

Needle Stick and Sharp Injuries among Nurses

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Abstract

The aims of this study are to determine the causes of sharp and needle stick injury in nurses working in a hospital, the use of safety practice exposure, to blood and blood containing material and contributing factors. A self-report questionnaire was completed by 201 nurses working at three Turkish hospitals. The percentage of nurse's "44.3% of the nurse's experience a sharp or needle sticks injury during their professional life". The most frequently encountered source of injury was injection needles (35.8%) followed by branules (5.5%), and suture needles (3.0%). Injuries occurred most frequently when the nurses were withdrawing a needle from rubber or other resistant material; recapping a used needle and disassembling a device or equipment. The majority of the nurses (74.6%) wear gloves and protective glasses. The study indicates that emphasis on work practice, disposal systems, education strategies and infection control precautions should be employed to reduce NSIs and contributing factors.

Keywords: Sharp injury; Needle sticks injury; Standard precautions; Universal precautions; Nurse

Introduction

A needle-stick injury (NSI) is defined as "a penetrating wound with an instrument that is potentially contaminated with the body fluid of another person" [1]. NSIs represent a major occupational hazard in the health care industry, with professional nurses incurring a large proportion of the total burden particularly with items that have been previously used on patients [2-6].

Needle-stick and other percutaneous injuries pose the greatest risk of occupational transmission of serious blood borne infections such as hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV) to health care workers (HCW) and patients [2,4,7-11]. According to the World Health Organization (WHO), 16000 HCV, 66000 HBV and 1000 cases of HIV may have occurred worldwide in the year 2000 among health care workers through their exposure, to NSIs [1,12]. In Turkey, about four million people are estimated to be carriers of chronic HBV between 0% and 2% of the blood donor population were found to be HCV antibody positive. The numbers of patients with HIV reported is relatively low, rates have been increasing steadily in recent years, whereas this number reached a total of 1325 in 2001 [5]. WHO reports that the number of sharp and needle stick injuries per person among health care staff are 4 per year in Africa, Western Mediterranean and Asia [13].

The risk of occupational infection is rises by a factor including the following: hospital overcrowding lower ratio of HCWs to patients, limited awareness of the risks associated with exposure, to blood, failure to implement standard precautions, inadequate supplies of basic safety equipment, handles contaminated needles and other sharp instruments are reuse. Developed countries recognized the importance of safety practice among HCWs [14-16].

In the Health care sector, although nurses and doctors are more exposed to NSIs, many HCWs did not have sufficient level of

knowledge to protect themselves from injury and they did not take the necessary precautions [5]. NSIs require appropriate evidence-based management to minimize the risk of infection. Guidelines on exposure, to potential sources of HIV, HBV and HCV exist and have been adapted for use by some practices [1,8,11,17]. The Centre for Disease Control and Prevention (CDC) and The Occupational and Safety Health Administration have been developed guidelines for the prevention of these injuries. The safety measures include hand washing, gloves, mask, eye protection, face shield, gown, patient care equipment environmental control, linen, occupational health and blood borne pathogens and patient placement [8,13,15]. The aim of this study was to determine the use of safety practice exposure, to blood and blood containing material, the reason(s) of sharp and needle stick injury nurses working in hospital and contributing factors.

Methods

Design

A cross sectional study was carried out with nurses working three hospitals, in Izmir.

Sample

We planned to study all the nurses, but it was not possible to reach to them as they were leave due to health reasons, annual leave and questionnaire did not completed correctly. Finally a total of 201 nurses were included in the study (79.1%).

Instrument

The items in the instrument were constructed based on literature review and was reviewed for content by 2 nurses with expertise in NSI. In addition, a focus group consisting of 1 professor at the university and 1 nurse from hospital edited questionnaire for content and clarity. The survey was pilot-tested with 10 nurses from each hospital. The instrument consisted of three parts. Part 1 comprised the descriptive data which including age, marital status, education, work experience,

nursing unit working on at time of survey, general immunization status; and part 2 comprised questions on whether the responded had ever sustained a sharp or needle stick injury doing their working life, history of occupational occurring percutaneous injury; if an injury occurred; wound care and how the injury occurred whether the NSI was officially reported to management and if not, the reasons why it was not reported and reasons of the injury episode. Part 3 comprised on the practices related to standard precautions including hand washing habits, use of gloves and exposure to blood and blood containing materials to the incident. Subjects were told that participation in the investigation was strictly voluntary and refusal would not affect their employment status.

Ethical consideration

Ethical approval was obtained from the Research Ethics Committee at hospital and High School of Nursing ethical committee. Permission to conduct the study was obtained from the Director of Nursing Services, Clinical Director and Lead Clinician. All the nurses were given oral information about study. Informed consent was verbally obtained from the subjects participating voluntarily.

Data collections

Data were collected from 201 nurses who were chosen with the random sample method. The researcher distributed the survey questionnaire which was accompanied by verbal instructions self-administration to all nurses present when each unit was visited. All those approach agreed to participate. Instructions were given to complete and return the questionnaire to the researcher directly or via their ward managers. Nurses were approached by the researcher in the units where they were working and given the questionnaires, which were collected at the end of the shift of the same day.

Data analysis

All data were collected by the researchers. It was entered into SPSS version 10 for Windows. Data analysis was conduct by academic staff employed in university. It was analyzed the data using descriptive statistics and paramedic tests for comparison between variables. A 'p' value below 0.05 were considered statistically significant.

Results

A total of 201 nurses participated in the study. These were selected at random. In the study, 28.4% were in the 28-32 age groups, 27.9% were 23-27 age groups, 44.3% were married, 47.3% were prepared at the baccalaureate level, 33.8% were diploma graduates, 1.0% were master's level. Of respondents, 36.8% were intensive care units, 32.8% were surgical departments, 46.8% were worked staff nurse, 24.9% had worked as a nurse 10 years, and 43.3% had worked in a current hospital lower than one year.

The percentage of nurses experiencing a sharp or needle stick injury during their professional life was 44.3%. Of those injured, 58.4% of nurses had been injured 1 to 3 injuries. The most frequently encountered source of injury was injection needles (35.8%) followed by branules/braunules (5.5%) and suture needles (3.0%). Injuries occurred most frequently when the nurse was withdrawing a needle from rubber or other resistant material, recapping a used needle and disassembling device or equipment (Table 1).

Reasons for not reporting were provided by 41.8% of the respondents. A common reason (33.3%) for no reporting was unaware of the reporting requirement or mechanism. In this study, 53.7% of nurses reported that they were washing hands "always" and 30.3% of nurses reported that they were washing hands "often" when they contact patient. The majority of nurses (74.6%) wear gloves and protection glasses or a mask to protect themselves from blood exposure, when drawing blood or starting an intravenous line and during procedures with potential percutaneous blood exposure. Only (8%) 16 cited lack of availability as a reason for not wearing gloves. More common reasons for not wearing gloves included a belief that they interfered with procedures (43.8%) not enough to equipment/instrument (18.8%), gloves were not needed by nurses (6.2%) and nurses were not want to wear gloves (31.2%).

	n	Percentage (%)
Direct patient care		
During use of device	16	8
Non-direct patient care		
While recapping a used needle	55	27.4
Withdrawing a needle from rubber or other resistant material	116	57.6
Disassembling device or equipment	14	7

Table 1: Events leading to injury.

There was statistically significance difference between total years in the profession and the occurrence of sharp and needle stick injuries numbers (p<0.05). This group which worked 6-9 and lower one year was occurred NSIs was higher than other groups. There was statistically significance difference between current position and the occurrence of sharp and needle stick injuries numbers (p<0.05). The occurrence of sharp and needle stick injury was higher in nurses who had worked in the surgical department (34.9%) and intensive care units (37.9%). There was no statistically significance difference between unit employed, the occurrence of sharp and needle stick injuries numbers (p>0.05) (Table 2).

Discussion

In this study, results showed that the nurses sustained sharp and needle stick injuries and 58.4% of the nurses reported that they had experienced NSIs from 1 to 3. In Turkey, Ilhan et al. [13] showed that the incidence of sharp or needle stick injury at the hospital within last year was 64.4%. Similar studies from Turkey which done Ayranci and Kosgeroglu [5] found that more than half of the nurses (62.6%) had experience at least one sharp or needle stick injury. Nurses were more exposed to, needle sticks and laboratory technicians to cuts by sharps. The incidence rates of exposures were full-time equivalent physicians and 7.0 per 100 full-time equivalent nurses [18].

In this study, sharp and needle stick injuries were caused by injection needles. Many authors have stated that sharp and needle stick injuries in nurses are caused by injection needles [2,5,13,19]. Injuries occurred most frequently when the nurse was separating a needle and syringe recapping a needle, transporting needles for disposable and giving an injection [2,3,7,13,19-26] and we similarly found a rate for

injection needles. Nagao et al. [7] stated that kinds of needle sticks occurred while recapping a used needle (14.7%), withdrawing a needle from rubber or other resistant materials (4.2%), disassembling device

or equipment (1.2%). Clarke et al. [27] found that needle disposable (32.5%), venipuncture (26.4%) and needle recapping (15.2%) were the activities most commonly associated with the injuries.

Sharp and needle stick injuries numbers								
Total years in profession	Non Injuries	N%	1-3 times	N%	4-6 times	N%	X2	p
<1 year	41	70.7	17	29.3	0	0		
2-5 year	19	59.4	9	28.1	3	9.4	58.2	<0.05
6-9 year	26	52	18	36	2	4		
10-13 year	6	33.3	2	11.1	4	22.2		
>14 year	20	46.5	14	14	3	7		
Unit Employed								
Emergency Department	14	70	2	10	1	5		
Surgical Department	33	50	19	28.8	4	6.1	13.6	>0.05
Intensive Care	42	56.8	23	31.1	5	6.8		
Internal Medicine	23	56.1	8	19.5	2	4.9		
Current Position								
Responsible Nursing	16	66.7	1	4.2	1	4.2		
Services Nursing	45	47.9	28	29.8	6	50	26.2	<0.05
Emergency Nursing	13	76.5	1	11.8	1	5.9		
Intensive care Nursing	38	57.6	21	31.8	4	6.1		

Table 2: Distribution of sharp and needle stick injury numbers and related to factors.

It showed that percentage of injuries related to direct patient care (8%) and non-direct patient care (92%) activities. This result was surprising because indirect patient care activities should not present opportunities for occupational exposure that exceed those of direct patient care. It stated that caregivers incurred injuries before or during use of the device, while preparing it for disposal and after disposal, percutaneous injuries occurred during injection, during blood sampling and during surgery. A frequent feature of sharp objects causing injuries was the necessity of disengaging a disposable sharp item from a reusable holder [23,27,28].

Needle stick injuries are financially and emotionally costly whereas safety equipment for intravenous therapy and venipuncture may provide a good return on investment, just as may address staffing and morale concerns. Safety equipment use in hospitals was associated with up to 20% and 30% reductions in risks of injuries and near-misses, respectively, but increases in risk 50% and more were observed among nurses in hospitals with poor staffing and working climate [27-29]. A systems approach to needle stick prevention that involves adequate organizational support for nursing practice organizational factors such as the safety climate and engineering controls. Infection Control Department is actively working to revise policies and procedures in which a sharp item and the revision of a procedures can climate risky practices and obviate the need for needles systems, is warranted and also reduced injuries [4,7,14,22,24,27,28,30-32].

Use of safety equipment is required as are universal precautions for nurses to protect themselves from blood borne infections [14,31-33]. However, the studies of measures to prevent sharps injuries have been largely a theoretical in nature. A few authors have considered the use of the Health Belief Model to help us understand the use preventive behaviors to decrease sharp injuries [23,34].

In the current study, most nurses did not report their NSIs to the health authorizes. The most common reason for not reporting was that the device was unused other reasons included “too busy to report it” and “the patient had no diseases”. Similar other studies found that most nurses did not report their NSIs to the health authorities [5,19,35]. Elmiyeh et al. [30] found that doctors who are less likely to report than nurses may be more inclined to make their own risk assessment before deciding how to proceed. Although doctors and nurses are aware of the benefits of early reporting, a culture of silence persists. The exact reasons for under reporting remain unclear [3,30].

The current study, most of the nurses were wash hands and wear gloves. The universal precautions principles include hand hygiene the use of personal protective equipment, the safe use and disposal of sharps [11,16,36]. Health care workers do not use adequate protection (such as gloves, wash hands) in all medical procedures with patients [15,17,37,38]. Glove compliance and the use of gowns/aprons or other protective clothing was on average 62% and 57% respectively [38]. Gloves are not routinely worn in high-risk procedures is consistent with the response by a majority of the nurses that they would wear

gloves only after determining that the patient is infections [19,39,40]. Vranes et al. [15] studied, 57.6% were gloves for all procedures and 3% did not wear gloves for any procedure. Wearing gloves for all procedures was not frequently reported by doctors and dentists. Ilhan et al. [13] found that lower of half of nurses (49.4%) were using gloves as protection against blood-borne infections at the time of the last sharp or needle stick injuries. It found that majority of nurses should pay more attention to hand hygiene whereas a small number of nurses never attention wash their hands [41,42].

The application of such models (e.g. the Precede-Proceed health education theory, Trans-theoretical Behavior Change Model) to practitioners' behavior is an area of research, which may positively influence compliance and result in more permanent adherence to standard precautions by affecting change in the attitudes, beliefs and self-efficacy of practitioners [17,43]. Most of studies results that nurses under a universal precaution educational training had significantly improved their knowledge, practice and behavior [16,37,44-46].

Our study shown that the risk of sharp and needle stick injuries is higher in young nurses with middle professional experience in working surgical department and intensive care units. In other study, sharp injuries were sustained by 40.2% of medical staff and 29.3% by nursing staff [4]. Similar other studies, the present data shows that investigation found no difference NSI exposure between in medical and surgical departments, younger nurses at significant increase in risk of NSI which concurred with the experience [3,13,21,45-48]. These results tend to suggest that although NSI prevalence rates differ between departments, the magnitude and the direction of such disparities are probably not uniform from country to country [2,3,45].

Conclusion

Our study shown that in working surgical departments and intensive care units young nurses with middle professional experience are higher exposed to sharp and needle stick injuries. The most important findings our study, most of the nurses did not report NSIs to the health authors. Health care workers should take the following steps to protect themselves and their fellow workers from needle stick injuries.

- Avoid the use of needles where safe and effective alternatives are available.
- Help your employer select and evaluate devices with safety features.
- Use devices with safety features provided by your employer.
- Avoid recapping needles.
- Plan for safe handling and disposal before beginning any procedure using needles.
- Dispose of used needles promptly in appropriate sharps disposal containers.
- Report all needle stick and other sharps-related injuries promptly to ensure that you receive appropriate follow up care.
- Tell your employer about hazards from needles that you observe in your work environment.

Regular auditing of the implantation and effects of these measures is also needed. A national survey of NSI among nurses should also be conducted in this country. In the meantime, combined intervention strategies and the modification of such working could lead to further reductions in NSI exposures are urgently required in Turkey, as they are elsewhere.

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