarzanych wstrząsach anafilaktycznych w toku przewlekłych stanów uczuleniowych"). The supervisor of the thesis was Prof. Hurynowicz. In 1965 Narębski received a postdoctoral degree on the basis of the thesis *The Analysis of Electroencephalographic Brain Reversible Mechanisms of Anaphylactic States* („Analiza elektroencefalograficzna mózgowych mechanizmów odwracalnych wstrząsu anafilaktycznego"). He became an associate professor in 1975 and he became a full professor at the Institute of Animal Physiology, NCU, in 1989. The professor was an active member of various societies and scientific committees. Since 1968 he was a member of the Physiological Sciences Committee of the Polish Academy of Sciences and in the frames of this project he was a member of the Clinical Neurophysiology and Epilepsy Committee; since 1972 he was a member and founder of European Sleep Research Society; since 1984 he was a member of the Board of Polish Society of EEGraphy and Clinical Neurophysiology of the 1st term. In the period of 1984-1992 he was the chairman of the Sleep Research Section and since 1992 he was the organiser and the first chairman of the Polish Society of the Sleep Research.

In his scientific research he much appreciated the co-operation with X. Kopystecki, PhD, M.D., the chief of the Department of the Central Medical Technology Centre (Oddział Centralnego Ośrodka Techniki Medycznej) in Białystok. The result of their work was a doctoral thesis supervised by Prof. Narębski (06.05.1976). He was an author or co-author of numerous works [4-8,10-12]. In 1993 he was distinguished with the Diploma and the Medal of Honour of Napoleon Cybulski [11,12].

The students of Prof. Narębski were the graduates of the Faculty of Biology and Earth Sciences, NCU. Genowefa Olearczuk, M.A. was doing researches on the 8 channeled Gallileo system, Italian, and Wanda Waczyńska, M.A. was working on a more modern 16 channeled Medicor, Hungarian. The interpretations of the EEG investigations of children were taken care of by Prof. Narębski.

From 1998 the management of laboratory was taken over by Stanisław Izdebski, M.D., a specialist in psychiatry. He had a very modern for the times Schwarzer PM 32 Digital system with a computer enabling a traditional paper and electronic data recording. The laboratory was doing three thousand EEG investigations annually, children from Toruń and the region accounting for 40%.

Meanwhile, in 1987 thanks to the initiative of the chief physician of the Children's Hospital in Toruń and the chief of the Developmental Neurology Clinic Marian Łysiak, PhD, M.D., an EEG laboratory for children was organised in the hospital. The lab had a 16 channelled Medicor. The chief position of the lab was given to Jolanta Kujawska, M.A., a graduate of the Faculty of Biology and Earth Sciences, NCU, Toruń. Her first contacts with EEG had taken place during the studies, while attending lectures of Prof. Narębski and later in the lab managed by him where she had started her first job in children's electroencephalography. Her further education had been provided by Prof. Anna Koślacz-Folga, M.D. and Michaela Pakszys, PhD, M.D. [13-18].

Prof. Koślacz-Folga was the organiser and the chief of the first Polish Electroencephalographic Laboratory for Children and Teenagers in the Mother and Child Institute in Warsaw, created in 1950, as well as the first chairman of the Developmental Electroencephalography Section.

Till 1988 the hospital provided the investigations only for children under 3-years-old. This year, after having been moved to the newly built children's hospital complex on the Skarpa housing estate, the lab underwent a consequent development. On 14th June, 1993, the lab received a modern EEG system, Pegasus EMS, made in Austria. In 1994 Kukawska was given the licence. The average number of the investigations in the years 1987-2006 oscillated around 1 400 annually. In 2004 the dream of Prof. Janina Hurynowicz, the creator of Torunian electroencephalography, came true. As a result of the fusion of Ludwig Rydygier Medical University in Bydgoszcz and Nicolaus Copernicus University in Toruń, Ludwig Rydygier Collegium Medicum of Nicolaus Copernicus University came to existence [19].

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Clinical-electroencephalographic analysis of brain bioelectrical activity in children with myelomeningocele and internal hydrocephalus

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Abstract

Purpose: The aim of the current study was the clinical and electroencephalographic (EEG) analysis of the brain bioelectrical activity in patients with myelomeningocele and internal hydrocephalus.

Material and methods: The present study included 86 children (44 boys and 42 girls) with myelomeningocele. The children were aged 1-17 years (mean 7±4.4 years). Thoracic myelomeningocele was identified in 24 children (28%), lumbar in 53 (62%) and sacral in 9 cases (10%).

Results: The standard EEG examination performed in the waking state revealed generalized changes in 53 patients (62%), including 19 (79%) with thoracic, 28 (53%) with lumbar and 6 (66%) with sacral myelomeningocele. Approximately 70% of the patients underwent ventriculoperitoneal shunting and epilepsy was found in 27 children (31.4%). The prevalence of changes detected in the left temporal region did not differ between the respective myelomeningocele types. No correlations were noted between the degree of spinal cord injury and the changes observed in the left temporal region in EEG recording. Likewise, changes found in the centroparietal region in EEG did not correlate with the site of myelomeningocele. Focal changes in the frontotemporal ($p<0.0067$) and right temporal region ($p<0.0314$) showed a positive correlation with the degree of spinal cord injury and were most frequent in patients with thoracic myelomeningocele.

Conclusion: The analysis of EEG might facilitate evaluation and prognosis of epileptic seizures in children with myelomeningocele and internal hydrocephalus.

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Key words: myelomeningocele, hydrocephalus, EEG, epilepsy.

Introduction

Myelomeningocele is a congenital defect involving insufficient closure of the spine, arising during fetal development of the spinal cord and vertebral column [1,2]. It affects 1 out of every 1 000 alive newborns and is thus the second most common congenital defect (after Down syndrome) [3,4]. Its incidence in Poland accounts for 2.05-2.68 per 1 000 births. Most children with neural tube defects are born in the regions of Białystok, Bielsk Podlaski, Łomża and Siedlce [4]. Exacerbation of locomotor disorder symptoms is due to body growth. New pareses or paralyses and sensation defects are due to the extension of the spinal cord and nerve roots as a result of adhesions formed between nerve elements and other surrounding elements. Factors that alter the neurological state include medullary ischemia, infection or spina bifida repair [5,6]. Approximately 25% of newborns with myelomeningocele have congenital hydrocephalus. According to Barszcz [6], epileptic seizures in children with myelomeningocele and hydrocephalus can be caused by the drainage system and subsequent brain damage, valvar dysfunction leading to increased endocranial pressure and infections of the central nervous system. It is estimated that epilepsy in children suffering from myelomeningocele and internal hydrocephalus occurs in 20% of the cases with ventriculoperitoneal shunt insertion, being found only in 2% of the patients without shunting [7-11]. EEG may facilitate evaluation and prognosis of epileptic seisures in children with myelomeningocele and internal hydrocephalus.

Study objective: clinical-electroencephalographic analysis of the bioelectrical activity of the brain in children with myelomeningocele and internal hydrocephalus.

***Table 1*. Incidence of hydrocephalus and treatment with ventriculoperitoneal shunt valve**

Incidence of hydrocephalus	Ventriculoperitoneal shunt valve				Total	
	No		Yes			
	N	%	N	%	N	%
Absent	16	100	0	0	16	100
Present	21	30	49	70	70	100
N	37	43	49	57	86	100

p<0.00001

***Table 2*. Frequency of drainage system revision and myelomeningocele location**

Location of myelomeningocele	Revision of the drainage system						Total	
	Lack		Once		More than once			
	N	%	N	%	N	%	N	%
Thoracic	3	13	7	29	14	58	24	100
Lumbar	37	70	10	19	6	11	53	100
Sacral	9	100	0	0	0	0	9	100
Total	49	57	17	20	20	23	86	100

p<0.00001

***Table 3*. Incidence of epilepsy and the clinical picture of hydrocephalus as correlated with computer tomography (CT) examination**

Epileptic seizures	Evans' index – in CT examination of the head				
	$\bar{x}$	N	S	Min	Max
No	0.50	25	0.07	0.37	0.64
Yes	0.55	35	0.09	0.38	0.69
Total	0.53	60	0.08	0.37	0.69

p<0.013

Material and methods

Eighty-six children with myelomeningocele treated in the Department of Pediatric Neurology and Rehabilitation, Medical University of Białystok, were recruited for the study. There were 44 boys and 42 girls at the age of 1-17 years (mean 7±4.4 years). The patients were divided into groups (thoracic, lumbar and sacral myelomeningocele) following Sharrard's classification. Thoracic myelomeningocele was detected in 24 children (28%), lumbar in 53 (62%) and sacral in 9 cases (10%). Hydrocephalus occurred in 100% of the patients with thoracic myelomeningocele, in 75% with lumbar, and in 67% with sacral region affected.

Electroencephalography (EEG)

EEG examination was performed at the Department of Pediatric Neurology and Rehabilitation, Medical University of Białystok, in conformity to the international standard [12,13].

Statistics

The t-Student test and chi-square test were applied for analysis.

Results

The most numerous group consisted of 53 (62%) patients with lumbar myelomeningocele. The thoracic location was found in 24 (28%), while sacral in 9 (10%) children. The ventriculoperitoneal shunt valves in the treatment of hydrocephalus were inserted in 70% of the patients. The correlation found between hydrocephalus and the use of the valve was significant at p<0.00001 (*Tab. 1*). In the thoracic myelomeningocele group, the shunt system was replaced more than once in 14 (58%) children, and once in 7 (29%) patients (*Tab. 2*). In children with lumbar myelomeningocele, the drains were replaced more than once in 6 (11%) patients, while once in 10 (19%). The number of replacements showed a significant correlation with myelomeningocele location (p<0.00001) and was higher among the patients with the thoracic type. There was a statistically significant difference between the groups with respect to the Evans' index in computer tomography (CT) examination of the head (p<0.013) (*Tab. 3*). The mean value of this index in the non-epileptic group was 0.50, in the epileptic group 0.55. Among the children who did not undergo drain insertion procedure, 44 (90%) were non-epileptic (*Tab. 4*). Epilepsy was observed in 18 patients after a single shunt replacement and in 4 children subjected to more than one revision. The incidence of epilepsy was found to depend on the frequency of the replacements. The relationship was statistically significant

***Table 4*. Incidence of epilepsy and revision of the drainage system**

Revision of the drainage system	Incidence of epilepsy				Total	
	Absent		Present			
	N	%	N	%	N	%
No revision	44	90	5	10	49	100
Once	13	42	18	58	31	100
More than once	2	39	4	67	6	100
Total	59	69	27	31	86	100

$p<0.00001$

at $p<0.00001$. Generalized changes in EEG recording were found in 53 (62%) patients, including 19 (79%) with thoracic myelomeningocele, 28 (53%) with lumbar and 6 (66%) with sacral myelomeningocele. The relationship between generalized changes in EEG and myelomeningocele location was not statistically significant. The frequency of generalized changes was not correlated with the location of myelomeningocele. The changes in the left temporal region in the respective types of myelomeningocele showed similar frequency in 8 (15.4%) children with lumbar myelomeningocele, in 4 (16.7%) with thoracic myelomeningocele and in 2 (22%) with sacral myelomeningocele (data are not shown). Those located in the frontotemporal region ($p<0.0067$) and in the right temporal region ($p<0.0314$) were found to correlate positively with the degree of spinal cord injury. They were most common in patients with thoracic myelomeningocele (8 patients; 38.3%), less common in children with the lumbar type (5 patients; 9.6%) and were observed only in one patient with sacral myelomeningocele. Abnormalities in EEG recording in the frontotemporal region were detected in 7 children (29%) with thoracic and in 3 (5.8%) with lumbar myelomeningocele.

Discussion

The EEG examination revealed a marked prevalence of generalized changes for all drains in thoracic and thoracolumbar myelomeningocele. A relationship was observed between location of myelomeningocele and the occurrence of changes in the frontotemporal and right temporal regions in EEG recording; changes of this type most frequently occur in thoracic myelomeningocele, being more seldom in the lumbar type. EEG recordings showed abnormalities of the basic action, including disturbed frequency, amplitude and spatial organisation, with myelomeningocele located in the upper thoracic and lumbar segments. Our results are in agreement with those of Battaglia et al. [7,11], who have confirmed the usefulness of EEG examination in the prognosis of the development and treatment of epilepsy accompanying myelomeningocele.

The brain-damaging factor also contributes markedly to abnormal EEG recordings [6,14]. A rapid action may cause substantial brain dysfunctions, which take longer to compensate. When the action is slower the adaptive mechanisms allow normal functioning of the brain and do not change the bioelectrical activity at the disease onset [15]. Changes in EEG recording differ between acute and chronic pathologies and depend on their intensification, duration or remission. According to Kośląc-Folga [15], EEG-localized changes are most frequently recorded in hydrocephalus.

Marszał et al. [16] emphasize that epilepsy is the most frequently diagnosed childhood neurological condition, with its physical, psychological and psychosocial sequels. The risk of epileptic seizures is an important obstacle to implementing rehabilitation practices and physiotherapeutic methods, as most epileptic patients are disqualified from electrotherapy, magnetotherapy or swimming group activities. In our group of patients, the decision to start a long-term antiepileptic therapy was made once the type, duration and frequency of epileptic seizures as well as precipitating factors had been established. We found epilepsy in 58% of patients after a single replacement of the drainage system and in 67% of children who underwent more than one replacement. In children with lumbar myelomeningocele, the system was replaced once in 19% and more than once in 11% of cases. Generalized seizure-like changes were recorded in over 79% of thoracic myelomeningocele children, while statistically significant correlations were noted for changes in the right temporal and frontotemporal regions. This group included the highest percentage of epileptic patients, which is consistent with data reported by other authors [17]. EEG examination is still very useful in the diagnosis of the form and character of epilepsy, allows monitoring of its course and therapeutic effects and evaluation of the basic action [16]. Our results are consistent with a report of Klepper et al. [10], who performed a retrospective analysis of 182 patients with hydrocephalus and shunt insertion, finding epilepsy in 20% of them. Epilepsy was also evaluated with respect to hydrocephalus etiology (posthemorrhagic, postinflammatory, associated with myelomeningocele or of unknown etiology). The authors revealed that early insertion of a ventricular drain and etiology of internal hydrocephalus were associated with a higher risk of epilepsy. No correlation was found between the number of ventricular drainage revisions, type of shunt valve or gender.

Conclusions

1. Generalized and focal changes revealed by EEG usually occur in patients with high location of myelomeningocele.
2. EEG is useful in the diagnosis of epilepsy and its prognosis among children with internal hydrocephalus accompanying myelomeningocele.
3. Dysfunction of the drainage system leading to enhanced

intracranial pressure and brain injury may be the cause of epileptic seizures in children with myelomeningocele and internal hydrocephalus.

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Antioxidant activity of blood serum and saliva in patients with periodontal disease treated due to epilepsy

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Abstract

Purpose: The aim of the study was to estimate the activity of chosen antioxidants in blood serum and saliva in patients with periodontal disease treated due to epilepsy.

Material and methods: Twenty-five epileptics and fifteen control persons were involved in the study. The activity of selected endogenous antioxidants were determined by spectrophotometric assay. Concentrations of vitamin A and vitamin E were measured using liquid chromatography.

Results: The analysis of the serum and saliva from patients with overgrown gingiva revealed: reduced activity of superoxide dismutase, glutathione peroxidase and glutathione reductase, elevated lipid peroxides, and decreased concentration of ascorbic acid and α-tocopherol. All values were statistically significant.

Conclusions: Our results indicate on the oxidant-antioxidant disturbances in epileptic patients, which can play an important role in the pathomechanism of periodontal disease in these persons. Further studies on the role of antioxidants in patients with epilepsy treated with antiepileptic drugs and afflicted with gingival hyperplasia will be continued.

Key words: epileptic patients, hyperplasia, antioxidants, antiepileptic drugs.

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Introduction

Among adverse effects of antiepileptic drugs (AEDs) used for the therapy of epilepsy gingival hyperplasia has been found as quite common complication. Since 1939 when Kimball as first [1] had described phenytoin (PHT)-induced hyperplasia of gums many theories trying to explain the gingival damage have been presented. Risk factors like stress, the effects of bio-antioxidants and prooxidants, dental plaque bacteria induced "oxygen shock" which can activate free radicals – these all reflect attempts at contemporary elucidation of the reasons of the gingival hyperplasia [2,3]. The action of free radicals brings about an increase in the protein degradation products, kinins, and activation of the arachidonic acid cascade (lipid peroxides, thromboxane, prostaglandins, leukotrienes) [4]. Free radicals atherogenic effects can induce disturbed microcirculatory hemostasis, and possibly through periodontal blood vessels, they can favour secondary gingival hyperplasia [5]. In an earlier publication we have described the disturbance of the oxidants-antioxidants balance in epileptic children [6]. Patients treated with antiepileptic drugs (AEDs) and suffering from gingival overgrowth can be an interesting model for studies of possible pathogenic mechanisms underlying the process of hyperplasia; the material for searches were their blood and saliva.

Material and methods

The present study included twenty-five patients of both gender aged 9 to 68 years (mean ±31.2). They were treated chronically due to epilepsy with PHT or with PHT combined with other AEDs. Average time of the therapy was 11.9 years. The study group consisted of 15 patients with gingival hyperplasia (GH) and 10 with gingivitis. Examination of oral health revealed 100% caries, softened, hyperplastic and bleeding gums, loosened teeth, lingual and buccal scars due to epileptic attacks. Blood samples and unstimulated saliva were taken at the same

***Table 1*. Endogenous antioxidants activity in blood sera and saliva of epileptic patients affected with periodontium disease**

	Superoxide dismutase (SOD) U/ml	Glutathione peroxidase (GSH-Px) IU		Glutathione reductase (GSH-R) IU	
	serum	serum	saliva	serum	saliva
Control (n=15)	4.00±0.45	261.76±44.18	195.45±53.39	37.00±7.86	9.72±2.90
Patients with periodontopathy (n=25)	2.78±0.85* * p<0.001	239.85±40.23* * p<0.02	167.33±34.24* * p<0.01	27.77±7.79* * p<0.001	5.82±2.17* * p<0.001

***Table 2*. Vitamin C and E levels in blood serum and saliva of epileptic patients affected with periodontium disease**

	Vitamin C mg/L		Vitamin E mg/L
	serum	saliva	serum
Control (n=15)	42.72±11.70	9.24±2.86	13.06±2.49
Patients with periodontopathy (n=25)	27.65±15.70* * p<0.01	6.94±3.15* * p<0.01	8.35±2.94* * p<0.001

***Table 3*. Blood serum and saliva concentrations of lipid peroxides in epileptic patients affected with periodontium diseases**

	Lipid peroxides (MDA) nmol/ml	
	serum	saliva
control (n=15)	1.03±0.13	0.97±0.16
patients with periodontopathy (n=25)	1.39±0.16* * p<0.01	1.17±0.24* * p<0.01

MDA – Malonyl dialdehyde

time in morning hours from fasting patients. Saliva samples collected under strict hygienic dietary regime conditions were frozen at -20°; prior to examination the samples were thawn and centrifuged. The sediment containing morphotic elements was discarded. Control group included 15 persons generally healthy, without periodontal disease. The following parameters were estimated in blood serum and saliva:

I. the activity of selected antioxidants (free radical scavengers): 1. endogenous enzyme systems (activities of superoxide dismutase (SOD), glutathione reductase (GSSG-R) and glutathione peroxidase). 2. low molecular mass endogenous substances: blood serum vitamin E (α-tocopherol) and vitamin C (ascorbic acid).

II. Malonyl dialdehyde (MDA) concentration in the blood serum and saliva.

Concentrations of both vitamins were measured using liquid chromatography [7]. Other parameters were determined by spectrophotometric assay according to the methods used in our earlier study [8]. The results have been elaborated statistically using the Student's t-test and compared with control values. A level of $p<0.05$ was considered statistically significant.

Results

Tab. 1 presents the activity of endogenous antioxidants in blood serum and in saliva. Significant decrease of SOD, GSSG-R and glutathione peroxidase is visible. *Tab. 2* illustrates the concentrations of ascorbic acid and α-tocopherol in the samples of blood serum and saliva. Comparing to control values the levels of these two free radical scavengers are reduced. Elevated levels of the blood serum and saliva lipid peroxides are seen in *Tab. 3*.

Discussion

The present findings support idea that oxydoreductive processes are involved in inducing gingival overgrowth in epileptic patients. Reduced activities of antioxidant enzymes like SOD, glutathione peroxidase and reductase, both in the blood and in saliva and decreased levels of C and E vitamins well correlated with an increase in the thiobarbituric acid reacting products (MDA) which are the products of enhanced peroxidation of arachidonic acid. It can be postulated that long-term PHT therapy inducing gingival hyperplasia is followed by disturbed redox system both in the blood and in saliva. Yu and Wells reported on catalytic effects of PHT upon cyclo- and lipoxygenase in their action on arachidonic acid [9]. According to these authors the resulting elevated hydroxyperoxides and prostaglandin H2 synthase should be responsible for teratogenic effects known as "fetal hydantoin syndrome". This syndrome includes myelocele, mental retardation, cleft lip and/or cleft palate, hypodactylia and heart defects. Pre-treatment with free radical scavengers (vita-

mins C and E and indomethacin) prevented these adverse effects [10]. Suppose, PHT acts directly as a modifier through the cytochrome P-450 system upon enhancement of lipid peroxidation processes in tissues, thus its effects upon gingiva through the saliva and crevicular fluid can be similar. According to earlier data [11,12] the PHT concentrations in saliva are high enough to estimate its levels during monitoring the therapy. Irrespective of direct effects of PHT on lipid peroxidation processes in the pathology of inflammatory and hyperplastic lesions of periodontium another pathomechanisms responsible for these changes can exist, too [13,14]. Local factors as bacterial plaque and calculus responsible for periodontal ill conditions which are followed by relative fluid stasis due to reduced blood flow, bleeding, hypoxia within the gingival sulcus and depressed redox potential can result in destruction of the periodontal tissues [13]. The pathogenic role of reactive oxygen species in the destruction of the periodontium during inflammatory periodontal diseases and the imbalance in oxidant/antioxidant activity in these processes have been described by many authors [15--17]. Under experimental conditions of acute oxygen shock vasodilatation and exudate from the periodontal blood vessels followed by increased gingival pocket fluid flow were observed [18]. This fluid showed antioxidant effects similar to the blood serum. Similar to our results are the findings which show diminished levels of blood serum ascorbic acid in most of patients with periodontitis and that this reduction progresses along with advancement of the disease. Also, clinical studies on early gingivitis confirmed the relation between decreased ascorbic acid concentration and the disease process [19]. In chronically PHT treated epileptic patients reduced blood serum calcium levels were found. This event results from prevalent calcium excretion over its enteral absorption that can influence calcium depletion in alveolar bone processes, in particular in the mandible distal parts. As a consequence, besides the alveolar recession pathologic pocketing and increased resorption of interdental septa of molar teeth have been observed [16]. Another important role of free radical scavengers includes conditions when at reduced levels they facilitate formation of atherosclerotic lesions and disturbed collagen synthesis [13,19].

Conclusions

The concept on the role of free radicals in the genesis of periodontopathies points to the purposefulness of including bioxidants and other bioregulatory substances in the pharmacological prevention of these diseases. Under present conditions these substances should find a proper place both in individual and professional oral hygiene. The importance of antioxidants in the process of periodontal diseases is the subject of further studies.

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Narcolepsy, metabolic syndrome and obstructive sleep apnea syndrome as the causes of hypersomnia in children. Report of three cases

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Abstract

Hypersomnia is a significant problem in about 5% of the general population. We discussed clinical aspects in 3 patients with hypersomnia diagnosed in our sleep laboratory. All of the patients, both obese and non-obese, presented abnormal oral glucose tolerance test (OGTT) and plasma insulin level. (1) A 17-year-old girl (BMI=20.3) with a two-year history of daytime sleep attacks (e.g. on the bus, in a classroom, while reading or eating), followed by refreshed feeling. The first symptoms appeared 2 years after spine injury (L2-L3). Total sleep time was >98 perc. The diagnosis of narcolepsy was confirmed by sleep-onset REM periods in 3 of 4 daytime naps (positive Multiple Sleep Latency Tests) and HLA-DQB1 (alleles *0201,*0602). (2) A 16-year-old girl (BMI=32.4) with a history of increased sleepiness (Epworth Sleepiness Scale score=13), not refreshing naps, along with BMI increase, since the age of 13. The metabolic syndrome was diagnosed based on the presence of obesity, hypercholesterolemia (CH=240 mg/dl, HDL-CH=49 mg/dl) and insulin resistance (HOMA index =6.75, hyperinsulinemia – 367 μU/mL at 30'after OGTT). (3) A 6-year-old boy (BMI=16.0) with a 10-month history of daytime sleep attacks and postprandial sleepiness; nocturnal enuresis, high simple carbohydrate diet, low plasma insulin level after OGTT. Diagnosis of food-related hypersomnia and obstructive sleep apnea was confirmed when the boy recovered after his nutrition habits had been changed, which resulted in decreased respiratory disturbance index (RDI) from 17.7/h in October 2005 to 2.9/h in October 2006. Within that time his parents did not observe any episodes of daytime sleepiness, irritability or nocturnal enuresis.

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Key words: hypersomnia, narcolepsy, metabolic syndrome, sleep apnea, polysomnography.

Introduction

Pediatric sleep disorders are common, affecting approximately 25% to 40% of children and adolescents [1]. Excessive daytime sleepiness (EDS) is a significant problem in about 5% of the general population, being common but often unrecognized [2]. It typically affects adolescents and young adults, frequently as a consequence of adolescent's sleep habits – a tendency to delay the timing of sleep, a decrease in total sleep time, and an increase in daytime sleepiness [3]. Hypersomnia can be a symptom of other diseases or other sleep disorders, such as narcolepsy or sleep apnea, but it may also reflect poor sleep hygiene [4]. The prevalence of narcolepsy has been calculated at about 0.04%, with the peak onset of symptoms occurring in adolescence [2]. The present report describes three patients with daytime sleepiness of a different origin, but all associated with disregulation of glucose homeostasis.

Case Reports

Between October 2005 and April 2006, three patients with hypersomnia were admitted to the III Department of Pediatrics, Medical University of Białystok. A detailed history, sleep questionnaire (*Tab. 1*), physical examination (*Tab. 2*), laboratory tests (*Tab. 3*), oral glucose tolerance test (OGTT) (*Fig. 1*), blood insulin curve after oral glucose intake (*Fig. 2*) and a sleep assessment involving polysomnography in sleep laboratory (*Tab. 4*) were performed in all 3 patients. Family history of sleep disturbances was negative in all the children.

Table 1. **Sleep questionnaire in three patients with different origin of hypersomnia**

History of sleep	Narcolepsy	Metabolic syndrome	Obstructive sleep apnea and food-related hypersomnia
No of naps/day	5-15	3-6	0-5
Type of napping	Paroxysmal sleep attacks, Not related to meal	Daytime Sleepiness, often postprandial	Sleep attacks and postprandial sleepiness
Daytime sleep (h)	5	2	1-2
Nighttime sleep (h)	9	10	11
Nighttime sleep (%)*	90-98	90-98	50-75
Total sleep time (h)	14	12	12.5
Total sleep time (%)*	>98	>98	90-98
Snoring	7/week	7/week	1/week
Nocturnal enuresis	no	no	6 /week
Nightmares	1/week	no	no
Myoclonus at sleep onset	3/week	2/mo	no
Family history of sleep disturbances	negative	negative	negative
Night sleep onset	1-2 min	>5 min	<5 min

* Iglowstein I et al. Pediatrics 2003, 111: 302-7 [19]

Table 2. **Physical examination in three patients with different origin of hypersomnia**

Physical examination	Narcolepsy	Metabolic syndrome	Obstructive sleep apnea and food-related hypersomnia
Age	17 y	16 y 9 mo	6 y 8 mo
Gender	F	F	M
BMI (kg/cm^2)	20.3	32.4	16.0
BMI percentile for age and sex*	42	97	64
Cole's Index	101.54%	161.73%	105.76%
WHR (waist-to-hip ratio)	0.92	0.87	0.87
Neck circumference (cm)	35	39	29
Blood pressure mmHg	98/54	108/65	106/65
ORL examination	normal	normal	normal

* BMI according to Child and Teen Calculator (www. apps.nccd.cdc.gov)

Table 3. **Laboratory tests in three patients with different origin of hypersomnia**

Laboratory tests and diabetes symptoms	Narcolepsy	Metabolic syndrome	Obstructive sleep apnea and food-related hypersomnia
Diabetes polytriad:			
Polyuria	no	no	no
Polydypsia	yes	yes	yes
Polyphagia	no	yes	no
Lipemia	no	yes	no
Fasting glucose (mg/dl)	88	86	88
Fasting insulin (uIU/ml)	9.3	31.8 (52.1)	3.3
Fasting Insulin-to-Fasting Glucose ratio	0.11	0.37	0.04
HOMA-IR#	2.02	6.75	0.73
Glucosuria	negative	negative	negative
Cholesterol (mg/dl)	136	240	209
HDL-cholesterol (mg/dl)	48	49	57
Triglyceride (mg/dl)	91	130	106
Uric acid (mg/dl)	3.11	6.1	3.6
HLA	DQB1*0201,*0602	Not studied	Not studied

#HOMA index – homeostasis model assessment index

Figure 1. **Oral Glucose Tolerance Test in three patients with hypersomnia**

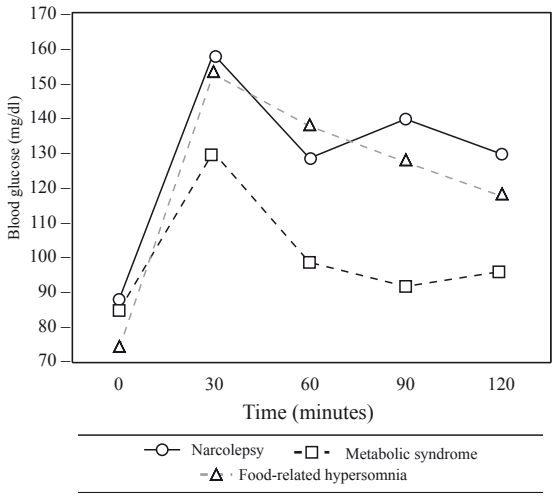

Figure 2. **Blood insulin in three patients with hypersomnia**

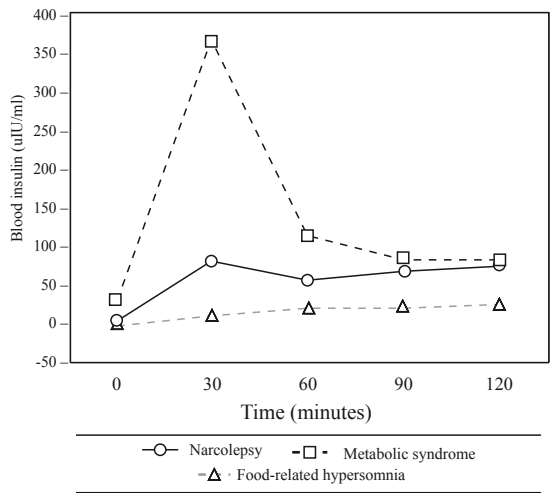

Table 4. **Polysomnnographic findings in three patients with different origin of hypersomnia**

Polysomnographic data	Narcolepsy	Metabolic syndrome	Obstructive sleep apnea and food-related hypersomnia	
Date	Oct. 2005	April 2006	Oct. 2005	Oct. 2006
RDI / hour	4.7	7.1	17.7	2.9
Central apnea index /h	2.2	3.7	2.9	1.0
Central apnea total time (min)	3.08	7.21	5.56	4.81
Central apnea % of sleep	0.3	0.7	0.6	0.5
Obstructive apnea index /h	1.3	1.1	6.2	1.3
Hypopnea index /h	1.0	1.4	9.8	0.6
Oximetry – average (%)	97	95	96	96
FRT(%)*	1.6	8.9	not studied	not studied
Body temperature at 17 p.m. (°C)	36.4	36.2	36.4	36.3

*Fractional Reflux Time – marker of acid gastroesophageal reflux =% time pH<4.0 in pH-metry

Case 1

History A 17-year-old girl with a history of spine injury (L2-L3), with negative radiological findings at the age of 13, was taken to hospital due to her two-year history of daytime sleep attacks lasting from a few seconds to half an hour (e.g. on the bus, in a classroom, while reading or eating) followed by refreshed feeling, ESS score =15. Nocturnal sleep with primary snoring was disturbed by nightmares. Total sleep time was elevated above 98 percentile. She had been previously hospitalized in the Department of Neurology where the first suspicion of narcolepsy was made and other neurological diseases were excluded. Her diet contained circa 1,500-3,000 ml of industrial fruit juice per day. Her main psychopathological problem was low self-esteem and anxiety.

Physical examination The physical examination was non-contributory, BMI=20.3 kg/m^2.

Diagnostic tests The oral glucose tolerance test revealed high levels of blood glucose at 120 min of OGTT and normal serum level of insulin after glucose intake (*Fig. 1, Fig. 2*). Total body and lumbar spine Body Mass Density (using DEXA-Lunar) were normal: 1.117 g/cm^2 (50-75 percentile) and 1.258 g/cm^2 (>75 percentile).

Polysomnographic findings The diagnosis of narcolepsy (without cataplexy) was confirmed by polysomnographic findings and sleep-onset rapid eye movement (REM) periods in daytime naps [5]. The Multiple Sleep Latency Test (MSLT) was performed after overnight polysomnography, consisting of four opportunities to nap at two-hour intervals; the mean sleep latency was 3.5 minutes and she had three sleep-onset REM episodes in this test**.** She was HLA class II positive for DQB1 (alleles *0201,*0602).

Case 2

History A 16-year-old girl with a two-year history of increased daytime sleepiness, not refreshing naps, along with a rise in BMI (since she was 13), was admitted to hospital due to suspected narcolepsy. The findings revealed: Epworth Sleepiness Scale (ESS) score =13. Her diet contained circa 1 000 ml of cow's milk, circa 1 000 ml of fruit juice per day and sweets several times a day. Hyperphagia was also observed by nurses

in the course of hospitalization. Her major daily life problem was low self-esteem, difficulty with mood regulation, memory impairment, learning difficulties and familial dysfunction.

Physical examination In physical examination, she presented with a typical obesity profile (BMI=32.4 kg/m^2) (*Tab. 2*).

Diagnostic tests The diagnosis of metabolic syndrome was based on the nutrition state (presence of obesity) and metabolic findings: total cholesterol =240 mg/dl, HDL-cholesterol =49 mg/dl, euglycemic hyperinsulinemia (367 µU/mL at 30' after glucose intake) (*Fig. 2*) and insulin resistance (HOMA-index =6.75).

Polysomnographic findings Elevated RDI (7.1/h) mainly due to the elevated central apnea index (3.7/h) and acid gastroesophageal reflux (FRT =8.9%).

Case 3

History A 6-year-old eutrophic boy was hospitalized for the evaluation of daytime sleep attacks (once or twice a week, e.g. during playing or sitting on stairs) and postprandial sleepiness of 10-month duration. Total sleep time was 90-98 percentile; nocturnal enuresis (6/week) without nephrological abnormalities. History of gastroesophageal reflux and allergic rhinitis (serum IgE anti-weed antibodies – 5 class RAST) manifested by mild clinical symptoms in late summer. His diet contained circa 500 ml of cow's milk, circa 500-1 000 ml of sweet fruit juice per day and sweets several times a day. He had low appetite for non-sweet foods. He's behavior was characterized by irritability and hyperactivity.

Physical examination Unremarkable except for "fetor ex ore". ORL examination by an ORL specialist was normal.

Diagnostic tests Borderline serum total cholesterol= =209 mg/dl, normal serum HDL-cholesterol =59 mg/dl, borderline glucose level at 120 min of OGTT, low plasma insulin concentration after glucose intake, glycated hemoglobin in normal range (A1C-5.6%). Cow's milk allergy was excluded based on lack of serum specific IgE antibodies; negative results of skin "prick by prick" tests and negative results of atopy patch tests with cow's milk.

Polysomnographic findings Polysomnographic results presented parameters of obstructive sleep apnea-hypopnea syndrome: RDI before treatment 17.7/h.

The diagnosis of food-related hypersomnia was confirmed when the boy recovered after his nutritional habits had been changed (low simple carbohydrate diet) and antireflux therapy, resulting in reduced respiratory disturbance index from 17.7/h in October 2005 to 2.9/h in October 2006. Within that time, his parents did not observe any episodes of daytime sleepiness, psychological problems or nocturnal enuresis.

Discussion

In this paper, we present three patients in whom three different diseases are accompanied by the same clinical symptom – daytime somnolence and by biochemical abnormalities. These metabolic findings may be temporary or may be prodromal for type I or II diabetes. Hypersomnia is the major symptom of narcolepsy, one of the hypersomnias of central origin in individuals with genetic predisposition [6]. Narcolepsy may be underestimated in children since the classic tetrad of symptoms (sleep attacks, cataplexy, sleep paralysis, hypnagogic hallucinations) is uncommon in this age group, and therefore the final diagnosis is often delayed [7-9]. In our 17-year-old female patient, the time between the onset of symptoms and diagnosis of narcolepsy was 2 years. We consider spine injury a potential challenge factor revealing genetic predisposition to narcolepsy in this patient. The metabolic syndrome is a common pathophysiological condition with implications in the development of many chronic diseases [10]. Genetic predisposition or early-life adverse events may contribute to insulin resistance. Daytime somnolence in metabolic syndrome may be a sequel of sleep disturbances and gastrological problems (e.g. GERD). Also obesity plays an important role in the association between severity of sleep-disordered breathing and increased morning fasting insulin levels in adults and children [11-14]. In childhood, daytime sleepiness is not recognized as abnormal [4]. In our 6-year-old patient, parents' anxiety was caused by sleep attacks only and not by daytime somnolence. Total regression of hypersomnia, psychological problems, nocturnal enuresis and disappearance of obstructive sleep-disordered breathing after diet intervention and antireflux therapy in this patient emphasize the role of improper nutrition habits in sleep disorders [15]. The aim of this paper is to draw attention to a likely association between obesity-dependent and obesity-independent daytime somnolence and metabolic disturbances in children. Parameters of carbohydrate metabolism should be assessed and monitored in patients with hypersomnia of a different origin. Children with hypersomnia need multidirectional differential diagnosis (e.g. towards neurological, endocrinological, pulmonological and gastroenterological disorders) and multispecialist medical and psychological care [16]. These children need psychological support irrespective of hypersomnia origin due to many behavioral symptoms: low self-esteem, difficulty with mood regulation, learning difficulties or hyperactivity [17,18].

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The symptomatology of tic disorders and concomitant sleep habits in children

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Abstract

Introduction: The aim of study was to analyze the clinical symptoms of tic disorders (TG) and sleep habits in children. The sleep habits were compared with those of a control group (CG).

Materials and methods: The study included 84 children with TG. The diagnoses were verified according to DSM-IVR criterion. CG included 156 healthy children. The parents filled in a questionnaire developed by the authors – TG's parents filled in a part concerning the symptomatology of tic disorders and sleep habits, CG's parents only the second part.

Results: There were 78.6% of male and 21.4% of female in TG respectively, and 53.8% and 46.2% in CG. The simple and complex motor tics were observed in 98.8% and 39.3% of patients, vocal tics – 64.3%, sensory tics – 20.2%. ADHD and OCD symptoms were noticed respectively in 73.8% and 35.7% of children. The most common simple and complex motor tics were respectively: blinking – 69.0%, jumping and touching – 20.2% of patients. Vocal tics were presented in 64.3%. 23.8% of TG slept together with another person in bed, and 69% of them in one room with other members of family; in CG it was respectively 58.1% and 19.2%. 33.3% of TG fell asleep and woke up in the same position in bed, in the CG 75.6% of children slept calmly. The bed-time stories were seldom read by the parents in TG – 3.6% vs CG – 31.4%.

Conclusions: Quote frequently TG are connected with other behavioral symptoms, in particular ADHD and OCD. Sleep habits are different in TG than in CG.

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Introduction

In 1885 Geroges Albert Edouad Brutus Gilles de la Tourette (1857-1904) for the first time described a syndrome characterized by involuntary movements and concomitant echolalia and coprolalia. The complex of symptoms was termed by him as a tic disorder [1,2]. By 1965 there were only 50 patients suffering from Tourette's Syndrome (TS) described in professional literature [1]. In the 1970s, scientist noticed that TS was one of the most common causes of tics. The frequency of tic disorders (TG) is evaluated as 1-3% of the general population (except transient motor or phonic tics) [3,4]. The male-to-female ratio in TG is approximately 4:1 [3]. The disorder is clearly manifested by the age of 11 in almost all of patients [5]. The aim of the study was to characterize the clinical manifestation and sleep habits in children with TG.

Material and methods

The analysis was conducted on a group of 84 patients at the age of 12.1±3.6 years admitted to the Department of Developmental Neurology and to the hospital's outpatient clinic to diagnose and treat TG. The researchers analyzed the symptomatology of tics and verified the diagnoses according to DSM-IV R criterion. The parents of the patients filled in a questionnaire developed by the authors, which consisted of two parts. One part concerned the symptomatology of tic disorders, the other – habits connected with sleep. The control group (CG) included 156 healthy children in similar age, whose parents filled in only the part concerning the sleep habits. All investigators were trained to ensure the quality of responses and they were present when the questionnaires were filled in. The chi^2 test was used to statistical analyses.

***Table 1*. Group Characteristic**

	Group of tics	Control group
n	84	156
Mean age	12.1	9.6
Age standard deviation	3.6	4.2
Females	21.4%	53.8%
Males	78.6%	46.2%

***Table 2*. Clinical manifestation of tics**

	n	%
Simple motor tics	83	98.8
Vocal tics	54	64.3
Complex motor tics	33	39.3
Sensory tics	17	20.2
ADHD symptoms	62	73.8
OCD symptoms	30	35.7

Results

There were 66 male (78.6%) and 18 female (21.4%) children in the TG group and respectively 84 (53.8%) and 72 (46.2%) in the CG. The mean age of the TG and the CG was similar i.e. appropriately 12.1±3.6 and 9.6±4.2 years. The characteristic of the groups is shown in *Tab. 1*. In our study, the simple and complex motor tics were observed respectively in 83 (98.8%) and 33 (39.3%) patients, vocal tics in 54 cases (64.3%) and sensory tics in 17 children (20.2%). The Attention Deficit Hyperactivity Disorder (ADHD) symptoms were noticed in 62 children (73.8%), whereas the obsessive-compulsive disorders (OCD) symptoms were occurring in 30 children (35.7%). The types of clinical manifestations of tics and comorbidity syndromes are shown in *Tab. 2*. The most common simple and complex motor tics appearing in the study group were blinking and head twisting in 58 (69.0%) and in 49 (58.3%) children respectively, whereas jumping and touching objects equally in 17 (20.2%) patients. The complete list of simple motor tics observed in the study group is presented in *Tab. 3*. Vocal tics were presented in 54 (64.3%) cases, and the most frequently observed included: throat cleaning and sniffing in 36 (42.9%) and 25 (29.8%) children, respectively. A feature distinctive of TS i.e. coprolalia, appeared in 10 (11.9%) patients. The symptomatology of the simple and complex vocal tics is shown in *Tab. 4*. In our study, 23.8% of children with TG slept together with another person in the bed, and about 69% of patients slept in one room with other members of family, in the CG it was respectively 58.1% and 19.2% but neither of differences was significant. 33.3% of patients with tics fell asleep and woke up in the same position in bed, while 75.6% of children in the CG slept calmly. Parent's presence was necessary to put a child to sleep in approx. 10.9% of cases in the CG, but only in 6% of patients with tics. The bed-time stories were seldom read by the parents in the TG and much more often in the CG – 3.6% vs 31.4%. This difference was significant. More children with tics (9.5% vs 8.3%) fell asleep when watching TV. Only 6% of patients needed a soft toy to fall asleep, while in the CG almost 45% had favorite cuddly toys. This difference was significant. The day naps were statistically more frequent in children with tics – 29.8% whereas only 12.8% of healthy children slept during the day. The sleep habits and naps are shown in *Tab. 5*.

***Table 3*. Symptomatology of motor tics**

Simple motor tics	Blinking	58	69.0
	Head twisting	49	58.3
	Clenching eyes	40	47.6
	Hand movement	37	44.0
	Face grimacing	35	41.7
	Shoulder shrugging	35	41.7
	Mouth grimacing	33	49.3
	Leg movement	30	35.7
	Head turning	27	32.1
Complex motor tics	Jumping	17	20.2
	Touching objects	17	20.2
	Echopraxis	11	13.1
	Copropraxis	7	8.3

***Table 4*. Symptomatology of vocal tics**

	n	%
Throat cleaning	36	42.9
Sniffing	25	29.8
Throaty sounds	18	21.4
Shoutting	18	21.4
Loudly sighing	14	16.7
Echolalia	12	14.3
Gulping	11	13.1
Coprolalia	10	11.9
Loudly breathing	8	9.5
Hooting	7	8.3

***Table 5*. Sleep habits and naps**

	Group with tics	Control group
Sleep in one bed	23.8%	19.2%
Sleep in one room	69.0%	58.3%
Parent's presence	11.7%	19,7%
Watching TV	9.5%	8.3%
The same place in bad during all night	33.3%**	75.6%**
Parents reading	3.6%**	31.4%**
Soft toy	6.0%**	44.9%**
Day naps	29.8%**	12.8%**

*p<0.05; ** p<0.005.

Discussion

Chang et al. reported that the most common simple motor tics were blinking (65.1%) and head twisting (32.6%) [6]. In the studied group, the most frequent tics also included blinking, which occurred in 69.0% children and head twisting, which

occurred in 58.3% of them. In the literature the most common complex motor tics were touching different objects, crouching, jumping and skipping [1,5,7]. Those types of tics occurred in 39.3 % of children with tics. The most frequent were jumping and touching objects described in 20.2% of patients. Chang et al. reported that the most common vocal tics were throat cleaning (32%) [6]. In the studied group, throat cleaning appeared in 42.9%. Complex vocal tics as shouting of obscenities, profanities or otherwise socially inappropriate words or phrases termed coprolalia occurred in 10-30% patients with TS. Those symptoms were observed in 11.9% of children in the studied group. Coprolalia is very characteristic for TS, but not as frequent as it is thought to be, especially in the population of children [5,7]. Sensory tics refer to repeated, unwanted, uncomfortable sensations, often in the absence of a verifiable stimulus [5]. This type of tics appeared in 20.2% of children. The occurrences of ADHD symptoms are more frequent in children with tic disorders than in the general population [8]. It's characteristic that comorbidity of these diseases is observed in 20-90% of patients. Teive et al. reported that ADHD coexisted with tics, especially with TS, in 38,6% and Budman et al. evaluated this correlation as 77% [1,9]. In the studied group, the components of ADHD were noticed in 73.8% of children with tics, all of them were verified according to DSM-IV criterion and ICD-10 used in Europe [8]. The occurrence of both diseases i.e. obsessive-compulsive disorders (OCD) and tic disorders is observed in 28-67% [5]. Teive et al. noticed that OCD coexisted with TS in 38,6% whereas Budman et al. estimated that on 52% [9]. In the studied group, the aforementioned symptoms occurred in 35.7% of patients. Sleep disorders connected with tic disorders manifest themselves by problems with falling asleep. It concerns 44-80% of patients [10]. In the studied group, sleep disorders (mainly night terror) were observed in 5 patients (4,1%). All of them were verified with the aid of DSM-IV criterion. Sleep habits and sleep disorders in children population are rarely described in literature. Their occurrence is evaluated as 25%-30% of the population. Our investigation revealed that sleep habits are different in the group of children with tics and in the CG. In the literature there are no other studies which compare sleep habits in the above-mentioned populations of children. The prevalence of sleep habits as sleeping in one room or bed with another person, watching TV when falling asleep was higher but not significantly, in the group with tic disorders than in the CG. The naps were significantly more frequent in children with tics. Statistically more frequently healthy children had soft toys when falling asleep, listened to bed-time stories read by a parent and slept all night in the same position in bad. The education of the parents is a basic way to modify habits connected with sleep of children. It's necessary to prevent more serious sleep problems and to improve the social functioning of the children, especially with TG, during the day [10].

Conclusion

Children with TG exhibited a variety of behavioral symptoms, particularly ADHD and OCD. Sleep habits were also different in this group than in healthy children. Therefore it seems that the comorbid behavioral conditions are interfered with education and social functioning more than tics alone.

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The assessment of comorbid disorders in ADHD children and adolescents

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Abstract

Purpose: The aim of these examinations undertaken by their authors was to run analysis concerning types and frequency of comorbid disorders occurrence in Attention Deficit Hyperactivity Disorders (ADHD) children and teenagers.

Materials and methods: Research, carried out from May 2005 to January 2007, in the area of the Łódź province, used a questionnaire, worked out by the above authors, addressed to parents of ADHD children and teenagers (research made in schools and among patients contacting the Clinical Psychology Institute of CZMP), and the study of medical documentation. 28 persons, 5 girls and 23 boys made the research group 7 to 13 years old (with an average age of 10.2), who had previously been ADHD diagnosed.

Results: Out of disorders pointed out by parents, school problems of different degree of intensity appeared the most frequent ones, (39% of the examined) 18% with diagnosed dyslexia, head injuries (in 12 cases – 26%), bed-wetting at 8 boys (17% of all registered diseases). Moreover tics disorder was diagnosed in 3 boys, epilepsy in 2 boys, habitual activity in one girl and one boy.

Conclusions: Head injuries, bed-wetting and dyslexia have most often been comorbid disorders. Boys with ADHD more often than ADHD girls, suffer from comorbid disorders. Desirable in the scope of ADHD diagnosis, further research on co-accompanying illnesses and its improvement.

Key words: ADHD, comorbid disorders, children.

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Introduction

Attention Deficit Hyperactivity Disorders (ADHD) syndrome as a complex nozologic item causes a growing concern, mainly because of occurring symptoms and the number of disorders and accompanying diseases. In the USA it is estimated that from 3 to 5% of general population suffer from ADHD, and among the population of children this rate is 7%. Recently, a significant growth of research concerning comorbidity of other disorders with ADHD, such as conduct disorders, oppositional-defiant disorders, obsessive-compulsive disorders, anxiety disorders, depression [1], language development disorders, tics and epilepsy. Escalating ADHD symptoms can also lead to sleeping disorders, night fears, uncontrolled urination or stuttering. In Poland there is neither a credible population research analysis, assessing the level of dissemination of a hyperactivity syndrome among children and adolescents, nor any data reference to comorbidity of such syndrome disorders.

The aim of the study was the analysis concerning types and frequency of comorbid disorders in children and adolescents with ADHD.

Materials and methods

The research was carried out from May 2005 to January 2007 in schools and among patients under care of the Clinical Institute of Psychology of CZMP in the area of the Łódź province. The authors worked out a questionnaire addressed to parents of ADHD children and adolescents, and carried out the study of medical documentation. 28 families were examined. As for gender, boys were a dominating group (23 vs 5), whose age ranged from 6 to 13 years.

Results

The average age of the research group was 10.2 years, birth weight spread from 1450 g to 4200 g (average 3319 g). Five children had caesarean section (18%), and 23 births (82%) were normal. Among pregnancy and birth disturbances there were: 5 prematurity, 2 cyesis dissemination, one newborn suffered from anoxaemia, and one was found umbilical cord wreathed. During the pregnancy period in the group of mother-respondents, one of the mothers had hypertension, three mothers were treated with pharmacological medicaments (1 case of epilepsy), seven women were heavy smokers. In the study group the most frequent were school problem of a different level of intensification (39% of the total diagnosed disorders; 18% dyslexia diagnosed), then head injuries (26%) – one case cerebrum concussion, and night urination (17%, present in the case of 8 boys) (*Tab. 1*). Moreover, in the study group it was diagnosed that there were: 3 boys with tics, 2 boys with epilepsy, and one girl and one boy with habituation activities. 80% of indicated disorders applied to boys. Parents didn't indicate the occurrence of such disorders as depression, night fears or stuttering.

Table 1. **Comorbid disorders among Attention Deficit Hyperactivity Disorder (ADHD) children (N=28)**

Type of disorder	Number of cases
Night urination	8
Tics	3
Cerebrum concussion	1
Head injuries	12
Epilepsy	2
Habituation activities	2
School problems (e.g. dyslexia)	18
Total	46

Discussion

The recognition and therapy of comorbid disorders, which make the process of diagnosis complicated, are the crucial matter that influences the choice and effectiveness of therapy methods in order to improve the treatment of ADHD and its prognosis.

Among ADHD children and adolescents a frequent occurrence of dyslexia nature specific difficulties as for learning how to read and write has been observed, and refers to estimated 15-30% ADHD persons, disorthography (26%), disgraphia (no data found) and discalculy (28%). In one of the research projects, carried out in the USA, it was revealed that children, who in their school age suffered form dyslexia, showed higher indicators of ADHD symptoms before they started junior education, the so-called "zero class" [2]. The first molecular tests concerning the basis of ADHD and dyslexia comorbidity proved that both these disorders share a common genetic background. The positioning of genes in chromosome 6p, responsible for dyslexia that cause tendency to poor reading skill development, simultaneously, have an influence on hyperactivity [3]. In the study group of 28 children, 64% had school problems of a different intensification, five children had dyslexia. ADHD children have a higher risk of head injuries [4]. In our study head injuries were present at 12 cases, and they count 26% of the total neurological illnesses.

The urination is present among 10-20% of children in the school age. Previous research carried out in CZMP on the group of nine year-olds, suspected to be ADHD, reveal that 23% (from the group of 56 children) experienced night urination, and its frequency is higher among ADHD boys than girls. In the study group 8 out of 28 children, diagnosed on night urination (about 29%), were boys.

Depending on the criteria, conduct disorders comorbid ADHD syndrome in a range from 30% to 80% of cases and are the risk of more serious disorders of psychical development. Conduct disorders may modify other diagnoses, including central nervous system disorders [5]. As for mood disorders e.g. affective dual channel disorders and conduct disorders the symptoms such as hyperactivity and impulsivity are common. The data show that over 90% of ADHD children expose affective dual channel disorders mostly [4]. Depression is more frequent at adolescence than among children (2 to 8%), where the dissemination ration 0.5 to 2.5%. A certain percentage, that is 10 to 17% show conduct, fear or attention disorders. No diagnosis concerning conduct disorders and depression was proved in the present report.

Epilepsy coexists with numerous neuro-development disorders such as autism, migraine, ADHD, depression-fear disorders and injuries [6]. ADHD appears more frequently at epileptics than in general population. The incidence of epilepsy differs and is conditioned by the type of the ADHD subtype. Epilepsy occurs from 1.6% to 21% for the hyperactive type and the mixed type. For attention deficit type epilepsy it is estimated at 24% to 26% [7-9]. In recent study, in which ADHD diagnostic criteria were neatly respected, it was stated that the frequency of this type for epilepsy was 20% [10]. Study carried out by Dunn in 2003 among 175 children aged 9 to 14 years old showed that in the case of epilepsy and ADHD co-occurrence the type of an attack and the location of epilepsy focus do not bare a significant meaning for the risk of ADHD existence [7]. After the analysis of parents' surveys two children had epilepsy.

Tourette's Syndrome is one of the most frequent cause of tics, 1-3% of the population, and it is four times ofter for boys, the intensification of symptoms is observed among 10-12 year-olds. The occurrence of ADHD symptoms is more frequent for children with Tourette's Syndrome than for general population. The comorbid of Tourette's Syndrome and ADHD is marked with 20-90% [11,12]. Hyperactivity and impulsivity dominate over attention deficit for Tourette's Syndrome children. In the research carried out on 51 patients (average age 11.2 years) treated due to tics, the comorbid of tics and ADHD syndrome was observed at 13 patients (25.5%). Hyperactivity occurred among 22%, impulsivity among 16%, attention disorder among 12%. The occurrence of obsessive-compulsive disorders and general fears was found in 23.5% of patients. Although four had night fears [13]. Three boys out of 28 children had tics and two children revealed habitual activities, which proves the frequency of occurrence these neurotic illnesses among ADHD

children and adolescents. Foetus alcoholic syndrome is a clinically diagnosed nozologic item with different-level disorders of central nervous system functions (static encephalopathy) caused by addictive alcohol drinking by a pregnant woman. None of the mothers in the research group did not confirm alcohol drinking while pregnancy period and there was suspicion of this kind towards any of the examined children.

Conclusions

The ADHD diagnosis has more often been put in boys than girls. Head injuries, night urination and dyslexia occurred more often in children with ADHD. Boys with ADHD more often than ADHD girls, suffer from comorbid disorders. Desirable in the scope of ADHD diagnosis, further research on comorbid disorders and its improvement.

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Bleeding Barrett's ulcer as a complication of gerd in physically and intellectually disabled children – report of two cases

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Abstract

Gastroesophageal reflux disease (GERD) is a problem frequently occurring among physically and intellectually disabled individuals. In this group of patients GERD is often overlooked, since the symptoms are usually non-specific. We present two cases of disabled children, who developed complications of GERD in the form of Barrett's esophagus, Barrett's ulceration and bleeding, the life-threatening events which were not preceded by typical GERD complaints.

Key words: Barrett's esophagus, disabled individuals.

Introduction

Gastroesophageal reflux disease (GERD) is a problem frequently occurring among physically and intellectually disabled individuals but is often overlooked, since the symptoms are usually non-specific [1]. The development of Barrett's esophagus (BE), a premalignant condition occurring with transformation of normal esophageal squamous epithelium into specialized columnar epithelium containing goblet cells, is a severe complication of GERD [2]. We present two cases of disabled patients, who developed complications of GERD in the form of Barrett's esophagus, Barrett's ulceration and bleeding, the life-threatening events which were not preceded by typical GERD complaints.

Case 1. The boy was well until the age of 4, when he had a car crash and developed spastic paralysis of the lower extremities, followed by severe scoliosis. When the boy was 14, he was treated for anemia with iron agents. At that time, gastroesophageal reflux was diagnosed by barium swallow study, but, as the patient was asymptomatic, he did not receive any treatment. At the age of 16, he was admitted to our department due to bleeding from the alimentary tract. On admission, his general state was fairly good, he weighed 35 kg. On the physical examination we found the boy in a wheelchair, with severe spasticity in the lower extremities, deformation of the thorax and skin pallor. His pulse was 90 beats/min and his blood pressure was 110/75 mm Hg. Laboratory evaluation disclosed a hemoglobin concentration of 10 g/dl, iron 36 µg/dl. Stool tests were positive for occult blood. On the third day of hospitalization, the boy had an episode of hematemesis. Endoscopy revealed fresh blood in the esophagus and stomach, deep and slightly bleeding ulceration of the distal esophagus, esophageal divertculum filled with blood and esophageal hernia. CT scans showed the presence of an esophagomediastinal fistula in the distal esophagus, with thickening of periesophageal tissues. The patient required transfusion of two units of packed red blood cells. Under fasting, intravenous feeding, antibiotic therapy and PPI application, closure of the fistula was achieved. He was discharged home in good general condition. He did non continue treatment with medications.

The patient returned to hospital 6 months later due to sialosis, dysphagia and odynophagia. Results of laboratory tests were within normal range. Magnification endoscopy was done, revealing a long segment of salmon-pink mucosa extending almost to the upper esophageal sphincter (UES) and ulceration in the proximal esophagus. An irregular Z line was seen 3 cm below the UES. The fistula detected in the previous endoscopy was completely healed. The long-segment columnar epithelium was visualized by chromoendoscopy with methylene blue. Histopathological investigation of esophageal biopsy confirmed the BE. Therapy with PPI was instituted. Currently, the boy is chronically treated with PPI and is in good condition.

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Figure 1. **Patient 1. Long-segment Barrett's esophagus**

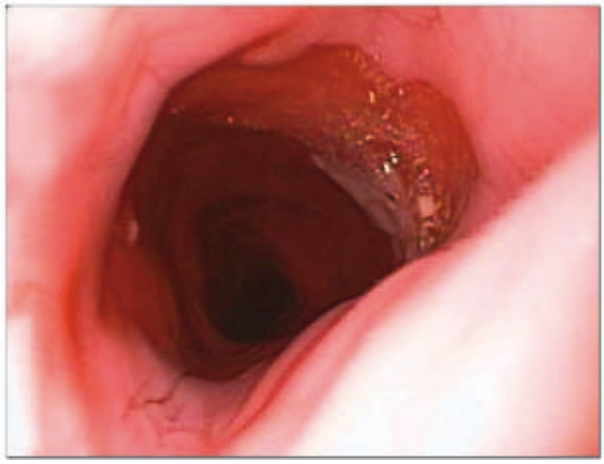
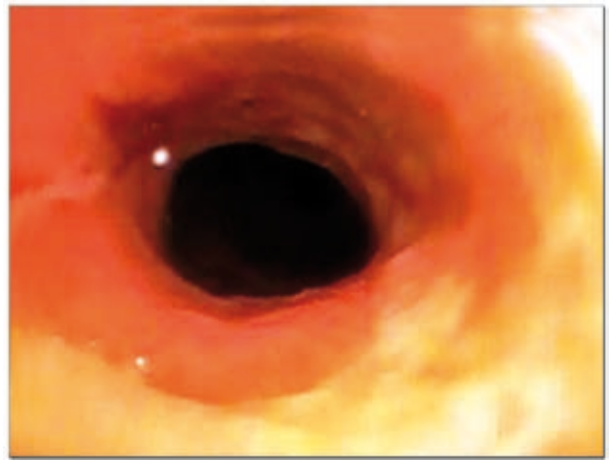


Figure 2. **Patient 2. Bleeding ulceration of Barrett's esophagus**



Case 2. The second patient, a 17-year-old boy with cerebral palsy diagnosed in the first year of life, treated with anticonvulsant drugs, was admitted to our department due to upper GI tract bleeding. Two weeks prior to admission, feeding problems appeared. The boy refused to eat, was restless and anxious, and suddenly developed hematemesis. On admission, we found a spastic quadriplegic boy with severe scoliosis. He was malnourished, with body mass of 28 kg. Except for typical neurological findings, physical examination did not reveal any other abnormalities. There were no signs of dental erosions. Laboratory tests showed anemia (hemoglobin – 9.1 g/dl, iron – 45 μg/dl). Upper gastrointestinal endoscopy was done under general anesthesia, revealing salmon-pink velvety mucosa over half of the esophagus, indicating long-segment Barrett's esophagus. Bleeding ulceration, Schaztki ring and hiatal were detected in the esophagus. Biopsy showed goblet cell mataplasia confirming BE. Under short-term intravenous feeding and PPI administration, the patient improved. The treatment with PPI was continued, the boy was qualified to anti-reflux surgery.

Discussion

Gastroesopageal reflux disease (GERD) is a common complication in patients with severe motor and intellectual disabilities. Previous studies have estimated that up to 10-25% of institutionalized patients have symptoms of vomiting, regurgitation or rumination. Gastroesophageal reflux GER occurs in up to 70% of children with cerebral palsy [3,4].

In the general population, heartburn is the most common symptom of GERD. In intellectually disabled individuals (IDI) it is possible to define the risk of GERD based on non-specific symptoms. Children with GERD may present with feeding difficulties, failure to thrive, recurrent vomiting, choking attacks, anemia, wheezing, hematemesis, rumination, dental erosions, recurrent pneumonia, aggression, fear, episodes of screaming [5].

Several factors are considered to be responsible for the high prevalence of GER in IDI, including anticonvulsant drugs, cerebral palsy, constipation, scoliosis, non-ambulancy [1,6]. In physically and intellectually disabled the risk factors for GERD are already present in childhood. Tovar [7] demonstrated a decreased lower esophageal sphincter pressure and high percentage of non-propulsive waves in children with severe brain damage as compared to healthy subjects. Also delay of gastric emptying was shown in this group [8]. Scoliosis by displacing the stomach and stretching the lower esophageal sphincter can be responsible for malposition of the cardia and fundus, hernia, and may therefore promote GERD [9].

Esophageal complications of GERD include erosive esophagitis, esophageal stricture, Barrett's esophagus and adenocarcinoma. BE is a metaplastic condition in which columnar epithelium containing goblet cells replaces the normal squamous esophageal mucosa. This specialized intestinal metaplasia is noted in about 15% of patients suffering from GERD and is associated with more than 50-fold increase in the risk for the development of adenocarcinoma of the esophagus [10,11]. Since the prevalence of GERD in disabled individuals is very high, this group is particularly at risk for developing BE. The prevalence of BE in IDI is estimated as 12-26% [1,12]. For a long time, symptoms may be minimal or absent due to impaired sensitivity of the columnar lining to acid [13]. The diagnosis of GERD and BE is considered when serious complications, such as hematemesis, occur. Barrett's ulcer, which develops within BE, is frequently responsible for bleeding. Perforation is a rare but often fatal complication of Barrett's ulcer. The risk of esophageal carcinoma in IDI is about three times higher, as compared to that in the general population [14].

Reliable diagnosis of BE depends on the endoscopic recognition, followed by histologic sampling to screen for intestinal-type metaplasia. Chromoendoscopy is a new method that can enhance endoscopic diagnosis, including the detection of intestinal metaplasia through more accurate targeting of biopsy specimens. The diagnosis of BE is established when intestinal

metaplasia is found in biopsy specimens obtained from the esophageal mucosa.

PPIs are the most effective pharmacological agents in the management of patients with BE in respect to symptom control, ulcer healing and stricture prevention. The normalization of intraesophageal acid exposure can decrease cellular proliferation and possibly reduce the risk of cancer [15]. Another option is anti-reflux surgery and indications for such a treatment should be established in each case.

Conclusion

Considering the high prevalence of GERD and Barrett's esophagus in disabled children, early diagnosis and proper treatment are essential to prevent complications.

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Low back pain in school-age children: risk factors, clinical features and diagnostic managment

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Abstract

Purpose: Low back pain (LBP) is common in adult population, and it is becoming a serious health concern in adolescents. On surveys, about every fifth child in the school-age reports LBP. The study objective was to analysis the natural history, risk factors, clinical symptoms, causes and diagnostic management in school-age children hospitalized with LBP.

Material and methods: The study group consisted of 36 patients at the age between 10 and 18 years, 22 girls and 14 boys suffering from LBP hospitalized in our Department of Pediatric Neurology and Rehabilitation in years 2000-2004.

Results: The mean age of clinical onset of LBP in our group was 14.7 years, earlier in girls, later in boys. We find the family history of LBP in 50% children. Most frequent factors associated with LBP were: spina bifida (16.7%) and incorrect posture (13.9%). Half of patients pointed the factor initialising LBP: rapid, incoordinated move (39%) or heavy load rise (11%). 58% of patients present the symptoms of ischialgia. Diagnostic imaging showed disc protrusion in 11 children (31%) 6 in computed tomography, 4 in magnetic resonance imaging and 1 in X-Ray examination only. Other causes of LBP included: spondylolysis in 2 patients, Scheuermann disease in one case and juvenile reumatoid arthritis in one case.

Conclusions: Some school-age children suffering on low back pain, particulary with sciatic neuralgia symptoms seek medical care in hospital. Althought the main causes are mechanical, associated with lack of physical activity or strenous exercise, serious diagnostic managment is strongly recommended.

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Key words: low back pain, lumbar disc herniation, children.

Introduction

Low back pain (LBP) is common in adult population, and it is becoming a serious health concern in children and adolescents. LBP has a relatively high prevalence during school ages.

On surveys, nonspecific LBP in children is nearly as common as in adults. The cummulative annual prevalence of LBP in 14-year old French schoolchildren was 82.9% with reporting 57.7% reporting recurrent pain and 8.9% chronic pain [1]. The annual prevalence of LBP in 5 000 iranian children aged 11- and 14-years was 17.4% [2]. Twenty-two percent of english schoolchildren and 18% of finnish among 14- and 16-year-old adolescents reported having LBP [3,4]. Back pain with non-organic cause in children has many biomechanical, neurophysiological and psychosocial determinants associated with age, sex, health state, genetic and socioeconomic factors, physical activity and lifestyle [5]. However, only a minority of the children suffering from LBP seek medical attention. A need for a physician visit was reported in 18.7% of cases only [1]. Even more rarely diagnostic managment is performed. The most common serious causes of LBP in children include spondylolysis or spondylolisthesis, Scheuermann disease, musculoligamentous injury, lumbar disc herniation and neoplasms [6-9].

Therefore, our study objective was to evaluate the natural history, risk factors, diagnostic imaging, causes, symptoms and therapeutic management in school-age children suffering from serious LBP, seeking medical care in hospital.

Material and methods

The study group consisted of 36 patients aged between 10 and 18 years suffering from LBP, hospitalized in our Depart-

ment of Pediatric Neurology and Rehabilitation in years 2000--2004. In this study we review all clinical data of these subjects including natural history, medical examinations, ymptoms, risk factors, spine imaging results, diagnostic managment.

Results

There were 22 girls (61%) and 14 boys (39%) in this group. The mean age of clinical onset of LBP in our group was 14.7 years. The peak of prevalence was earlier in girls – 15 years, later in boys – 17 years. Eighteen (50%) children reported the LBP in family history. Most frequent factor associated with LBP was incorrect posture in 5 children (13.9%), particulary sitting position. Eighteen patients (50%) pointed the factor initialising LBP: rapid, incoordinated move 14 (39%) or heavy load rise 4 (11%) adolescents.

In 15 of these cases (42%) the beginning of LBP was associated with strenous excercise like dance and sport training. 21 patients (58%) present the symptoms of ischialgia. Almost 42% (15 patients) of our group presents the symptoms LBP only, 6% (2 children) sciatic neuralgia only and in 52% cases (19 patients) main complain were complex symptoms of LBP and sciatica. If we analysed factors which induced the onset of LBP separately for sciatica and back pain only, we didn't find significant difference. All patients underwent detailed pediatric and neurological examination. Plain radiographs of the lumbar spine were performed in all patients. The lumbar spine was assesed by magnetic resonance imaging (MRI) or computed tomography (CT) in all patients with sciatica symptoms and chronic LBP. Diagnostic imaging showed disc protrusion in 11 children (31%): 6 in computed tomography, 4 in magnetic resonance imaging and 1 in X-Ray examination only. Plain radiographs performed in all 36 patients show spina bifida in 6 cases (16.7%). Other causes of LBP included: spondylolysis in 2 patients, Scheuerman disease in one case and juvenile reumatoid arthritis in one case. The level of disc changes was determined in L4/L5 in 4 adolescents, L5/S1 – 6 patients and one case of disc herniation in two levels: L4/L5 and L5/S1.

Discussion

The data from literature, concerning gender differences and peak age of the prevalence of LBP have been partly controversial. The prevalence of back pain was low among the 7-years-old (1%) and 10-years-old (6%) schoolchildren, but increased with age, being 18% both among 14- and 16-year-old adolescents [4]. In other studies LBP was also significantly correlated with age [2]. In our study, the peak age of clinical onset of LBP in our group was 14.7 years, however, earlier in girls (15 years), later in boys (17 years). Moreover, 61% patients hospitalized with LBP were girls. Female gender was associated with current back pain [1], but in more studies no gender difference have been found [2,4,8]. We found the family history of LBP in 50% children. Some authors reported family history of LBP [3], but other not [10,11]. It seems depend on psychosocial factors, like lifestyle and physical activity in different populations. Significant risk factor are postural abnormalities. We confirmed incorrect posture in 13.9% patients of our group. The system of postural reflex control reaches maturity at 18-21 years age. That is why adolescents are not aware of postural abnormality [5]. So both lack of physical activity and strenuous excercise are significant risk factors for LBP [5]. Very important questions should be asked about the mechanisms of oneset and exacerbating factors. Half of our patients pointed the factor inducing LBP: rapid incoordinate move (39%) or heavy load rise (11%). Althougt most of the painful injuries that children sustain in recreational activities are mild, low back pain that lasts for extended periods may be due to various disorders, including spondylolysis and spondylolisthessis, dics herniation, Scheuermann disease, or neoplasms [7]. Almost 42% patients of our group presents the symtptoms LBP only, 6% sciatica only and in 52% main complain were symptoms of LBP and sciatica. The classic clinical onset in the children with herniated discs started with LBP and sciatica, as in the children with neoplasms, althought in this group leg pain to be bilateral [8]. If we analysed factors which induced the onset of LBP separately for sciatica and back pain only, we didn't find significant difference.

Plain radiographs of the pediatric spine showed that X-Ray examination is still a valuable diagnostic tool and it is standard in diagnostic procedure in patients with LBP [12]. However, plain radiography is better for diagnosing spinal growths compared with their scant utility in disc herniations [8]. This examination, performed in all our patients with LBP showed spina bifida in 6 patients, spondylolysis in 2 patients and one disc herniation only. We confiremed also X-Ray features of Scheuermann disease in one case and juvenile reumatoid arthritis in one case. A specific cause of LBP in children is often identified by CT and MRI [12,13]. MRI showed promising results in detecting and monitoring the early onset spondylolysis in children and adolescents, even with normal plain radiographs [14]. Spondylolysis and spondylolisthesis are the most common causes of chronic LBP in children [13]. Lumbar disc herniation is uncommon in adolescents and even more rarely surgical treatment is necessary in such cases [15]. Disc protrusion is prevalent in young athlets [13]. In our material, diagnostic imaging showed disc protrusion in 11 children (31%): 6 in CT, 4 in MRI and 1 in plain radiographs only. MRI fatures of disc protrusions in adults are good known and could be powerful predictors of surgical outcome [16,17]. However, very little is known about the distribution of of lumbar MRI findings and how they are associated with LBP in youngsters. In cross-sectional cohort study of 13-years-old children with LBP, signs of disc degeneration were noted in approximately 1/3 of the subjects [18], similar like in our study. Moreover, there were obvious differences between genders: degenerative disc changes in the upper lumbar spine were more strongly associated with LBP in boys, while disc abnormalities in the lower lumbar spine were associated with seeking care in girls [18]. In our material disc changes were found in the lower lumbar spine: L5/S1 – 6 cases, L4/L5 – 4 cases and in 3 cases degenerative changes were placed in 2 levels: L4/L5 and L5/S1. CT seems to be less useful in diagnostic managenent of LBP [12]. CT scans were done in our study because the restricted availability of MRI in our region in the past. Hovewer, in seven performed CT we find disc herniation

in 6 cases. It could depend on good selection to imaging diagnostic. All these patients demonstrated ischialgia symptoms.

Conclusions

Half of our patients pointed the factor initialising LBP: rapid, incoordinated move or heavy load rise. We confirmed incorrect posture in 13.9% patients of our group. 58% adolescents with LBP have the symptoms of ischialgia. Diagnostic imaging showed disc protrusion in 31 % children. Other causes of LBP included: spondylolysis, Scheuermann disease and juvenile reumatoid arthritis. Some school-age children suffering on low back pain, particulary with sciatic neuralgia symptoms seek medical care in hospital. Althought the main causes are mechanical and developmental, associated with lack of physical activity or strenous exercise, serious diagnostic managment is strongly recommended. The most valuable diagnostic tool is magnetic resonance imaging. This procedure should be standard in diagnostic managment in adolescents with LBP.

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