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Syringes and needles disposal practices by House Surgeons from major hospitals in Yangon, Myanmar

Paing Soe, **Myo Khin,*Kyaw Oo, ***Myat Phone Kyaw,****S. Kyaw Hla, ****Tin Tin Aung, ****Aye Maung Han,**** Ne Win, ****Nyunt Thein, ****Saw Win & *****Than Htein Win*

*Ministry of Health
**Department of Medical Research (Central Myanmar)
***Department of Medical Research (Lower Myanmar)
****Department of Medical Science
*****Department of Health

Needle stick injury (NSI) is regarded as an important cause of the transmission of blood-borne viruses to health care staff. There is lack of information on the occurrence of needle stick injury and needle disposal services among House Surgeons (HS) in Myanmar. With the aim of promoting measures for preventing NSIs, a hospital-based cross-sectional descriptive study was carried out to determine incidence of needle stick injury among HSs and to investigate their practice regarding injection instrument waste disposal. Two hundred and ten responding HSs at all medical wards of Yangon General Hospital, North Okkalapa General Hospital and Sanpya General Hospital, paediatric medical wards of Yangon Children Hospital and Sanpya General Hospital were investigated by self-administered questionnaire. Of them, 206 (98%) recapped the needle after giving injections, of which, 75 (36%) handled the cap during recapping process. Among 206 subjects who practiced recapping, 60 (29%) disclosed that they had experienced injury during recapping. A slightly higher rate of injury was observed among subjects who handled the cap during the recapping process as compared to those who recapped the needle without handling the cap (34% vs 26%). The majority 162 subjects (78%) separated the needle before discarding the syringe. Among those who separated needles 6.2% experienced injury during separation. The most commonly used container for discarding needle and syringes was plastic drinking water bottle (71%) followed by WHO Card Box (18%). However, only 28% of the respondents said the containers were within arm's reach and 72% of them stated that they had to walk to reach the container. Nearly 55% of all perceived that they are safe with the current practicing needle and syringe disposal system. This study showed that HSs are at risk of needle stick injury and blood-borne infections during their clinical activities while performing procedures on patients. Efforts need to be made to ensure greater awareness amongst House Surgeons about the risk of mucocutaneous and percutaneous injuries.

INTRODUCTION

In the midst of infections, disposing of waste properly is an often-overlooked but important aspect of infection prevention. The unsafe use and disposal of injection equipment continues to put patients, health-care workers, and the general community at risk of infections such as hepatitis B or C virus and human immunodeficiency virus. Needle stick injury (NSI) is regarded as an important cause of the transmission of such blood-borne viruses to health care staff. In Taiwan where there is a high incidence of

hepatitis infections, it has been estimated that approximately 1,000 healthcare workers out of 100,000 suffer seroconversion with hepatitis B virus and hepatitis C virus through needle sticks with hollow bore needles annually [1]. Most importantly, it was reported that in countries with a high prevalence of HIV infection, one young doctor would become infected with HIV every seven or eight years [2]. The problem of NSI is considered as an important issue even in countries with low prevalence of blood borne infections. In France, it has been estimated that one surgeon in 14 might expect to be hepatitis C contaminated during his or her career, and one in 630 might be infected with HIV [3].

Among health workers at risk, medical students and interns are those with the highest risk. Nearly a third of medical students had reported sharps injury over their clinical training of which one third of those were associated with hollow bore needles [4]. In USA, based on a survey of 3,239 participants, emergency medicine residents in their first four years of training have been reported to suffer from a high rate of exposure to blood. Residents had been exposed very often, with 56% having at least one exposure, and one in 10 having four or more exposures [5]. Medical students are at risk of acquiring infections caused by NSIs, although it is unknown when NSIs are most likely to occur during medical training. Over one third (55/157) of respondents suffered at least one needle stick injury [6]. It was also reported that life-time prevalence of NSIs was 23%, ranging from 12% in first year students to 41% in fourth year students. These accidents happened most commonly during medical internships, especially during blood-taking practices; an activity that usually starts during the third year of training [7]. Among the undergraduate students in Australia, 13.8% experienced the injury during their third year training period [8].

Although several batches of medical students have completed their years as House Surgeons at different hospitals in Myanmar, there is lack of information on the occurrence of needle stick injury and needle disposal services. The present study was conducted to explore the retrospective prevalence of needle stick injury among house surgeons and to investigate their practice regarding injection instrument waste disposal with the aim of promoting measures for preventing NSIs among the hospital medical practitioners.

MATERIALS AND METHODS

A hospital-based cross-sectional descriptive study was carried out. The frequency of injections, disposal practice of the needles and number of accidental needle stick injuries of the house surgeons at all medical wards of Yangon General Hospital, medical wards of North Okkalapa General Hospital and Sanpya General Hospital, paediatric medical wards of Yangon Children Hospital and Sanpya General Hospital were explored by self-administered questionnaire. Questionnaire included needle recapping practice, needle removal practices, and disposal practices. A total of 210 house surgeons from the four study hospitals were recruited to answer the questions. Filled questionnaires were checked by the assigned research medical officer immediately. Data recoding and entry were carried out using EpiData software. Analysis was done using SPSS version 11.5 after the data file was transferred into SPSS format. Univariate and bivariate tests were carried out to describe the occurrences and to determine differences. Differences were considered significant if $P < 0.05$.

RESULTS

Response rates

The participating house surgeons (later refer as subjects) were very cooperative and high response rates (more than 95%) were obtained for questions on needle recapping, injury obtained during recapping and

separation of needle and syringe before discarding, needle discarding practices, and disposal of containers.

Needle recapping practices and experiences of injury during recapping

Among the 210 responding subjects, 206 (98%) recapped the needle after giving injections. Of those who recapped the needle, 75 (36%) handled the cap during recapping process. The remaining 131 subjects recapped the needle without handling the cap. Among 206 subjects who practiced recapping, 60 (29%) disclosed that they experienced injury during recapping. A slightly higher rate of injury was observed among subjects who handled the cap during the recapping process as compared to those who recapped the needle without handling the cap (34% *vs.* 26%) (Table1).

Table 1. Occurrence of injury among subjects who recapped in different ways

How recap?	Injury during recapping		Total (%)
	Yes (%)	No (%)	
Handling the cap	25 (33.8)	49 (66.2)	74 (100)*
Without handling the cap	34 (26.0)	97 (74.0)	131 (100)
Total	59 (28.8)	146 (71.2)	205 100)

Chi square=1.414, p=0.234*One HS did not respond.

Table 2. Method of needle separation and experience of injury among needle separators

How separate?	Injury during separating		Total (%)
	Yes (%)	No (%)	
Two hands	9 (5.9)	143 (94.1)	152 (100)
One hand	1(10.0)	9 (90.0)	10 (100)
Total	10 (6.2)	152 (93.8)	162 (100)

Needle separation practices and experiences of injury during separation

The majority 162 subjects (78%) separated the needle before discarding the syringe. The remaining 50 subjects did not separate the needle from the syringe before discarding. Of those who separated the needle from the syringe almost all 152 subjects (94%) used both hands, whereas a few 10 (6%) used only a single hand. A small percentage (6.2%) of needle separators experienced injury during separation. Among them, 10% of those who used one hand for separation the needle from syringe had a slightly higher experience of injury during separation (10% *vs* 6%) than those who used the two hands method (Table 2).

Discarding practices

A variety of containers were listed. The most commonly used container for discarding needle and syringes was plastic drinking water bottle (71%) followed by WHO Card Box (18%). Other containers included storage bin (8%), tin can (2%) and plastic bags (1%) (Fig.1). Regarding the procedure for waste disposal, all participants stated that discarding the needle and syringe into the containers was unproblematic. However, only 59 (28%) of the respondents said the containers were within arm's reach and 150 (72%) of them stated that they had to walk to reach the container.

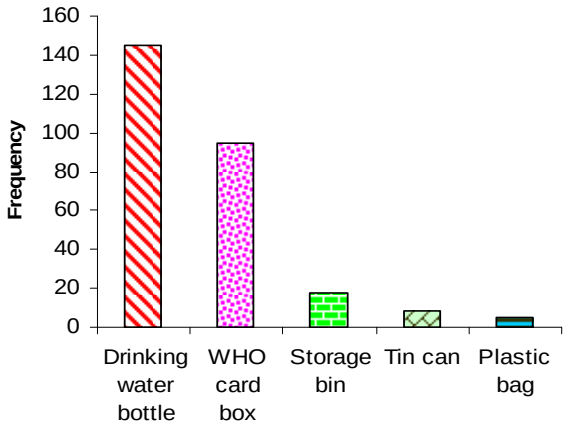

Fig 1. Types of discarding containers used by the subjects

Injury during discarding

Although it is simple to conduct, 20 % of subjects experienced that needle and/or syringes escaped from the container at the time of discarding. A very small percentage (1%) reported injury during discarding.

Practices of disposing the container

It was found that over 90% of the subjects noted that the containers were immediately emptied after being filled. It was done mainly by hospital workers (96%), although

some nurses (3%), attendants (1%) also carried out the process. Chance of injury during disposing the container was very few as only 1 % of respondents noted injury during the process.

Incidence of injury

Out of the total 211 respondents, 66 (31.3%) expressed that they had injury at least once during their HS period. The frequency of injuries was 74 amounting to 0.35 injuries per HS. Most frequent action for getting needle stick injury was during recapping (75% of all incidence injuries) (Table 3).

Table 3. Injury at various steps of disposing

Steps of disposing	N	Frequency	Percent
Injury during recapping	206	60	29.1
Injury during separating	162	10	6.2
Injury during discarding	209	2	1
Injury during emptying	209	2	1

Perceived safety on the current situation

Among the study population, nearly 55% perceived that they are safe with the current practicing needle and syringe disposal system. The remaining 45% perceived that they are less safe.

DISCUSSION

The very high response rate (more than 95%) of the subjects is very encouraging and outlines the interest of the subjects. This response rate is much higher than those obtained by investigators from United States on their medical students (77%) [4], emergency medicine residents (90%) [5]. It has been reported that only 60% of third and fourth year medical students and medical and surgical house staff replied to an anonymous questionnaire on needle stick injury [9].

The present study demonstrates that needle stick injury among the House Surgeons is not rare. At least a third of them had an episode of NSI during their House Surgeon training period. This finding is similar to that of the risk of needle stick injury among American medical students where about a third of medical students had a sharp injury over their clinical training [4]. It has been reported that most house staff would have at least one NSI a year and NSIs most often involved disposable needles (85%), most often occurring during phlebotomy (62%), and most often when recapping a needle (54%) [10]. It has been reported that in Singapore, house officers experienced an average of 1.4 sharp and needle stick injuries per month [11].

In our study, 75% of all injuries were due to recapping the needle after injection. Both one-hand and two-hand users experienced injury in our study. The findings from our study are consistent with a study reported from Canada where 45% of needle stick injuries occurred at recapping. In that study, the results also showed between 46% and 77% of needles were being recapped and 9% to 20% of recapped needles were blood-stained [12]. Recapping devices were rarely used and two-handed recapping techniques predominated. Common reasons for recapping include inability to dispose immediately of needles properly, and sharps containers being too far away [12]. It has also been reported that recapping accounted for a higher percentage of NSI than any other activity [13]. Based on a study on medical students in India, it was found that re-sheathing or recapping the needle was responsible for causing NSI to 69% of the students [14]. Although we failed to ask the reason for recapping, more than 90% were recapping and majority of subjects (71.4%) responded that the container for discarding was placed needing to walk to reach. Only one-fourth of the subjects said the container was at within their arm's reach. This might be the reason for recapping among the subjects after practicing injection.

We failed to inquire whether the HSs reported their injury and if so any medical or psychological assistance have been

provided. They may not have reported the injury as they felt that it is not serious enough. It has also been reported that only 43% of students who were injured reported the injury, mostly because they felt it was not serious enough to constitute a serious exposure [15]. The present study focused only on NSI and did not account for other type of injuries such as those involving suture needles. In certain Institutions, injuries caused by hollow bore needles accounted for only 17% of injuries whereas surgery accounted for 70% of injuries. However, hollow bore needles could be blood filled and are usually deemed high risk [4]. Only a few incidence of injury were found during disposing and discarding container since it was not the responsibility of the house surgeons. Our study also did not take account the incidence among other staff at hospitals. .

Measures to reduce NSI have been reported by various authors. It has been reported that the introduction of a comprehensive programme to reduce NSIs led to a reduction of more than 60% over four years in a US hospital [16]. A significant, prolonged fall in needle stick injuries was demonstrated following the introduction of more, and more convenient, sharps containers at the hospital in California. More needle disposal containers were added to patient care areas and as close to the area of use as possible [15]. A similar hospital wide comprehensive multi-focused programme reduced sharps injuries by 69%. The intervention consisted of the introduction of needless systems for intravenous therapy and a new sharps disposal system. The disposal system consisted of new, wide-mouthed containers, together with a new system of changing the containers on a regular basis, and before they were full. Factors related to sharps injuries in the period before and the latest after the intervention [17]. Alternate methods for preventing needle sticks have been proposed [18]. Such measures should be outlined and adapted to local situation for use in our hospitals.

Conclusion

This study showed that House Surgeons are at risk of needle stick injury and blood - borne infections during their clinical activities while performing procedures on patients. Efforts need to be made to ensure greater awareness amongst House Surgeons about the risk of mucocutaneous and percutaneous injuries. Proper training in percutaneous procedures and how to act in case of injury should be made to reduce the number of injuries. The present study also highlights the fact that compliance with the non-recapping needle policy is poor. More education and awareness programme (lectures, videotapes, handouts); discouragement of recapping and innovative arrangements for sharps disposal should be promoted. It should be evaluated whether vaccination against hepatitis B should be offered to students before entering the clinical part of the study. It could be further stated that medical students also have a high risk for needle stick injuries, and attention should be directed to protection strategies against blood borne pathogens. Not only prevention of accidents but also post-exposure management should be frequently reiterated to the medical students at every level. Any medical practice of students should be under supervisor control.

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