

Surgical nurses and their concerns of acquiring HIV infection at the workplace

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Abstract

A study was conducted to identify pertaining to the care of HIV infected patients among nurses in the County of West Pomerania.

Most of the respondents (43.2%) were working in municipal hospitals, 38.7% in hospitals located in the country and 18% in academic hospitals. The responding nurses ranged in age from 20 to 58 (median 38 years). Median of work experience was 16 (1-28) years. The respondents were divided into 3 groups: A – the nurses who expressed serious concern about HIV infection, 62.9%; B – some degree of concern, 31.3%; C – not concerned, 4.3%. An HIV/AIDS workshop was attended by 74.6% of respondents from group A and 76.6% from group B ($p > 0.85$). The occupational exposure reported 49.5% nurses from group A, 39.9% from group B and 42.4% from group C ($p > 0.3$). The gloves were “always” used by 82.5% respondents from group A, 87.8% from group B and 76.9% from group C ($p > 0.07$). 79.9% of nurses from group A, 53.2% from group B and 42.3% ($p < 0.0001$) favored HIV antibodies testing of all patients.

Key words: Nurses' concerns, HIV, occupational exposure.

Introduction

There is no doubt that the number of people living with HIV (human immunodeficiency virus) is increasing in Poland and all

over the world year by year and many of them would need hospital treatment [1-4]. Surgical nurses have been shown to have higher incidence of exposure to patient's blood compared with nurses from some other wards [1-3,5]. So it seems natural that, in the context of transfer of HIV in this very way, they are concerned about acquiring the infection. The first case of occupational HIV infection among health care workers (HCWs) was documented in 1984. Since then, about 300 HIV infections among this group have been reported, most of these were found in nurses [1,2,6,7].

Even though HCWs are much more likely to be infected by hepatitis viruses as a result of taking care of an infected patient, they tend to be much more concerned about becoming infected with HIV [8-11]. There are several reasons for this increased concern. Virtually all individuals infected with HIV eventually develop AIDS (acquired immune deficiency syndrome). Despite the antiretroviral treatment and the treatment of opportunistic infections, AIDS is uniformly fatal. It has been also proved that, even during asymptomatic period of this infection, the quality of life keeps getting worse. HIV infection has, for many individuals, adverse social implications and can result in loss of job, family, friends, as well as in the stigmatisation or negative valuation [4,12].

The cumulative risk of occupationally acquired infection is determined primarily by three factors: the population seroprevalence, the risk of seroconversion after an exposure and the type and cumulative frequency of exposures to blood [1-3,6,7].

The risk of occupational HIV infection is actually rather low, but real. After a percutaneous exposure it has been estimated as 0.3% or 1 in 333 [1-3]. On average 99.7% of HCWs who are exposed to HIV will not be infected. For mucous membrane exposure the risk is 0.09%, but for non-intact skin even less. From the three risk factors mentioned above, the only one that can be controlled by nurses is the frequency of exposures. It can be achieved by implementing safety devices and safer workplace practices, using protective equipment, and educating the medical personnel about blood transmitted infections [1-3,5-7].

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We wanted to investigate how the years in practice, the type of hospital, the number of HIV infected patients under care, the HIV/AIDS special training attendance and the number of sharps injuries sustained per year influenced HIV concerns among this job category. The purpose of this study was to determine the concerns for acquiring HIV infection at workplace among the nurses from surgical wards from the randomly selected hospitals in the County of West Pomerania.

Material and methods

A representative group of 601 nurses from 7 hospitals located in the city of Szczecin (2 university, 5 municipal) and 11 located in the County of West Pomerania took part. An anonymous questionnaire prepared by the authors according to the guidelines of A. Lowenfels from N.Y. Medical College, USA, was distributed by mail, with an adequate instruction, between January and March 2003.

The questionnaires were sent to 601 active nurse staff, 9 of them were eliminated because they were not complete. Minimal of sample size ($n=556$) of the finite general population nurses employed in health service institutions in West Pomeranian ($N=7495$) for the day the 31.12.2002 according to Statistics Bulletin of Health Ministry of 2003 was stated at arbitrary chosen sizes half interval confidence (not over for 4%) and basing on definite level of confidence $=0.95$, if unknown variance of fraction of examined variable got the maximum value. To this analysis have been included all fill in inquiry forms in number of 592. In this way the condition required minimal of sample size has been fulfilled.

The survey consisted of two sections. The first section asked for demographic data. The second section identified the level of fear of acquiring HIV infection at work, occupational exposure to HIV infectious, use of gloves when in contact with potentially infection material and the expectations towards testing patients for HIV antibody. Between group differences were determined using χ^2 test and U Mann-Whitney's test. Differences were considered as statistically significant at $p=0.05$.

Results

Almost half of the respondents (257/601; 42.8%) practiced in municipal hospitals, 229 (38.7%) in hospitals situated in the country and 115 (18%) in university hospitals. The responding nurses ranged in age from 20 to 58 (median 38 years), mean work experience was 16 years (range 1-28 years). For the majority of respondents (565; 94%) it was a full-time job. Almost three-fourths (450, 74.9%) participated in HIV/AIDS workshop.

Over one-fourth of the nurses (162; 27.3%) had one or more occupational contacts with HIV infected patients during their professional carrier. Almost one half of respondents (276, 46%) reported at least one puncture injury in the preceding year.

After eliminating 9 questionnaires, incomplete regarding responses about the level of fear of acquiring the HIV infection at work, the respondents were divided into three groups. Group A – the nurses expressed serious concern about HIV infection

(378; 62.9%); group B – some degree of concern about HIV infection (188; 31.3%); group C – were not concerned (26; 4.3%).

No differences ($p>0.17$, U Mann-Whitney's test) in the median of years at practice between the groups: A-17, B-16, and C-15 were found. In the group A – 102 (27%) respondents had at least one professional contact with HIV infected patient, in the group B – 40 (21%; $p>0.85$).

In the rural hospitals 177 (77.3%) nurses from the total of 229 were much concerned about acquiring HIV infection at work, in the municipal hospitals – 150 (58.6%) and in university hospitals 51 (47.7%); the differences statistically significant ($p<0.02$). The number of nurses who expressed some degree of concern about HIV infection was: in academic hospitals 48 (44.9%) respondents, in municipal hospitals 90 (35.2%) and in rural hospitals 50 (21.8%). The significant differences were between rural and municipal hospitals and also between rural and academic hospitals ($p<0.02$).

An HIV/ AIDS workshop had been attended by 282 (74.6%) nurses from group A, by 144 (76.6%) from group B and by 17 (65.4%) from group C. The differences between the groups were not significant ($p>0.21$). Data are presented in *Tab. 2*.

In the group A, almost one half of respondents – 187 (49.5%) had the occupational percutaneous contacts with blood in the preceding year. The median for this kind of contacts was 2. In the group B – 75 nurses (39.9%) had such type of contacts (median number for the contacts 3), and in group C – 11 (42.3%, median number for the contacts 2). The differences between the median number of percutaneous contacts in three groups were not significant ($p>0.21$, U Mann-Whitney's test).

In the group A – 50 respondents (26.7%) reported blood exposure, in the group B – 19 (25.3%) and in the group C – 5 (45.5%; $p>0.3$; data in *Tab. 2*). Almost one-third (46; 32.2%) of respondents from the group A was not convinced about patient's infectivity, above half (30; 50.8%) from group B and from group C. The significant differences were between group A and B; $p<0.02$. Some of the respondents were convinced that even if they reported the occupational exposure to HIV/AIDS it would not help to avoid the infection (group A – 43; 30.1%; group B – 13; 22%, group C – 2; 25%; $p>0.24$).

The vast majority (312; 82.5%) of respondents from the group A, 165 (87.8%) from the group B and 20 (76.9%) from the group C claimed that they always used protective gloves when in contact with potentially infected material ($p>0.07$). The *Tab. 3* shows the reasons why the nursing staff is not "always" using the personal protective equipment.

About one-third of nurses (56; 29.8%), who expressed some degree of concern about HIV infection and 67 (17.7%) who were seriously concerned, were convinced that the patient was not the source of HIV infection and they did not follow the protective procedures ($p<0.002$).

Because of skin abrasions and cuts, 215 (56.9%) respondents from the group A were exposed to potentially HIV infected material, 87 (46.3%) from the group B and 12 (46.1%) from the group C. The difference was significant between group A and B ($p<0.002$).

Most of the respondents (302, 79.9%), who were seriously concerned about HIV infection, claimed they should know the

Table 1. Relations between employment place of respondents and their concerns of acquiring HIV at work

Level of concerns	Place of employment					
	Rural hospitals (n=229)		Municipal hospitals (n=256)		University hospitals (n=107)	
	n	%	n	%	N	%
Serious concern Group A	177	77.3 ¹	150	58.6 ¹	51	47.7 ¹
Some degree of concern Group B	50	21.8 ²	90	35.2 ²	48	44.9 ²
Not concerned Group C	2	0.9	16	6.2	8	7.5

Indexes 1 and 2 mean statistically significant differences (χ^2 test).

¹p<0.02; ²p<0.002

Table 2. Occupational behaviours of nurses vs their concerns of acquiring HIV at work

Variable	Concerns					
	Serious concern Group A (n=378)		Some degree of concern Group B (n=188)		Not concerned Group C (n=26)	
	n	%	n	%	n	%
HIV/ AIDS workshop	282	74.6	144	76.6	17	65.4
Occupational percutaneous contacts with blood in the preceding year	187	49.5	75	39.9	11	42.3
Reported blood exposure	50	26.7	19	25.3	5	45.5

serological status of the patient, 76 (20.1%) were against it; the difference was statistically significant ($p<0.0001$). Data are presented in *Tab. 4*. Most of the respondents (553; 93.4%) favored preoperative HIV antibody testing of patients. Significant differences between group A and B ($p<0.002$) and between group A and C ($p<0.02$) were found.

Discussion

There is a serious fear about nursing HIV positive patients among our respondents, especially nurses from rural hospitals. The degree of fear does not depend on the duration of practice or the number of HIV positive patients cared for. Our results are comparable to earlier studies [9,10,13-16].

Of the nurses included in our survey who declared serious fear of acquiring HIV infection at work, 49% sustained at least one injury with sharps during the past 12 months. In view of the high prevalence of fear and of a history of sharps injury among nurses, it would be advisable to recommend adherence to all the

Table 3. Reasons for not using regularly the personal protective equipment by concerns of acquiring HIV at work

Reasons	Concerns					
	Serious concern Group A (n=378)		Some degree of concern Group B (n=188)		Not concerned Group C (n=26)	
	n	%	n	%	n	%
Lack of time	59	15.6	15	8	2	7.7
No accessibility	102	27.0	40	21.3	3	11.5
Not comfortable	78	20.6	36	19.1	9	34.6
Not effective	27	7.1	10	5.3	1	3.8
The patient is not a source of infection	67	17.7 ¹	56	29.8 ¹	6	23.1

¹ p < 0.002 (χ^2 test)

Table 4. Nurses' opinions on patients' HIV testing by concerns of acquiring HIV at work

Level of concerns	All patients admitted to the hospital				Preoperative testing			
	yes		no		yes		no	
	n	%	n	%	n	%	n	%
Serious concern group A	302	79.9 ^{1,2,3}	76	20.1 ¹	365	96.3 ^{4,7,8}	13	3.7 ⁴
Some degree of concern group B	100	53.2 ²	88	46.8	166	88.3 ^{5,7}	22	11.7 ⁵
Not concerned group C	11	42.3 ³	15	57.7	22	84.6 ^{6,8}	4	15.4 ⁶

Indexes 1,2,3,4,5,6,7 and 8 mean statistically significant differences (χ^2 test).

^{1,2,3,4,5} p < 0.0001; ⁶ p < 0.001; ⁷ p < 0.002; ⁸ p < 0.02

standard precautions during patient contacts. During simulated needlesticks by hollow-bore needles it has been proven that gloves decrease the exposure volume an average by 50% [7,17]. Nevertheless, our results show that the fear of the infection does not result in better safety practices when dealing with potentially infectious body fluids. Among nurses with a serious fear of HIV infection, 83% regularly used gloves when dealing with the procedures involving body fluids. Studies in New Zealand and Taiwan found that 49% and 76% respectively of nurses always used gloves in such procedures [9,10]. Similar results to Taiwan's study were obtained by Beniowski [18] in his research on behavior of Polish medical staff.

Unfortunately, in our study lack of gloves and other protective equipment is the main reason that nurses with a fear of acquiring the HIV infection at work reported for not following standard precautions. Although extra expenses will be required, this is the easiest obstacle to overcome. Despite their concerns, 48% of respondents do not use regularly personal protective equipment because they believe that source-patient is not infected. The implication is that a large segment of nurses

exposed to a patient of unknown HIV status assume that the patient is HIV negative. This is a serious finding, in light of the international principles of standard precautions, mandating that all patients should be considered infectious [1-3,6,7].

Additionally, over half of the nurses with a serious fear of acquiring HIV infection at work admit they worked with skin abrasions on their hands at least once during the preceding 12 months. This behavior increases the risk of transmission of the HIV infection [1-3,6,7,11,12].

In our previous study [11] we found that the most frequent source of injury (63%) among nurses was hollow-bore needles. These needles contain a relatively large amount of infectious material. In spite of their fear of acquiring HIV, almost three-fourths of respondents did not report sharps injuries, mainly because they were not convinced about the patient's infectivity. Such behavior deprives the nurses of appropriate post exposure prophylaxis.

Among the respondents seriously concerned about HIV infection, 96% favored preoperative HIV antibody testing. While in some countries results similar to ours have been reported, most studies reported that 50% or less of nurses favoured preoperative testing [1-3,5,9,18]. The prevalence of people living with HIV in Western Europe and North America is generally higher than in Poland, so it is evident that the risk of exposure to HIV infected patients for Polish nurses is lower than for nurses working in the countries such as USA, UK or France. Accordingly, less fear of occupationally acquired HIV infection should be felt by Polish nurses, fewer should favor preoperative screening. The reality of the situation is different. This could be due to the lack of adequate training or education or/and to lack of personal protective equipment.

It has been proven that fear of contracting HIV at work applies to most health care workers. It has been reported that lack of knowledge about the risk of infection and of appropriate post-exposure prophylaxis is the main reason for such fear [4,9,10]. What is remarkable, is that one-fourth of our respondents had never attended special training for HIV/AIDS. Hence such training must be intensified. Testing of patients for HIV infection has not been proven effective as a method to decrease the risk of occupational infection. In one frequently cited study, it was reported that knowledge about patient's HIV status made no difference to the incidence of exposures to blood among operating team [5].

Contact with blood is still frequent among surgical nurses. Despite increased fears of occupationally acquired HIV infection, nurses have not adopted standards of safety precautions to minimize contact with potentially infectious material. Furthermore, nurses do not report exposures and continue to believe that preoperative HIV testing of patients is the best way of avoiding infection.

In the surgical suit there is no place for exaggerated fear. A key factor in assuring the well-being of nurses is their personal knowledge and safety practices. The greatest danger is not the patient itself, but the nurse's lack of adequate perceptions of potential risk of acquiring the HIV infection.

Conclusions

Despite increased fears of occupationally acquired HIV infection, nurses have not adopted standards of safety precautions to minimize contact with potentially infectious material. Furthermore, nurses do not report exposures and continue to believe that preoperative HIV testing of patients is the best way of avoiding infection. Surgical nurses should receive effective training for HIV/AIDS and safety work practices to minimize the fear of occupational HIV infection.

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References

1. Beltrami EM. Risk and management of blood-borne infections in health care workers: an overview. *Clin Microbiol Rev*, 2000; 13: 385-92.
2. Bell DM. Occupational risk of HIV infection in healthcare workers: An overview. *Am J Med*, 1997; 102: 9-15.
3. Kuo YH, Fabiani JN, Mohamed AS. Decreasing Occupational Risk Related to Blood-Borne Viruses in Cardiovascular Surgery in Paris, France. *Ann Thorac Surg*, 1999; 68: 2267-72.
4. Ciastoń-Przeclawska E. Lekarze, pielęgniarki i pracownicy socjalni a zagrożenia związane z HIV/AIDS. Wydawnictwo Poznańskie, Poznań, 2001.
5. Geberding JL, Littell G, Tarkington A et al. Risk of exposure of surgical personnel to patients blood during at San Francisco General Hospital. *N Engl J Med*, 1990; 322: 1788-93.
6. Boroń-Kaczmarzka A. Standardy postępowania u zakażonych HIV. *Med po Dypl*, grudzień 2000; 108-55.
7. Juszczak J. Profilaktyczne stosowanie leków antyretrowirusowych w warunkach zawodowego ryzyka zakażenia u pracowników medycznych. Warszawa. Glaxo Smith Kline; 2001; 4.
8. Geberding JL. Incidence and prevalence of Human Immunodeficiency Virus, Hepatitis B Virus, Hepatitis C Virus, and Cytomegalovirus among health care workers at risk for blood exposure: final report from longitudinal study. *J Infect Dis*, 1994; 170: 1410-7.
9. Juan CW, Siebers RW, Wu FF et al. The attitudes, concerns, gloving practices and knowledge of nurses in a Taiwanese hospital regarding AIDS and HIV. *Inter J Nur Prac*, 2004; 10: 32-8.
10. Van Weissen KA, Siebers RW. Nurses' attitudes and concerns pertaining to HIV and AIDS. *J Adv Nurs*, 1993; 18: 912-7.
11. Gańczak M, Milona M, Szych Z. Nurses and HIV exposures. *J Infect Contr Hosp Epidemiol*, 2005 (in press).
12. Gańczak M, Boroń-Kaczmarzka A, Białecki P i wsp. Narażenie lekarzy specjalności zabiegowych województwa zachodniopomorskiego na zakażenie HIV. *Pol Merk Lek*, 2003; XV, 85: 75-80.
13. Jocz W. Postawy pracowników służby zdrowia województwa białostockiego wobec AIDS. *Probl HIV i AIDS*, 1999; 5 (supl.1): 38.
14. Shapiro MF, Hayward RA, Guillemot D i wsp. Residents' Experiences in, and Attitudes Toward, the Care of Persons With AIDS in Canada, France, and United States. *Jama*, 1992; 268: 510-5.
15. Resnic FS. Occupational Exposure Among Medical Students and House Staff at a New York City Medical Center. *Arch Intern Med*, 1995; 155: 75-80.
16. Gańczak M, Szych Z. Obawy lekarzy specjalności zabiegowych przed zakażeniem HIV. *Ort Traum Rehab*, 2004; 6 (supl. 1): 134.
17. Kowalczyk H. Barrierowa odzież ochronna dla personelu medycznego w prewencji chorób przenoszonych przez krew. *Błok Oper*, 1999; 2: 66-9.
18. Beniowski M, Karczmarz T, Sawaryn T i wsp. Podstawy, wiedza i zachowania pracowników służby zdrowia dotyczące HIV/AIDS w kontekście narażenia zawodowego na zakażenia krwiopochodne. *Nowa Klin*, 1996; 3: 53-8.