



Investigating Healthcare Workers' Experience after a Needle Stick Injury at a Tertiary Hospital in Makkah Region in Saudi Arabia: A Qualitative Assessment

Manal Al-Gethamy¹, Hamed Adetunji², Shazra Abbas^{1*} and Duaa Al-Qatabi¹

¹ Department of Public Health, Infection Prevention and Control, Alnoor Specialist Hospital, Makkah, Saudi Arabia

² Department of Epidemiology, Umm-ul-Qura University, Makkah, Saudi Arabia

*Corresponding e-mail: shazraabbas@gmail.com

ABSTRACT

Objective: To describe contextual factors leading to a Needle stick injury (NSI) event; highlight challenges faced by hospital employee that increase their vulnerabilities to such an exposure; and identify solutions to prevent future occurrence of these events. **Methods:** The study was conducted at a tertiary care hospital in Makkah, Saudi Arabia. Twenty in-depth semi-structured interviews with hospital staff who experienced a NSI were carried out aiming to understand system gaps preventing reduction in the incidence of NSI and assess the quality of healthcare provided after such an event. Data was analyzed using thematic analysis. Results are described under four key themes that emerged during analysis including: training on safe handling of sharps; environmental details at the time of NSI; processes followed the incident; employees' awareness about hospital's NSI policy. **Results:** Majority NSI incidents (80%) occurred in emergency room. Causative factors identified leading to a NSI included: high work load, mental stress, fatigue due to prolong work hours, lack of supervision and casual attitude of senior staff. Likewise, suboptimal quality of NSI prevention training program and inadequate service provision to staff after they acquire an injury were found as major implementation gaps despite existence of clear hospital guidelines/policies on NSI prevention program. **Conclusions:** Hospital employees are front line workers at risk of sustaining a NSI, hence, their regular training on safe handling of sharps is recommended and highly emphasized. Nonetheless, without addressing gaps as highlighted by participants in this study no policy or guideline can fully achieve its objectives.

Keywords: Needle stick injury, Blood-borne infections, Healthcare workers

INTRODUCTION

A needlestick injury (NSI) is defined as a penetrating wound from a sharp object that exposes a person to blood or other body fluid [1]. Owing to the nature of their work, healthcare workers (HCWs) are at an increased risk of NSI that exposes them to a range of blood borne infections including hepatitis B, hepatitis C and HIV [2]. It is estimated that about 37% Hepatitis B, 39% hepatitis C and 4.4% HIV infections among HCWs are attributed to NSIs in healthcare settings [3]. Recommended measures to minimize the risk of such an injury include: observing universal precautions, safe disposal of sharps, appropriate use of personal protective equipment (PPE), and hepatitis B vaccination in addition to regular trainings of healthcare staff on safe handling of sharps [4].

Nevertheless, despite availability of consistent policies, standard guidelines and staff trainings, an average of 700,000-800,000 and about a 100,000 NSIs occur in US and in UK respectively every year [5,6]. The situation is even more alarming in low and middle-income countries where unsafe injection practices are high, and blood borne infectious diseases are prevalent, thereby, posing a greater and constant threat to HCWs in these settings [7]. It is estimated that about 8.6% HCWs globally experience a NSI event per annum; majority being from low and middle-income world [8]. Evidence has shown that there are additional factors in a healthcare environment that put HCWs to an increasing risk of a NSI despite availability of standard protocols and recommended safety measures. Examples of these risk factors include busy work schedules, prolonged duty hours and lack of supervisory support to junior staff further leading to feelings of anger, frustration, and fatigue, thereby, exponentially increasing HCWs vulnerability to sustain

a NSI [1,9]. Understanding these risk factors and properly addressing them is therefore essential to develop more successful NSI prevention programs in a healthcare setting.

Rationale for the Study

Although there are few studies conducted in Saudi Arabia on needle stick injuries, but they primarily focused on availability of personal protective equipment (PPE), mechanisms for safe waste disposal, number of staff positions in Infection Control Departments, knowledge, attitude, and practices of HCWs towards NSIs, training programs for hospital staff and vaccination against Hepatitis B infection [2,10-13]. None of the studies, however, examined the real events that led to the occurrence of a NSI in a healthcare setting. The environment in which a NSI occur, the psychological impact of the event on HCW, their expectations as well as personal experience of the care given are often overlooked aspects of a NSI event. Without understanding the holistic picture in which a NSI event occur and analyzing in-depth all the factors operating in the environment that ultimately led to the event it may not be possible to prevent or at least reduce such occurrences in future. This is the focus of the present study.

Study Setting

This study was conducted at Al-Noor Specialist hospital in the region of Makkah, Saudi Arabia. The NSI prevention program in the hospital is well established; comprising of a stepwise guideline for HCWs to seek appropriate healthcare after exposure to a sharp injury, a regular training program for HCWs on injection safety, and provision of PPE as well as other supplies for safe disposal of sharps. Nevertheless, despite all the available guidance and support, the incidence of NSI in the hospital remained persistent. In fact, a continuing rise was noticed in two consecutive years before the study began; necessitating an in-depth inquiry to understand gaps preventing successful implementation of NSI program in the hospital.

This study is aimed at identifying and understanding the environmental factors that led to this recent increase in the rates of NSI in the hospital despite the availability of appropriate training programs, supplies and a comprehensive NSI policy.

Study Objectives

To describe contextual factors leading to a NSI event; highlight challenges faced by hospital employee that increase their vulnerabilities to such an exposure; and identify solutions to prevent future occurrence of these events.

Inclusion Criteria

HCWs at Al-Noor hospital (doctors, nurses, paramedics) with a NSI or occupational exposure to body fluids between October 2015 and June 2016.

Exclusion Criteria

HCWs at Al-Noor hospital (doctors, nurses, paramedics) that had a NSI or occupational exposure to body fluids before October 2015 to minimize recall bias.

METHODOLOGY

Study Design

Using qualitative research approach, semi structured in-depth interviews were carried out between July-October 2016. Themes selected for interviews were based on study objectives, review of relevant literature and hospital's NSI policy guidelines. The thematic guide helped interviewers to maintain consistency across interviews while at the same time giving opportunity to the participants to share their experiences in their own words and at their desired pace. The guide was pre-tested and modified accordingly before the start of actual interviews.

Ethical Considerations

Ethical approval for the study was obtained from the hospital ethics committee before initiation of the study.

Data Collection and Analysis

A total of 61 employees sustained a needle stick or other sharp injury between October 2015 to June 2016 in the

hospital. All these employees were contacted through the Infection Control Department of the hospital and requested for possible participation in the study. After informed consent 20 out of the 61 identified as eligible were interviewed. Reasons for not being able to participate for the rest eligible included; transfer out to another hospital, resignation/end of contract with the hospital or not reachable with the contact details available on record. Interestingly, all those that were contacted agreed to participate in the study.

Majority interviews were carried out in English while few were conducted in Arabic on request of the participants. The two interviewers who conducted these interviews have strong public health and qualitative research background while one of them is a native Arabic speaker who is also fluent in English language. Each interview lasted for an average of 30 minutes (range 25 to 40 minutes). Interviews were carried out at a private space within hospital at a mutually agreed time, audiotaped with prior consent of the participants and transcribed verbatim. Findings are grouped according to the themes of the interview guide and additional themes added as emerged during analysis.

RESULTS

Baseline characteristics and work experience of study participants are given in Tables 1 and 2.

Table 1 Baseline characteristics of the participants

Gender	Number (n=20)	%
Male	9	45%
Female	11	55%
Profession		
Doctor	6	30%
Nurse	8	40%
Technician	4	20%
Cleaner	2	10%
Nationality		
Saudi Arabia	9	45%
Philippines	5	25%
Bangladesh	2	10%
Pakistan	2	10%
India	1	5%
Indonesia	1	5%

Table 2 Work experience data

Work Experience In Al-Noor		Total Work Experience	
< 1 year	>1 year	<5 years	>5 years
6/20	14/20	15/20	5/20

Interview Themes

Training on safe handling of sharps

Eight out of 20 participants never attended a formal training on injection safety and safe disposal of sharps. Four participants attended only a lecture on NSI but stated it insufficient. One participant mentioned attending informal discussions on safe handling of sharps during clinical ward rounds with senior hospital staff. Study findings further revealed casual attitude of staff towards risks related to NSI as evident from their responses below. A participant stated:

“No one among colleagues took it serious when I got NSI, they said this is part of job” and I should not worry”

Similarly, three out of 20 participants denied need of a formal training, rationalizing it as below:

“In practice, it is difficult to avoid injury as we are so busy all the time so there is no need to attend such trainings”

However, 70% participants showed their concern regarding few training opportunities available in the hospital on safe handling of sharps and further suggested improvement in the current training methodology, which is predominantly lecture oriented, to a more interactive approach.

Environmental details at the time of acquiring a NSI

The study results revealed, majority NSI incidents (80%) occurred in emergency room and Operation Theater while less than 20% happened at other places such as outpatient clinics and hospital laboratory. At the time of acquiring injury all the participants were wearing gloves and almost all of them (90%) instantly noticed the injury. An inconsistent approach, however, was observed in their immediate response to the injury where nine out of 20, washed their wound with soap and water, five used alcohol and pyodine solution to clean the wound, one employee just rubbed the affected area whereas one did nothing. Four employees squeezed the wound in addition to washing it with water or pyodine.

Factors identified by the study participants that possibly led to the incident included: mental stress at workplace such as performing a procedure without supervision, non-cooperative attitude of operation theater staff pushing junior surgeons to finish procedure quickly; and high workload especially in emergency room. A participant has this to say:

“I was in rush, I was taking blood sample of one patient but thinking of four other patients that I had to attend in next half an hour before end of my shift in emergency room. I had to complete patient files and write handing over notes as well all in 30 minutes. It is lots and lots of stress”

Failure to adhere to “standard operating procedures” is another risk factor identified that put employees at an increasing risk of acquiring a NSI such as throwing sharps in ordinary waste baskets instead of designated containers; as stated by one participant;

“I told nurses many times not to throw syringes in blue basket (designated for ordinary waste) but they never listened to me. I was collecting waste one day and I got pricked from a used needle there, which should have been thrown in the yellow basket. She (the nurse) said sorry to me but I was already pricked”

Other risk factors recognized included lack of staff familiarity with hospital standard safety procedures, non-availability of appropriate instruments for a given procedure, working in an understaffed environment and fatigue due to prolonged work hours.

Processes following NSI incident

All participants informed a fellow colleague, senior staff, or nursing in-charge after sustaining the injury. Six employees immediately visited emergency room (ER) to seek care, ten visited staff clinic in outpatient department, one reported in Infection Control Unit in the hospital while three were not sure where to report and visited either ER or staff clinic after a delay of at least 24 hours. Only one out of six employees completed the standard NSI incident report form in emergency room and none were provided with a counseling support. One employee who visited Infection Control Unit was referred to staff clinic. Serology for hepatitis B, C, HIV and hepatitis B antibody titers for both source patients and employee were sent in only three cases. Experience in ER was mentioned by one of the participant as follows:

“ER is a busy place. After NSI, I waited in ER for two hours before I could get any help. I was tired and scared too but in ER they always think staff want day-off. The in-charge nurse asked me to come back to duty immediately after reporting to staff clinic.”

Once at staff clinic, the findings showed employees were only verbally asked about details of the NSI without taking written notes. All participants who attended staff clinic were advised to complete NSI incident report that almost all of them found too detailed, in a difficult to read font and with confusing questions. No guidance was available to correctly fill the report form. On this, one participant stated:

“I find questions in the form confusing. I asked the nurse (at staff clinic) but she was too busy to explain”

“I was given a form to fill but it was in Arabic that I do not understand, I did not return this form, and nobody asked me to submit it”

At staff clinic hepatitis B vaccine was given to all employees after sending their serology but when asked about benefits of hepatitis B vaccine only half of the participants were familiar with the advantages of vaccination. Results of the serology were communicated by staff clinic to only five out of 20 employees while five checked their results from the laboratory themselves. The other ten participants never received an update regarding their serology results. Lack of communication and counseling support at staff clinic is evident from the two participants' comments as stated

below:

“I was given an injection at staff clinic, I did not know why it was given to me and I was too nervous to ask”

“If you are injured you have to do all efforts yourself and run everywhere. Nobody tells you clearly what to do and you are so afraid at the same time. I never visited staff clinic afterwards as I was busy but they also never called me back”

Employees’ awareness about NSI policy/guidelines in the hospital

Eight participants were aware of hospital’s NSI policy but only three knew how to access it online and only two had ever read this policy to understand their rights and support available to them in case they sustain a NSI while on duty.

DISCUSSION

Our study found majority NSI incidents (80%) occurred in emergency room and operation theatre while less than 20% happened at other places such as outpatient clinics and hospital laboratory. This is consistent with previous studies elsewhere in Saudi Arabia that identified inpatient departments, emergency rooms and intensive care units as frequent sites where such events occur [11]. The study findings revealed sub-optimal policy implementation and the study participants raised their concerns over lack of training opportunities as well as sub-optimal quality of the available training program. Similar findings have been reported and was found necessary to recommend regular training programs and mandatory hepatitis B vaccination services for HCWs in the country [2,10,12].

In this study, an inconsistent approach was found on what to do after sustaining NSI; ranging from nine out of 20 washing their wound with soap and water to using alcohol and pyodine solution and even just rubbing the affected area to doing nothing. The practices were not different from what have been found previously. For example, in Uganda following NSI, 60 out of 280 healthcare workers reported that “they squeezed the site of the injury and washed it with bleach” [14]. Furthermore, casual response of senior staff members to such an injury and defying attitude of study participants on need of a training program is alarming. Staff member not convinced or not knowledgeable of possible grave consequences of a NSI can put themselves as well as their fellow colleagues at a higher risk of sustaining a sharp injury.

The study further brings to surface a range of risk factors contributing to a NSI event. High work load, less work experience, fatigue due to prolong work hours, and mental stress identified in this study are also globally known factors associated with NSI [15,16]. Reduction in work hours and implementation of staff friendly policies are often-recommended solutions to address these issues, however, shortage of health work force worldwide is a key barrier preventing implementation of relaxed work schedules for healthcare workers [16,17]. Nevertheless, other barriers such as non-compliance or lack of familiarity of staff with hospital standard protocols are manageable at individual health setting level requiring only better planning and organized efforts to implement existing hospital policies.

Another significant finding that emerged from this study was lack of staff awareness about steps to follow after a NSI. According to the hospital NSI protocol, staff sustaining a NSI should immediately wash the wound with soap and water, followed by an immediate visit to staff clinic if injury occurred during work hours or emergency room in after-work hours, weekends, and public holidays. However, despite these guidelines, majority participants were unclear of immediate care as well as further steps to seek the required healthcare services available in the hospital. Similar lack of clarity was noticed among senior staff members directly responsible for provision of treatment and care in NSI incidents. This finding is not peculiar to our study. Similar results were noted in a study conducted among nurses in Turkey, where 33.3% nurses did not report their NSI incident as they were not aware of a reporting requirement or mechanism in the hospital [18].

CONCLUSION

This study is an effort to understand barriers preventing successful implementation of a NSI program in a healthcare setting from the perspective of HCWs who had experienced such an injury. It can be concluded from the findings of the study that the NSI protocol of Al-Noor hospital, which is a user-friendly, easy to understand and evidence-based guide, is not implemented well. It confirmed what was found before that availability of standard protocol does not guarantee effective implementation of a program [19]. Rather, a range of factors can fail policies based on scientifically proven knowledge to be translated into meaningful practices [20]. Results of this research study are classical example of this real-world phenomenon. Hospital employees are front line workers at risk of sustaining a NSI, hence, their regular

training on safe handling of sharps is recommended and highly emphasized [21]. Nonetheless, without addressing gaps as highlighted by participants in this study; such as sub-optimal quality of training program, lack of interventions to mitigate stress in work environment, and non-availability of any forum where employees can confidently raise their voice if not satisfied with the care given, no policy or guideline can fully achieve its objectives. Developing strong monitoring and evaluation mechanisms to objectively analyze barriers to successful program implementation is another approach that can help transform policies into effective practices.

DECLARATIONS

Conflict of Interest

The authors and planners have disclosed no potential conflicts of interest, financial or otherwise.

REFERENCES

- [1] Centers for Disease Control and Prevention. "Stop Sticks Campaign". *The National Institute for Occupational Safety and Health (NIOSH)*, 24 Jun 2011, <https://www.cdc.gov/niosh/stopsticks/sharpsinjuries.html>.
- [2] Buraidah, Al-Qassim, and Saulat Jahan. "Epidemiology of needle-stick injuries among health care workers in a secondary care hospital in Saudi Arabia." *Annals of Saudi Medicine*, Vol. 25, No. 3, 2005, pp. 233-38.
- [3] World Health Organization. *Needlestick injuries protecting health-care workers - preventing needle-stick injuries*, http://www.who.int/occupational_health/topics/needinjuries/en/.
- [4] Center for Disease Control and Prevention. Preventing needle-stick injuries in health care settings. National Institute for Occupational Safety and Health; 1999.
- [5] Qazi, Abdul Rafay, et al. "Comparison of awareness about precautions for needle stick injuries: A survey among health care workers at a tertiary care center in Pakistan." *Patient Safety in Surgery*, Vol. 10, No. 1, 2016, p. 19.
- [6] O'Connor, M.B. "Needlestick injury advice in the UK and Ireland." *Journal of Hospital Infection*, Vol. 71, No. 2, 2009, pp. 185-86.
- [7] Kaweti, Gudeta, and Teferi Abegaz. "Prevalence of percutaneous injuries and associated factors among health care workers in Hawassa referral and Adare District hospitals, Hawassa, Ethiopia, January 2014." *BMC Public Health*, Vol. 16, No. 1, 2015, p. 8.
- [8] Jahangiri, Mehdi, et al. "Needle stick injuries and their related safety measures among nurses in a university hospital, Shiraz, Iran." *Safety and Health at Work*, Vol. 7, No. 1, 2016, pp. 72-77.
- [9] Nelson, Roxanne. "High rate of needle-stick injuries among surgeons." 2007, p. 509.
- [10] Ismail, A.A., M.S. Mahfouz, and A. Makeen. "Injection safety among primary health care workers in Jazan Region, Saudi Arabia." *The International Journal of Occupational and Environmental Medicine*, Vol. 5, No. 3, 2014, pp. 441-55.
- [11] Memish, Ziad A., et al. "Risk analysis of needle stick and sharp object injuries among health care workers in a tertiary care hospital (Saudi Arabia)." *Journal of Epidemiology and Global Health*, Vol. 3, No. 3, 2013, pp. 123-29.
- [12] Al-Dharrab, Ayman A., and Khalid H. Al-Samadani. "Assessment of hepatitis B vaccination and compliance with infection control among dentists in Saudi Arabia." *Saudi Medical Journal*, Vol. 33, No. 11, 2012, pp. 1205-10.
- [13] Mahfouz, A.A., et al. "Injection safety at primary health care level in south-western Saudi Arabia." Vol. 15, No. 2, 2009, pp. 443-50.
- [14] Newsom, D.H., and J.P. Kiwanuka. "Needle-stick injuries in a Ugandan teaching hospital." *Annals of Tropical Medicine & Parasitology*, Vol. 96, No. 5, 2002, pp. 517-22.
- [15] Cho, Eunhee, et al. "Factors associated with needle-stick and sharp injuries among hospital nurses: a cross-sectional questionnaire survey." *International Journal of Nursing Studies*, Vol. 50, No. 8, 2013, pp. 1025-32.
- [16] Nsubuga, Fredrich M., and Maritta S. Jaakkola. "Needle stick injuries among nurses in sub-Saharan Africa." *Tropical Medicine & International Health*, Vol. 10, No. 8, 2005, pp. 773-81.
- [17] Zurn, Pascal, et al. "Imbalance in the health workforce." *Human resources for health* 2.1 (2004): 13.

- [18] Akyol, A., and C. Kargin. "Needle stick and sharp injuries among nurses." *Global Journal of Nursing and Forensic Studies*, Vol. 1, No. 109, 2016, p. 2.
- [19] Bauer, Mark S., et al. "An introduction to implementation science for the non-specialist." *BMC Psychology*, Vol. 3, No. 1, 2015, p. 32.
- [20] Damschroder, Laura J., et al. "Fostering implementation of health services research findings into practice: A consolidated framework for advancing implementation science." *Implementation Science*, Vol. 4, No. 1, 2009, p. 50.
- [21] Sharma, Rahul, et al. "Study of prevalence and response to needle stick injuries among health care workers in a tertiary care hospital in Delhi, India." *Indian Journal of Community Medicine: Official publication of Indian Association of Preventive & Social Medicine*, Vol. 35, No. 1, 2010, p. 74.