Brunei International Medical Journal

OFFICIAL PUBLICATION OF THE MINISTRY OF HEALTH, BRUNEI DARUSSALAM

Volume 16 21 April 2020 (27 Syaaban 1441H)

INCIDENCE OF OCCUPATIONAL SHARPS INJURIES AND FOLLOW UP PATTERN AMONG HEALTHCARE WORKERS IN BRUNEI DARUSSALAM.

K N. WIN[1], N A.A. OMAR[2], N A.A. TUAH[2, 3], A A. TRIVEDI[1], A SC LAI[1, 2]

[1]Occupational Health Division, Ministry of Health, Brunei Darussalam,
[2]PAPRSB Institute of Health Sciences, Universiti Brunei Darussalam, Brunei Darussalam,
[3]Department of Primary Care and Public Health, Imperial College London, United Kingdom

ABSTRACT

Introduction: It is estimated that 40% of HBV and HCV infections and 2-3% of HIV infection are attributed to occupational sharps injuries among Healthcare workers (HCWs). The objectives of this study were to calculate the rate of sharps injury, determine its occurrence by age, gender, occupation, work location, working hours, mode of injury, duration of employment, and occupational health and safety (OHS) awareness; as well as analyse trend of follow-up reviews. **Methods:** A retrospective cross-sectional study aimed to determine the incidence of sharps injuries in healthcare workers from 2014 to 2018, and analyse compliance of post injury management review. **Results:** It showed that 79.7% were female with mean age of 33 years (SD 10.1); 53% were among nurses; 77% occurred in a hospital setting; 54% occurred during shift work; 51% occurred whilst performing clinical procedures; 30% worked for less than 5 years; and 76% were aware of occupational health and safety hazards. Post injury follow-up showed continuous improvement from 48.7% (2014) to 64.5% (2017). **Conclusion:** The study findings highlight the high risk groups of healthcare workers, work areas and work activities. The findings will contribute towards the development of improved healthcare policies, awareness on reporting, effective interventional programmes to minimise risk of sharps injury, and enhance post sharps injury management practices.

Keywords: Healthcare worker, Needlestick injuries, Occupational health, Post-exposure prophylaxis.

Brunei Int Med J. *2020;16:42-48*

ISSN 1560 5876 Print
ISSN 2079 3146 Online

Online version of the journal is available at www.bimjonline.com

Brunei International Medical Journal (BIMJ)
Official Publication of the Ministry of Health, Brunei Darussalam

ISSN 1560-5876 Print
ISSN 2079-3146 Online

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INTRODUCTION

Healthcare workers (HCWs) are at high risk of occupational sharps injuries as a result of exposure to blood borne pathogens from needle stick or other sharps instruments. These injuries may cause serious infections with blood borne viruses (BBVs) such as Hepatitis B virus (HBV), Hepatitis C virus (HCV) or Human Immunodeficiency Virus (HIV).[1] Among 35 million healthcare workers worldwide, 3 million workers reported percutaneous exposure to BBVs annually; 2 million of these to Hepatitis B virus (HBV), 0.9 million to HCV and 170,000 to HIV.[2] As reported by the United States Centre for Disease Control (CDC), direct costs of sharps injury in HCWs ranged from USD 500 to USD 3000 per HCW.[3]

Corresponding author: Kyaw Naing Win, Occupational Health Division, Ministry of Health, 1st Floor Health Screening Centre, Jalan Delima Dua, Berakas (BB2313), Brunei Darussalam
Email: knwin2005@yahoo.com

Studies have reported that occupational sharps injuries are more common in female, nurses and in hospital settings.[3-9] Other major contributing factors identified were improper work practices, poor work environment, practice of needle-recapping, shortage of staff, work related stress, lack of awareness, sleep deprivation, and fatigue from shift work.[3-11] An effective sharps injury prevention programme is an essential part of blood borne pathogen prevention in any healthcare institution, and has several components ranging from selection of safer devices, Hepatitis B vaccination, post exposure prophylaxis (PEP), follow-up reviews, counseling, awareness on universal precautions, and post injury management.[3] Good compliance in post injury follow-up is important for early detection and management of infections related to sharps injury.

In Brunei Darussalam, the Ministry of Health (MOH) sharps injury management include first aid treatment, notification to Occupational Health Clinic, risk assessment for PEP for HBV and HIV infections, counselling, and follow up review.[12] To date, no study on incidence of sharps injury had been conducted, hence , the patterns and the contributing factors of occupational sharps injuries among HCWs are unknown in Brunei Darussalam. Therefore, this study objectives were to determine the incidence of occupational sharps injuries with associated risk factors in HCWs in Brunei Darussalam, as well as to analyse the trend of follow-up reviews over a five-year period.

MATERIALS AND METHODS

This cross-sectional study is based on secondary data analysis of notified cases to the Occupational Health Division (OHD), MOH, from January 2014 until December 2018. All notified cases of needle stick or sharps injuries and body fluid exposures from both government and private healthcare sectors were included. However, for the post sharps injury follow-up practices, only reported cases that had completed a full six-month review (at the time of this data collection) from January 2014 until December 2017 were entered for this study analysis. Occupational sharps injuries that were not officially notified to OHD were excluded.

Demographic details, incident details, source status, and details of OHS awareness of the HCW were extracted from the MOH Accident at Work Reporting Form. Follow-up cases were accessed through the Brunei Health Information Management System (BruHIMS), and categorised into 'complete follow-up', 'partial follow-up' or 'no follow-up' in reference to the Division's standard operating procedure for management of HCWs with exposure to blood or body fluids.[12]

Data were entered into Microsoft Excel 2016, and analysed into descriptive statistics using percentage, mean and standard deviation. The sharps injury incidence rate was calculated as number of injuries in a particular year per 1,000 HCWs.

Ethics approval was obtained from the Medical and Health Research and Ethics Committee, Ministry of Health (MHREC) and Institute of Health Sciences Research Ethics Committee, Universiti Brunei Darussalam (IHSREC).

RESULTS

Over the five-year period, there were 202 cases of reported occupational sharps injuries. The mean incidence rate was 9.51 **(**per 1,000 HCWs), with an increasing trend from 2015 to 2018 (Table I)**.**

Sharps injuries occurred predominantly in females (79.7%), and the mean age was 33.4 years (SD 10.1) for both genders, with the highest number of cases in the 21-30 age

Table I: Incidence and incidence rate (per 1,000 HCWs) of occupational sharps injury (2014-2018).

	2014	2015	2016	2017	2018	Average (2014-2018)
Number of cases	33	28	45	45	51	40
Incidence rate	7.9	6.48	10.0	10.85	12.3	9.51

group (44%). Majority of the cases were among nurses (53.4%); followed by doctors (11.4%), dental professionals (9.9%), students (6.4%), cleaners (5.4%), and other HCWs (11.9%). Most of the cases occurred in hospitals (77.2%); this was followed by primary healthcare centres (9.4%) and the national dental centre (5.4%). Among the cases, the highest number was observed in HCWs who had been in service for less than 5 years (Table II: 30.2%).

The top three modes of injury for reported sharps injury cases were: during clinical procedures (51%), needle re-capping (14.3%), and during disposal of contaminated needles (10.4%). Needle stick injury (NSI) was the commonest sharps injury (75.7%) among the notified cases, followed by other sharps injury from scalpel, dental wires and glass (7.4%), and body fluid exposure (2.5%). 53.5% of reported cases were noted to have occurred during shift hours compared to normal working hours (39.6%). 76.2% of cases reported that they were aware of OHS hazards at their workplace. The study findings showed that for most of the cases, details of the source person were known in 79.7% of cases. (Table III).

From 2014 to 2017, there was an increasing trend for cases who had completed a six-month review (48.7% to 64.5%), whilst the number of cases who did not return for follow-up showed a decreasing trend (Figure 1: 15.4% in 2014 to 8.9% in 2017).

Table II: Demographic distribution of study population.

Variables	Mean ± SD (Range)	N (%)
Age (in years)	33.4 ± 10.1	
Age group (in years)		
≤ 20		10 (4.9)
21-30		89 (44.0)
31-40		53 (26.2)
41-50		33 (16.3)
> 50		16 (7.9)
Unknown		01 (0.5)
Gender		
Male		41 (20.3)
Female		161 (79.7)
Occupation		
Nurse and Midwife		108 (53.4)
Doctor		23 (11.4)
Dentist and other dental		20 (9.9)
Other healthcare workers		24 (11.9)
Student		13 (6.4)
Cleaner		11 (5.4)
Unknown		03 (1.5)
Duration of employment (in years)		
≤ 5		61 (30.2)
6-10		25 (12.3)
11-15		19 (9.4)
16-20		09 (4.5)
21-25		09 (4.5)
> 25		08 (4.0)
Unknown		71 (35.1)
Work location		
Hospital		156 (77.2)
Primary Healthcare Centre		19 (9.4)
National Dental Centre		11 (5.4)
Dialysis Centre		02 (1)
Laboratory		02 (1)
Other		02 (1)
Unknown		10 (4.9)

DISCUSSION

The average sharps injury rate was 9.51 per 1000 HCWs in Brunei Darussalam. This rate

Table III: Proportion of occupational sharps injury by type, mode of injury, working hours, source status and OHS awareness.

Variables	N (%)
Type of Injury	
Needle stick	153 (75.7)
Body fluid exposure	05 (2.5)
Other sharps injury	15 (7.4)
Unknown	29 (14.4)
Mode of Injury	
During procedure	103 (51)
During disposal	21 (10.4)
During cleaning	12 (5.9)
Recapping	29 (14.3)
Other	08 (4.0)
Unknown	29 (14.3)
Working hours *	
Regular work hours	80 (39.6)
Shift work	108 (53.5)
Unknown	14 (6.9)
OHS Awareness	
Yes	154 (76.2)
No	08 (4)
Unknown	40 (19.8)
Source Status	
Known source	161 (79.7)
Unknown source	37 (18.3)
Unknown	04 (2.0)

was much lower than that of Singapore's (41 per 1000 HCWs), the UK's (51.5 per 1000 HCWs), and Europe's (37 per 1000 HCWs), but higher than that of Malaysia's (6 per 1000 HCWs).[13-16] In this study, there was an increase in incidence of occupational sharps injuries from 28 (in 2015) to 51 (in 2018). This may be due to an increase in reporting of occupational sharps injuries by HCWs, following the Division's increased promotional activities over the past years on raising awareness on the importance of incident reporting.

The mean age of cases was 33 years, and 75.1% of sharps injuries were among HCWs below 40 years of age. This finding is similar to other studies where the mean age ranged from 28 to 33 years and below 36 years.[4,9,17-19] This can be attributed to daily clinical procedures in clinics or wards being tasked to younger HCWs whilst older HCWs were either more commonly involved in administrative duties or were more experienced in handling sharps instruments.[19]

Studies have shown a higher prevalence of sharps injury among female HCWs ranging from 53.8% (Ethiopia), 55.1% (Nigeria), 66.3% (China), 69% (South Africa), to 76% (Saudi Arabia).[4,9,18-20] Our study showed a similar finding whereby majority of sharps injuries reported were among female HCWs (79.7%), which reflects on the higher proportion of female gender in the nursing profession in the healthcare industry.[4]

Among HCWs, nurses and midwives had the highest frequency of sharps injuries (53.4%), followed by doctors (11.4%) and dental professionals (10%). Many other studies such as in Iran (48%), Ethiopia (59%), Mongolia (63%), and Pakistan (64%) supported this finding, where more than half of sharps injuries were seen among nurses as routine clinical procedures were commonly carried out by nurses.[6-9] Other studies, however, have shown that medical doctors who were mainly trainee doctors in a teaching hospital in Nigeria, whereas medical assistants in two teaching hospitals in Malaysia reported more sharps injuries compared to nursing staff.[4,21]

Our study showed that the occurrence of sharps injuries was highest during clinical procedures (51%, which included wound suturing, skin closure, phlebotomy, surgery, removal of needles, performing injections, and inserting intravenous lines), followed by re-capping (14%) and during disposal (10%, which included discarding needle into sharps bin, collection or segregation of sharps). This

finding was in line with similar studies carried out in South Africa (34%) and Pakistan (42% and 45.9%).[18,8,22] Two studies, however, showed that the incidence of sharp injuries was highest during recapping of needles.[4,9] The high number of sharps injuries during clinical procedures may be attributed to lack of awareness on safe work practices, poor handling of sharps instruments, insufficient clinical skills and experience, lack of supervision, long working hours and work-related stress.[5] The practice of needle re-capping further increases the incidence of needle stick injury.[8,22]

Needle stick injuries by hollow-bore and solid needles (75.7%) were the commonest sharps injuries, followed by other sharps injuries from scalpels, surgical blades, sharp dental instruments (7.4%) and body fluid exposure (2.5%). Similarly, these findings were reported in studies conducted in Saudi Arabia (79%) and Pakistan (68%). [20,22]

The highest proportion of HCWs with sharps injuries were those who had worked for less than five years (30%), which was similarly seen in two other studies done in Nigeria and Pakistan.[4,9] A possible contributing factor for this may be lack of clinical experience.[23]

This study showed that 77% of sharps injury cases occurred in a hospital setting; followed by primary healthcare centres (9%) and the national dental centre (5%). RIPAS Hospital, being the largest tertiary care government hospital in Brunei Darussalam, provides specialist healthcare services including advanced surgeries. Evidence suggests that high patient load, high frequency of injection practices, and long working hours in tertiary care hospitals may contribute to a high incidence of sharps injury cases.[7,8]

Majority of the HCWs encountered sharps injury whilst working shift hours (53.5%). This finding is in concordance with a study conducted in Iran where 57.8% of sharps injuries occurred during the morning shift.[10] The author stated that this may be due to a high number of new patients admitted to the wards or those seen during normal working hours, as well as most clinical procedures being undertaken in the morning compared to other times of the day or night. In contrast, a study conducted in Saudi Arabia showed no significant association between sharps injuries and shift hours.[20]

Source tracing and screening for BBVs is an important step of sharps injury management. In this study, source status was known for almost 80% of the cases. This is likely to be due to the cases of sharps injuries occurring during a clinical procedure or treatment where the source patient was still available to obtain consent and a blood sample. A similar result was seen in two studies conducted in Malaysia, where sharps injuries from known sources were between 59.5% to 86.7%.[21,24] In our study, we found that cases in which source person details were unknown were observed to be among cleaners who had encountered a sharps injury during disposal of healthcare wastes.

Our study showed that a large proportion of HCWs (76.2%) were aware of basic workplace health and safety hazards. However, the available data did not specifically enquire about health and safety specific to sharps and needle stick injuries. Studies elsewhere have reported that attending training on infection prevention and control, having knowledge on the risk of NSIs, and adhering to universal precautions can result in less sharps injury encounters than those who did not practise the above measures.[6,7,9]

As per the local guideline, sharps injuries among HCWs should be evaluated as soon as possible after an exposure, and based on risk assessment, these cases should be

reviewed periodically for at least six months.[12] Reviews are important for further management including the need to prescribe PEP, and for further clarification of the nature of the exposure, and review of available source person's data for BBV status.

Follow-up practices and pattern of sharps injury cases from 2014 until 2017 showed an improving trend for those who had completed a six-month review. This may be due to increased targeted awareness activities for healthcare workers, which were periodically conducted by the OHD during those years. However, this result was observed to be lower when compared to a similar study in Malaysia (72.3%).[24]

CONCLUSION

This study showed that most sharps injuries occurred in females, among nurses who carried out most clinical procedures such as cannulation, administrating intravenous medications and phlebotomy work in the wards. Therefore, it is not surprising that majority of sharps injuries were from injection needles regularly used for such clinical procedures and in hospital settings, during morning or daylight shift hours. HCWs have awareness on basic OHS. There is an improving trend in the follow-up practices among HCWs who had sustained an occupational sharps injury. Strengthened and focused awareness interventions can help in further improving notification and post-injury follow-up among HCWs.

DECLARATION OF INTEREST

The authors have no conflict of interest to declare.

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