

Needlestick and sharps injuries among nurses at Atatürk university research hospital and their practices after injury

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ABSTRACT

Objective: Exposure to needlestick and sharps injuries (NSI) is among the major occupational risks of health workers. Yearly 385,000 NSI are reported by health workers. In this study, we aimed to evaluate the frequency of NSI among nurses at Atatürk University Research Hospital together with the elaboration of the utilization of effective preventive measures used for infection control as well as the affecting factors.

Methods: All 562 nurses working at Atatürk University Research Hospital during September-November 2016 were invited to fill a questionnaire with 27 items. Questions were asked about the sociodemographic characteristics, having experienced NSI, usage of protective equipment, and hepatitis B vaccination status. A total of 555 (98.7%) nurses volunteered to participate. Verbal consent was taken from the participants.

Results: Of the participants, 425 (76.6%) were females, and 130 (23.4%) were males. Their mean age was 27.5 ± 7.4 years. 52.6% (n = 293) of the participants were in the surgical clinics while 47.4% (n = 262) were in the medical clinics. Of the participants, 21.6% (n = 120) stated that they experienced a needlestick or sharps injury within the last one year. Of those injuries, 16.7% (n = 20) happened while removing the needle tip from the syringe, 29.2% (n=35) while trying to reattach the needle cap, 16.7% (n = 20) while filling the syringe, and 12.5% (n = 15) while drawing blood from the patient.

Conclusion: Health workers should be trained on injuries and all other occupational risks with cutting and puncturing tools, and they should be instructed on the use of protective equipment.

Keywords: needlestick injuries, sharps injuries, occupational health, nurses

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Exposure to needlestick and sharps injuries (NSI) is among the major occupational risks of health workers. According to the Centers for Disease Control and Prevention (CDC) estimates, yearly 385,000 NSI are reported by health workers. On the other hand, it has been shown that 50% or more of the NSI was not reported [1]. There is the particular importance of NSI contaminated with body fluids in the transmission of more than 20 pathogens, especially HIV, Hepatitis B, and Hepatitis C to health workers [2]. NSI refer to

medical or laboratory equipment (needles, shredded intravenous cannulation devices, broken glass fragments, lancets, pipettes or ampules, and injectors) that can cause skin penetration injury when held by hand [3]. According to the International Labor Organization (ILO), the most exposed occupation to needle injuries among health professionals are nurses [4]. The insufficient number of nurses and the intense and long working hours brings many occupational risks that involve members of this group, including



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NSI [5]. Injuries with cutting and needling tools are fundamental problems for healthcare workers in the sense of spreading infections [6]. Transmission mainly occurs by percutaneous or the mucosal route. Percutaneous spread happens through deep cuts, cutting with sharp tools, puncturing with needles, burning or peeling, while transmission via mucosal route occurs by contact with the nose, eyes, oral mucosa, blood, or body fluids [7]. The best method to protect health personnel is to prevent their contact with blood [8]. Means of protection from bloodborne infections are compliance with universal precautions, barriers, cleaning of used devices, gloves, and other equipment, as well as waste disposal, immunization, and protective measures after exposure [9]. The Patient and Employee Security Department of the Ministry of Health is valuable from this perspective [10]. Despite the decrease in percutaneous injuries parallel to the preference of disposable medical devices, blood drawing with vacuum tubes, and appropriate disposal of cutting and needling tools, the current rate of NSI remains still high in Turkey [11].

In this study, we aimed to evaluate the frequency of NSI among nurses at Atatürk University Research Hospital together with elaboration of the utilization of effective preventive measures used for infection control as well as the affecting factors.

METHODS

The population of this descriptive-cross-sectional study was nurses working at Atatürk University Research Hospital. A questionnaire with 27 items was applied to the participants who accepted to join. Items in the questionnaire were: Questions on the sociodemographic characteristics of participants such as age, gender, marital status, department, and duration of work. The second section of the questionnaire consisted of questions on the experience with NSI such as the practice causing injury (drawing venous blood, cannulation, drug administration, etc.), the injuring instruments (needles, lancets, bottles, etc.), usage of protective equipment, and hepatitis B vaccination status. The population under study consisted of 562 nurses. The study was conducted between September-November 2016. Before the study, approval was obtained from Atatürk University

Faculty of Medicine Ethics Committee (decision no. 01, date 28.01.2016). All nurses in the population were invited to join the study; 555 (98.7%) volunteered to participate. Verbal consent was taken from the participants.

Statistical Analysis

The SPSS 22.0 for Windows software (SPSS Inc., Chicago, IL, USA) was used for data analysis. Descriptive statistics for all variables were given as n, percentage, mean, and standard deviation (SD). The Chi-square test was used for the bivariate analysis of categorical variables and Student t test or Mann-Whitney U test for numerical variables. A *p* - value < 0.05 was accepted as statistically significant.

RESULTS

A total of 555 nurses (98.7%), including 425 (76.6%) females and 130 (23.4%) males, participated in the survey. Their mean age was 27.5 ± 7.4 years.

Table 1. Demographic characteristics of the participants

Characteristics	Data n (%)
Age (years)	
17-24	245 (44.1%)
25-29	145 (26.1%)
30 and above	165 (29.7%)
Sex	
Male	130 (23.4%)
Female	425 (76.6%)
Marital Status	
Married	225 (40.5%)
Single	320 (57.7%)
Divorced	10 (1.8%)
Employed Department	
Surgical Disciplines	292 (52.6%)
Medical Disciplines	263 (47.4%)
Intensive Care	355 (64.0%)
Laboratory	30 (5.4%)
Outpatients	60 (10.8%)
Emergency Ward	5 (0.9%)
Dialysis	20 (3.6%)
Inpatient Nurse	85 (15.3%)
Years in the Profession	
0-3 years	185 (33.3%)
4-6 years	135 (24.3%)
7-9 years	100 (18.0%)
10 years and above	135 (24.3%)

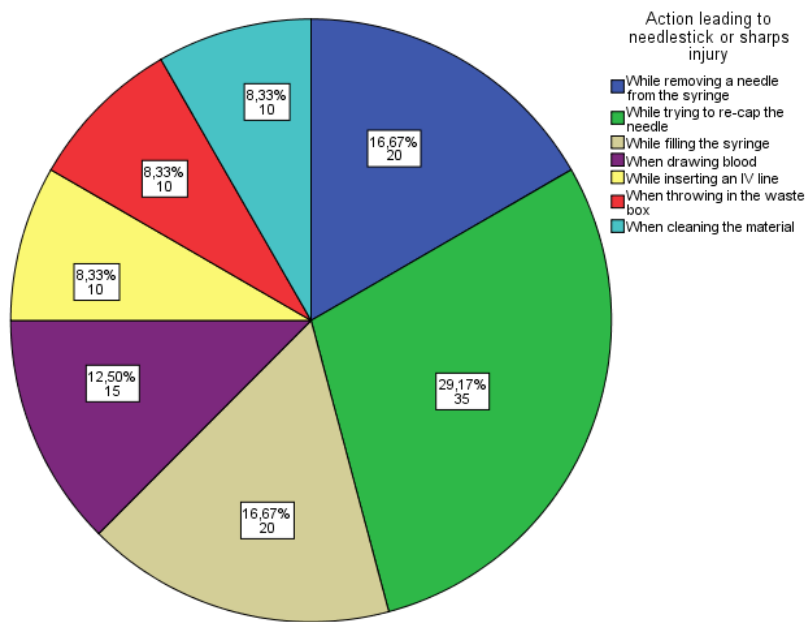


Figure 1. Distribution of actions leading to needlestick and sharps injuries.

52.6% (n = 293) of the participants were in the surgical clinics while 47.4% (n = 262) were in the medical clinics. The mean weekly working time of the participants was 40.1 ± 7.9 hours. 185 (33.3%) participants were working in the nursing profession for 0-3 years, 135 (24.3%) for 4-6 years, 100 (18.1%) for 7-9 years and 135 (24.3%) for more than ten years. Participant characteristics are presented in Table 1. Of the participants, 37.8% (n = 210) were satisfied with their work and 60.4% (n = 335) indicated that their work was too hard. Only 14.4% (n = 80) of those surveyed stated that they could take a break from work. 60.4% of those surveyed (n = 335) stated that they felt tired when they started work. The proportion of in-service training in the last year was 69.4% (n = 385). Of the surveyed, 13.5% (n = 75) stated that they were afraid of being criticized when reporting a needlestick and sharps injury, while 73.9% (n = 410) said that they did not have such a worry. 42.3% (n = 235) of the participants mentioned that employee safety was not a priority the employer, 46.8% (n = 260) stated that adequate measures were not taken against their occupational risks in their institutions, and only 35.1% (n = 195) thought that their institutions provided all equipment to protect them from work accidents. 89% (n = 494) of the survey participants stated that they used protective equipment

during patient interventions.

Of the participants, 21.6% (n = 120) stated that they experienced a needlestick or sharps injury within the last one year. Of those injuries, 16.7% (n = 20) happened while removing the needle tip from the syringe, 29.2% (n = 35) while trying to reattach the needle cap, 16.7% (n = 20) while filling the syringe, and 12.5% (n = 15) while drawing blood from the patient (Figure 1). Of the surveyed, 26.1% (n = 145) reported having hepatitis B vaccination. Only 48.6% (n = 260) of those surveyed knew that they had to fill out the 'Contaminated Needlesticks, Sharps, or Splash Exposures Follow-up Form' after injury, and 12.5% (n = 69) of the injured notified their authorities by filling out the follow-up form.

The mean age of those who stated that they had been injured in the last year (26.6 ± 6.0 years) was found to be significantly lower (t = -2.123; p = 0.034) compared with the uninjured (28.3±8.1 years). Female nurses (23.5%; n = 100) had significantly higher injury rates when compared to males (11.5%; n = 15) (Chi-square = 9.343; p = 0.009). There was no significant difference between the nurses working in the surgical (20.5%; n = 60) or medical wards (20.9; n = 55) concerning injuries (Chi-square = 1.369; p = 0.504). There was a significant difference between injuries with needlestick or sharps of people with different

weekly working hours. Mean duration of working hours was shorter in those with experience of injury within the last year compared to non-exposed (39.8 ± 6.5 vs. 40.4 ± 8.1 respectively; Mann-Whitney U test; $Z = -2.567$; $p = 0.010$). There was a significant difference in the injury proportions concerning the duration of work in the profession (Chi-square = 54.302; $p < 0.001$). Participants with 0-3 years, 4-6 years, 7-9 years, and 10 or more years' experience had 24.3% ($n = 45$), 22.2% ($n = 30$), 5.0% ($n = 5$), and 25.9% ($n = 35$) NSI; respectively. Those participants reporting the possibility of giving breaks at work experienced less injury compared to the others (Chi-square = 69.294; $p < 0.001$). No significant differences in NSI were observed with regard to having received (23.4%; $n = 90$) or not received (18.2%; $n = 20$) in-service trainings (Chi-square = 1.444; $p = 0.486$).

DISCUSSION

The proportion of participants, who had at least one needlestick or sharps injury within the last year, was 21.6%. A similar study conducted in Muğla revealed a ratio of 42% [12]. Another study conducted in İzmir showed a proportion of 65.8% [13], while in a study done in Isparta, this rate was 36.2% [14]. In the latter investigation, according to the latest injuries remembered, the proportion of NSI was 30.4%. In various studies, it was determined that most of the injuries were caused by injector needles [15, 16]. In the survey conducted by the CDC, 5,000 percutaneous injuries were identified during the five-year follow-up period, out of which 62% were due to syringe needles [17].

In our study, the mean age of those who had been injured in the last year was found to be significantly lower than those uninjured. In one research, it was stated that being under the age of 24, having an experience of four years or less, working in surgical or intensive care units, and working more than 8 hours a day, were factors that increased needlestick and sharps injuries [16]. According to the literature, those working in surgical and intensive care units, having mixed shifts or more extended working hours, nurses with less experience, reloading needles, and those who do not use protective gloves while holding needles are more likely to be injured [18, 19].

In our study, although the number of nurses in the surgical units who had NSI was higher than nurses working in medical wards, the difference was not statistically significant. The literature provides ambiguous information on this issue. Among the reasons for the higher number of injuries in the surgical units may be the relatively higher frequency of parenteral applications and procedures in these wards. Many studies have shown that healthcare workers in the emergency and surgical departments had more penetrating puncture injuries than in other units [2, 11, 20].

The proportion of vaccination against hepatitis B in our study was 73.9%. The probability of infection after percutaneous injuries in the form of needle puncture is 30% for Hepatitis B 3-4% for Hepatitis C [21], and 0.3% for HIV [14]. These rates indicate that percutaneous injuries are a significant risk for Hepatitis B in particular. The practical way of protection from hepatitis B is vaccination. All healthcare providers should be included in the Hepatitis B vaccination program [22]. However, also the immunity status of post-vaccination persons should continuously be monitored.

It was determined that 51.4% of the participants in the study were not informed about the form to be filled after a needlestick or sharps injury. Usage of the follow-up form in the event of any injury was found to be 11.7%. In another study conducted in İzmir [13], 13.8% reported the injury while 34.8% did not do so, and 5.8% stated that they were not aware of the regulations about notification. When the reasons for not reporting injury were queried, 15.3% answered "I did not know how to report" and 7.2% mentioned, "I had no time for notification". In another study conducted in Mersin, it was determined that 87.3% of the research group did not report NSI. When the reasons for not reporting the injury were examined, 48.6% of the employees answered: "I did not know that I had to report," 17% responded, "I was not worried," and 16% said, "I did not know the process" [21]. Other studies reported proportions between 32.4% and 96.2%. When all studies are evaluated together, the most reported reasons for not reporting (in decreasing order) are; negligence, fear of perception, fear of warning, lack of knowledge about the reporting procedures, concerns about privacy, and reluctance [23-25].

Fear of being criticized when reporting the injury was 13.5%. In another study conducted in Istanbul, it was stated that especially those who are new to the profession act more timidly in reporting an injury [26]. It was also observed that these people had less knowledge about infectious diseases. Increasing the notification rate is possible by increasing the training of newcomers to the profession [27].

The use of safety devices that cover the needle-tip after hypodermic injection lowers the risk of NSI per HCW by 43.4%-100% compared to conventional devices [28]. The World Health Organization (WHO) recommends the use of safety injection devices and instructs governments to transition to their exclusive use by 2020 [29].

CONCLUSION

Health workers should be trained on injuries and all other occupational risks with cutting and puncturing tools, and they should be instructed on the use of protective equipment, which must be provided by the employer. Safety-engineered devices should be used for hypodermic injections. Occupational physicians should be assigned to follow up in case of any injury or occupational illness. Not only nurses but all other allied health workers should be provided with for hepatitis B vaccinations and antibody follow-ups, with screening, diagnosis, and treatment support also for other occupational infectious diseases.

Conflict of interest

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