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Research Article

KNOWLEDGE LEVELS AND ATTITUDES OF STUDENTS OF ORDU UNIVERSITY FACULTY OF DENTISTRY TOWARDS THE USE OF SAFE CUTTING AND SHARP INSTRUMENTS

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ABSTRACT

Sharps injuries are among the leading occupational accidents and risks to which healthcare workers are exposed. Our study aimed to evaluate the level of awareness and approaches of Ordu University Faculty of Dentistry students about the safe use of sharps during their education and throughout their professional lives. The study included 189 students who voluntarily agreed to participate in the study among the 4th and 5th grade students studying at Ordu University Faculty of Dentistry. Demographic information and multiple-choice questionnaire questions were asked to measure the level of knowledge and attitudes of the students toward the safe use of materials. All data of 189 students [147 female (75%) and 42 male (25%)] were included in the study. It was determined that the most common cause of injury was 'glass in the hand as a result of a broken light bulb'. The most common intervention was 'cleaning with antiseptic' with 52%. Dental students are at serious risk of sharps injuries during their clinical practice training. To minimize these risks, faculties should take the necessary precautions by health quality policies.

INTRODUCTION

Sharp objects, defined as any instrument that has the potential to cause penetrating injury in the skin, are the most common cause of infection among healthcare workers (Guilbert, 2002). Healthcare workers are exposed to many different infection factors such as direct contact with blood, bloody bodily fluids, or sharp-penetrating object (SPO) injury. The most common of these factors include the Hepatitis B virus (HBV), Hepatitis C virus (HCV), and Human Immunodeficiency Virus (HIV) (Beltrami, Williams, Shapiro and Chamberland, 2000). It is reported that dentistry infection rates have decreased thanks to vaccinations significantly compared to the past when there were no HBV vaccines and dental applications involved high rates of HBV infections (Ramos-Gomez et. al., 1997).

It is noted that dentists and nurses are more likely to be exposed to sharp-penetrating object injury than other healthcare workers (Bouya et. al., 2020). Dentists, in particular, are one of the occupational groups that are frequently exposed to occupational accidents due to the mobility of patients and working with sharp objects in a setting where the working area is

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confined and visibility is limited (Ramoz et al, 1997). Many dentists are exposed to SPO injury at least one time throughout their professional lives (Demirbaş, 2021). Injuries occur mostly while breaking ampoules, handling sharp objects in the team, and closing needle caps (Gerberding et. al., 1990). Also, the students of dentistry are at a high risk of being exposed to SPO injury especially during their clinical practice education mainly due to a lack of medical knowledge, inexperience in practical applications as well as lack of knowledge on personal protective measures (Kumar et. al., 2015).

In our country, SPO injury incidence rates are at high levels, i.e. 50-70%, a significant portion of which have gone unreported (Ayranci & Kosgeroglu, 2004). As such injuries may cause life-threatening conditions as well as pose threats in terms of control of blood-borne diseases such as HIV, HBV, and HCV related to professional exposure undermining both occupational health and safety, it has been made mandatory to report SPO injury incidents (Hanrahan & Hanrahan, 1997).

Dentists and dentistry students are significantly at risk of SPO injury incidents. To minimize these risks, students must receive courses on this subject as part of their curriculum, take personal protective measures, and receive supervision in terms of these measures. These courses should be delivered before clinical education, which must mainly include occupational accident preventive measures, blood-borne infections, correct injury reporting methods, as well as prophylaxis procedures required during post-infection.

The present study aims to reveal the knowledge level and approaches of students at the Faculty of Dentistry, Ordu University, on the safe handling of sharp-penetrating tools they use or will be using during their study and professional life.

MATERIAL AND METHOD

Goal and Type of Research

Our research involves a questionnaire administered to 4th and 5th-year students attending clinical practice at the Faculty of Dentistry of a university.

Universe and Sample of Research

Universe of the Research consists of the students attending clinical practice education in the academic year 2022-2023 in the Faculty of Dentistry of a university (N=189), and no sampling is applied to survey the entire universe.

Data Collection and Analysis

As a data collection tool, a questionnaire created on Google Forms survey tool is used. The first section of the questionnaire asks for demographic data, while the second section contains 18 multiple-choice questions to measure the knowledge level and attitudes of students on the safe handling of SPO. Students are kindly asked to read questions carefully and answer them personally.

Statistical Analysis

We used the IBM SPS 16.0 (IBM Corp., Armonk, NY, USA) software to conduct statistical analysis of data. While evaluating data, categorical data are presented in numbers and percentages, with numerical data in mean and standard deviation values. Comparisons between groups are made using the Chi-square test. In the analyses, values smaller than $p<0,05$ are considered statistically significant.

Ethical Considerations in Research

Before starting the research, written permission was obtained from the Clinical Research Ethics Board of Ordu University (Decision No. 125 of 2023). In accordance with the Principles of Helsinki Declaration, each respondent was given an ‘Informed voluntary consent form’ to prove that they voluntarily participated in the survey. The research was initiated after informing respondents about the study and collecting consent from those who voluntarily wanted to participate in the research.

RESULTS

Entire data collected from a total of 189 respondent students [female 147 (75%) and male 42 (25%)] are included in the study. 142 of the students are in the age range of 18-23 years old [female 106 (81%) and male 73 (19%)]. Of all respondents, 96 students (51.1%) attend their fifth year with 93 students in the fourth year (48.8%).

Of all students, 148 students (77.8%) answered yes when they were asked if they have sustained SPO injury such as needle sticks, or glass shard cuts in the clinical practice settings. Of these students, 73 students accounted for 4th year students while 75 students for 5th year. No statistically significant difference is found between the school years in terms of occurrence of SPO injury ($p<0.05$). The distribution of the various clinical factors that cause respondents to sustain injury is provided in Figure 1. The most common cause of injury is found to be 'hand cuts by glass shards due to the broken ampoule’.

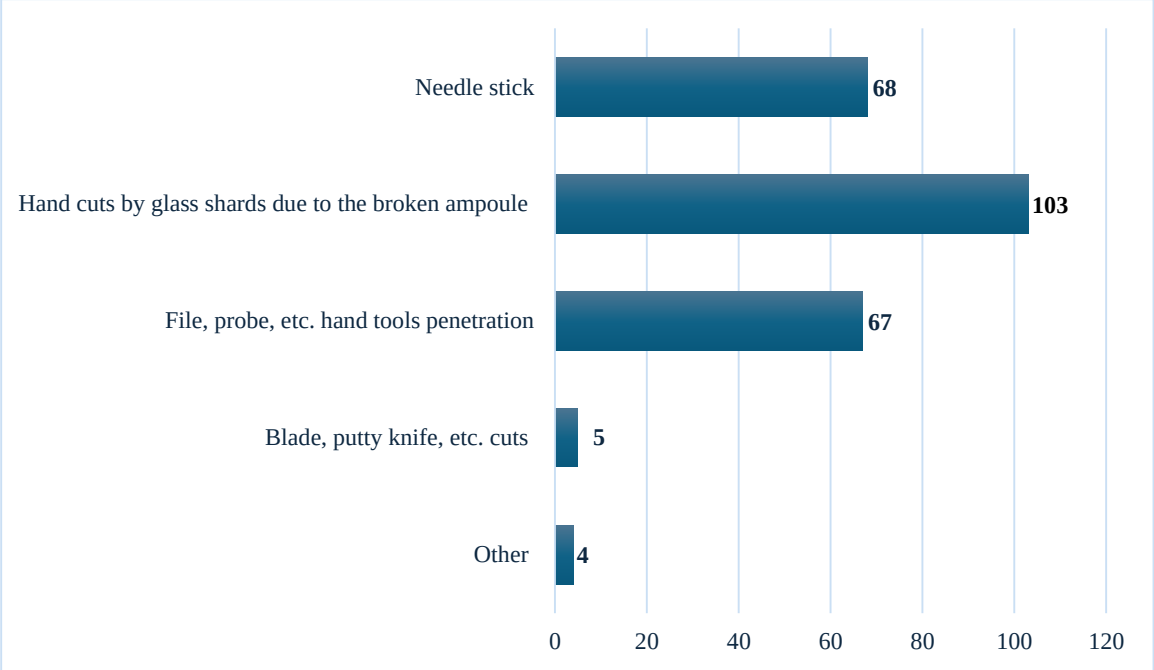

Figure 1. Causes of Injury Sustained by Students Involving Sharp-Penetrating Objects

Figure 2 shows the distribution of answers given by students when asked how you intervened in the injury. With 52%, the most common intervention is observed to be 'cleansing with antiseptic'.

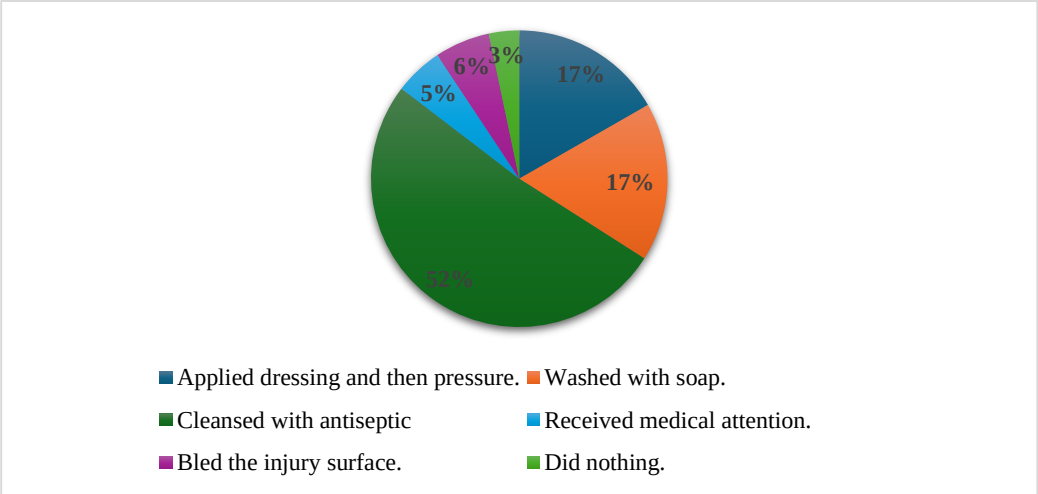

Figure 2. Methods to Intervene in Injury Surface

Respondents are asked if they have reported the injury. Of the respondents, 136 (90.1%) said they did not report injury with 15 (9,9%) said as having reported it. In terms of school year among non-reporting students, fourth-year students account for 92%, with fifth-year students for 88,8%, meaning there is no significant difference between 4th and 5th-year students in terms of non-reporting. ($p<0,05$) This suggests that there is an important lack of knowledge on reporting injuries in terms of occupational health and safety. Of the reporting students, 13

(86.7%) reported having applied to the quality unit. Figure 3 shows the distribution of causes behind why non-reporting students did so.

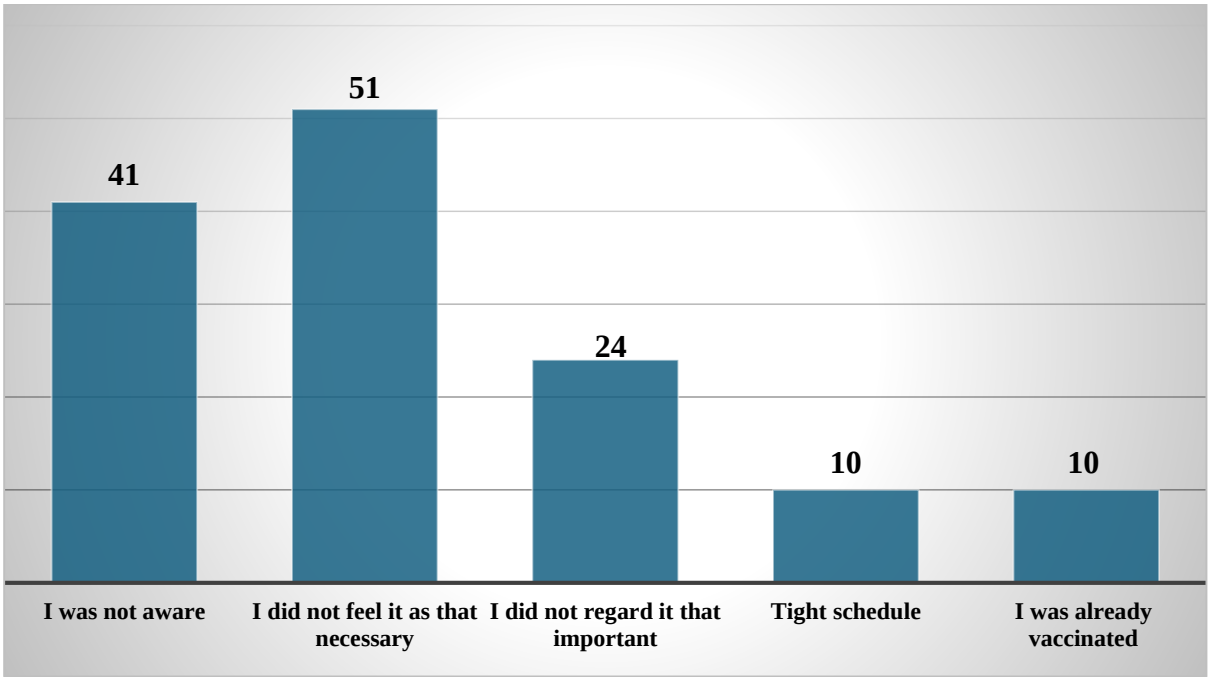

Figure 3. Causes of Non-Reporting

Responding students were asked if they had had any vaccine in the past five years, where 170 of them responded as COVID-19, 170 as Hepatitis B, 113 as tetanus, 63 as Hepatitis A, and 11 as flu vaccine. Students are further asked if they are immune to Hepatitis B, 170 of whom responded yes, 19 as not having had the vaccine, therefore not being immune.

When asked, as per your recall, whether the SPO involved in the most recent incident you have experienced contact with blood and other bodily fluids of patients, 114 students responded No (70.4%), 32 Yes (19.8%), and 16 I do not know (9.9%). The right hand (58.6%) is reported as the most frequently injured body site.

When asked whether they take adequate measures to protect themselves against diseases that are transmissible via SPO injuries, 109 students answered Yes (58.6%) with 77 students as No (41.4%). Finally, 122 students responded No (64.4%), with 67 students Yes (35.6%) to the question as to whether they have ever attended a course on SPO handling and injury.

DISCUSSION

Hospitals are environments where infection agents exist intensively. Healthcare workers, while doing their tasks, are constantly in contact with such agents, which may lead to serious infections. All hospital staff whose duties involve possible contact with blood and bodily fluids are at serious risk of blood-borne diseases. Dentists are a part of the group with a high risk of

exposure to such accidents (Lee et. al., 2014). Students of Dentistry use and handle SPOs frequently during clinical and preclinical studies. Due to the underdeveloped manual dexterity, inadequate practice, lack of knowledge, high anxiety levels, and low-risk perceptions, these students are included in the high-risk group in terms of pathogens that are transmissible via the blood or bodily fluids of patients. As healthcare workers are in direct contact with the blood of patients, they are at constant risk of contracting blood-borne viral infections especially such as HBV, HCV, and HIV (Pavithran, 2015).

A Brazilian study involving dentistry students found 43.1% of respondents were exposed to SPO injuries (Fernandes et. al., 2017). A Taiwanese study reported this rate as 21.28% for dentistry students, 7.50% for assistants, and 6.77% for nursing staff. Studies demonstrated that there is an inverse correlation between the experience-knowledge level and injury incidents (Lee et. al., 2014). The present study planned to measure the knowledge level of dentistry students on SPO handling and found that 77.8% of the respondents were exposed to SPO injury.

As studies on sharp-penetrating object injuries can only reply to the reported incidents, it is estimated that the actual incidence of SPO injuries is much higher than those reported. A study on needle stick injuries at Hamory, a university hospital, notes that 75% of the SPO injuries have gone unreported. It is observed that a questionnaire-based study involving dentistry students revealed that 77% of SPO injuries have gone unreported (Li, Lin and Chang, 2023). Like these studies, our present study also found that 90.1% of the students have not reported SPO injuries.

Studies on SPO injuries among healthcare workers other than dentistry professionals determined that disposable needles account for the common cause of the injuries. Our present study found that two important factors leading to injuries include a sterile glass shard pricking into the hand due to a broken ampoule at 68.7%, followed by an injector needle stick at 45.3%. In dentistry, multiple injections are applied to the patient throughout their treatments. This makes dentists vulnerable to the risk of needle stick injuries. Local anesthesia and re-capping of injectors are two important factors that cause SPO injuries among dentists (Shah, Merchant, and Dosman, 2006). Guidelines of the World Health Organization (WHO) recommend that the injury site should be left bleeding for a short period, and then must carefully be washed under running water and using an antiseptic solution (Toraman et. al. 2011). In our study, when asked how you intervened in the injury, if any, students responded by cleansing it with antiseptic (51.3%), and washing it with soap (17.3%), respectively.

Healthcare workers are working in a setting where they are constantly exposed to pathogens with the potential to cause infections such as HIV, Hepatitis B, and Hepatitis C due

to the need for sticks, SPO injuries, or, saliva and blood spatters. Among these pathogens, Hepatitis B is one of the most contagious ones. However, Hepatitis B vaccination reduces this risk by 90-95%. Therefore, it is vitally important for healthcare workers to receive vaccines regularly and follow the safety measures carefully. Using personal protective equipment and adopting safe applications is also equally important to reduce the risk of other infections. A Brazilian study involving dentistry students indicates that 83.3% of the respondents reported having received Hepatitis B without exception (de Souza et.al., 2006). A Canadian university found a vaccination rate of 95% among dentistry, medicine, and nursing school students. It is observed that there is a direct correlation between the education level and the importance placed on vaccination (McCarty & Britton, 2000). Likewise in our study, 89.9% of the respondents (N=170) reported to have received Hepatitis B vaccination. However, this rate is not sufficiently high for a professional group that inherently bears a high risk of infectious diseases. To increase the vaccination rates, student training, and guidance must be fostered and implemented.

A study involving UK medicine school students reported that only 14% of the respondents were able to define an SPO injury correctly. Said study concluded that students must importantly be fostered in terms of their theoretical knowledge and practical skills on needle sticks and SPO injuries (Elliott, Keeton, and Holt, 2005). A study demonstrated that training effectively reduced SPO injuries among healthcare workers (Wang et. al., 2014). In our study, dentistry students are asked if they have attended a course on SPO handling and injury, and 64.4% of them reported they have never received such training. When asked if they wanted to receive training on the subject, 89% of them responded positively. To protect both doctors and patients against infectious diseases, the curriculum of the dentistry school must be reinforced, starting with first years, with courses on handling and protection of sharp-penetrating objects, as well as post-accident reporting, which must be refreshed regularly.

The present study is subject to certain limitations. First, the present study is single-center. Second, respondents included 4th and 5th year students in the academic year 2022-2023. Results may vary when including students from different faculties or different schools of the same faculty. Third, the study involved students only. Results most likely vary if the target group is extended to include other professional groups (teaching assistants, nurses, technicians, or instructors). Lastly, the effectiveness of the training given in the study is not repeated within a different period. Further studies should be conducted with the same target group or by also including different target groups where pre-training knowledge level and attitudes of respondents on SPO injury are compared and analyzed with that of post-training.

CONCLUSION

It is found out within the limitations of this study that 77.8% of the respondent dentistry students sustained SPO injuries in the past, which were mainly caused by glass shard pricking into hand due to broken sterile ampoule, or injector needle stick, and 90% of injury incidents were not reported.

Dentistry students are at severe risk of SPO injury, especially during their clinical practice education. To minimize these risks, it is imperative for faculties to take necessary measures as required by their health quality policies. To help students protect themselves against SPO injuries, they must be provided with relevant courses regularly, which must mainly include topics such as protective measures against injuries, post-injury interventions, treatment processes, and the importance of reporting. The awareness among students on infectious diseases and the importance of vaccination must be raised, they must also be provided with guidance to encourage them to receive required vaccinations.

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