

Sharp injuries during clinical training among medical students in the University of Peradeniya, Sri Lanka

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ABSTRACT

Introduction: Medical students are exposed to blood and body fluids during their clinical training which increases the risk of transmission of blood-borne infections. The objective of the study is to assess the prevalence, knowledge, attitude and practices regarding sharp injuries among final medical students of the University of Peradeniya, Sri Lanka

Methods: A survey was done among 210 final-year medical students of the University of Peradeniya with a self-administered online questionnaire including demographic information, experience, knowledge and reporting behavior following sharp injuries.

Results: Response rate was 80% (n=168). Sharp injuries were experienced by 22.6%. Most of the sharp injuries were sustained during venepuncture (39.5%). The majority (58.9%) did not adhere to universal precautions as they did not anticipate the event. One-third of the students (31.6%) did not know about universal precautions. Most of the students (68.4%) who had a sharp injury did not seek post-exposure assistance or prophylaxis. The majority of this group thought there is no risk (64%). Twenty-five students have not completed the full course of the hepatitis B vaccine. More than half (51.8%) of the fully vaccinated group were unaware of their immune status. The majority (67.3%) believed that their knowledge is not adequate regarding the prevention and management of needle stick injuries. The majority (97%) believed more emphasis should be given to knowledge and practice regarding sharp injuries.

Conclusion: The knowledge, attitude and practices of medical students regarding the prevention and management of sharp injuries were unsatisfactory. Poor awareness was observed regarding immune status following hepatitis B vaccination among medical students.

Keywords: Blood-borne infections, Health care workers, Medical students, Sharp injuries, Sri Lanka

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Introduction

Healthcare workers (HCWs) including medical students are at a higher risk of exposure to infectious agents during clinical work. This includes exposure to contaminated sharp instruments which increases the risk of transmission of various blood-borne infections including HIV, Hepatitis B and C and many others.

Sri Lanka has a low level of HIV epidemic, with HIV prevalence below 0.1% which is well below other South Asian countries including India.¹

Prevalence of Hepatitis B is less than 2% and Hepatitis C has an intermediate level prevalence in Sri Lanka.²⁻⁴ But this recent change in social structure and proximity to India makes Sri Lanka very vulnerable to blood-borne infections.⁵

The health system in Sri Lanka is free for all and it caters ever-increasing number of patients with various medical conditions. The recent Covid 19 pandemic and an increasing number of dengue and leptospirosis patients have saturated the capacity in health care. HCWs are overburdened with the increasing patient numbers and the high number of clinical procedures carried out. The risk of occupational exposure to blood and blood products is invariably increased in HCWs who are overworking with many patients. The use of universal precautions before a clinical procedure and recommended practices after a possible exposure to blood or body fluids are practices at a lower level in developing countries.⁶⁻⁸ This could be multifactorial including a lack of knowledge, lack of supervision, or unavailability of necessary personal protection equipment (PPE).

Medical students in their clinical years are expected to carry out many hands-on clinical procedures as a part of their curriculum. They are involved in clinical procedures such as blood draws, intravenous cannulation, and surgical procedures in the theatre and labor room. During these procedures, students are vulnerable to getting exposed to blood and body fluids. There are many factors contributing to this including, lack of practice and experience, and poor knowledge and practice about universal precautions.^{9,10} After an exposure, practice of post-exposure prophylaxis and proper notification to relevant bodies are also not commonly seen.

The objective of this study is to assess the prevalence of exposure to blood and body fluids among final-year medical students at the University of Peradeniya. In addition, we have assessed knowledge, attitudes, and practices of universal precautions practiced and post-exposure prophylaxis. Knowledge of infections in occupational exposures and vaccinations to prevent infections were assessed.

Methods

A cross-sectional descriptive study of final-year

medical students was carried out in 2022. Ethical clearance for the study was obtained by the Ethical Review Committee of the Faculty of Medicine, University of Peradeniya. The students in the sample were in the final year doing the second 8-week rotation of professorial appointment. There were 210 students registered in the batch. The link for the google form containing the questionnaire was forwarded to all the final year medical students via email. Along with the google form, an information sheet was forwarded explaining the purpose of the study. The questionnaire contained 102 items in the form of multiple-choice questions (MCQs) and short answer questions. English medium was used in the questionnaire. These questions assessed different domains of the objectives including prevalence, knowledge, attitude and practices regarding the prevention and management of sharp injuries. The frequencies, percentages and prevalence rate were calculated. Chi-square test was used to assess the significance when relevant.

Results

The response rate was 80% (n=168) and among them 54% were females. All participants were in the age group of 25-30 years (mean age 26.3). More than one-third (44.6%) reported not having any formal teaching and training on the prevention of needle stick injuries as a part of the curriculum. Among participants, 22.6% had sustained a sharp injury during clinical procedures. There is no statistically significant difference in exposure to blood or body fluids between males and females (P=0.2).

Most of the exposure to blood-borne infections was in the form of percutaneous injury by sharp instruments (86.8%). Others (13.2%) had exposure to body fluids and potentially infective material. Most of the needle stick injuries were sustained during venepuncture (39.5%). Nearly one-fourth of needle stick injuries were during performing or assisting surgery. More than one-fifth (21%) had a percutaneous injury during suturing of episiotomies (Figure 1).

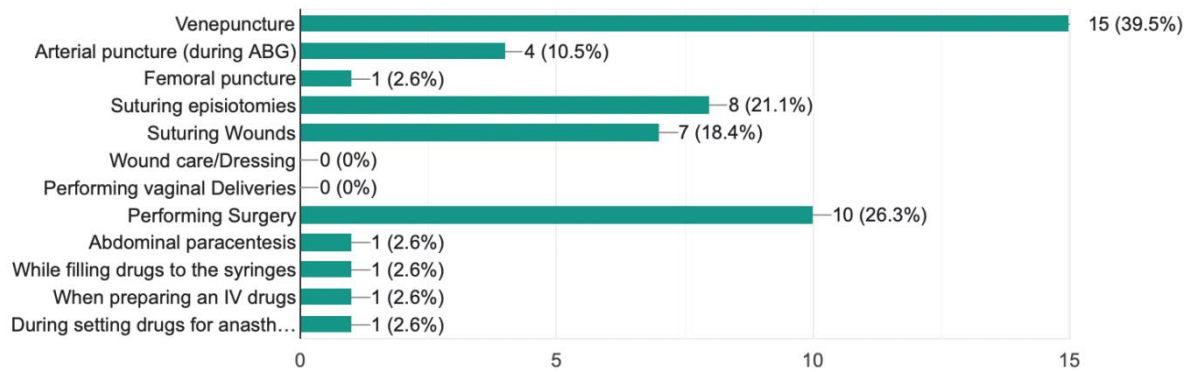


Figure 1- Type and frequency of sharp injuries

Attitude and practices regarding preexposure precautions

Only 52.6% of students who had a sharp injury believed that they practiced universal precautions during the clinical procedure. Most of the students (89.5%) used gloves during the procedure. Among

this group, 58.9% reported not using universal precautions as they did not anticipate the event. One-third of the students (31.6%) in this group did not know about universal precautions. Reasons that the student provided for non-adherence to universal precautions are summarized in figure 2

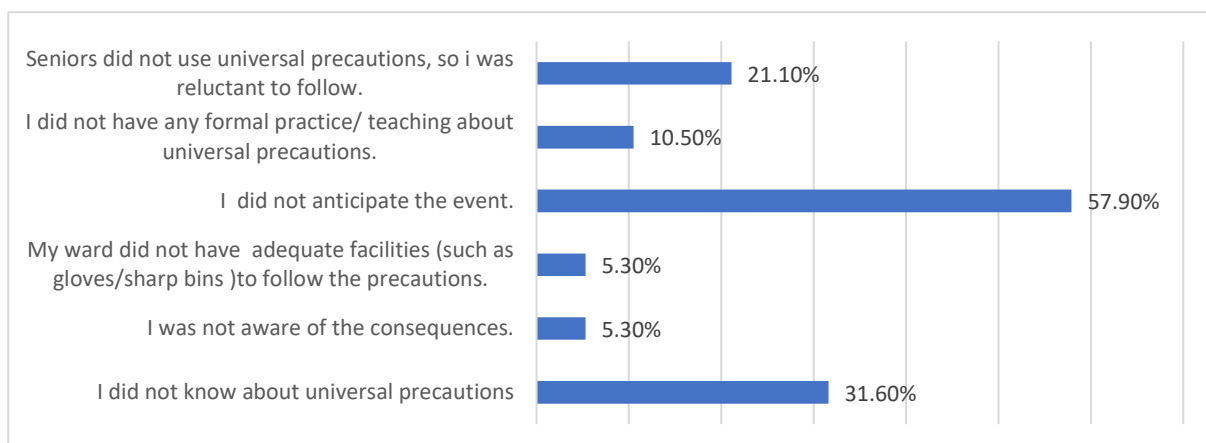


Figure 2- Reasons for not following universal precautions

Attitude and practices regarding postexposure prophylaxis

Among the students who had a sharp injury, 84.2% washed the prick site with runny water. Two students did not do anything specific. A small percent of the exposed group followed measures that are not recommended such as scrubbing, squeezing, and applying antiseptics.

Most of the students (68.4%) who had a sharp injury did not seek post-exposure assistance or

prophylaxis. The majority of this group thought there is no risk (64%). Eight students have taken a detailed history from the source person and decided that there is no additional risk (Figure 3).

Among students who have sought post-exposure assistance, the majority informed ward sister (n=16) and the infection control unit (n=15). But only 11 students had their exposure documented and notified. Three students were started on post-exposure prophylaxis (PEP) for HIV after the exposure.

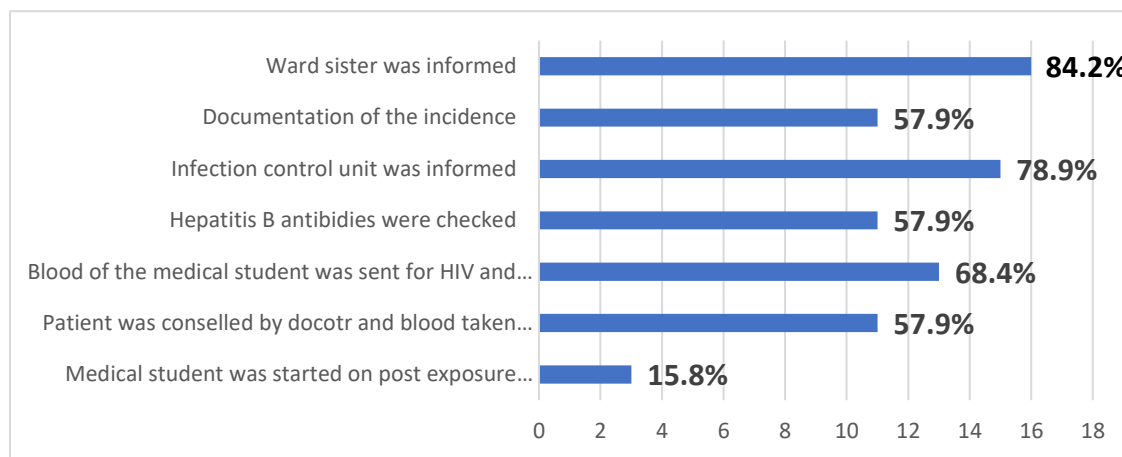


Figure 3- Actions occurred after sustaining a needle stick injury

Knowledge about blood-borne infections

Most of the students were aware that Hepatitis B (n=167) and HIV (n=165) can be transmitted through sharp injuries. But only 73.2% of the study group were aware that Hepatitis C can be transmitted by a needle prick injury.

Among final-year medical students, 14.9% (n=25) have not completed the full course of the hepatitis B vaccine although most of them (97%) were aware that the hepatitis B vaccine is recommended for HCWs. More than half (51.8%) of the students who had the full course of hepatitis B vaccine, were not aware of the hepatitis B antibody status and 41.1% did not know where to go to get their antibody levels checked. Twenty-nine students (17.3%) were not aware or had heard of post-exposure prophylaxis.

Only one-third of the students (32.7%) believed that their knowledge is adequate regarding the prevention and management of needle stick injuries. The majority of the students (95%) believed that more emphasis on improving the knowledge and practice regarding sharp injuries should be given in the clinical curriculum

Discussion

The medical students are having a hands-on exposure to a wide variety of clinical procedures during their clinical appointments as a part of the medical curriculum. Some of the procedures were directly supervised by the doctors such as assisting in major surgery, but some are not directly supervised such as suturing episiotomies

or venepuncture. Some clinical procedures are taught to medical students by junior doctors (e.g. house officers) or nurses in informal ways such as venepuncture and episiotomy suturing. Lack of experience and practice makes them more vulnerable to getting exposed to blood and body fluids during these procedures. This mainly involves sustaining sharp injuries leading to an increased risk transmitting of blood-borne infections. This study showed a significant proportion of medical students getting exposed to sharp injury during clinical procedures and unsatisfactory pre-exposure precautions and post-exposure prophylaxis.

In a study done in Sri Lanka in 2008 among medical students at the University of Colombo, 95% of the students had one or more sharp injuries.¹¹ But among 168 final-year medical students at the University of Peradeniya, only 22.6% had a sharp injury during their clinical training. An in-depth analysis needs to be done to identify factors for this difference. But the final year medical student batch we studied in 2022 completed their 3rd and 4th clinical years amidst the Covid Pandemic, which probably affected their clinical exposure. A reduction in the number of clinical procedures a student carries out would invariably lead to a reduction in sharp injuries sustained. But this needs to be supported with further data and research.

Most of the sharp injuries sustained by students were during venepuncture. A significant number of students had sharp injuries during episiotomy

suturing and assisting surgery. Most medical students gain the skill of venepuncture through junior doctors or nurses and episiotomy suturing through junior doctors. They do not have any formal teaching or hands-on skills training sessions in a skills laboratory on these procedures. After minimal training, they tend to perform these procedures unsupervised.¹² Therefore, they carry a high risk of sustaining sharp injuries inadvertently.

Universal precautions during a clinical procedure should be taught, supervised, and reinforced among medical students. It should be an essential component of the medical curriculum.¹³ Skills laboratories available in the universities and hands-on training sessions on universal precautions can be easily introduced and students can be trained. Among the medical students who sustained sharp injuries nearly one-third were not aware of the universal precautions. Among those who did not use universal precautions, many did not anticipate sharp injury. And some reported that they were reluctant to use universal precautions as they were not practiced by the seniors.

Most of the students (97%) were aware of hepatitis B vaccination is recommended for HCWs, but 15% of the students in the final year have not completed the full course of vaccine. Among students, 58.9% knew that only some people develop protective antibodies against the Hepatitis B vaccine, and more than half of the students did not have their hepatitis B antibody level checked. This is significant as vaccination induces antibodies only in 85% of people and it may give a false sense of security to the student about security.¹⁴ Among these students, 41.1% did not know where to go to get the antibodies checked. This is an important aspect that needs to be addressed and students should be motivated to get their hepatitis B immune status checked.

Post-exposure prophylaxis is known to significantly reduce the transmission of blood-borne viral infections such as hepatitis B and HIV, provided that they are started promptly after a risk assessment.^{15,16} In this study, we found a

significantly low level of reporting and seeking assistance after a sharp injury. The vast majority (68.4%) did not seek any post-exposure assistance or prophylaxis. The main reason was the perception of the medical students that there is no additional risk. Some students have talked with the source patient and reassured themselves as no risk. Reporting to ward sister and infection control unit remained at a low level and low level of notification and documentation were noted among students.

Conclusions

We found that the knowledge, attitude, and practices of medical students regarding the prevention and management of sharp injuries are not satisfactory. Poor awareness was observed regarding confirming immunity following hepatitis B vaccination among the medical students.

The study emphasizes that medical students should receive comprehensive pre-clinical training on universal precautions and post-exposure management of sharp injuries. Universities can use skill laboratories to improve student's hands-on skills to give confidence and competence before dealing with patients. Adopting a strategy to improve hepatitis B vaccination and assessing the immune status during the pre-clinical years of the medical student would minimize the risk of hepatitis B transmission.

Limitations

Clinical exposure of the studied student batch was somewhat compromised due to the Covid pandemic in Sri Lanka and this might have affected the lower incidence of sharp injuries.

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