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Prevalence of Needle Stick Injuries and Compliance to Infection Control Guidelines Among Health Care Workers in a Teaching Hospital, Malaysia

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ABSTRACT

Introduction: Health care workers (HCW) are constantly exposed to blood-borne illnesses through needle stick injuries (NSI). Despite the increasing trend of NSI, evidence regarding the actual practice of universal precautions among these HCWs is lacking. This study assessed the practice of universal precautions towards prevention of NSI among HCWs in a teaching hospital setting. **Methods:** This cross-sectional survey involved a newly-designed self-completed questionnaire assessing demographic data, exposure to NSI and practice of universal precautions. Questionnaires were distributed to every ward and completed questionnaires were collected after a period of 7 days. **Results:** A total of 215 HCWs responded to the survey. 35.8% were exposed to bodily fluid, with 22.3% had NSI in the last 12 months. Blood taking was the commonest procedure associated with NSI. Of practices of universal precautions, recapping needle and removing needle from syringe were still wrongly practiced by the HCWs assessed. **Conclusion:** NSI among HCW are still common despite the introduction of universal precautions in our hospital. Incorrect practices in handling sharps should be looked into in order to reduce the incidence of blood-borne illnesses through NSI in the hospital.

Keywords: Needle stick injury, health care workers, infection control guideline

INTRODUCTION

Needle stick injury (NSI) is defined as 'any wound caused by a needle (either suture or hollow-bore), which puncture the skin accidentally.[1] It is known as a main cause of work-related injuries and illnesses among health-care workers (HCW) worldwide.[2] The World Health Organization (WHO) estimated that of the 12 billion injections administered by HCWs yearly, approximately one million cases of NSI cases are reported involving various levels of HCWs including doctors, nurses and paramedics.[3] This trend is reflected in our health care system, where the Ministry of Health has reported an increase in the incidence of NSI among HCW in the government hospitals from 498 in year 2000 to 746 in six years, with medical officers and nurses forming the most number of cases [4].

One of the occupational hazards of NSI is the transmission of blood-borne illnesses such as HIV, Hepatitis B and Hepatitis C. Studies have shown that the transmission of these blood-borne illnesses could occur at any stage of needle usage, commonly associated with factors such as nature of the procedures, manner of the work performed and years of experience of the staff involved.[4,5,6,7]. Ismail *et al.* reported that the prevalence of NSI amongst health care workers in Malaysia was 24.9%, in which the needle recapping was identified as the main procedure involved. For the past two decades, hospitals in Malaysia have been following the CDC guidelines for the universal precautions of NSI which aim to prevent transmission of HIV, HBV and other blood pathogens when providing first aid or health care.[1] The universal precautions guidelines apply to all bodily fluids; it also includes standard isolation precautions when outbreaks occur in a hospital setting.

Despite the increasing emphasis given to the health-care workers about the hazards of NSIs, the prevalence of NSI among these workers in government hospitals shows increasing trend [8]. Little is known about the actual practice of universal precautions among health care workers in Malaysia. Therefore this study was done to assess the practice of universal precautions towards prevention of needle stick injuries among health care workers in a teaching hospital setting.

MATERIALS AND METHODS

Subject enrolment: This was a cross-sectional survey study conducted among various levels of health care workers in Serdang Hospital, the teaching hospital for the Medical and Health Sciences Faculty, University Putra Malaysia. It

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was carried out over a period of four weeks (31st March to 30th April 2008) as part of the students' research project. Universal sampling method was used to recruit subjects in this study. All health care workers working in the hospital and exposed to the use of needles in their daily works were invited to participate in the survey.

Study instrument: A newly-designed questionnaire was constructed from triangulation of resources via literature review, clinical practice guidelines and expert opinions from the field of infectious diseases and occupational health. The questionnaire was designed in both English and Malay languages which had been translated and cross-translated to maintain the content validity of the questionnaire. Parameters tested in the questionnaire were demographic data, exposure to NSI and practices of universal precautions in daily works. The 33-questions questionnaire was designed as True/False question, with one (1) point given for true answer and zero (0) point given to wrong or unsure answer.

Data collection: A total of 240 questionnaires were distributed to all wards, clinics and laboratory units in Hospital Serdang. The questionnaires were placed at the general area in the wards or units which were easily accessible to all the potential respondents. Envelopes were placed at the same area for the respondents to return the completed questionnaires. This was to maintain the confidentiality of the respondents. A period of seven days was given for the respondents to return the questionnaire. Those who failed to return the questionnaires were considered as non-respondents.

Statistical analysis: Data was summarized and analyzed with the Statistical Package for Social Sciences (SPSS) version 16.0. Descriptive analysis was used for categorical variables such as age, sex, years of service etc. Comparison of categorical data was performed with Chi-square analysis. Fisher's exact test was used for small expected values less than 5. A p value < 0.05 was considered as significant. Ethical clearance was obtained from Medical Research Ethics Committee of Faculty of Medicine and Health Sciences, UPM and Ministry of Health , Malaysia ethical committee.

RESULTS

Demographic data

Of the total 240 sets of questionnaire that were distributed, a total of 215 HCW responded to the survey (response rate of 89.6%). The demographic characteristics of the respondents are as in Table 1. The mean age was 30.0 + 6.0 years, with the youngest respondent was 20 years and the oldest was 54 years old. The mean years of working experience for our cohort of HCW was 6.77 + 5.58 years. Of the vaccination status, 198/215 (92.1%) of the HCW had been vaccinated with Hepatitis B vaccine.

Table 1. Demographic characteristics of respondents

Variable	N = 215	Percentage
Job category		
Doctors	41	19.1
Staff nurses	136	63.3
Medical Assistant	38	17.6
Male	48	22.3
Female	167	77.7
Ethnic group		
Malay	173	81.1
Chinese	16	7.5
Indian	20	9.4
Working experience		
Up to 4 years	84	40.4
5 – 9 years	79	38.0
10 – 14 years	27	13.0
15 – 19 years	9	4.3
More than 19 years	9	4.3

Exposure and prevalence of NSI among HCW

In the 12 months period, 76/215 (35.8%) of the HCW have been exposed to blood and bodily fluids during the course of their works. 89.3% had handled hollow-bore needle, while 60.9% had handled suture needles in their daily work. Our survey demonstrated that 48 respondents (22.3%) had needle stick injuries in the 12 months preceding the survey. Of those who have had NSI, 83.3% experienced up to two episodes of NSI and 16.7% had 3 – 4 episodes of NSI. Out of these, only 29/48 (60.4%) reported the incident to the higher authorities. Looking into the job categories, doctors were the most affected with the NSI (34.9%) followed by staff nurses (19.1%) and medical assistants (7.9%). Our survey demonstrated that 11/48 (23.3%) HCW did not wear protective gloves when they experienced the NSI. Table 2 shows the procedures commonly associated with NSI.

Table 2. Factors associated with NSIs

Variables	Number of the respondents	Percentages of the respondents
Types of procedures performed when experienced NSI	(N= 48)	(%)
Blood taking	35 /48	72.9
Using suture needles	17 / 48	35.4
Parenteral injection	18 /48	37.5
Setting drip	4 /48	8.3
Assisting in operation theatre	4 /48	8.3
Performing in operation theatre	3 /47	6.2
Reasons for not wearing gloves when NSI occurred	(N = 11)	
Feeling uncomfortable	2 / 11	18.2
In a hurry	7 / 11	63.6
Feeling lazy	1 / 11	9.1
Allergy to latex	2 / 11	18.2
Insufficient gloves	1 /11	9.1
Unsuitable size	1 / 11	9.1
Reasons for not reporting the case of NSI	(N = 19)	
Source thought not to be infectious	17 / 19	89.5
Incident thought was not important	1 / 19	5.3
Worried about future consequences	17 / 19	89.5
Did not know how to report	17 / 19	89.5
Too complicated to report	10 / 19	52.6
Embarrassed to report	17 /19	89.5
Did not know that the incidence needs reporting	17 /19	89.5

Blood-taking procedure was the most frequent procedure involved with NSI (35/48, 72.9%), followed by giving of parenteral injection (18/35, 37.5%), procedures involving suture needles (17/48, 35.4%) and performing/assisting in minor operation (7/48, 14.6%). Assisting in major operation was not associated with NSI (3/48, 6.2%). Setting up intravenous line was also the least source for NSI with only 4/48 (8.3%) HCW that have had NSI reported it as the cause. Our survey demonstrated that medical officers/ specialists were the most affected with NSI (34.9%) followed by the staff nurses (19.1%). Our survey also showed that 23.4% of those who have had NSI, did not wear any glove during the incident.

Practices of Universal Precautions among respondents

Of the total 215 respondents, more than three quarter of respondents adhered to 10 correct practices tested in this section. 98.6% washed their hands after contact with patients or bodily fluid, whereas 96.7% of the HCW wore gloves during handling of the blood and bodily fluids. However there is lower compliance with washing hands after

changing gloves, where only 180/215 (84.9%) admitted to adhering to this washing guideline. We also found that 30.0 % respondents still recapped needles after use and threw the used-needles into the domestic dustbin. Removal of needle from the syringe after blood-taking was practiced by 67.9 % respondents. Finally, the practice of removing the needle from syringe and placing them into the corresponding disposal container were practiced only by 66.0% of HCW in this survey.

DISCUSSION

The objective of this survey was to determine the prevalence of NSI and the actual practices of universal precautions among HCW in a tertiary teaching hospital in Malaysia. Our cohorts of respondents were relatively young; with less than 10 years of experience post-training. Nurses formed the majority of the respondents. As universal precautions guidelines were introduced in Malaysian hospitals in the 90s, we postulated that most of the respondents would be knowledgeable with the practices of universal precautions in their daily practices. However, our study reported the prevalence of NSI was 22.3%, with 83.3% reported having two episodes of NSI over the last 12 months. Our prevalence is in concordance with earlier local studies5,8 which reported prevalence of 20.9% and 22.4% of reported single exposure of NSI respectively. Our study concurs with the findings of earlier studies, in which procedures involving hollow-bore needles accounted for the highest proportion of NSI among the HCW.[5,8] This is important as this type of needle has the potential of retaining bodily fluid (i.e. blood) therefore most often associated with the blood-borne pathogen infections such as hepatitis and HIV.

Following a NSI, a health care worker must report the incident to the Head of Department or the Infection Control Team within 24 hours for record and for blood investigations. However, the reporting itself is voluntary; hence many of the cases were left unreported and probably untreated. Our survey revealed that nearly 30.0% of the HCW who have had NSI failed to report the incident to their superiors. One of the major reasons given by the respondents was the perception that NSI were non-contagious.[9] Lee KH *et all*[5] in a similar study quoted the main reason being the amount of blood transmitted through NSI was regarded as insignificant hence considered 'not infectious'. This perception need to be corrected based on two factors. Firstly, as there is no compulsory screening for HIV and hepatitis for patients admitted hence HCW could be unknowingly exposed to asymptomatic HIV or Hepatitis B virus carriers through NSI. Secondly, the concept of universal precaution states that all patients should be considered infectious. Therefore all procures involving bodily contact should follow appropriate infection control procedures10 due to the fact that infected patients cannot always be identified.

Other causes for non-reporting include 'not informed that NSI needs to be reported and did not how to report the incident'. It is commonly assumed that all the HCW are aware of the existing guidelines pertaining to reporting of a NSI incident in the workplace. However, our results seemed to contradict this assumption. These findings are in accord with previous studies by Gershon *et al*[11] and Alam *et al*[12] who also documented of respondents cited 'did not know how to report' as the main reason for not reporting. These results emphasize the needs for review of the current implementation of universal precautions in our hospitals. Although the guidelines are available in many of the wards, there is no apparent substantiation that the documents are read by the HCW. Efforts may be needed to overcome these problems. Apart from ensuring that the guidelines are always available in the wards and other units in the hospital, it should be made compulsory for any new HCW to read the guidelines upon joining the wards/ units. In addition, compulsory annual refresher course could be implemented for the senior staffs in the wards/units to ensure that the HCW are constantly updated and made aware of the importance of adhering to universal precautions in their daily work. Finally, every wards/units in the hospital should have the guidelines on how to report a NSI incident readily accessible to all HCW via posters, manual or pamphlets.

Our study reported almost 30% of the HCW were still practicing recapping needles after use and removing the needle from the syringe after blood-taking procedures. This finding is much higher than those reported by Lee KH in 2005.[5] This is an alarming finding as the practice of recapping of needle is not only unsafe but prohibited in most hospitals. HCW should be made aware that these practices put them at risk to highly dangerous blood-borne infections. The administrators should identify staffs with risk taking tendencies (e.g. those with multiple exposures) so that strong supervisory support, counseling and guidance could be given to improve their attitude in their daily practice.[11]

Although these findings provide direction and focus for possible intervention to improve the practice of universal precautions among our HCW, cautions must be applied in generalizing these data. One of our limitations is the manner of the data collection. As data were collected using a self- answered questionnaire, respondents might be limited by recall bias. In addition, there was the tendency for the respondents to give socially accepted responses especially when these questionnaires were confidential in nature. As these data were cross-sectional, we were unable to establish the cause and event of the NSI prevalence of our study cohorts.

CONCLUSION

This study showed that health care workers are exposed to needle stick injuries in their daily work despite working

in a teaching hospital. Efforts should be taken in order to overcome these problems, especially concerning lack of existing guidelines in reporting a NSI and incorrect practices of handling needles after injections and blood-taking. Interventions such as compulsory refresher course for all staffs should be implemented in order to increase the awareness of the danger of needle stick injuries to the HCW and cross- infections to patients.

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