Needle Stick Injuries and Compliance among Doctors and Nurses

Mamoon Matlab, RN, OCN, CCRN, MSc* Seamus Cowman, PhD, MSc, RPN, RGN, RNT, Dip N (London), PGCEA, FFNMRCSI, FAAN** Ali Al-Shagag, MSc (HCM) BSc Nursing, DPN, AD, RN*** Moeen Aboabdo****

Background: Needle stick injuries (NSI) as an occupational hazard is a concern to employers and health professionals. The literature shows that NSI although a common incident, it is preventable through proper training and routine vaccinations of all hospital employees.

Objectives: To determine the incidence of NSI among doctors and nurses in a teaching hospital and the contributing factors towards these injuries.

Design: A Cross-Sectional Study.

Setting: King Hamad University Hospital, Bahrain.

Method: Two data collection approaches were employed in the study: a retrospective review of records and a survey instrument.

Result: One hundred fifty questionnaires were distributed, 91 responded; 30 had NSI. Fifteen (50%) were nurses, and 15 (50%) were doctors. Only 16 (53%) of the NSI respondents attended an annual training program on infection prevention and control; 14 (47%) nurses and 2 (7%) doctors attended an annual training program on infection prevention and control. Thirteen (43%) nurses and 8 (27%) doctors reported that 'I should not recap a needle', P-value 0.030.

Conclusion: NSI continues to be a problem for health and safety. Sharps tools management training should be mandatory for all staff, particularly to staff in high risk area.

Bahrain Med Bull 2017; 39(4): 225 - 228

Doctors and nurses are increasingly exposed to a range of occupational hazards in the workplace. Needle stick injury (NSI) is of increasing concern to employers and health professionals. In the USA it is estimated that 600,000 to 800,000 NSIs occur annually[1]. The first case of needle stick-transmitted HIV infection was reported in 1984, and this case served as to alert both employers and employees to the risks associated with sharp instrument injury[2]. The risk of transmission of infection after an occupational percutaneous exposure with a contaminated needle varies according to blood-borne virus, which could be HIV O.3%, HBV 2-40% and HCV 2.7-10%[3].

Recent studies in Kuwait, Nigeria, and Saudi Arabia have identified that NSIs are a leading cause of occupational injury in the workplace[3-5]. The Studies showed that NSI although a common incident, it is preventable via proper training and routine vaccinations. It was identified that most hospitals were not implementing appropriate training for their healthcare workers[3-5].

In Bahrain, similar to other countries, there is a paucity of research, and this serves to limit the potential for an evidence-based approach to manage the problem.

A study found 342 reported injuries at a local hospital, 35 cases were due to recapping of needles[4]. Another study found that 34% of all the injuries were associated with recapping of needles[5]. In a study in Accident and Emergency, 124 nurses were found to have needle stick injuries, 35.9% had been caused by recapping used needles[6]. NSI can be reported from many different clinical settings; a study of 124 unlicensed drugs shops in Uganda revealed that 62% of the respondents had training in injection safety, and 24% of the operators had at least one NSI[7].

In a study of nursing students, 9.1% of students had received Hepatitis A vaccination, while 28.1% of the 1491 students had previous exposure to NSI's[8]. A study of 245 hospital staff, only 37 had attended a biosafety training course, and only 11 participants had Hepatitis B vaccine, and 79 had multiple NSI[9].

Studies have revealed that training and the use of safety cannulas for IV administration could lower the incidence of NSI[4]. A 30-month training and teaching program leads to an increase of overall knowledge from 55.61% to 63.47% and leads to less NSI incidents[10].

* Nursing Manager
Department of Nursing Training and Education
King Hamad University Hospital
** Professor of Nursing and Head of School of Nursing and Midwifery
*** Lecturer
School of Nursing and Midwifery
**** Medical Student
Royal College of Surgeons in Ireland – Medical University of Bahrain
The Kingdom of Bahrain
E-mail: mamoon.matlab@khuh.org.bh

The aim of this study is to determine the incidence of needle stick injuries among doctors and nurses in a teaching hospital and the contributing factors towards these injuries.

METHOD

Two data collection approaches were employed in the study: a retrospective review of records and a survey instrument. The hospital Datix software is used to record incidences and details of the staff accidents/injuries for the period 2012 to 2014 were reviewed. The clinical areas with the four highest reported incidences of NSI were selected for the study: Intensive Care Unit (ICU), Operative Room (OR), Neonatal Intensive Care (NICU) and Emergency Department (ED). Data were collected using a self-completion questionnaire distributed to the nurses and doctors located in the highest NSI incidence areas.

Informed consent was obtained from the participants. Data were analyzed using SPSS 20.

RESULT

One hundred fifty questionnaires were distributed, 91 responded. Thirty had NSI and were included in this study. Thirteen (43%) were males, and 17 (57%) were females.

In each particular clinical location for the study, the reported NSI levels were as follows: 7 (23%) Emergency Medicine, 2 (7%) NICU, 15 (50%) Operating Room and 6 (20%) ICU.

Table 1 outlines the characteristics and frequencies of the NSI.

Table 1: Respondents Personal Characteristics

Category	Nurses (n=15)	Doctors (n=15)	TOTAL (n=30)	P -Value
Male	2 (13%)	11 (73%)	13 (43%)	
Female	13 (87%)	4 (27%)	17 (57%)	0.445[1]
TOTAL	**15 (100%)**	**15 (100%)**	**30 (100%)**	
Highest Education qualification				
Diploma	5 (33%)	0	5 (17%)	
BSc	10 (67%)	(13%) 2	12 (40%)	
Postgraduate qualification	0	13 (87%)	13 (43%)	0.002[2]
TOTAL	**15 (100%)**	**15 (100%)**	**30 (100%)**	
Years of Service				
< 2	0	1 (7%)	1 (3.3%)	
3 - 5	4 (27%)	2 (13%)	6 (20%)	
6 – 9	2 (13%)	2 (13%)	4 (13.3%)	0.537[2]
>10	9 (60%)	10 (67%)	19 (63.3%)	
TOTAL	**15 (100%)**	**15 (100%)**	**30 (100%)**	
Attended Sharp Management Annual Mandatory Training				
Yes	14 (93%)	2 (13%)	16 (53%)	
No	1 (7%)	13 (87%)	14 (47%)	0.035[1]
TOTAL	**15 (100%)**	**15 (100%)**	**30 (100%)**	
Department				
Emergency Medicine	6 (40%)	1 (7%)	7 (23%)	
Operation Theatre	7 (74%)	8 (53%)	15 (50%)	
NICU	1 (7%)	1 (7%)	2 (6%)	0.132[1]
ICU	1 (7%)	5 (33%)	6 (20%)	
TOTAL	**15 (100%)**	**15 (100%)**	**30 (100%)**	

[1]Man Whitney
[2]ANOVA

Fifteen (50%) doctors and 15 (50%) nurses had NSI.

A higher rate of NSI was identified among those who did not attend the annual management training.

The safety practices and knowledge level of respondents are outlined in Table 2. The result highlights the differences between doctors and nurses. Thirteen (43%) nurses and 11 (37%) doctors reported that 'I should not recap a needle' P-value 0.030. Six (20%) nurses and 4 (13%) doctors reported an injury in the past year.

Table 2: Safety Knowledge and Practices of Doctors and Nurses

Item		Nurses (n=15)	Doctors (n=15)	TOTAL (n=30)	P-value
Needle and sharp objects should be kept in puncture proof container	Yes	15 (100%)	15 (100%)	**30** (100%)	0.326
	No	0	0		
	Total	15 (100%)	15 (100%)		
I have received 3 doses of Hepatitis B before being involved in the clinical field	Yes	12 (80%)	11 (73%)	23 (77%)	0.560
	No	3 (20%)	4 (27%)		
	Total	15 (100%)	15 (100%)		
I should not recap a needle following use	Yes	13 (87%)	8 (53%)	21 (70%)	0.030
	No	2 (13%)	7 (47%)		
	Total	15 (100%)	15 (100%)		
I should not bend needle before disposal	Yes	14 (93%)	14 (93%)	28 (93%)	0.623
	No	1 (7%)	1 (7%)		
	Total	15 (100%)	15 (100%)		
I should complete an incident report if I have needle stick injury	Yes	14 (93%)	14 (93%)	28 (93%)	1.000
	No	1 (7%)	1 (7%)		
	Total	15 (100%)	15 (100%)		
All sharp containers that are 3/4 full must be disposed of	Yes	15 (100%)	14 (93%)	29 (97%)	0.200
	No	0	1 (7%)		
	Total	15 (100%)	15 (100%)		
Notices that promote safe disposal of used injections should be posted	Yes	13 (87%)	13 (87%)	26 (87%)	0.699
	No	2 (13%)	2 (13%)		
	Total	15 (100%)	15 (100%)		
NSI past year	Yes	6 (40%)	4 (27%)	20 (67%)	0.456
	No	9 (60%)	11 (73%)		
	Total	15 (100%)	15 (100%)		

Datix was reviewed and revealed 58 records of NSI. It appeared that the NSI risk varied according to the type of the procedure performed, the highest rates of NSI occurring during injection (47%), disposal of the sharp needles in the container (12%), and suturing (10%), see figure 1.

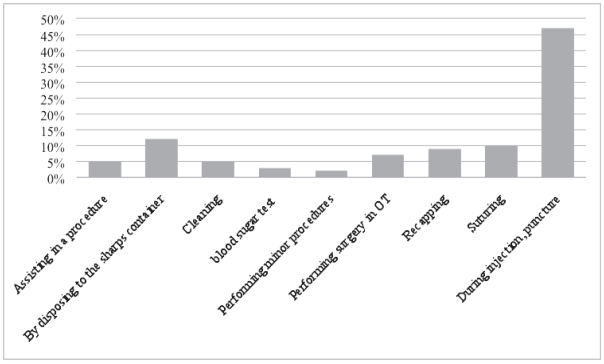

Figure 1: Datix Records of Reported Causes of NSI

DISCUSSION

In our study, there was an unacceptably high level of injury from NSI. The NSI rate of 33% in the previous year reported in our study is slightly higher than the 13.9% of NSI incidence reported among primary healthcare workers in KSA, Malaysia and Egypt[11-13]. NSI was reported in the USA EPINet™ study as 16.5 NSI per 100[20]. The higher rate of NSI incidence in this study may reflect the need for preventive measures through education, training, policy and procedures which are enforced.

Other studies reported higher rates of NSI amongst doctors compared to nurses. A study found NSI rate of 48% among doctors, 22.4% of medical students and 18.7% among nurses[12]. In a Ugandan teaching hospital, interns reported more NSI than nurses[14].

In our study, most nurses and doctors reported HBV immunization, 80% and 73% respectively. That is comparable to a high rate in a Malaysian study with an immunization rate of 93% and a low rate in Egypt of 15.8%[15,16]. Probably there should be a mandatory vaccination of all healthcare workers.

Many studies including ours, show that NSI occurred most often during injection[12,18,20]. NSI through recapping of a needle is a most serious violation of policy and procedure and must be of concern to undergraduate training schools in medicine and nursing. In our study, Datix report revealed that 9% of NSI was due to recapping needle, which was considered low compared to other studies[5,19].

NSI commonly occurs in clinical areas where there is frequent use of injection technique; in our study, the highest rate of NSI occurred in the operating room, which is similar to other studies[5,20]. Therefore, a special emphasis on NSI training in high-risk areas should be considered.

CONCLUSION

NSI continues to present a serious problem to doctors and nurses. Sharp tools management training should be mandatory for all staff, particularly those in high-risk areas. There is a need to introduce safer needle devices, such as self-blunting safety needle or retractable safety syringe. A review of policy and procedure is recommended.

Author Contribution: All authors share equal effort contribution towards (1) substantial contributions to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes.

Potential Conflicts of Interest: None.

Competing Interest: None.

Sponsorship: None.

Acceptance Date: 14 October 2017.

Ethical Approval: Approved by the Research and Ethics Committee, King Hamad University Hospital and The Royal College of Surgeons in Ireland-Medical University Bahrain.

REFERENCES

1. Kingma M. Nursing Matters. http://www.who.int/occupational_health/activities/2icnneed.pdf Accessed in August 2017.
2. Rapiti E, Prüss-Üstün A, Hutin Y. Sharps Injuries: Assessing the Burden of Disease from Sharps Injuries to Health-Care Workers at National and Local Levels. Geneva: WHO, 2005; 11.
3. Wilburn SQ, Eijkemans G. Preventing Needlestick Injuries among Healthcare Workers: A WHO-ICN Collaboration. International Journal of Occupational and Environmental Health 2004; 10(4): 451-456.
4. Mehta A, Rodrigues C, Singhal T, et al. Interventions to Reduce Needle Stick Injuries at a Tertiary Care Centre. Indian J Med Microbiol 2010; 28(1):17-20.
5. Sharma R, Rasania S, Verma A, et al. Study of Prevalence and Response to Needle Stick Injuries among Health Care Workers in a Tertiary Care Hospital in Delhi, India. Indian J Community Med 2010; 35(1):74-7.
6. Gourni P, Polykandrioti M, Vasilopoulos G, et al. Occupational Exposure to Blood and Body Fluids of Nurses at Emergency Department. Health Science Journal 2012; 6(1):60-68.
7. Stanback J, Otterness C, Bekiita M, et al. Injected with Controversy: Sales and Administration of Injectable Contraceptives in Drug Shops in Uganda. Int Perspect Sex Reprod Health 2011; 37(1):24-9.
8. Yamazhan T, Durusoy R, Tasbakan MI, et al. Nursing Students' Immunisation Status and Knowledge about Viral Hepatitis in Turkey: A Multi-Centre Cross-Sectional Study. Int Nurs Rev 2011; 58(2):181-5.
9. Elduma AH, Saeed NS. Hepatitis B Virus Infection among Staff in Three Hospitals in Khartoum, Sudan, 2006-07. East Mediterr Health J 2011; 17(6):474-8.
10. Jere DL, Kaponda CP, Chimwaza A, et al. Improving Universal Precautions and Client Teaching for Rural Health Workers: A Peer-Group Intervention. AIDS Care 2010; 22(5):649-57.
11. Ismail AA, Mahfouz MS, Makeen A, et al. Injection Safety among Primary Health Care Workers in Jazan Region, Saudi Arabia. Int J Occup Environ Med 2014; 5(3):155-63.
12. Lee LK, Hassim IN. Implication of the Prevalence of Needlestick Injuries in a General Hospital in Malaysia and its Risk in Clinical Practice. Environ Health Prev Med 2005; 10(1):33-41.
13. Hanafi MI, Mohamed AM, Kassem MS, et al. Needlestick Injuries among Health Care Workers of University of Alexandria Hospitals. Eastern Mediterranean Health Journal 2011; 7(1): 26-35.
14. Newsom DH, Kiwanuka JP. Needle-Stick Injuries in an Ugandan Teaching Hospital. Annals of Tropical Medicine & Parasitology 2002; 96(5): 517-522.
15. Norsayani MY, Noor Hassim I. Study on Incidence of Needle Stick Injury and Factors Associated with this Problem among Medical Students. J Occup Health 2003; 45(3):172-8.

16. Talaat M, Kandeel A, El-Shoubary W, et al. Occupational Exposure to Needlestick Injuries and Hepatitis B Vaccination Coverage among Health Care Workers in Egypt. Am J Infect Control 2003; 31(8):469-74.
17. Ippolito G, Puro V, De Carli G. The Risk of Occupational Human Immunodeficiency Virus Infection in Health Care Workers. Italian Multicenter Study. The Italian Study Group on Occupational Risk of HIV Infection. Arch Intern Med 1993; 153(12):1451-8.
18. Odeyemi KA, Onifade KA, Onifade EU. Needle Stick/ Sharp Injuries among Doctors and Nurses at the Lagos University Teaching Hospital. Nigerian Quarterly Journal of Hospital Medicine 2005; 15(2): 50-54.
19. Amira CO, Awobusuyi JO. Needle-Stick Injury among Health Care Workers in Hemodialysis Units in Nigeria: A Multi-Center Study. Int J Occup Environ Med 2014; 5:1-8.
20. Memish ZA, Assiri AM, Eldalatony MM, et al. Benchmarking of Percutaneous Injuries at the Ministry of Health Hospitals of Saudi Arabia in Comparison with the United States Hospitals Participating in Exposure Prevention Information Network (EPINet™). Int J Occup Environ Med 2015; 6(1):26-33.