

ORIGINAL ARTICLE

Needle Stick and Sharp Injuries among Health Care Workers in Kelantan: A Retrospective Six-Year Cohort Study

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ABSTRACT

Introduction: The prevalence of needle stick and sharp injuries (NSSIs) still high among healthcare workers and many of them, without reason had defaulted the post management follow up. Thus, the aim of the study was to determine factors associated with default follow up among healthcare workers sustained NSSIs in Kelantan. **Method:** A retrospective cohort study using secondary data from Sharp Injury Surveillance notification system within period of six years started from January 2010 was done. Data were collected using proforma and analysed using SPSS version 22.0. Two hundred and seventy cases were selected by using multistage random selection method. Binary logistic regression analysis was used to determine the factors. **Result:** Majority of reported NSSIs involved female, with the mean age of 33 years. Most of them were intern that had less than ten years' experience. Most of the accident occurred during office hours at tertiary healthcare setting during venepuncture for blood or intravenous fluid management. The workers with age less than 40 years and those who work at hospital setting have higher possibility to default the follow up with (Adj. OR 2.80; 95% CI: 1.12,7.00; $p = 0.027$) and (Adj. OR 4.65; 95% CI: 1.77,12.33; $p = 0.002$) respectively. **Conclusion:** NSSIs can occur at all level of occupational setting particularly among those who has less experience and work at tertiary healthcare setting. Thus, an intensive precaution action should focus on them since they are also the group that has higher odd to default the post management follow up.

Keywords: Needle stick injuries, Healthcare workers, Defaulted follow up, Kelantan

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INTRODUCTION

Needle stick and sharp injuries (NSSIs) is a major occupational health and safety issue faced by health care workers (HCWs) globally. It is estimated that out of 35 million HCWs, three million of them were reported to accidentally involve in NSSIs (1). The prevalence of NSSIs in health care settings differs in relations to the level of country economic growth (2). The Centre for Disease Control and Prevention (CDC) of USA, estimates more than thousand NSSIs reported per days with a total number of cases reaching nearly 385,000 each year, and most of them occurred among HCWs in United States hospitals (3). The most worrying part is that the true magnitude of the problem is huge because it might involve all level of HCWs in different type of health care settings. In healthcare setting, sharp objects such as needles and ampoules are common handling item during daily working activities. After all, handling sharps objects represent a major risk for HCWs.

HCWs face constant risk of exposure to cut and splash as occupational hazard at workplace. These injuries may transmit blood-borne viruses which include Hepatitis B Virus (HBV), Hepatitis C Virus (HCV) and Human Immunodeficiency Virus (HIV) and Acute Immunodeficiency Syndrome (4). It is demonstrated that the risk of exposure to blood borne infection post NSSIs varies among countries. In developing countries, 40.0-65.0% of HBV infections in HCWs were attributable to percutaneous occupational exposure.

In Malaysia, the prevalence rate was reported as 6 notified cases of NSSIs per 1000 HCWs in 2016 (5). Based on Ministry of Health (MOH) Annual Non Communicable Disease (NCD) Report (2010) the number of NSSIs increased to 26.0% in 2010 (1231 cases) compared to 2009 (910 cases). Between different job categories, the largest proportion of cases were reported among doctors (35.7%) followed by staff nurses (21.3%) and hospital support service (8.0%). The NSSIs mostly occurred during handling patient (6).

Globally, policy regarding NSSIs was developed to reduce the prevalence and each country has its own related policy. In Malaysia, the standard target for needle

stick injury is set at zero incidence. Unfortunately, it is still happening despite of the present of the guideline. Post exposure prophylaxis (PEP) among each HCWs who sustains NSSIs need to be conducted within 24 hours of injury along with confidential counselling and follow up. Pre-exposure prophylaxis should be initiated as early as possible following exposure should the risk of retroviral infection is suspected and the retroviral testing will be repeated and counselling support will be continued during 3 monthly follow up (4). Proper management is needed to prevent NSSIs and their consequences through PEP for HIV and HBV, HBV vaccination for HCWs, education and awareness and providing sharp containers (7). However, without proper reason, many of the HCWs sustained NSSIs defaulted the management. So far there is limited evidence to determine the reason for defaulted the therapy. Working environment, lack of knowledge impact of NSSI, and afraid to know the post-incident result could be a few that can be listed (8, 9).

Thus, the current proposed study is useful to describe the update on epidemiological data on NSSIs among HCWs and to ascertain the factors related to default follow up which can be used in future intervention study.

MATERIALS AND METHODS

Study Design and Area

The current study applied a retrospective cohort study design. The follow up was made by the authorities based on the surveillance data obtained from Sharp Injury Surveillance Kelantan Database. The study was conducted within two months period starting from January till February 2016. This study was carried out in all MOH facilities in Kelantan. Kelantan is positioned in north-east in peninsular Malaysia. It is bordered by Terengganu to the south-east, Perak to the west, Pahang to the south and Thailand to the north. There are ten districts in Kelantan and each district consists of their own health district office. These include Kota Bharu, Tumpat, Pasir Mas, Bachok, Kuala Krai, Gua Musang, Tanah Merah, Machang, Jeli and Pasir Puteh. Apart from that, there are nine public hospitals in Kelantan and three of them are upgraded into tertiary care hospitals. They include Hospital Raja Perempuan Zainab II (HRPZ II), Hospital Tanah Merah (HTM), and Hospital Kuala Krai (HKK). All districts have their own hospital except Bachok. All health facilities in Kelantan need to report the incidence on NSSIs to the unit. The secondary data from Sharp Injury Surveillance Survey was obtained from the Environmental and Occupational Health Unit, Kelantan Health Department. The randomly selected health facilities were involved in the study.

Sampling Method

All reported NSSIs cases among HCWs based on Sharp Injury Surveillance Kelantan Database from January 2010 till Dec 2015 that fulfil study criteria were included. The data that has missing info more than 20%

was excluded from the list. A two proportion formula was used to measure the sample size. A total of 270 sample was required.

There were 284 reported cases of NSSIs who fulfilled the inclusion and exclusion criteria from a total of 389 reported cases. Two hundred and seventy cases were selected using multistage random selection method. The random sample was applied to ensure the equal probability of sample being selected from all level of health care that included in the surveillance system in Kelantan. Initially, the facility was chosen by using simple random sampling method. There were 2 specialist hospitals, a non-specialist hospital and three health clinics were selected. Later, a proportionate sampling method was applied to ensure the representatives of sample from each facilities. As for example, total number of sample from specialist hospitals is 199. Thus, the proportion taken for 2 specialist hospitals = $(199/284) \times 270 = 190$. In other hand, the total number of cases from non-specialist hospital is 23. Therefore the proportion taken from a non-specialist hospital = $(23/284) \times 270 = 22$. The total number of sample from 3 health district offices is 61. Therefore the proportion taken from the health district offices = $(61/284) \times 270 = 58$. To get the sample, lists of the eligible sample were obtained from each randomly selected facilities. From the list, a simple random sampling method was again applied to get the total sample of 270.

Study Tool

Proforma were utilised to transfer the data from Sharp Injury Surveillance Kelantan Database for analysis in SPSS. The databased include the particular of affected person (with strict confidentiality preserved), job category, place of injury, how the injury occur, type of device caused the injury, type of procedure performed causing injury. The affected person was followed up at the respective hospital from where they seek the post-exposure treatment. The data from the respective hospital were retrieved to determine whether the person completed the follow-up or not.

Study Analysis

The data was analysed by using SPSS version 22.0. The descriptive statistic was presented with mean and standard deviation or frequency and percentage. The binary logistic regression was used to determine the significant factor associated. The dependent variable was status of post management follow up either defaulted or not. While the independent variables include age, gender, event location, job categories, timing of duty and working experience, type of devices and job description. All variables were classified into two categories. Age were categorized into less than 40 years and 40 years and above. Event location were divided into type of workplace and type of department. Type of workplaces were classified into event occurred at health clinic and hospital setting. Whereas type of department

were classified according to non-intensive care unit and intensive care unit. Job categories was classified into professional and non-professional profession. Type of devices were categorised into occurrence of devices due to non-needle related devices and needle related devices. Whereby job description was classified into occurrence of NSSIs while handling equipment and surgical and while handling patient and needle. From univariate analysis, variables with p-value of less than 0.25; or any clinically relevant or important variable were selected for multiple logistic regression.

Preliminary main effect model was obtained after comparing model using Forward LR Backward LR methods. Multicollinearity was checked by using correlation matrix in which if the correlation between variables were weak, it indicated no multicollenariarity. All possible two-way interactions were also checked. Fitness of the model was tested by Hosmer and Lemershow goodness of fit test. The classification table and receiver operating characteristic (ROC) curve were also used to determine the fitness of the model. The final model was determined by enter forced method. The adjusted odds ratio (Adj. OR) and 95% CI was estimated and used as a measure of strength of association between the outcome variable and their predictors. The level of significance was set at p-value of less than 0.05.

Ethical Consideration

The current study was approved by the USM Human Research Ethical Committee: USM/JEPeM/15120558 and National Medical Research Register (NMRR) with reference no: KKM/NIHSEC/P16-113. The confidentiality of the data had been strictly maintained. Only the author and supervisors had the access to the data available.

RESULTS

In general, the mean (SD) age of the subjects was 33.9 (7.34) years. Most of them are female (72.6%). Majority of them worked at hospital with specialist (22.0%) and their median (IQR) working experience was 1.8 (6.0) years. The top three places that contribute to the total number of cases came from in-patient care (49.3%), followed by accident occur in dental clinics (11.9%), and injury in operation theatre (10.7%). Out of 270 reported NSSI cases in the past six years, majority of the accident occur among house officers or intern which carry 31.1%, followed by medical officer 22.2%, nurse 20.7%, dental officer 8.9% and other job categories. Injury can occur at any time of working period. The current study reported that most of the cases (75.9%) occur during office hours rather than after the office hours. Based on the type of devices, most of the cases reported have associated with the use of needle (81.9%). The summary of the epidemiological characteristic of NSSIs is described in Table I.

Table II summarizes the connection between job

Table 1: Characteristic of NSSIs among HCWs in Kelantan (n= 270)

Variables	Mean (SD)	n (%)
Age (years) *	33.87 (7.34)	
20- 29		84 (31.2)
30- 39		135 (50.0)
40- 49		39 (14.4)
≥ 50		12 (4.4)
Gender *		
Female		196 (72.6)
Male		74 (27.4)
Workplace		
Specialist hospital		190 (70.4)
Non-specialist hospital		22 (8.1)
Health Clinic		58 (21.5)
Working Experience [‡]	1.80 (6)**	
<10years		216 (80.0)
≥10years		54 (20.0)
Department		
In-patient/ ward		133 (49.3)
Emergency Department (A & E)		12 (4.4)
Primary care clinic		27 (10.0)
Outpatient Clinic		14 (5.2)
Dental clinic		32 (11.9)
Labour room		14 (5.2)
Operating theatre		29 (10.7)
Others		9 (3.3)
Job category		
House Officer		84 (31.1)
Medical Office		60 (22.2)
Nurse		56 (20.7)
Dental Officer		24 (8.9)
Health Attendant		16 (5.9)
Pharmacist		7 (2.6)
Medical Assistant		5 (1.9)
Dental attendant		5 (1.9)
MLT		6 (2.2)
Specialist		4 (2.2)
Dental Surgery Assistant		3 (1.1)
Time of Injury		
Office hour		205 (75.9)
After office hour		65 (24.1)
Type of Devices		
Needle		221 (81.8)
Surgical and dental instrument		45 (16.7)
Others		4 (1.5)
Job Description		
Managing patient		88 (32.6)
Handling equipment/ specimen		78 (28.9)
In operation and suturing		44 (16.3)
Collision		6 (2.2)
Disposal related		24 (8.9)
Sharp in usual location		21 (7.8)
Other circumstances		9 (3.3)

Note: ** Median (IQR) * (8), † (9) and (10), ‡(11)

categories and type of devices used. The aim is to look at the nature of job performed by the different types of health care categories and the risk that they might expose. The current study revealed that majority of house officers and medical officers sustained the injury while handling needles at workplace (59.9%). While the dental officers easily got the injury while handling surgical instrument (35.6%). Due to the nature of their job description, the nurses sustained needle prick injury more frequent than injury while handling surgical instrument.

All subjects who sustained NSSIs need to go for post exposure management. They need to comply to all the follow up schedule accordingly. However, the current study revealed that 70 (25.9%) of the cases had defaulted follow up at any point of time.

Table II: Type of devices used according to job categories among HCWs who sustained NSSIs (n=270)

Job category	Device Characteristic [n (%)]		
	Needle (n = 221)	Surgical instrument (n = 45)	Others* (n = 4)
House officer	78 (35.3)	6 (13.4)	-
Medical officer	54 (24.4)	6 (13.4)	-
Nurse	47 (21.3)	8 (17.8)	1 (25.0)
Health attendant	13 (5.9)	2 (4.4)	1 (25.0)
Dental officer	7 (3.1)	16 (35.6)	1 (25.0)
Pharmacist	7 (3.1)	-	-
Medical Assistant	5 (2.3)	-	-
Specialist	3 (1.4)	1 (2.2)	-
Medical laboratory technology	3 (1.4)	2 (4.4)	1 (25.0)
Dental attendant	3 (1.4)	2 (4.4)	-
Dental surgery assistant	1 (0.4)	2 (4.4)	-

Note: * Others = broken ampoule, glasses or other sharp material

Table III: Defaulted follow up of NSSIs among HCWs (n=70)

Year	n (%)
2010	14 (20.0)
2011	26 (37.1)
2012	5 (7.1)
2013	6 (8.6)
2014	0 (0.0)
2015	19 (27.2)

In Table III, it is observed that highest cases of defaulted follow up was in 2011 (26 cases) followed by 2015 (19 cases), 2010 (14 cases), 2013 (6 cases) and 2012 (5 cases). There was no defaulted follow up of post exposure management among HCWs in year 2014. Table IV shows that most of the defaulter age range between 30 to 40 years (61.4%) and majority of them were female (75.7%). According to job category distribution, house officer score the highest proportion (41.4%), followed by medical officer (30.0%) and nurse (14.3%).

Simple and multiple logistic regression analysis were conducted to determine the factors associated with defaulted follow up in post exposure management among HCWs in Kelantan.

There was significant association between ages, workplaces categories, type of job with defaulted follow up in post exposure management. The other variable such as gender, type of department, time of injury, device characteristic and job description showed no significant association with defaulted follow up post exposure management with p value > 0.5. Summary of the finding is illustrated in Table V.

As demonstrated in Table VI, the significant factors associated with defaulted follow up in post NSSIs management among HCWs were age (Adj. OR 2.80 ; 95% CI: 1.12,7.00; p = 0.027) and type of workplace (Adj. OR 4.65; 95% CI: 1.77,12.23; p = 0.002), after

Table IV: The comparison characteristic of NSSIs cases whom defaulted and completed the post exposure management in Kelantan (n = 270)

Variable	Defaulted (n=70) n (%)	Completed (n=200) n (%)
Age (years)		
20- 29	21 (30)	63 (31.5)
30- 39	43 (61.4)	92 (46.0)
40- 49	6 (8.6)	33 (16.5)
≥ 50	-	12 (6)
Gender		
Female	53 (75.7)	143 (71.5)
Male	17 (24.3)	57 (28.5)
Workplace		
Specialist hospital	64 (91.4)	126 (63.0)
Non-specialist hospital	1 (1.4)	21 (10.5)
Health Clinic	5 (7.2)	53 (26.5)
Department		
In-patient/ ward	45 (64.3)	88 (44.0)
Emergency Department (A & E)	4 (5.7)	8 (4.0)
Primary care clinic	1 (1.4)	26 (13.0)
Outpatient Clinic	5 (7.2)	9 (4.5)
Dental clinic	4 (5.7)	28 (14.0)
Labour room	1 (1.4)	28 (14.0)
Operating theatre	8 (11.4)	13 (6.5)
Others	2 (2.9)	7 (3.5)
Working Experience		
<10y	61 (87.1)	166 (83.0)
≥10y	9 (12.9)	34 (17.0)
Type of Devices		
Needle	62 (88.6)	159 (79.5)
Surgical and dental instrument	8 (11.4)	37 (18.5)
Others	-	4 (2.0)

Table V: Associated factors of defaulted follow up post exposure management among HCWs using simple logistic regression analysis (n= 270)

Variable	Crude OR (95% CI)	Wald stat	p-value
Age (years)			
≥40	1		
< 40	2.84 (1.15,6.99)	5.11	0.024
Gender			
Male	1		
Female	1.24 (0.66,2.33)	0.46	0.497
Type of Workplace			
Health Clinic	1		
Hospital	4.69 (1.80,12.27)	9.90	0.002
Type of Department			
Non intensive care unit	1		
Intensive care unit	1.02 (0.48,2.15)	0.02	0.966
Time of injury			
Office hour	1		
After office hour	1.13 (0.60,2.11)	0.14	0.709
Job category			
Non professional	1		
Professional	2.09 (1.14,3.83)	5.72	0.017
Working Experience(years)	0.97 (0.93,1.01)	1.75	0.187
Type of Device			
Non-needle	1		
Needle	1.45 (0.77,2.73)	1.30	0.254
Job Description			
Handling equipment & surgical	1		
Handling patient & needle	1.26 (0.67,2.37)	0.51	0.474

Table VI: Factor associated with defaulted follow up in post exposure management among HCWs using Multiple Logistic Regression (n=270)

Variables	Crude OR ^a (95% CI)	Adjusted OR ^b (95% CI)	Wald stat (df)	p-value
Age				
≥40	1	1		
<40	2.84 (1.15,6.99)	2.80 (1.12,7.00)	4.86 (1)	0.027
Type of Workplace				
Health clinic	1	1		
Hospital	4.69 (1.80; 12.27)	4.65 (1.77,12.23)	9.73 (1)	0.002

a Simple logistic regression b Multiple logistic regression
Constant = -0.370 Forward LR and Backward LR Multiple Logistic Regression was applied.
No multicollinearity and no interaction Hosmer Lemeshow test, p-value = 0.766 Classification table (overall correctly classified percentage = 74.1%) Area under the curve is 66.1%

controlling other confounders (gender, working experience, department, job category, time of injury, type of devices, job description). Other factors associated were found to be not significant.

DISCUSSION

A total of 270 cases were randomly selected from Sharp Surveillance notification system. The cases occurred in the period of six years started from January 2010 till December 2015 with majority of them were female. Female have higher frequencies of injury because the distribution of gender among HCWs in Malaysia shows that female is more than male especially among nurses (9, 10). The result on NSSIs related to female were reported in many previous studies in which they showed that female HCWs sustained NSSIs more compared to male (11,15). It could be explained by the reason giving that they spend more time managing patient and handling procedures related to sharps and needles such as carry out venepunctures, intravenous fluid administration and other procedures; thus they are more exposed and vulnerable to NSSIs compared to male (9). However, in other study conducted by Bhardwaj et al. (2014), it showed that male respondents had been reported to have higher prevalence (16).

The majority of female HCWs were less than 40 years of age; the current finding was consistent with studies conducted by (16-17). The number of NSSIs cases was higher in younger age groups and has relatively less working experience. The experienced HCWs were mostly in charge of administrative tasks and deal less frequently with blood investigation or other task that are associated with high risk for NSSIs thus explained the higher cases involving the younger age group among HCWs (18). The present study found that the mean working experience was two months and most of NSSIs occurred among those who has less than ten years of service compared to those who has worked more than ten years. This finding is consistent with a study by Cho et al. (2013) which found that the prevalence of NSSIs decreased as the years of experience (19). Less seniority of HCWs undertake a greater proportion of routine tasks involving patient care and sharp devices for training

purposes compared to those with more seniority in services.

Place of work also contribute significantly in the prevalence of NSSIs. The current study found that the number of NSSIs tended to be higher at hospital setting especially at specialist hospital which is consistent to worldwide studies (13, 18, and 20). This is because of higher turnover rate of patient in specialist hospitals as compared to other health care facilities which increases the workload of the staff. Among the entire unit, higher prevalence of NSSIs was reported while managing in-ward patient. This finding was also consistent with the finding from (14).

Simple reason for this finding could be due to the nature of procedure conducted for patients stay in ward. It was reported that more samples were being collected for invasive intervention procedure such as injections, drug preparation and intravenous infusions. However, unexpected finding was also reported when a comparison was made between in-patient care and management at Emergency Department, whereby it was found that the prevalence of NSSIs was higher during management of in-patient cases rather than in Emergency Department or during Intensive care unit. The finding could be due to the fact that the management in Emergency department and ICU are handled by trained and experienced staffs and most of the time the treatment is closely monitored by the HCWs, with the ratio of one HCW to one patient, it could reduce the risk of injury to occur (21).

Apart from that, Mohammad (2014) found that the highest NSSIs cases were at operating theatre due to higher interventional procedures as compared to other setting (22). The proportion of NSSIs relating to each clinical specialty and clinical practices between variations of health care settings differed across various types of sharps devices used. Bhardwaj et al. (2014) explored the reason behind the increase risk of NSSIs in operating theatre were possibly due to rushing to complete the task, fatigability and lack of experience on safe handling sharp devices and emotional stress related to long standing while doing surgical procedures in operation theatre (16).

Current study observed that the highest incident of occupational exposure to infected blood and body fluids were reported among house officer, followed by medical officer and nurses. This study revealed similar finding with other studies conducted by Chacho et al. 2007 and Kessler, et al. 2011 (23-24). This might be due to the fact that the house officers or intern have more patient direct contact, handling majority of inpatient procedures such as blood sampling and possibly due to repeated attempt to complete procedure as demonstrated by (24); thus they are more vulnerable to injuries. In addition to that, getting inadequate hours of sleep due to busy night call also might have contributed to the factor of the prevalence NSSIs among house officer.

Other than that, basic knowledge on the procedure also play significant role. O'Sullivan et al. (2011) reported that only one third of the house officer felt that they received adequate education and training regarding phlebotomy and cannulation prior to starting their internship (25). Hence, it is not surprising that the highest number of NSSIs occurred among house officer compared to other job categories. These findings suggest the need to enhanced continuous education programs to the target group which may help them to improve their knowledge and awareness, especially among house officer regarding standard precautions and risk of NSSIs.

Strategies that would certainly reduce the prevalence of NSSIs is by replacing the conventional needles with safer needle devices for example needless sets, butterfly system, self-capping intravenous catheters, safety cannula, self-retracting lancets for blood glucose monitoring and auto-disposable syringe. Studies by (12, 26) proved that there was a significant reduction in NSSIs prevalence after the introduction of safety-engineered alternatives. The technical standard criteria need to be fulfilled and accepted as safety devices, for instance the devices should be easy to be handling, intuitive to use, do not hinder and have clear guidance of activation (Hoffmann et al., 2013). It was observed that, the highest reported cases of NSSIs occurred during handling patient and needle. This possibly due to most of the procedures involved patients and needle was used for the procedure. According to (12) NSSIs certainly occurred as a result of sudden and unexpected movement made by patient during procedure even though the procedures were handled by experienced HCWs. Besides that, momentary lack of concentration during procedures involved handling patient and needle also may attribute to injuries. Thus, the best known alternatives to protect against NSSIs is by using safety devices.

It is observed that defaulted follow up post NSSIs exposure remains high and seems increasing in trend. Possible reason for this might be due to poor understanding of the importance of follow up among HCWs because compliance to follow up is not compulsory among those who had injured. Due to these reason, the cases tend to increase year by year with no proper action was taken to overcome the problem (27).

Based on the current study, 28.0% of HCWs had defaulted the follow up and among them, house officer have the highest rate either at six week, three months or six months follow up period. This finding is consistent with a study done by (27) whereby it showed that more than half of HCWs had defaulted follow up post exposure to NSSIs. Poor compliance to follow up lead to unidentified infections and miss the chance to use post exposure measure in order to reduce and avoid the likelihood of subsequent transmission of infection.

The current study illustrated that there was a significant association between age and defaulted follow up of NSSIs among HCWs. Based on descriptive analysis, the HCWs with age less than 40 years old has a high tendency to default the follow up as compared to age more than 40 years old. The reason behind this might be due to this group of HCWs perceived lack of time due to high workloads in view of most of procedures in health care setting were conducted by younger HCWs (28). Those senior HCWs have less exposure to blood sampling and procedures because of their task mainly focusing on consultation and administrative, thus they are less risk to have injury (11).

It was discovered that HCWs who work at hospital setting has four times probability to default post management as compare to those who work at primary health care setting. The current study revealed that the majority of defaulted follow up came from hospital with specialist followed by primary care and non-specialist hospital. The condition is in congruence with almost all studies conducted previously (29).

Tertiary hospital is a major hospital that has full complement of services and provides specific sub-specialty care. The hospital has high turnover rate of patient as result of referral cases from primary care and secondary care facilities, lead to increase demand for blood investigations and procedures. As for these possible reasons, the HCWs in specialist hospital have more risk to sustain NSSIs compared to other healthcare settings. With the same reason, high workload and lack of time, make the HCWs in specialist centre had higher tendency to default post management follow up (14).

Few limitations of the study were identified. The current study uses secondary data as its source of information. It was subjected to a lot of missing data and limited studied variables. Thus, the study needs to comply with the information that already exists. This, will affect the accuracy of the analysis and limit the objective that wanted to achieve. Only government health care facilities hospitals were included in the current study. The situation in private hospitals and teaching hospital could be different, as the number of patients and workload varies. Thus the findings need to be properly inferred to specific group of population and not as a whole.

As for recommendations, despite of using secondary data, the information gathered in the surveillance system able to generate important findings for improvement. Based on the findings, it was a must for the organization to continuously educate the healthcare workers on the important of the needle and sharp injuries especially to the junior. A documented education activities with a proper modules might be relevant and useful. On top of that, the incident of NSSI could be reduced if we incorporated technology in the management. The

use of needless devices, shielded needle devices and plastic capillary tubes might be an option. We also need to encourage the health care workers to wear the proper protective equipment while doing the procedure. Facilitating the report process, notably the time taken to report a NSSIs, is another approach that values attention at local level. Taken together, these measures to optimise reporting should enhance occupational health care delivery to the health care workers who require it the most. They should be provided post exposure follow up services that ensure confidentiality, are integrated into the services, removed barriers to services, including counselling and support. The list of those who need the follow up should be informed the head of the unit. This to make the management team remind those who need to go for the follow up. A reminder system also might be useful. Most importantly, the exposure reporting format should be made simple in order to encourage reporting by health care workers who are pressed for time. Policy makers need to create convenience of post exposure follow up and create supportive blame free working environment to reassure the workers comply with post exposure management of NSSIs.

CONCLUSION

Healthcare setting still have its own occupational risk to sustain NSSIs among HCWs. In the current study, it revealed that female, lack of experience, and the young age group has more tendencies to sustain the injury and most of the reported cases came from hospital setting. Surprisingly, the accident mainly occurs among house-officers who play a significant role as first line manager to treat the patients. The important variables that significantly associated with defaulted follow up were age group and type of workplace. Our study has shown the important finding and a salient reminder stress the significance of defaulted follow up among HCWS as means of maximally reducing the exposure and transmission of blood borne infections. These groups had better be acknowledged as a risk group and targeted for training programmes in order to reduce the NSSIs' incidence.

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