

Strain on the spine – professional threat to nurses' health

Sienkiewicz Z, Paszek T, Wrońska I*

Institute of Social Nursing, Health Science Department, Medical University in Warsaw, Poland

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, $\chi^2=16.768$. 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.

Key words: threats to nurses' health, strain on the spine.

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

* CORRESPONDING AUTHOR:
Zakład Pielęgniarstwa Społecznego
Akademia Medyczna w Warszawie
01-445 Warszawa, ul. Erazma Ciołka 27, Poland
Tel/fax: +48 22 8773597
e-mail: zofia.sienkiewicz@onet.eu (Sienkiewicz Zofia)

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).

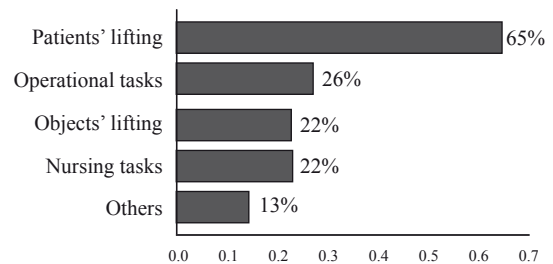
The aim of the research was to investigate correlation between low back pain, work place and years spent at work.

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 least 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

Figure 1. Strenuous activities in work environment N=937

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.

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 least 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	Pediatrics	Cardiology	Nephrology	Gastrology	Hepatology	Neurology	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 listed (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

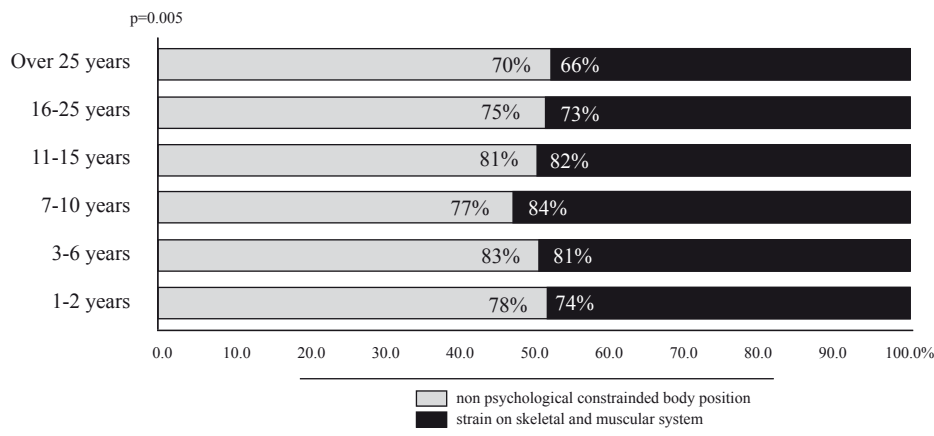


Figure 3. Reasons for inconveniences' occurrence N=937

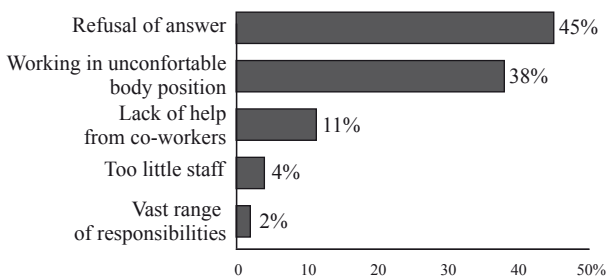
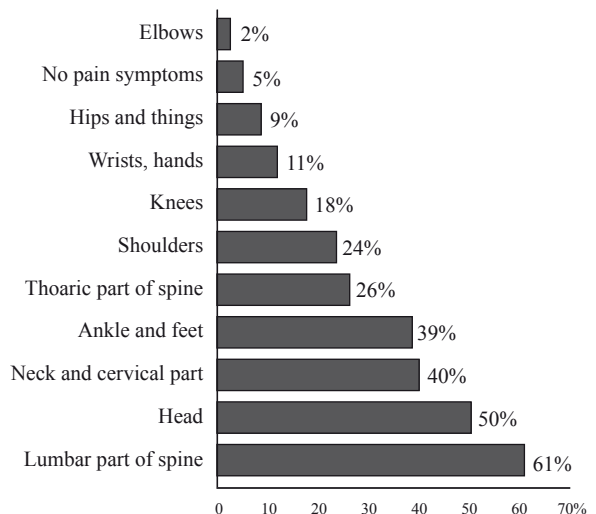
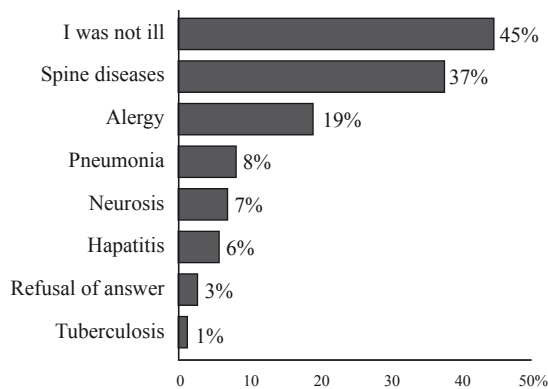


Figure 4. Pain symptoms suffered after duty N=937



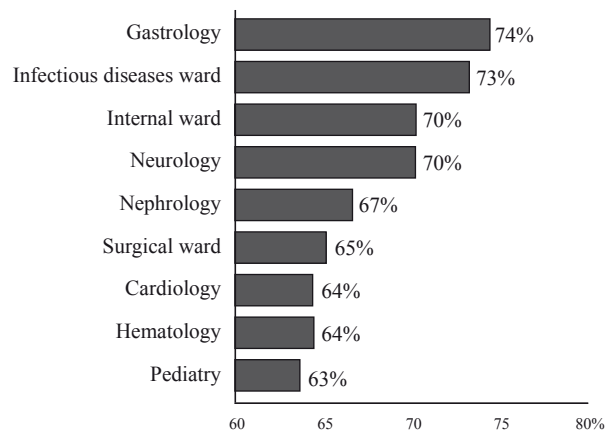
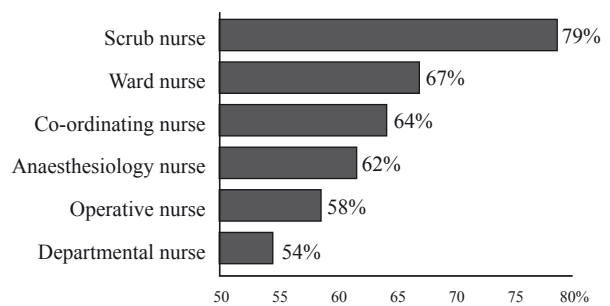
vical part of spine and 39% from pain in feet and ankles. Only 5% of respondents does not complain about any pain symptoms at all. Spine diseases were reported by more than 1/3 of nurses (37%) (Fig. 5). Back aches are suffered most by nurses working in such departments as: gastrology (74%), infectious 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

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 6. Lower back pain vs ward in which respondents work N=937**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 thoracic 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.

Acknowledgements

Special thanks to students of non-stationary 1st and 2nd degree studies of Health Science Department of Medical University in Warsaw, Poland, who were involved the research in professional threat to nurses' health.

References

1. Kosińska M, Kułagowska E. Nurse workplace. Ergonomics and organization aspects. Katowice: Medical University of Silesia; 2003.
2. Smoliński D. Professional workplace risk assessment. Guidebook, Wrocław: 2004.
3. Marcinkowski JT, editor. Hygiene, preventive medicine and organization in medical professions. Warsaw: PZWL; 2003.
4. Regulation of the Council of Ministers of 30 July 2002 amending regulation on the job list forbidden to women. Dz.U. 2002 nr 127 poz. 1092.
5. The Council of Europe Directive 90/269/EEC of 29 May 1990 on the minimum health and safety requirements for the manual handling of loads where there is a risk particularly of back injury to workers (fourth individual Directive within the meaning of Article 16 (1) of Directive 89/391/EEC).
6. Vieira ER, Kumar S, Coury HJ, Narayan Y. Low back problems and possible improvements in nursing jobs. *J Adv Nurs*, 2006; 55: 79-89.
7. Alexopoulos EC, Burdof A, Kalokerinou A. A comparative analysis on musculoskeletal disorders between Greek and Dutch nursing personnel. *Int Arch Occup Environ Health*, 2006; 79: 82-8.
8. Trinkoff AM, Le R, Geiger-Brown J, Lipscomb J, Lang G. Longitudinal relationship of work hours, mandatory overtime, and on-call to musculoskeletal problems in nurses. *AM J Ind Med*, 2006; 49: 964-71.