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Review Article

**NEEDLESTICK INJURIES AMONG HEALTH WORKERS IN SAUDI
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Abstract:**Background**

Needle stick injuries (NSIs) are serious occupational hazards in the transmission of a variety of blood borne pathogens such as hepatitis B virus, hepatitis C virus, and human immunodeficiency virus (AIDS) among healthcare workers (HCWs). NSI is a common event in the health-care environment and these injuries may occur not only with freshly contaminated sharps, but also with needles that carry dry blood.

Objectives

In this study, we aim to: report on previous literature on NSIs that were carried out in Saudi Arabia and worldwide and detect the prevalence, causes and complications of NSIs.

Methods

PubMed database and EBSCO Information Services were used for articles selection. All relevant articles to our review with the topics regarding NSIs have been used. We excluded other articles, which are not related to this field. The data will be extracted according to specific form in which it is going to be reviewed by the group members.

Conclusion

Prevention of NSI is the best way to prevent several diseases in health care workers. It should be an integral part of prevention programs in the work place, and training of HCWs regarding safety practices indispensably needs to be an ongoing activity at the hospital. It is recommended that every hospital should develop a multi-pronged strategy to deal with NSI. Besides health promotion, there should be setting up of an adequate surveillance mechanism in every large hospital and also of facilities for prompt response and treatment of NSI.

Keywords: Needlestick, Injuries, Health Workers, Saudi Arabia.

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INTRODUCTION:

Needle stick injuries (NSIs) are serious occupational hazards in the transmission of a variety of blood borne pathogens such as hepatitis B virus, hepatitis C virus, and human immunodeficiency virus (AIDS) among healthcare workers (HCWs) [1, 2]. Medical, dental, nursing, and midwifery workers are at high risk for occupational exposure to blood-borne pathogens (BBPs) via sharp injuries such as needle stick injuries [3]. Nurses have the highest rate of NSI among health-care workers [4]. NSIs are a common event in the health-care environment and these injuries may occur not only with freshly contaminated sharps, but also with needles that carry dry blood [5]. Injuries may be caused by objects such as hypodermic needles, blood collection needles, intravenous (IV) stylets and needles used to connect parts of IV delivery systems [6]. There is some evidence revealing a high prevalence of unsafe injection practices among HCWs in developing countries, where about 90% of accidents related to NSIs occur [7]. In a survey of 806 interventional radiology physicians, it was reported that, only half of the physicians exposed to needlestick injury; and the survey was not aimed for evaluation of the reporting practices [8].

In another study of 895 interventional radiologists, 91% of them reported a prior needlestick injury, 35% reported at least one injury during treatment of HIV-positive patient. Only 71% received training courses on needlestick injury. On the other hand, only 66% of injuries were reported [9]

OBJECTIVES:

In this study, we aim to: report on previous literature on NSIs that were carried out in Saudi Arabia and

worldwide and detect the prevalence, causes and complications of NSIs.

METHODS AND MATERIALS:**Sample & Study Groups**

PubMed and EBSCO Information Services were chosen as the search databases for the publications used within the study, as they are high-quality sources. PubMed being one of the largest digital libraries on the internet developed by the National Center for Biotechnology Information (NCBI) which is a part of the United States National Library of Medicine. Topics concerning NSIs have been used in the making of the article. Restrictions to the last 10 years, country restriction on Saudi Arabia, and English language due to unavailable resources for translation were used. The founded articles were screened by titles, and reviewing the abstracts yielded 4 articles which were enrolled. Inclusion criteria: the articles were selected based on the relevance to the project which should include one of the following topics; 'NSIs, Occupational problems for nurses, NSIs among nurses'. Exclusion criteria: all other articles which did not have one of these topics as their primary end, or repeated studies, and reviews studies have been excluded.

Statistical Analysis

No software has been utilized to analyze the data. The data was extracted based on specific form that contains (Title of the publication, author's name, objective, summary, results, and outcomes). These data were reviewed by the group members to determine the initial findings, and the modalities of performing the surgical procedure. Double revision of each member's outcomes was applied to ensure the validity and minimize the mistakes.

RESULTS:

Table 1. Study, study design, country, objective, duration, outcome, and reference number

Study	Study Design	Country	Objective	Duration of Study	Outcome	Ref.
Khabour, Omar F et al.	survey-based study design	Al-Madinah, Saudi Arabia.	To examine self-reported frequency of occupational infection and needlestick injury among the clinical laboratory workers	-	The results showed that approximately 33% of the sample had an experienced occupational infection while 24% had experienced a needlestick injury. Occupational infection, needlestick injury and recapping needles after use were associated with lack of training on biosafety ($P < 0.05$).	10
Amini, Maryam et al.	cross-sectional, analytical and descriptive study	Tehran, Iran	to determine the rate of NSIs in a teaching hospital in Tehran, Iran.	-	only 50.2% of injuries had been reported; 67.8% of all participants (n = 211) had at least one NSI. Most participants mentioned the injection syringe needles as the main cause of their injuries (71.1% of all NSIs). Among NSIs, those caused by insulin syringe needles (6.2%) were the second cause.	11

Mohammad Hassan Kazemi Galougahi	Descriptive analytical cross-sectional study	Khanevadeh Hospital in Tehran	To evaluate prevalence of NSI in nursing workers of Tehran Khanevadeh Hospital and identify related factors in order to decrease the risk of infectious diseases transmission.	1 Year	About 40.5% of all participants were men and 59.5% were women. Mean age was 33.26 (8.03) years; 56.96% of participants had history of at least one needle stick injury and 22.15% of them had needle stick injury during last year. Injections were the most common action resulted to exposure (24.44%) and recapping of needles was at the second order (21.11%). Operation room had the highest prevalence (18.9%) of needle stick injuries among all wards of hospital.	12
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Trayner K. et al	cross-sectional survey	The 2017 British Dental Association (BDA) Conference and Exhibition in Manchester, and at the 2017 BDA Scottish Conference and Exhibition in Glasgow.	To estimate the prevalence of sharps injuries, the level of underreporting and of self-reported access to an OH service both for the care of sharps injuries and for general health and wellbeing.	5 years	A total of 796 delegates participated, of whom 166 (20.8%) had experienced a sharps injury in the past year and 58 (35%) did not report the incident. Of the participants, 190 (23.9%) reported no, or uncertain, access to OH support.	13
Alghamdi MS	cross-sectional study	King Abdulaziz University Hospital, Saudi Arabia	To identify predisposing factors of sustaining sharp injuries in operating rooms among surgical residents and their attitudes and behaviors in dealing with sharp injuries.	2 months	Among the 78 recruited residents, 46 (58.9%) had sharp injuries during surgical procedures. Most of the injuries (60%) were self-induced, and (72.9%) of the injuries took place while suturing. Twenty (43.5%) of those who had injuries did not report any injury, 15 (32.6%) reported some, and 11 (23.9%) claim that they reported all their sharp injuries. 44.9% of the participants are fully aware of sharp injuries local policy and procedures in the hospital. Most of the injured participants during surgeries did not follow each step of the local sharp injury policy. The perceived causes of sharp injuries among the participants were due to rushed (61.1%), fatigue (43%), lack of skills (19.4%), lack of assistance (15.3%), lack of sleep (13.9%) and (16.7%) though it is not preventable.	14

Yi Y	cross-sectional study	Hunan Province, China	To assess adherence behaviors for self-reporting of occupational exposure to blood and body fluids among RNs and identify factors affecting self-reporting	-	In total, 548 RNs completed the questionnaire. All participants experienced sharp object injuries at least once during their career; 65.88% of participants were exposed to blood/body fluids thrice, and 31.2% experienced 1–5 occupational exposures in the past month. However, only 14.6% of participants submitted a blood/body fluid exposure report to a supervisor/official after every incident. Blood/body fluid exposure was associated with the non-usage of safety protocols.	15
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Jaybhaye R. et al	cross-sectional study	India	To determine prevalence of needle stick injuries among health care workers. (2) To study circumstances under which they occur among health care workers in tertiary care hospital	-	A total 130 (59.09%) HCWs reported having occupational exposure to blood and body fluid in last one year, out of these 108 (49.09%) had NSIs and 22 (10%) had history of splash of blood and body fluid. Maximum exposure of NSIs was found among nurses (50%), followed by resident doctors (25.93%).	16
Baghcheghi N	descriptive cross-sectional study	Arak, University of Medical Sciences	To describe the frequency, causes and practice of nursing students in contaminated needle stick/sharps injuries.	-	70% and 43% of the subjects had experienced at least one contaminated NSIs in total education period and the past 12 months, respectively. The average number of injuries per student was 1.02 times/student/year. Approximately 40 percent of the injuries were not reported to the clinical educator. The first action after incidents in 51.6 % of the subjects was squeezing the wound. After incidents, 64.22 % tracking patients' tests for blood-borne pathogens and 10% of the subjects did not perform any action following incidents.	17
Salelkar S	cross-sectional study	Goa, India	To study the problem of needle stick injuries. A structured questionnaire was used to interview the study participants at their work place.	3 months	Around 34.8% (200/575) of the Health care workers had experienced a needle stick injury in the last one year. Needle stick injuries were equally distributed across different work experience periods. Hollow bore needles were responsible for 77.5% of needle stick injuries followed by suturing needles (19.2%). As far as use of personal protection was concerned only 58% of the health care workers were wearing gloves at the time of the injury.	18

DISCUSSION:

Needle stick injuries are one of the hidden problems in the health care workers [19]. The prevalence of NSIs in Bagdey et al study [20] (31.78%) was similar with Kulkarni MS et al [21], Mehta A et al [22], Karbaksh M et al [23] while Jayant S et al [24], Tetali S et al [25] and Khader Y et al [26] found higher prevalence of NSI in their studies. The incidence of NSIs among a sample including 180 nursing workers in a university hospital in Shahroud, Iran [26] was 114 cases (63.3%). Similarly, in Egypt of 273/371 nurses (62.3%) reported at least one NSI in the previous 12 months [27]. Also, the study of Jaybhaye R. et al revealed that Maximum exposure of NSIs was found among nurses (50%) [16] Furthermore, among 526 nurses and midwives in Uganda [7], the incidence of NSIs in the last year was 300 cases (57%).

(23.9%) of the participants at the 2017 (BDA) Conference and Exhibition in Manchester, and at the 2017 BDA Scottish Conference and Exhibition in Glasgow reported no, or uncertain, access to OH

support [13], also most of the injured participants during surgeries at Alghamdi MS study in King Abdulaziz University Hospital did not follow each step of the local sharp injury policy [14] Peculiarly, only 14.6% of participants in Yi Y study submitted a blood/body fluid exposure report to a supervisor/official after every incident [15], also Baghcheghi N showed that Approximately 40 percent of the injuries were not reported to the clinical educator [17], furthermore Salelkar S study revealed that only 58% of the health care workers were wearing gloves at the time of the injury [18]

The majority (51.8%) of injuries that occurred after use and before disposal of the objects [38] was similar to other findings [28]. Anjum et al. study [29] showed that; most injuries 59.4% occur while wearing single pair of gloves only 21.9% with double pair of gloves thus our study validates these studies and also the AORN's recommendations. In our study 96.9% items causing NSIs have no safety design. An Australian study concluded introduction of self-

retracting safety syringes and elimination of butterfly needles should reduce the current hollow-bore NSI by more than 70% and almost halve the total incidence of NSI [30].

Previous studies have shown increased risk of clinical laboratory workers to diverse types of infection from their work places [31] that include blood borne pathogens (HBV, HCV, HIV), respiratory illnesses (MERS-CoV, influenza viruses, Tuberculosis) [32] and skin infections [33]. In a cross-sectional survey study that was conducted in clinics from 10 Moroccan cities, 58.9% of the subjects underwent at least one occupational blood exposure [34]. The results showed an association between occupational infection and college degree holders and training on biosafety.

Immediate reporting of NSIs plays a vital role in post exposure prophylaxis and treatment of the injury. However, a number of researches have indicated a poor reporting rate of NSI incidents in healthcare settings, even in institutions with well-established sharps injury surveillance programs and easily accessible reporting systems [35]. The data of a Germanic university hospital, where a specialist consultant in emergency medicine is responsible for reporting occupational accidents and post exposure prophylaxis, showed that only 28.7% of injured HCWs reported the NSI. Moreover, recent evidence from some of the previous Asian investigations showed underreporting rates of NSIs in healthcare professions to be 76.2% in Thailand [36] and 99.3% in Pakistan [37].

CONCLUSION:

Prevention of NSI is the best way to prevent several diseases in health care workers. It should be an integral part of prevention programs in the work place, and training of HCWs regarding safety practices indispensably needs to be an ongoing activity at the hospital. It is recommended that every hospital should develop a multi-pronged strategy to deal with NSI. Besides health promotion, there should be setting up of an adequate surveillance mechanism in every large hospital and also of facilities for prompt response and treatment of NSI.

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