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A STUDY ON NEEDLE STICK INJURIES AND HEPATITIS B VACCINATION STATUS AMONG B.SC. NURSING UNDERGRADUATES IN GENERAL SIR JOHN KOTELAWALA DEFENCE UNIVERSITY, SRI LANKA

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ABSTRACT

Nursing undergraduates are essential to practice clinical procedures during their training at teaching hospitals. While improving hands-on skills, the students carry a risk of sharps injuries exposing them to blood-borne infections.

Objectives: The aim of this study was to investigate on needle stick injuries and Hepatitis B vaccination status among B.Sc. Nursing undergraduates in General Sir John Kotelawala Defence University.

Materials and Methods: A descriptive cross sectional study was conducted among all nursing undergraduates in the Faculty of Allied Health Sceinces to find out the incidence of needle stick injuries, associated factors, practices and perceptions regarding standard precautions. A self-administered questionnaire was administered to 294 undergraduates. Data was collected at the faculty premises.

Results: A total of 235 nursing undergraduates consented in the study. Ninety five percent of the participants had obtained at least one dose of Hepatitis B vaccination. Only 16% had vaccinated with all three doses. Among the participants, one or more needle stick injury was experienced by 36% (n = 84). Most (51%) of the injuries were reported by 3rd year nursing students. Majority (51%) of injuries occurred during injection procedure and 27% during blood drawing. Most of the incidents (61%) had occurred at the medical wards. Eighty two percent of the incidents were due to hollow bore needles and 49% were cutting injuries with glass or ampules.

Forty one percent injuries had occurred due to distraction, whereas 29% due to incompetent skills and 22% with inadequate preparation. Following the injury, 96% students had washed the injured site, 40% had informed the ward sister regarding the incident, 22% had checked own blood sample whereas 24% had checked patient's blood.

There was no association (p=0.6) between the frequency of injury and gender. However, the duration of clinical training and the frequency of injuries was statistically significant (p=0.000). The knowledge on prevention of needle stick injuries was found at a satisfactory level.

Conclusions: Needle stick injuries are preventable. The incidence of injuries was relatively low in this group of students. The practice of standard precautions and post-injury management should be taught before the clinical training. The availability of personal protective equipment at the clinical settings need to be increased while encouraging the students to get adhered to the universal precautions.

Keywords: Nursing undergraduates, Hepatitis B vaccination, Needle stick injuries

1. Introduction

Sharps related injuries are the most efficient method of transmitting blood-borne infections between patients and healthcare workers. Approximately 60 pathogens can be transmitted through occupational exposures to injuries, including viruses, bacteria, parasites and yeasts, and hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency (HIV) virus [1]. Nurses are known to be a high-risk group for these injuries, and nursing students may be at even greater risk due to their limited clinical experience [2]. Healthcare workers are at risk of occupational exposures, which can be caused by needle stick injuries (NSIs), and sharp object injuries. Nursing undergraduates are involving clinical training to develop their skills in nursing practice. The training is obtained at the teaching hospitals, where they handle sharps and piercing objects in their procedures. Even though the studies on the risk of sharps injuries have largely focused on hospitals and the health care workers, it has also to be focused on students who practice in health care settings. Some studies, reported that medical and nursing students have higher risks of suffering occupational exposures than graduate professionals. The possible reasons for the injuries and exposure to blood and body fluids include less experience, stressful work environment, lack of support from the staff and etc. [12]

2. Methodology

A descriptive cross sectional study was conducted among 235 nursing undergraduates in the Faculty of Allied Health Sciences, General Sir John Kotelawala Defence University (KDU), Sri Lanka. The participants were studying in their first semester of 1st, 2nd, 3rd and 4th academic years. Most of them had started their clinical training except the 1st year students. The total number of nursing undergraduates in the faculty was 294, however, only a sample of 235 had consented to participate in the study.

A self-administered questionnaire was used to collect data. This questionnaire contained questions from five different sections i.e. Demographic data, Hepatitis B vaccination status, exposure to sharps related injuries, post exposure practices and knowledge on prevention of needle stick injuries with both open and closed ended questions. The students were allowed to provide multiple responses for some questions.

The questionnaire was administered in English which is the language used in teaching and communications in the nursing undergraduates at the faculty. The questionnaire was pre-tested using 16 students and further changes were made accordingly.

The questionnaire was administered in the students lecture halls after their academic work. The students who were not willing to participate the study, was asked to leave the lecture hall prior to data collection.

The participants were explained the purpose of this study and the importance of providing accurate information. They were assured of the confidentiality and were advised to refrain from discussing the responses with one another. They were given nearly 20 minutes to complete the questionnaire by recalling the incidents they experienced at the clinical setting.

The ethical approval for the study was obtained from the Ethical Review Committee of Faculty of Medicine, General Sir John Kotelawala Defence University. Data collection process was commenced after obtaining written permission from the university administration, including Head of the Department, Dean, Deputy Vice Chancellors and the Vice Chancellor of KDU.

Following data collection, the data entry process was started. Data was analysed by using SPSS.16.0 version. Descriptive statistics (frequencies, percentages, etc.) and inferential statics (Chi-square test) were used to obtain the study findings.

3. Results

The response rate was 80%. Of them, 76 % were females and 24% were males. Maximum number of participants were from third academic year (n=104). Other students were from first year (n=36), second year (n=42) and final year (n=53).

3.1-Hepatitis B vaccination status

Table 1. The number of students who have obtained the Hepatitis B vaccine with the respective dose

	Number of students (n)	Percentage %
Not vaccinated	11	05
Only one dose	24	10
Two doses	162	69
All three doses	38	16
Total	235	100

From the participants, 95% had obtained Hepatitis B vaccine. Other 5% of students had not received a single dose. The full course of hepatitis B vaccination was obtained by 16% while others (79%) have not completed all three doses of the vaccine by the time of data collection (Table 1).

3.2- Needle stick injuries

Table 2. Type of needle stick/sharps related injuries

Type of injury	Number of students (n)	**Percentage %
Hollow bore needles	69	82
Suture needles	07	09
Surgical blades	162	69
Glass (Ampules)	41	49

* Students were allowed to choose more than one answer.
** The percentage out of the total number of students (N = 84) who experienced one or more incidents.

The participants have reported information on both needle stick and sharps related injuries. Among all participants 36 % students had experienced needle stick and other sharps related injuries during their clinical training. Among them 21% had experienced such an injury only for one time whereas the other 15% had multiple exposures. The injuries related to needles were commoner than other sharps injuries (Table 2). Among those injuries 12 % students reported that they have been injured with used needles where as 82% were injured with un-used needles. Other 6% students were not aware of whether the injury occurred with a used or un-used needle. However, only 24% students had obtained at least a single dose of Hepatitis B vaccine at the time of

injury.

Table 3. The frequency of injuries occurred at each clinical set up where students practice.

Unit	Number of students (n)	**Percentage %
Medical wards	51	61
Surgical wards	40	48
ICU	11	13
OT	07	09
Other units	13	16

* Students were allowed to choose more than one answer.
** The percentage out of the total number of students (N = 84) who experienced one or more incidents.

This study showed that needle stick injuries had mainly occurred at medical wards (Table 3). In addition to the general wards, the injuries have been reported from labor rooms and accident services where the students obtained the special training.

Table 4. The frequency of injuries according to the procedure that was being carried out at the time of the injury.

Procedure	Number of students (n)	**Percentage %
Blood drawing	22	27
IV cannulation	17	21
Injections	42	51
Drug preparation	18	35
Other	11	18

* Students were allowed to choose more than one answer.
** The percentage out of the total number of students (N = 84) who experienced one or more incidents.

The nursing students are supposed to practice invasive procedures during their clinical rotations. Sample collection and drug administration are main procedures that nurses are involved in since their student period. Therefore, the chance of getting exposed to needle stick injuries are more common during these procedures. In addition to that, the students reported needle stick injuries during monitoring blood glucose levels (8%) and nebulization (2%). Small number of cut injuries (18%) were also reported while preparing IV medications and injections. Students reported that they had these cut injuries while opening glass ampules (Table 4). Main reasons for the above injuries included poor pre-preparation for the procedure (22%), incompetent to perform the procedure (29%) and distractions during procedures (41%). The minority of students (28%) reported that the injuries were occurred due to un-cooperative patients and unavailability of personal protective equipment.

4. Discussion

As per the curriculum, the nursing undergraduates are supposed to practice in the clinical set-up since their first academic year. Nursing students develop their skills by performing procedures in which they need to handle cutting and piercing objects [4]. During the first year, they need to improve hands-on skills in patient care, related to patient hygiene and other basic needs. They start practicing invasive procedures since the second academic year and continue throughout the course. Once they are graduated, they have to practice and improve skills while continuing their career as a nurse.

This study was conducted with all nursing undergraduates from each academic year, since they start clinical training from the first year onwards.

However, participants from the first year were not able to provide information regarding the needle stick injuries, since they had not started clinical training by the time of data collection. Therefore, they were only able to provide information on Hepatitis B vaccination status and the knowledge on prevention of needle stick injuries.

This study showed that 36% of the participants sustained needle stick and sharps related injuries in which they carry a risk of blood born infections.

Among the participants, majority (51.2%) of needle stick injuries were reported by the 3rd year students. This results from the increasing number of procedures that they must perform during their training to acquire the skills required. In addition to that, the number of clinical hours compared with the other academic years were also high in the 3rd year where they get more risk of exposure.

The association between the academic year and the exposure to needle stick injuries found statistically significant (p=0.000). Similarly, Smith et al (2005) [9] showed that being a third-year student was a statistically significant risk factor for needle stick injuries. The final year students had reported comparatively a lower percentage (34%) of injuries than 3rd year students. The possible reasons may include the less involvement in clinical training since they have other activities such as research work, home visits, etc. A similar study [4] showed that there was an increase in the number of medical students who reported injuries as the course advanced.

This study showed that the higher number of incidents were reported by females. However, there was no significant association (p=0.628) between the gender and the exposure to injuries. A study conducted with medical and nursing students in a Brazil University [4] has shown that the frequency of injuries did not change with the gender.

The present study revealed that most (82%) of the injuries had occurred with hollow bore needles since the nursing students had involved in procedures such as administering injections, IV medication, blood drawing, etc. It was shown that 12% students had been injured with used needles, whereas 6% students reported that they were not aware whether the needle had been used or not. Taiwanese study, showed 42.6% of all injuries among nursing students were caused by a syringe needle and 21.3% were from glass items [3]. Wang et al. (2003) also showed that most injuries among Chinese nursing students were caused by intravenous needles (44%) or syringe needles (32%)[8] .A similar study results among the medical students in Sri Lanka showed that the injuries were mainly occurred with suture needles [6,7].

Majority (51%) of the students in the present study sustained injuries during injection procedure. The minimum (21%) injuries had been reported during Intra-venous cannulation and 27% while blood drawing. Students had also reported some (11%) incidents during checking random blood sugar levels, drug preparation and nebulization procedure.

The students had encountered most (61%) of the needle stick injuries at medical wards, whereas minimum (09%) incidents were encountered at operating theatres. It was due to the different clinical exposure the students experience in both settings. In the wards, they have to practice number of procedures whereas the limited procedures are practiced at theatre settings. The learning method at the theatre setting is mainly based on observation and assisting in procedures, rather than obtaining direct hands-on skills.

Few percentage (16%) of cases in the present study had been reported during special training at Gynaecology and Obstetrics wards and the labor room. In the labor room, the injuries had mainly occurred during assisting in suturing episiotomies. The present study revealed that the students had shown good practices after their exposure to needle stick injuries.

Over 96% of students who sustained injuries had washed the injured site with soap and water. Other practices include; informed the ward sister (40%), checked own blood sample (24%), checked patient's blood (22%), informed the incident to the infection control unit (21%), etc. The overall knowledge and practices on post exposure management was at a satisfactory level. A similar study conducted among the health care workers in a Gynaecology and Obstetrics ward of a Malaysian hospital showed that, 36.8% did not report the incident due to perceived low risk of Hepatitis B/Human Immuno deficiency virus infection (42.9%), and that it was not important to report the incident (28.6%) [11].

According to the Sri Lankan journal of Venereology (2012)[5] , most health care workers believed that they should seek Post Exposure Prophylaxis when they get needle stick injuries from an HIV infected patient (82%). This fact was better known by doctors (91%) and nurses (90%). However, the students' knowledge in this regard was poor and majority (60%) of them had no idea. This fact seems important since 36% students of the present study had cared known patients with blood born infections whereas, 17% were not aware whether they have cared such patients.

This study showed that the overall knowledge on prevention of needle stick injuries was satisfactory among 2nd, 3rd and 4th year students. However, the knowledge of 1st year students needs to be improved. Few (15%) students had shown poor knowledge regarding re-capping of needles after use. They had recommended re-capping of needles as a good practice.

Among the all participants, 95% had obtained at least one dose of Hepatitis B vaccination at the time of data collection. Only 16% of participants had completed the full course of vaccination. It was notice that the majority (76%) of students had not obtained a single dose of this vaccine at the time of the needle stick injury. A study results among the medical students showed that the full course of Hepatitis B vaccination was obtained by 154 (92%) of the students, and 10% checked their antibody status [6].

The vaccination status among the nursing students in the present study was not satisfactory compared to similar studies.

According to 49% participants of the present study, the information and the guidance provided by the teachers and the clinical staff regarding prevention of needle stick injuries was not satisfactory. Majority (68%) had reported that the availability of personal protective equipment were not enough to practice procedures. There

had been some incidents that the students were not allowed to use gloves for certain procedures due to limited resources.

5. Conclusion

Most of the needle stick and sharps related injuries are preventable. The study findings highlight that the nursing undergraduates of all academic years are at risk for occupational exposure of blood born infections. The need for work related interventions to prevent sharps injuries among nursing undergraduates is important. Clinical inexperience and insufficient training were probably responsible for the high proportion of injuries among nursing students. The Hepatitis B vaccination status among the students was not satisfactory. The institutional policies need to be set to fully immunize the students against Hepatitis B, before beginning clinical practice. Findings would focus in designing education programs directed at the students to increase their awareness on prevention of injuries and to enhance compliance with universal precautions.

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