IS KNOWLEDGE AND AWARENESS OF NEEDLE STICK INJURY AMONG FUTURE HEALTHCARE PROVIDERS SUFFICIENT?

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ABSTRACT

Future healthcare providers are facing the threat of needle stick injuries (NSIs) with the consequent risk of acquiring blood borne diseases. A cross sectional study was conducted from May 2017 to September 2017 among 327 students including medical, nursing and paramedic students from Faculty of Medicine UKM. This study aimed to determine the level of knowledge and awareness among students during their clinical years. A validated questionnaire was delivered via convenience sampling. Data was analyzed using SPSS 23 software and one sample T test was used to compare with the standard setting value. The mean age of respondents was 23.32±2.37. The knowledge and awareness were significantly higher in both paramedic (knowledge (10.71 ± 1.64, $p<0.001$), awareness (5.50 ± 0.86, $p<0.001$), and nursing (knowledge (9.94 ± 1.38, $p<0.001$), awareness (5.35 ± 1.07, $p<0.001$)) students as compared to standard setting, respectively. Meanwhile for medical students there was no significant difference in knowledge (9.95 ± 1.39, $p=0.589$) but significant difference in awareness (5.87 ± 1.03, $p<0.001$) compared to standard setting. The prevalence of NSIs was 8.3% with majority having at least one incident (85.2%) and main exposure is during medical posting (77.8%) during procedure needle recapping (70.4%) using hollow needle (63%). Incident of NSIs were mostly not reported (74.1%). Despite a significant good result on knowledge and awareness, the incidence of NSIs is alarming. Therefore, preventive steps need to be taken by the university to avoid the occurrence.

Keyword: Knowledge, Awareness, Students, Needle Stick Injury (NSI), Cross-sectional study

INTRODUCTION

Needle stick injuries (NSIs) have been considered as a serious consequence among doctors, nurses, dentists, paramedics and other health care workers (HCW) while handling needles and sharp objects in their daily work activity.[1][2]NSIs are defined as an accidental percutaneous piercing wound caused by hollow bore needles such as hypodermic needles, intra-venous catheter stylet , needles used to connect parts of IV delivery system, scalpels and broken glass.[3]The same phenomenon applies to young learners i.e. medical, nursing and paramedic students while doing required procedures in their clinical years.[2][3] This situation has put them into having the risk of NSIs. World Health Organization in 2002 reported that 37.6% of Hepatitis B, 39% of Hepatitis C and 4.4% of HIV/AIDS in healthcare workers around the world are due to NSIs.[4]Therefore, it has been one of the serious safety issues in healthcare settings.

Numerous ways of conveying the knowledge and awareness throughout pre-clinical years have been done via case studies and clinical skill learning. However, when it comes to practice, how sure are we that the existing knowledge and awareness is enough to protect the future healthcare providers from having NSIs? Therefore, our objectives are to assess the knowledge, awareness regarding NSIs and to determine the prevalence of NSIs among medical, nursing and paramedic students of the Faculty of Medicine, Universiti Kebangsaan Malaysia in Hospital Canselor Tuanku Muhriz (HCTM). In the light of hope, the data may provide us more understanding about ways to move forward to reduce NSIs in future.

METHODOLOGY

A cross sectional study was conducted from May 2017 to September 2017 among medical, nursing and paramedic students of Faculty of Medicine UKM in HCTM who are in their clinical years. A validated, self-administered questionnaire was distributed to all medical, nursing and paramedic students after attending lecture in their respective lecture halls. The questionnaires contained 3 parts that covered socio-demographic, knowledge and awareness. All questionnaires had been labeled with number for tracing purposes. The purpose of this study was explained to the participants and written consent was obtained. Completed questionnaires collected by the investigators on the same day after completion of the lectures. The level of knowledge and awareness was determined via a scoring system and graded by comparing the scores to the standard setting.

The standard setting was obtained by distributing the similar questionnaires to 5 specialists and consultants of each group to determine the lowest threshold of score required by the students to be graded as good or vice versa. Data was analyzed using SPSS 23 software and one sample T test was used to compare with the standard setting value. The statistical analysis was conducted with 95% confidence interval and a p-value of <0.05 as threshold of statistical significance.

RESULTS

I. Characteristic of respondents

Table 1: Sociodemographic characteristics of respondents

Variable (N=327)	n (%)	Mean (SD)
Age (years)		23.32 (2.37)
Gender		
Male	75 (22.9)	
Female	252 (77.1)	
Race		
Malay	246 (75.2)	
Chinese	47 (14.4)	
Indian	23 (7.0)	
Others	11 (3.4)	
Students		
Medical	216 (66.1)	
Nursing	97 (29.7)	
Paramedic	14 (4.3)	
Needle Stick Injury (NSI)		
Yes	27 (8.3)	
No	300 (91.7)	

Distribution of future health care providers

In this study, a total of 400 students were distributed questionnaires out of which 327 students completed and returned the questionnaire giving a response rate of 82%. So, there were 327 future healthcare providers who participated in this study which included216 medical students, 97 nursing students and 14 paramedic students. Among the respondents, 75 (22.9%) were male and 252 (77.1%) were female. The majority of the respondents were Malay 246 (75.2%). The mean age of the respondents

was 23 years old (SD, 2.37) years. Out of 327 respondents, 27 (8.3%) of them had been exposed to the needle stick injury during their clinical years.

II. Knowledge on needle stick injury

Table 2: The level of knowledge regarding needle stick injury among future health care providers(One sample T-test)

Categories (students)	Level	n (%)	X ± SD	T	p
Medical	Good	132(61.1)	9.95 ± 1.39	0.540	0.589
	Not Good	84 (38.9)			
Nursing	Good	84(86.6)	9.94 ± 1.38	6.681	<0.001
	Not Good	13(13.4)			
Paramedic	Good	13(92.9)	10.71 ± 1.64	8.487	<0.001
	Not Good	1(7.1)			

The level of knowledge regarding needle stick injury of nursing and paramedic students showed significantly good level of knowledge while for medical students there was no significant difference (Table 2).

III. Awareness on needle stick injury

Table 3: The level of awareness regarding needle stick injury among future health care providers.(One sample T-test)

Categories (students)	Level	n (%)	X ± SD	T	p
Medical	Good	201(93.1)	5.87 ± 1.03	12.466	<0.001
	Not Good	15(6.9)			
Nursing	Good	96 (99)	5.35 ± 1.07	21.618	<0.001
	Not Good	1(1)			
Paramedic	Good	14(100)	5.50 ± 0.86	6.565	<0.001
	Not Good	0(0)			

The result showed that the level of awareness regarding needle stick injury among all the groups of future health care providers are significantly good compared to standard setting (Table 3).

IV. Incident of needle stick injury

Table 4: Incident of needle stick injury encountered by future health care providers in HCTM

Student Category	**Exposure**			**NSI**	
	Location n(%)	Procedure n(%)	Type of needle n(%)	Frequency n(%)	Report n(%)
Medical, n=6	Medical 3(50) Non-Medical 3(50)	Recapping, 3(50) Non-Recapping, 3(50)	Hollow 5(83.3) Non-Hollow, 1(16.7)	Once, 6(100) More than Once, 0(0)	No, 6(100) Yes, 0(0)
Nursing, n=17	Medical 15(88.2) Non-Medical, 2(21.8)	Recapping, 15(88.2) Non-Recapping, 2(21.8)	Hollow, 9(52.9) Non-Hollow, 8(47.1)	Once, 14(82.4) More than Once, 3(17.6)	No, 13(76.5) Yes, 4(23.5)
Paramedic, n=4	Medical, 3(75) Non-Medical, 1(25)	Recapping, 1(25) Non-Recapping, 3(75)	Hollow, 3(75) Non-Hollow, 1(25)	Once, 2(50) More than Once, 2(50)	No, 1(25) Yes, 3(75)
Total n =27					

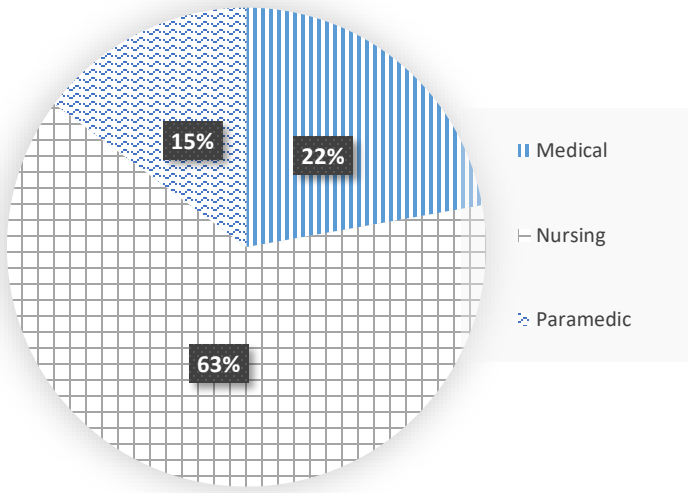

Figure 1: Positive Needle Stick Injury

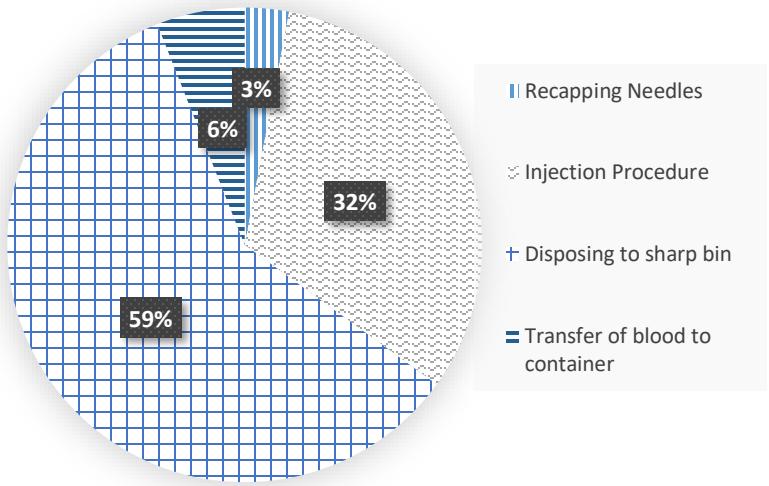

Figure 2: Incident happen during procedure

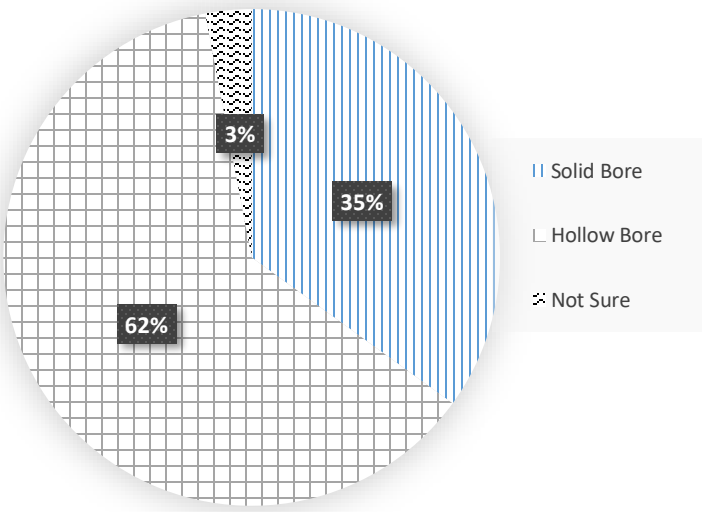

Figure 3: Type of needle used during procedure

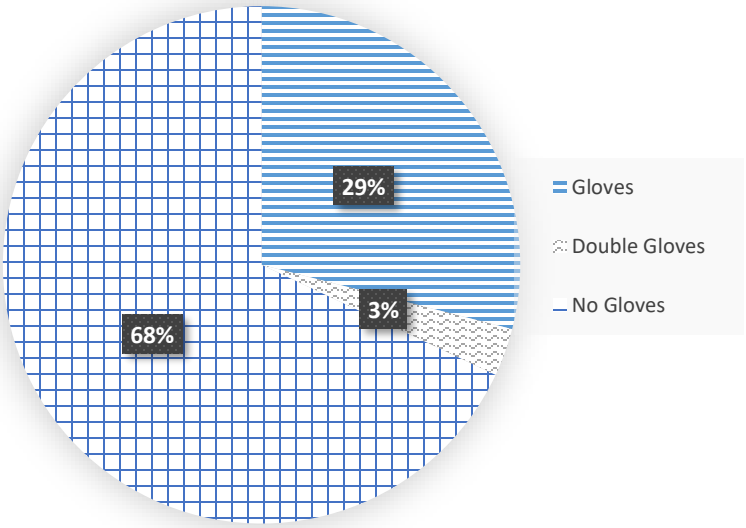

Figure 4: PPE used during procedure

Incident of NSIs were 27 (8.3%) out of 327 which include the nursing students 17 (63%), followed by medical students 6 (22.2%) and paramedic students 4 (14.8%). In the event of the injury, most of the injuries were encountered during recapping needles (57%),

injection (31%), disposing needle to sharp bin (9%) and transfer of blood to container (3%). Most of the injuries were due to hollow bore needle (62%), followed by solid bore (35%) and 1(3%) was not sure the type of needle used during the procedure. Regarding the standard precaution, only one (3%) wore double gloves as their personal protective equipment while the others wore single glove (29%) and (68%) not wearing a glove.

The majority of the needle stick injury incident (63%) was from the nursing group, (22%) from the medical students and (15%) was the paramedic students. 68% of the students with positive needle stick injury experienced the injury during the medical posting while the rest are during non-medical posting (surgical, psychiatry, emergency and klinik kesihatan) (32%). Only7 students (26%) reported the incident which consist of nursing 4(23.5%) and paramedic students 3(75%).

DISCUSSION

The level of knowledge and awareness of needle stick injury (NSI) among medical, nursing and paramedic students of Faculty of Medicine UKM inHCTM was found to be sufficient. The findings are similar to the previous studies.[5][6]With a significant good result on knowledge and awareness among the students, the incidence of NSIs is quite acceptable. Only 27 of the 327 reported having NSIs and which mostly happened during the medical posting (68%). The incidence is also lower compared to a previously published data in a developed country.[7]

Most of them had NSI when they first encountered their clinical years with 16(94%) nursing students and 67% medical students. Most of the paramedic students experienced the NSI during working period prior to joining the degree program.

The incidence of NSI among medical student was reported worldwide and our study showed similar findings.[8][9][10] Despite the common incident of NSI among these students theywere often recognized as likely to ignore reporting as evidenced in few other studies .[11][12] In this study, it is shown that underreported incident of NSI was high among these students 20(74%). Unfortunately, we did not explore further regarding the underreporting of NSI. The underreported NSI happened not only for the medical students but also the healthcare workers such as doctors (61%) and nurses (30%) as shown in the study by Voide et al.[13]The Ministry of Health in Malaysia provided a policy regarding NSI which requires all cases of needle stick injuries to be reported within 24 hours to the infection control team of the hospital or the head of department or to the safety and health committee.[12]

Hollow bore needles commonly associated with transmission of blood borne diseases due to the remaining blood in the bore of the needle after used which contains larger volume of viruses than the relatively small amount of blood remaining on the outside of a solid core needle such as a suture needle.[14]In this study the highest incidence of NSI was associated with hollow bore needle 17 (63%) which was similar with the study by Sharma et al with 69.5% of NSI

were due to hollow-bore needles and 30.5% were from solid bore needles.[15][16] Our study showed most of the injuries occurred during needle recapping 19(70%) even though the standard protocol regarding blood taking procedure in our hospitals does not allow recapping of the needles. Our standard protocol is based on the OSHA's Blood-Borne Pathogens Standards 2003.[17]Needle recapping was the main cause of injury in this study and was comparable with other studies done earlier.[3][15]

Wearing gloves is known to be an important line of defense and was proven to reduce the risk of blood transmission during the NSI as shown in the previous study.[18]According to a publications titled standard precautions by the Ministry of health Malaysia in 2002, the guidelines also suggests the medical personnel to wear glove and use additional protective equipment if necessary during intravascular procedures. Failureto wear a glove is associated with various complications as shown in multiple studies on needle stick injuries worldwide.[19][20] Yeshitila et alin 2015 revealed 72.9% of the students were not using glove during NSI and this finding was similar with our study 68% which was more than 50% of the incidents.[21]In this study, percentage of students not using gloves was 68% . This is because, wearing gloves is not a popular practice among students. Hypothetically, using gloves may cause lack of sensitivity on the tip of forefinger to manually differentiate between veins and nerves. A study done by S.U.Din et al in 2013 concluded that a double layer of glove material was more resistant to puncture and removed more contaminant compared with an equivalent single thick layer of glove material.[22]Even though the study above was a simulated "needle stick" injuries but the finding is significant and may be applied in the blood taking protocol of the hospital. Council on Surgical and Perioperative Safety (CSPS) endorse a sharps safety measures to prevent injury during perioperative care which also include double gloving but the evidence to support the practice was not found.

CONCLUSION

The knowledge and awareness of NSIs among medical, paramedic and nursing students of Faculty of Medicine UKM in HCTM are good. However, despite having good knowledge and awareness of NSI, there are still incidence of NSI. Thus, improvement on these issues should be emphasized to maximise the awareness of NSI. Reinforcement on glove usage during blood taking procedure is needed to maximise the safety measures. Improvement on the reporting system on NSI will help to reveal the magnitude of the problem and to identify the prevalence of NSI. Prevention of NSI is an integral part of prevention programs in the work place, and training regarding safety practices indispensably needs to be an ongoing activity at a hospital.

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