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Original Article

Research Regarding Injuries to Health Workers by Surgical and Other Potentially Dangerous Medical Tools and Precautions Against Such Injuries

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Abstract

Objective: This study describes the research regarding injuries by surgical tools and the precautions to be undertaken in the event of such an injury. The study was conducted at the Ministry of Health of the Republic of Turkey, İstanbul (Fatih) Institution of Public Hospitals Province of İstanbul Association of Public Hospitals General Secretary, Istanbul Training and Research. The study aims to enhance professional safety programs in this regard.

Methods: From March to April 2014, 200 nurses from different clinics were personally met. These volunteers answered 19 questions from the data collection form. The survey responses were analyzed. Proportional data was statistically analyzed using a Chi-square test.

Results: It was determined that 59% of volunteers (118 volunteers) experienced injuries from contaminated surgical or medical tools, and in 54% of these cases (64 volunteers), the injury occurred while putting the cap on a syringe needle. Only 6% (7 volunteers) of those injured by surgical or medical tools were reported. Moreover, 91% of volunteers (182 volunteers) answered that they had been vaccinated against hepatitis B. To prevent such injuries, 36% of volunteers recommended that workers should be given periodic and in-depth educational programs.

Conclusion: We conclude that majority of nurses are vaccinated against hepatitis B. Moreover, although there are a high number of injury cases, a very small number of these cases are reported. In light of the information obtained in this study, it is probable that the use of safe medical tools and periodic educational programs that teach precautionary measures can reduce the number of injuries.

Keywords: Health workers, injury by surgical/potentially dangerous medical tools, environmental precautions, safety of health workers

Introduction

The working life covers at least 1/3 of our normal day and lasts a large part of our lifespan. The work performed in this 1/3 portion or the working environment significantly affects human health. The working environment, with its physical, chemical, biological, and psychosocial factors, affects an individual's overall health in positive and negative ways (1, 2). A hospital is not only an institution providing healthcare but also an education and research center. All planned healthcare services include maintaining good sanitation, administering treatment, and ensuring that the people who cannot be cured completely can live unaided and have the best health status possible. However, the hospital environment poses a greater risk due to its complex structure (3-5). Although work-related accidents and risks faced by healthcare workers are wide-ranging, most accidents are caused by sharp objects (2, 6, 7). In considering the institutions where injuries are caused by sharp objects, education hospitals come in first place (8). When the injuries are caused by especially contaminated sharp objects, it creates a significant risk of infection for employees and patients. Using disposable sanitary products minimizes the infection risk in sharp object injuries. However, in injuries that occur while removing the instruments during or after intervention, the risk of infection for healthcare personnel is high (6). The Center for Disease Control and Prevention has developed a guidebook called Universal Precautions to give advice to help protect all healthcare personnel from being contaminated by infected blood and body fluids.

According to this guidebook, the body fluids of all individuals served are considered infected and precautionary measures before procedures are therefore mandatory. Accordingly, before and after the operation, hands should be washed after pulling off protective gloves, and protective gloves, gowns, mask, and goggles should be used to prevent contamination from skin and mucous membranes.

Also, in case of contamination with patient blood or body fluid, first, the area should be washed with soap and water and then wiped with an antiseptic solution. Afterwards, the hospital infection control committee should be consulted for an infection contamination follow-up. In the guidebook, to prevent sharp object injuries, it is advised that used syringes should

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be disposed of in a waste bin that is resistant to sharp objects without removing the needle; furthermore, these boxes should be replaced before they get full (7-10). In the present study, we aimed to determine the sharp object injury experiences of healthcare personnel (nurses, health staff, etc.) working in our hospital and to investigate the practices causing injury, injury reports, vaccination rates against hepatitis B, the prophylaxis information generated against specific infections and contamination, and to acquire data for the development of occupational safety programs.

Methods

This study is a descriptive research aiming to present the experiences of sharp object injury to nurses and health officers working in the clinical environment in İstanbul Training and Research Hospital and the measures taken in the case of such injuries, in order to develop an appropriate occupational safety program. The study was approved by the local ethic committee and verbal consent of the volunteers participating in the study were obtained. Therefore, a total of 200 nurses and health officers at different clinics were interviewed face to face between March and April 2014. A 19-question "Data Collection Form" was used that was developed by using the literature and that questioned the working experiences and surgical instrument injury experiences during professional practice and also the precautions taken. The data collection form was administered face to face with the participants.

Statistical analysis

The data obtained from the study were analyzed with the Statistical Package for the Social Sciences 11.5 software (SPSS Inc.; Chicago, IL, USA). Descriptive statistics regarding all the variables are given as numbers and percentages. Controls of independence between variables that indicate categorical feature were performed with the chi-square test, and $p<0.05$ was considered significant.

Results

A total of 200 nurses and health officers, mostly having a high school diploma (51%), with an average age of 32.37±8.44 years and working in the clinical environment in T.C. (Republic of Turkey) Ministry of Health, Turkey Public Hospitals Authority, İstanbul (Fatih), Association of Public Hospitals Secretary General, İstanbul Education and Research Hospital, were interviewed. It was observed that 43% (n=86) of the participants worked in in-patient services; the average period in their profession was 10.90±8.85 years, and the average period of working in hospital was 7.60±7.40 years. It was observed in the study that 59% of the healthcare personnel had suffered from sharp object injury at least once, and these injuries (54%) often occurred when capping the syringe needle. It was determined in the study that sharp object injury areas are cleaned with water or povidone-iodine after the injury, and while investigation of hepatitis markers took first place, the case report rate to the infection control committee was as low as 6%. In addition, one of two volunteers, who said they did not do anything at the time, summarized the situation as "I did not have time" and the other "I did not attach importance to it" as a reason (Table 2). In the study, it was found that generally the rates of taking hepatitis B vaccination (%91), having knowledge about hepatitis B vaccination prophylaxis (89%), and trusting the effectiveness of using protective equipment (74.5%) by health personnel are considerably high (Table 3). It was determined in the study that even though nurses are exposed to more injury, there is not a significant difference between the state of injury and the unit where the nurse works (p=0.862) (Table 4). Considering the reasons of being exposed to injury by personnel in the service units, factors such as having a great number of patients per person, concern about completing the task, excessive paperwork, and weak organizations can be distinguished.

Discussion

The U.S. National Surveillance System for Healthcare Workers states that most of the sharp object injuries occur in the process of percutaneous intervention, and considering the rates, injuries occur during subcutaneous injection interference (32%), with a suture needle (19%), with winged infusion needles (Butterfly Needle) (12%), with a lancet (7%), with an intravenous catheter needle (6%), and with a venipuncture needle (3%). In injuries occurring in the process of parenteral administration, the risk of transmission with blood infected by human immunodeficiency virus (HIV) is 0.3%, whereas the risk of transmission with blood infected by hepatitis B (HBV) is 30%, and the

Table 1. Practices in which healthcare personnel are exposed to sharp object injuries

	Number	%
Sharp object injuries	118	59
Injury during the syringe needle capping	64	54
Injury during vascular access establishment	32	27
Injury during bloodletting	30	25
Injury during injecting	7	6
Injury during glucose level check	7	6
Injury with a scalpel	6	5
Injury with a needle thrown into a garbage bag	4	3
Injury when disposing a needle into a waste bin	2	2
Injury with a suture needle in an operating room	2	2

Note: more than one choice was marked.

Table 2. Applications healthcare personnel performed in sharp object injury cases

	Number	%
Washing the injury area with water	88	75
Investigating whether the patient has an infectious disease	87	74
Cleaning the wounded area with Povidone-iodine	70	59
I got the results of hepatitis markers checked	66	56
Reporting the infection to the Control Committee	7	6
Doing nothing	2	2

Table 3. Precautions against sharp object injuries taken by healthcare personnel

	Number	%
Vaccination against Hepatitis B	182	91
Having knowledge about protectiveness of Hepatitis vaccination	177	89
Trust in the effectiveness of using protective equipment	149	74.5
Receiving training to reduce injuries	186	93

Table 4. The distribution of injuries by units in which healthcare personnel work

	No injury (n=82)	Injury exists (n=118)	p
Emergency ward	11	14	
Operating room	14	27	
Outpatient clinic	10	11	0.8620
Service	36	50	
Intensive care unit	11	16	
Chi-square test			

risk of transmission with blood infected by hepatitis C (HCV) is 20% (9, 12). Vaccination for preventing the transmission of HIV and hepatitis C pre and post-injury with sharp objects is out of question, but immunization can be administered to prevent transmission of hepatitis B virus, as is done for the prophylaxis program for HIV, but this is both long standing and costly and also has high mortality and morbidity rates. It is stated that most of the sharp object injuries occur as a result of pinprick by accident, when capping the syringe needle, or when suturing or disposing of the syringe needle. Considering the studies related to sharp object injuries, they range from 30% to 70%. It is observed that syringe needles cause the majority of these injuries (13). In harmony with the literature, it was also identified in this study that the injury rate among health professionals is 59%, and the rate of injuries resulting when capping the syringe needle is 54%. For the prevention of sharp object injuries, it is remarked that used syringe needles need to be disposed of without capping after the operation. However, it is observed that improper practices in this regard still persist.

In addition, it is specified that although the disposal of syringes without removing the needle into sharps disposal containers reduces the injury risks, because of the high costs of these containers for healthcare organizations, syringes are now designed to reduce the risk in accordance with the regulations and are disposed of into medical waste container while only the needles are disposed of into sharp disposal containers by detaching them from the syringes (9, 12). Studies in recent years show that a sensibility about protective measures and vaccination has arisen, but, reporting the injuries is still not common enough. Also in this study, the rate of reporting sharp object injuries to the control committee was detected as being considerably low (6%).

Conclusion

In the present study, it was determined that the rate of sharp object injuries is high, with most of the injuries occurring after treatment while capping the syringe needle, and that this rate is higher especially among nurses in in-patient units. In our study, the second desired outcome was having knowledge about hepatitis B prophylaxis, high vaccination rates against hepatitis B, and the effectiveness of using protective equipment. But, despite all these, it is remarkable that the rate of reporting injuries is still very low.

With these results, it can be said that using safe medical supplies in healthcare services to prevent contamination from infectious diseases in blood, encouraging healthcare personnel to report injuries after the case, and maintaining periodic training programs involving measures to be taken against injury can provide a dramatic decrease in sharp object injury cases.

Ethics Committee Approval: Ethics committee approval was received for this study from local ethic committee.

Informed Consent: Verbal informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

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