

Original Article

Effect of the Training Provided for Nurses on Sharp - Needlestick Injuries and Reporting Process

Fatma Ersin, PhD

Assistance Professor, Harran University School of Nursing, Department of Community Health Nursing, Sanliurfa, Turkey

Süda Tekin Koruk, PhD

Associate Professor, Harran University Faculty of Medicine, Department of Infectious Diseases and Clinical Microbiology

Leyla Yilmaz, RN

Nurse, Harran University Research and Application Hospital, Infection Control Committee

Correspondence: Fatma Ersin, Assistance Prof. Harran University School of Nursing, Department of Community Health Nursing, Sanliurfa, Turkey E-mail: fatmaersin1@gmail.com

Abstract

Background: Healthcare professionals comprise a high - risk group in that, they are vulnerable to being infected by occupational communicable diseases.

Aim: The aim of the study was to investigate the rate of sharp and needlestick injuries among the nurses, to determine the frequency in which these infections are reported, and finally, to decrease the rate of sharp and needlestick injuries by means of different applications.

Methods: A semi – experimental study. This study was conducted in only one group in the pretest-posttest order at Harran University Research and Application Hospital between June - December 2013. The study population consisted of 144 nurses. The data were evaluated in the SPSS 11.5 packaged software. Definitive statistics and McNemar test were used in the data analysis.

Results: 30.6% of nurses indicated that they were exposed to sharp and needlestick injuries before the training and 20.8% after the training. The rate of those who reported after the injury was 31.8% before the training and 76.7% after the training, and the difference between them was not found statistically significant ($p > 0.05$).

Conclusions: As a result of findings, it was established that interventions were effective upon injuries and their regular notification.

Key words: Sharp and needlestick injuries, notice, nursing.

Introduction

There exist about 33 million healthcare professionals throughout the world and 20 million of these professionals consist of nurses and midwives (World Health Organisation [WHO], 2011). Due to occupational reasons, health professionals are prone to contracting hepatitis B, hepatitis C and HIV- related infections that can lead to major mortality and morbidity following exposure to infected blood and body fluids (El-Hazmi & Al-Majid 2008; Inan et al. 2005; Korkmaz 2008). It is stated that the risk of contracting infection is higher in case of sharp and needlestick injuries in comparison to other factors (Altrok et al., 2009).

Among all occupational groups, nurses constitute the occupational group where exposure to blood or body fluids and needle stick injuries reach the highest levels. Previous studies have reported as well that health professionals contact with blood or body fluids mostly due to needle stick injuries and the nurses display the highest level in terms of this kind of injury in the healthcare environment (El-Hazmi & Al-Majid 2008; Hanafi et al.,2011; Inan et al., 2005; Tabak, Shiaabana & Shasha 2006). It is well known that health professionals are under risk of infection due to contact with blood and blood products as well as sharp and needlestick injuries.

It was reported in numerous descriptive studies that health professionals should be provided with trainings on contact with blood and blood products, factors increasing sharp and needlestick injuries, protection and the steps to be taken after injury and be made to undergo medical screening regularly through an effective organisation after the necessary measures are taken (Habib, Ahmed Khan & Aziz 2011; Köşgeroğlu et al., 2003; Muralidhar et al., 2010; Tabak, Shiaabana & Shasha 2006; Wicker et al., 2007). National Institute of Occupational Safety and Health (NIOSH) emphasized that needle stick injuries constitute a serious risk for health professionals and the necessary measures should be taken to prevent them (NIOSH, 2002). In a study, it was reported that nurses' rate of being injured was relatively high and the rate of these injuries decreased considerably after interventions (Zafar et al., 2009). Besides, it was stated that 99 % of the nurses did not report these injuries due to the lack of a reporting system in the hospital (Habib et al., 2011). United National Occupational Safety & Health Administration (UN-OSHA) reported in the study in 1999 and 2000 that 67363 health professionals experienced occupational injuries and 28 health professionals died because of the complications resulting from sharp and needlestick injuries (OSHA 2000).

Although there is not a national database in Turkey, relevant studies indicate that needle prick injuries and other percutaneous injuries constitute a significant problem for health professionals, most of these injuries are not reported (Ayrancı & Köşgeroğlu 2004; Beşer 2012) and the rates of being injured vary between 50 % and 70 % (Altıok et al. 2009; Ayrancı & Köşgeroğlu 2004; Eğri & Pehlivan 2000; İlhan et al., 2006; Köşgeroğlu et al. 2003; Omaç et al. 2010).

Various studies point out to the factors increasing the sharp and needlestick injuries. These factors include the clinic where the nurse works, deficiency and unsuitability of equipment, understaffing, working conditions, lack of training and experience, attention deficit, desire to finish all the work quickly (Clarke et al., 2002; Hanafi et al. 2011; İlhan et al., 2006; Johnson et al., 2008, Muralidhar et al. 2010, Omaç, Eğri & Karaoğlu 2010).

Even though numerous studies have been conducted in order to detect sharp and needlestick injuries in our country and

throughout the world, the number of studies aiming at preventing such injuries is limited.

The present study was carried out in order to determine the rates of sharp and needlestick injuries among the nurses working in Harran University Research and Training Hospital, reduce the rates of exposure and increase the rate of reporting.

Sample and Method

Design

The study was planned as semi-experimental with pretest-posttest design on a single group.

Participants

Data were collected in Harran University Research and Training Hospital in June – December 2013. Study sample consisted of 161 nurses working in the hospital. A sampling method was not applied and 144 (89 %) nurses accepting to take part in the study were included in the sample. Nurses who were either on leave while the data were collected or did not want to participate in the study (11 %) were excluded from the sample. While the dependent variable of the study was the nurses' status of being subject to sharp and needlestick injuries and reporting them while the independent variable was the training given to the nurses.

Data Collection Tool

Data of the study were collected through “Sharp and Needlestick Injuries Data Form”. This form was prepared by the researchers based on the literature. It consists of 29 questions regarding socio-demographic attributes of nurses, their knowledge of sharp and needlestick injuries, their status of exposure as well as their knowledge of the steps taken after exposure. Expert opinion was sought from 5 academicians specialised in this field after the form was developed and a pilot application was carried out on 10 nurses working in another hospital. Incomprehensible questions were revised and the form was finalised.

Procedure

1st Stage: First of all, a voluntary study group was created out of the chief nurses in the clinic. With this group, problems encountered in the clinic in relation to the sharp and needlestick injuries and proposed solutions were discussed and interventions were planned. The voluntary nurses were provided with training on the sharp and needlestick injuries by the researchers. Later

on, the Directive on the Prevention, Reporting and Monitoring of Sharp and Needlestick Injuries, Reporting and Work Flow, Reporting Form following Sharp and Needlestick Injuries were developed with this group.

2nd Stage: Pre-test (Sharp and Needlestick Injuries Data Form) was applied on the nurses working in the hospital by the researchers. Nurses working in all units (clinic, polyclinic and intensive care units) were provided with training by the voluntary group included in the research. Trainings were organised by using audio-visual materials. In the training, situation of sharp and needlestick injuries in Turkey and the world, risk management and protection in sharp and needlestick injuries, safe use of materials (sharp needlestick boxes and use of gloves in the clinics) and the importance of reporting injuries were addressed. Besides, it was recommended that:

Nurses should change sharp needlestick boxes when two third of them gets full in all clinics;

Use of proper-sized non-sterile surgical gloves was ensured in the units.

Posters showing the protection ways of sharp and needlestick injuries were prepared by the researchers and hung on the walls of the clinics.

Sharp and needlestick injuries reporting form prepared by the researchers was saved in the computers of all clinics and it was thereby aimed at facilitating the reporting process.

Post-tests were filled out by the researchers through face-to-face interviews 6 months after the training.

Data Analysis

SPSS 11.5 package program was used in the evaluation of the data. Descriptive statistics and McNemar test were used in the analysis of the data.

Ethical Consideration

Permission was taken from Ethics Committee of Harran University, Head Physician of Harran University Research and Training Hospital and nurses participating in the study.

Results

Mean age of the nurses participating in the study was 32.74 ± 7.30 years and mean duration of

serving as nurse was detected to be 10.48 ± 7.73 years. While 42.4 % of the nurses were female, 57 % of them were male. 70.5 % of the participants had bachelor's degree, 18.8 % of them had associate degree, 6.5 % of them had master's degree and 4.2 % of them were graduates of vocational school of health. 52.9 %, 74.5 % and 86.2 % of the participants held hospital administration, occupational health and safety unit and infection committee responsible for sharp and needlestick injuries respectively while 50.8 % of the participants held these three units responsible jointly.

It was stated that 30.6 % of the nurses experienced sharp and needlestick injury before to the training while 20.8 % of them experienced sharp and needlestick injury after the training. It was expressed that injuries usually occurred mostly in the form of needle stick injury while collecting the used material during urgent intervention, mostly at intensive care units. It was determined that injuries usually occurred when length of daily working exceeded 17 hours both before to and after the training. Before to the training, 60 % of the nurses stated that they took a preventive measure while, after the training, 86.5 % of the nurses expressed that they took a preventive measure. It was stated that the most common preventive measure was 'wearing gloves' before to the training (20.8 %) while the most common preventive measure was 'using gloves + tool box' after the training (18.8 %). The rate of nurses stating that there were some factors inhibiting the use of gloves was 13.9 % before to the training and 22.2 % after the training (Table 1)

Nurses explained the factors inhibiting the use of gloves before to and after the training by giving urgent cases, allergy and difficulty in performing intervention as example, respectively. 7 % of the participants stated that they cleaned the site of needle stick with disinfecting agent before to the training while, after the training, 11.1 of the participants stated that they cleaned the site of needle stick with soapy water.

They listed the factors increasing the sharp and needlestick injuries as understaffing, patient density, long working hours and time constraint, respectively (Table 1).

Table 1. Distribution of certain factors according to exposure status of nurses to sharp and needlestick injuries before training and after training (n = 144)

Factors	Before Training		After Training	
	Yes	%	Yes	%
Sharp and needlestick injury exposure	44	30.6	30	20.8
Units responsible for sharp and needlestick injuries hospital administration	66	45.8	8	5.6
Occupational health and safety unit	25	17.4	18	12.5
Infection committee	47	32.6	118	81.9
All	6	4.2	---	---
<u>When and how does the injury occur</u>				
During invasive intervention	9	6.3	7	4.9
While closing the syringe head	11	7.6	10	6.9
While collecting the used material	16	11.1	7	4.9
Other (breaking open an ampoule, preparing treatment)	8	5.6	6	4.2
<u>Object leading to the injury</u>				
Syringe	32	22.2	22	15.3
Scalpel	3	2.1	5	3.5
Glass	4	2.8	7	4.9
Other	1	0.7		
<u>Place where the injury occurs</u>				
Sick room	9	6.3	5	3.5
Treatment room	6	4.2	5	3.5
Nurse station	1	0.7	2	1.4
Intensive care unit	10	6.9	7	4.9
Other (operating room, bloodletting....)	16	11.1	12	8.3
<u>Type of intervention during injury</u>				
Urgent intervention	22	15.3	15	10.4
Planned intervention	19	13.2	17	11.8
<u>Length of working at the time of injury</u>				
0-4 hours	3	2.1	2	1.4
5-8 hours	10	6.9	4	2.8
9-12 hours	4	2.8	5	3.5
13-16 hours	6	4.2	3	2.1
17 hours and over	12	8.5	13	9.0
Status of taking preventive measure	24	60.0	32	86.5
<u>Type of preventive measure</u>				
Glove	30	20.8	2	1.4
Tool box	2	1.4	---	---
Glove + tool box	6	4.9	27	18.8
<u>Steps taken after injury</u>				
I cleaned the site of needle stick injury with disinfecting agent.	10	7.0	15	10.4
I cleaned the site of needle stick injury with soapy water.	6	4.2	16	11.1
Other (cleaning with batticon, using alcohol-soaked swab, closing with dressing)	26	18.1	---	---
<u>When should a sharp needlestick box be changed?</u>				
When half of the box gets full (1/2)	4	2.8	---	---
When one third of the box gets full (1/3)	7	4.9	---	---
When two third of the box gets full (2/3)	95	66.0	140	97.2
When it gets completely full	38	26.4	4	2.8
Is vaccination important in prevention?	104	72.2	139	96.5
Status of vaccination	109	75.7	121	84.0
<u>Type of vaccination</u>				
Hepatitis A	---	---	2	1.4
Hepatitis B	30	20.8	31	21.5
Tetanus vaccine	14	9.7	11	7.6
Hepatitis B-tetanus vaccine	66	45.8	80	55.6
Status of receiving training on sharp and needlestick injuries	89	61.8	144	100.0
Status of reporting	14	31.8	23	76.7

Table 2. Nurses' status of exposure to sharp and needlestick injuries and taking preventive measures after the training in comparison to pre-training period (n = 144)

Before Training	After Training				Total	Mc Nemar	p
	Yes		No				
	n	%	n	%			
Exposure							
Yes	9	20.45	35	79.55	44	30.56	36.623
No	21	21.00	79	79.00	100	69.44	
Total	30	20.83	114	79.17	144	100.0	
Preventive Measures							
Yes	8	30.77	18	69.23	26	18.06	4.688
No	24	20.34	94	79.66	118	81.94	
Total	32	22.22	112	77.77	144	100.0	

Before to the training, 53.5 % of the nurses stated that they threw syringes into the sharps bin by disconnecting needle pin and syringe while this rate was reported to be 55.6 % after the training (Table 1). When the status of using sharp needlestick box of 1.2 litres (small sharps bin) in invasive procedures was examined, 29.2 % of the nurses before the training and 26.4 % of the nurses after the training stated that they did not use a sharps bin. They expressed the insufficiency of small sharps bins, inappropriate sizes of existing sharps bins, lack of habitude, heavy work load and lack of time as the reasons of not using sharps bin. Both before to and after the training, nurses reported that they changed the sharps bin when two thirds of it got full (Table 1).

While 72.2 % of the nurses before to the training and 96.5 % of the nurses after the training found vaccination important for protection, the rate of being vaccinated was 75.7 % before to the training and 84.0 % after the training. The most common vaccine was Hepatitis B with tetanus vaccine. 61.8 % of the nurses stated that they received training on sharp and needlestick injuries before to the study. This rate reached to 100 % following the training. Nurses stated that they received training mostly in the form of in-service training (Table 1).

The 31.8 % of the nurses before to the training and 76.7 % of the nurses after the training stated that they reported their injuries. Being unaware of the necessity of reporting the injury, not finding reporting necessary, not finding necessary after treating the injury properly and

lack of time were the most common reasons for not reporting the injuries (Table 1).

In the study, a statistically significant difference was detected between the post-training period and the pre-training period in terms of exposure to injury ($p < 0.05$) and taking preventive measures ($p < 0.05$). However, when nurses' status of reporting the injuries before to and after the training was examined, it was determined that the rate of reporting increased but the difference was not found statistically significant ($p > 0.05$) (Table 2).

Discussion

In the study conducted in the university hospital, it was determined that one third of the nurses were subject to sharp and needlestick before to the training while one third of the nurses experienced such injuries after the training and injuries most frequently occurred while collecting the used material during the urgent intervention largely in the form of needle stick injury, mostly at intensive care unit. Previous studies have indicated that the group where the highest level of sharp and needlestick injuries was reported was constituted by the nurses among the health professionals (Altıok et al. 2009; El-Hazmi & Al-Majid 2008; Goswami et al. 2010). Studies conducted in Turkey show as well that sharp and needlestick injuries pose a major problem for health professionals (Ayrancı & Köşgeroğlu 2004; Beşer 2012) and the rate of being injured varies between 50 % and 70 % (Ayrancı & Köşgeroğlu 2004; Eğri & Pehlivan 2000). It is also thought that nurses constitute the occupational group with the highest level of exposure to sharp and needlestick injuries in

Turkey due to such factors as heavy work load of nurses (highness of the number of patients per nurse), other responsibilities of nurses apart from professional ones and time constraint. In parallel to the findings of the present study, previous studies reported that injuries frequently occurred while closing the syringe head in the form of needle stick in the treatment room (Altıok et al. 2009; Ghofranipour et al. 2009; Goswami et al. 2010; Honda et al. 2011; Zafar et al. 2009). It is thought that the lack of safe medical equipment in the hospital where the study was conducted contributed to the increase in the incidence of sharp and needlestick injuries. It is reported that the use of safe medical equipment can decrease the incidence of sharp and needlestick injuries (Hanafi et al. 2011; Muralidhar et al. 2010; Wicker et al. 2007).

It was detected in the present study that injuries usually occurred during urgent interventions and following long working hours. As it shows that nurses have intensive working environment and the possibility of being injured increases when they lose their attention, this finding is of paramount importance. Nurses participating in the study explained the factors increasing the sharp and needlestick injuries and listed them as understaffing, heavy work load, long working hours and time constraint. In numerous studies, intensive working environment, long working hours, the clinic in which the nurse works, deficiency and unsuitability of the equipment, understaffing, working conditions, lack of training and experience, attention deficit, desire to finish all the work quickly are reported as the factors increasing the incidence of sharp and needlestick injuries (Clarke et al. 2002; İlhan 2006; Johnson et al. 1998; Korkmaz 2008; Omaç, Eğri & Karaoğlu 2010)

In parallel with previous studies, the most common measure taken against infectious diseases and injuries was detected to be 'wearing gloves' in this study (Gücük 2002; Muradlihar et al. 2010; Omaç et al. 2010). In a study conducted in Saudi Arabia, it was detected that half of the nurses were using single-layer gloves at the time of injury while 5 % of them were using double-layer gloves (Tarantola et al. 2003). Mohammadi et al. (2011) reported that 81.1 % of the nurses were using gloves at high-risk interventions while Manzoor et al. (2010) stated that 64.9 % of the nurses did not use gloves while giving injection. In this study, nurses frequently listed urgent cases, allergy and difficulty in performing

intervention among the factors inhibiting the use of gloves. These findings lead to a conviction that the healthcare system and medical policies require an arrangement in relation to the working conditions of nurses. The importance of trainings aimed at solving the problem, in particular, and the necessity of drawing up new policies for healthcare professionals are emphasized in the researches (İlhan et al. 2006).

In parallel with the other studies, more than half of the nurses participating in the study stated that they cleaned the site of injury with disinfecting agent and washed the site with soapy water (Gücük et al. 2006; Manzoor et al. 2010; Muradlihar et al. 2010). It was detected in the study of Mihir et al (2010) that 90 % of the injuries resulted from contaminated needles and 90 % of the health professionals washed their hands with soap and water after the injury.

Likewise, the majority of the nurses getting injured before to the training did not report their injuries (Ayrancı & Köşgeroğlu 2004; Beser 2012; Goswami et al. 2010). It was determined that almost half of the needlestick injuries (48.2 %) occurred during treatment of cases in which nurses were unaware of the infection and the rate of the nurses who were unaware of what to do after the injury was found as 94.2 % (Ayrancı & Köşgeroğlu 2004). Most of the nurses taking part in the present study expressed that they did not report their injuries as they were unaware of the necessity to report the injury, they did not find reporting necessary, they did not find it necessary after making the proper intervention and they did not have enough time.

In a similar way, the reasons of not reporting the injuries included not knowing where to report the injury, time constraint and lack of reporting system in the studies conducted so far (Habib, Ahmed Khan & Aziz 2011; Hanafi et al. 2011; Muradlihar et al. 2010). Creating an injury reporting culture, raising awareness in relation to the importance of the problem and following HBV vaccination as a preventive measure are of great importance to protect the health of the professionals.

It is of paramount importance that the great majority of the nurses stated that vaccination is important in protection against diseases in the study. In compliance with the literature, the rate of getting the hepatitis B vaccine is found to be high in the present study as well (Ayrancı & Köşgeroğlu 2004; Köşgeroğlu et al. 2003,

Manzoor 2010; Mohammadi, Allami & Mohamadi 2011). In another study where Keçik-Boşnak et al. (2013) examined HBV seroprevalence among health professionals in the same region, 82,8 % of the nurses and 69,3 % of the auxiliary staff stated that they got at least 3 doses of hepatitis B vaccine. This finding can be regarded as an indicator of the importance that nurses pay to the protection against hepatitis B disease. However, another study conducted in Turkey reported that 44.5 % of all health professionals were completely vaccinated against hepatitis B virus (Inan 2005). There is no routine practice to determine hepatitis and HIV infection in patients hospitalised in Turkey and infection status of patients is not known. Thus, vaccination and prophylaxis following the exposure among health professionals should be monitored closely.

More than half of the nurses participating in the present study received training on sharp and needlestick injuries and most of them received in-service trainings. It was seen in the observations that behaviours of the nurses working in the clinics changed positively in terms of taking measures against sharp and needlestick injuries after the training, which is an expected result of the study. It is accordingly thought that such trainings can be useful in decreasing the rate of injury. The studies on the efficiency of training in the sharp and needlestick injuries, which are limited in number, show us that trainings on sharp object injuries lead to decreases in the rate of injury (Zafar et al. 2009). It is therefore essential that infection control committee draws attention to this problem through trainings and other application strategies.

Conclusions and recommendations

As a conclusion, nurses are under risk of encountering sharp and needlestick injuries and follow-up rate for sharp and needlestick injuries is poor.

Nurses should be monitored in terms of sharp and needlestick injuries. Safety protocols should be developed, preventive strategies should be established and it must be obligatory to report injuries.

Trainings should be planned on safe use of equipment, reporting and recording injuries, the importance of training for all health professionals and nurses, in particular, disposal/transfer of sharp needlesticks, establishment of employee safety unit and making health professionals

develop a responsible attitude as well as necessary preventive measures.

Hospital administration, infection control committee managers and all the health professionals should be in cooperation in terms of the use of preventive products against sharp and needlestick injuries. This approach would be more economic and effective than the attempts made to treat the injured health professional.

Necessary steps should be taken in order to ensure that nurses and other health professionals undergo the tests related to hepatitis B and repeat them every 6 months, have the preventive vaccines against hepatitis B and undergo examination and medical screening for early diagnosis and treatment of other infectious agents.

Relevance to clinical practice

Results of this study demonstrate that measures to be taken against sharp and needlestick injuries in the clinics are of great importance in terms of employee health. Furthermore, ensuring the continuity of follow-ups, establishing safety protocols and developing preventive strategies will shed light on the clinical practices by showing the importance of reporting the injuries. Thus, continuous in-service training programs should be extended for occupational health and safety.

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