International Journal of Innovative Research in Medical Science (IJIRMS)
Volume 07, Issue 12, December 2022,
https://doi.org/10.23958/ijirms/vol07-i12/1603

Original article

Factors Association with Needle Stick Injury: An Overview of Prevention & Management

Ohud Matar Aljameeli [*1], Norah Mudlah Alrasheedi [2], Amsha Mohammad Alsuhali [1], Sarah Mohammad Alsuhali [1], Dhawwaa Mohammad Alsuhali [1]

[1]Nursing, Ministry of Health, Saudi Arabia.
[2]Dental Assistant, Ministry of Health Saudi Arabia.

*Corresponding author: Ohud Matar Aljameeli; *oaljamli@moh.gov.sa*

Received 22 November 2022; Accepted 24 December 2022; Published 28 December 2022

Abstract

Background: Every day, almost 20 million committed health care workers (HCP) are exposed to biological, chemical, and mechanical risks. According to the World Health Organization, nearly three million health care personnel are exposed to blood and other fluids each year as a result of needle stick or sharps accidents. Needlestick and sharps injuries (NSIs) are among the most common job-related injuries suffered by health care professionals. In fact, one of the most common occupational dangers among health care workers is the transmission of hepatitis B or C through work-related NSIs. ***Methods:*** This is a review is based on collecting all previous articles which were done on Factors association with needle stick injury: An Overview of Prevention & Management. ***Results:*** The review process involved determining the suitability of 20 publications. There were 20 papers that made it through the full text screening and into the final review. The purpose of this research was to assess Factors association with needle stick injury: An Overview of Prevention & Management. ***Conclusion:*** The findings indicated that no single device, place, or behaviours can be held solely accountable for all types of NSIs, although each can contribute to the injury. HCWs must use safety equipment more frequently, and training institutions with constant observation for procedures to reduce NSIs must be designed and implemented.

Keywords: ***CPR, Artificial Intelligence, Robotics.***

Introduction

Healthcare workers (HCWs) who experience needlestick injuries (NSI) are at high risk of developing 20 bloodborne infections, including Hepatitis B and C viruses (HCV, HBV). as well as the HIV virus in the workplace [1].

According to estimates, 3 out of 1000 health care workers are at risk of getting HIV as a result of percutaneous contact with HIV-positive blood [2]. In every medical environment, NSIs represent a significant risk and are a frequent event [3]. The World Health Organization (WHO) reported that millions of health workers from 35 occupations worldwide were exposed to infection as a result of needle stick injuries (NSIs) each year, with hepatitis B and C accounting for the highest percentages (37.6% and 39%, respectively) and HIV accounting for the lowest percentages (4.4%) [3]. A study in 2012 including 52 hospitals found that the national rate of NSIs in the Kingdom of Saudi Arabia (KSA) was 3.2 per 100 occupied hospital beds [4]. Additionally, it was discovered that 60.2% of NSIs were not reported, and that recapping the needles was the source of 41.4% of NSIs. Additionally, their research revealed a connection between working hours, sex, and the occurrence of NSIs[3].

Along with the potential risks brought on by infectious diseases, NSIs impose direct expenses for laboratory testing like HIV antibody tests, hepatitis B serology tests, and baseline tests for anti-hepatitis C, as well as treatment fees for these conditions [5] Studies also point to a link between the injured HCWs' mental health and their injuries. Their quality of life was impacted by anxiety, despair, and fear of contracting the sickness or spreading it to their family [4].

Due to the high number of injuries, it's also crucial to identify and minimize the risk factors for NSIs [3]. a study in North East Ethiopia found that private hospital employees were 9.62 times more likely to contract NSIs than those working in government hospitals due to their weak commitment to best practices and lack of usage of personal protective equipment [4]. The numerous causes that lead to needle accident incidents are not well known. An essential tool for gathering this data is surveillance programs that offer in-depth analyses of needlestick incidents [6].

Due to exposure to bone spikes in the operating room and the use of sharp orthopedic equipment including drills, saws, kirschner wires, and pins, orthopedic surgeons are more likely to suffer needle stick injuries. According to reports, an orthopedic surgeon's chance of suffering a severe injury can reach 80%-90% over the course of ten years [7]. Since the HIV epidemic brought attention to the dangerous nature of medical job and the need to ensure the safety and health of health professionals, there has been limited progress in the prevention of needlestick injuries. Health care worker protection has only lately received attention in Africa, the region where AIDS first emerged and where hospitalized patients have the highest global frequency of the human immunodeficiency virus (HIV). Nurses have been in the vanguard of advocating for prevention, especially those who have contracted an infection from a preventable exposure [6].

Materials and Methods

Study design

Our study was conducted between 2011 and 2021, with different studies design, published on journals with high IF. All studies which conducted before 2011, all type of studies used case report, case series, unpublished article were excluded.

Search strategy

An intensive literature search was conducted in order to provide a full narrative to evaluate Factors association with needle stick injury: An Overview of Prevention & Management. We choose papers that were published in English between 2011 and 2021. We used keywords such as needle stick, Management, Prevention, prevalence to search the databases (Web of Science, Springer, Google Scholar, and Science Direct). The studies were chosen based on the titles, abstracts, and techniques found in electronic searches, as well as full texts.

Study selection and data extraction

Mendeley is used to manage citations. The duplicated article was successfully removed. Two reviewers examined the abstract and title of each linked paper to verify and analyse the whole content of the potential publications. Using the modified data extraction form, two reviewers extracted the results and research characteristics independently and anonymously.

Results And Discussion and conclusion

Prevention

This crucial aspect of health services has been a source of occupational harm for healthcare professionals (HCPs) ever since the mid-1840s when the first needle was used till the present [8].

Health care workers who are exposed to NSIs run the danger of contracting blood-borne pathogens from sharps or other equipment, which is a potentially serious threat [7]. A major amount of the workers (79.5%) reported having an NSI during their careers, which is a worrying statistic. A similar frequency of NSI ever in a working lifetime was discovered to be 73% in a study conducted in rural North India [2]. 91.2% of these injuries occurred in the hands, mostly in the fingers, with the right index finger being the most frequent site (46.2%). About 76.9% of HCWs with NSIs cleaned the wound with soap and water, 38.5% identified the patient who caused the injury, 44.0% had their blood tested for hepatitis B, hepatitis C, and HIV, and only 23.1% received post-exposure prophylaxis [4]. The primary causes of occupational exposure to blood and body fluids (BBFs) were sudden movements of the patient during blood sampling or the intramuscular or intravenous administration of drugs; childbirth; handling of specimens; recapping of specimens; handling and collection of waste; or a lack of personal protective equipment (PPE) [5] Although earlier research identified a few risk factors for NSIs in healthcare workers, the described factors differed by industry and location. Personal characteristics associated with NSIs among dentists in Taiwan included the practitioner's experience, the number of patients seen each day, recapping needles, knowledge of infectious diseases, and adherence to infection control policies [9]. In order to reduce the occurrences of NSIs, nurse education and institutional support are essential because they can enhance and strengthen training on occupational safety, provide enough protective equipment to avoid NSIs, and enhance the working environment in hospitals [3] Development and application of occupational safety and health policies and programs based on those variables, as well as adequate oversight of their execution, are necessary additional steps to reduce the chance of NSIs occurring All nursing professionals, both new and seasoned, need to take NSI prevention training. All healthcare professionals must receive the greatest infection control training. It's crucial to understand how to recap and discard needles properly [3].

Management

After NSI, site compression and soap and water cleaning were the two most often used procedures [1]. According to Hashemi et al., the majority of staff members who had needlestick injuries were sent straight to the medical center for care and effective infection control [1]. It is strongly advised to raise HCW awareness of the issue and conduct regular training on how to utilize sharp objects safely. It is also advised to enhance the current NSI reporting methods to guarantee that post-exposure prophylaxis is used as soon as possible. Implementation [4]. By establishing a work environment with enough employees and resources, hospitals can reduce NSIs. Therefore, reducing emotional weariness at work and offering safety-engineered tools and equipment can be helpful [10]. Doctors had a considerable danger of coming into contact with blood and bodily fluids. Despite the fact that some studies have indicated that nurses are exposed to more blood and bodily fluids than doctors [11]. It's critical that healthcare providers are aware of their responsibilities to prevent needle stick injuries given the rise in such incidents in clinical settings. Companies must take the necessary precautions to safeguard their workers and react appropriately when there are needle stick accidents, Suggestions for Action Keep your needle stick injury protocol current, make sure that your company has policies in place for reporting needle stick injuries, Make sure that every employee has received the necessary training on this reporting process [12].

Factors association with needle stick injury:

there are studies from Pakistan and other nations show that extended working hours increase NSI. This might be the outcome of the mental and physical stress brought on by long work hours Additionally, it raises the issue of understaffing in emerging nations The need to guarantee that working hours do not exceed those outlined in legislation has consequences for policymakers and hospital management [13]. Consistently recycling used needles and working consecutive shifts were independent risk factors for needle stick injuries. Hospital infection control facilities received reports of 54.5% of events overall. Younger age and male gender had statistically significant relationships with a decreased risk of reporting needle stick injuries [14]. Studies from all over the world have a tendency to show that registered nurse suffers from injuries more frequently than other groups [6].

Infectious diseases transmitted through needle stick injury:

Infectious disorders like hepatitis B, hepatitis C, and HIV are among the main potential issues brought on by NSIs. Blood infections generated from infected needles or sharp objects spread these diseases [5]. According to one study, there is a 0.6% risk of developing HIV, a 6.0% to 30.0% risk of HBV, and a 0% to 10% risk of HCV. Numerous research attempted to measure the prevalence, incidence, and underreporting of this issue because to its seriousness in the health work setting [19]. Although earlier research identified a few risk factors for NSIs in healthcare workers, the described factors differed by industry and location. Personal characteristics associated with NSIs among dentists in Taiwan included the practitioner's experience, the number of patients seen each day, recapping needles, knowledge of infectious diseases, and adherence to infection control policies. A second retrospective study conducted over a two-year period from January 2002 to December 2003 found a 110 per 1000 employee incidence rate, The research was conducted in a Riyadh tertiary care facility. The incidence rate was lowest among doctors and greatest among nurses and technicians [19]. The majority of HIV-infected patients live in developing nations, particularly those in sub-Saharan Africa, and more than 90% of occupational exposure takes place in these nations [20]. Priority should be given to preventing occupational infections among HCWs, HCWs should receive formal training on safe practices and the availability of preventive facilities from local health authorities on NSIs [13]. The risk of NSIs among nurses who had not participated in any training on NSI management and prevention in the workplace was considerably higher than the risk among those who had [3].

Table 1: Summary of reviewed studies regarding Factors association with needle stick injury

No	Author	Methodology	Samples	Country	Results
1	Habib et al.,[5]	Cross-sectional study	216 nurses selected by convenience random sampling	Pakistan	Most injury causing instruments and needlestick injuries were reported at bedside and wards, the professionals did not participate in any educational sessions, seminars or workshops related to needlestick injuries during their job.
2	Nsubuga and Jaakkola [15]	Descriptive	526 nurses and midwives	Africa	Lack of training was the most important risk factor for needlestick injuries; working for more than 40 h/week, replacing needle caps most of the time, and not wearing gloves when working with needles.
3	Lotfi and Gashtasbi [16]	Cross-sectional study	90 health center personnel	Iran	Important risk factor for needlestick injuries was working night shifts; other important risk factors included lack of training on such injuries, number of patients attended daily or nightly and recapping needles.
4	Smith et al., [17]	Descriptive-exploratory	509 nurses	China	Nurses who reported their departments were understaffed were more likely to suffer needlestick injuries than nurses who told their departments were sufficiently staffed. Nurses who worked mixed shifts were more likely to sustain NSIs than those who did not.
5	Bijani [14]	Cross-sectional study	246 nurses	Iran	Independent risk factors for needlestick injuries were recapping used needles habitually and consecutive shift works.
6	Rampal et al.,[18]	Cross-sectional study	345 health care workers	Malaysia	Staff nurses suffered the highest prevalence. The causes of needlestick injuries were mainly replacing needle caps. Majority said that they dispose of needles or sharp devices instantly after use in sharp bins, most of them did not separate needles from syringes before throwing away and did not dissemble needles or sharps with hand and restore needle caps after use
7	Martins et al., [5]	Cross-sectional study	363 health care workers	North Portugal	The major risk factor was working in health services for more than 10 years. Another important associated factor was being over 39 years old.
8	Parsa-Pili et al., [5]	Cross-sectional study	97 health care workers	Iran	A significant association was observed between the risk of needlestick injury and age, gender, work experience of less than two years and education. The majority of needlestick injuries happened at the ICU and CCU.
9	Afridi et al., [13]	Cross-sectional study	497 health care workers	Pakistan	Factors which are found to be highly associated with needlestick injuries were experience of more than five years and working as nurse than doctor, working in surgical wards and being a female. Most repeatedly quoted cause of needlestick injuries was injecting medicine and drawing blood, followed by doing needle recapping by two hands.
10	Yenesew and Fekadu [11]	Cross-sectional study	317 health care professionals	Northwest Ethiopia	The reasons for job-related exposure to blood and body fluids were: the sudden movement of a patient during blood sampling or the intramuscular or venous injection of drugs during childbirth; during the handling of specimens; during recapping of specimens; during handling and collection of waste; and due to lack of personal protective equipment.

Conclusions

The findings indicated that no single device, place, or behavior can be held solely accountable for all types of NSIs, although each can contribute to the injury. HCWs must use safety equipment more frequently, and training institutions with constant observation for procedures to reduce NSIs must be designed and implemented. The 2000 Needlestick Safety and Prevention Act. Although they are still widespread in the United States, avoidable needlestick injuries are more common in Southeast Asia and Africa. Due to the high prevalence of infections among the patients and the fact that hepatitis B vaccination is not required, these are the environments where healthcare workers are most at risk of contracting an infection. To provide protection to healthcare professionals globally, more effort and resources are required.

Ethical approval

Non

Abbreviations

KSA: Kingdom of Saudi Arabia
HCWs: health-care workers
MOH: Ministry of Health
ADA: American Dental Association
NSIs: Needlestick and sharps injuries

Data Availability

On request

Acknowledgments

Not applicable

Funding

The authors received no financial support for the research, authorship and/or publication of this article.

Conflict of interest statement

The authors declare that there is no conflict of interest.

Author contributions

Conceptualization: OMA, SMA, and AMA. Methodology: NMA and OMA. Writing - Original Draft Preparation: DMA and SMA. All contributors reviewed the manuscript.

References

[1] Joukar F, Mansour-Ghanaei F, Naghipour MR, Asgharnezhad M. Needlestick injuries among healthcare workers: Why they do not report their incidence? Iran J Nurs Midwifery Res. 2018;23(5):382-7.

[2] Sharma R, Rasania SK, Verma A, Singh S. 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.

[3] Alharazi R, Almutary H, Felemban O, Hawsawi EH, Alsulami LM, Alariany AS, et al. Prevalence of Needle Stick Injuries Among Nurses in Jeddah, Saudi Arabia. 2022;(December).

[4] Alsabaani A, Alqahtani NSS, Alqahtani SSS, Al-Lugbi JHJ, Asiri MAS, Salem SEE, et al. Incidence, Knowledge, Attitude and Practice Toward Needle Stick Injury Among Health Care Workers in Abha City, Saudi Arabia. Front Public Heal. 2022;10(February).

[5] Motaarefi H, Mahmoudi H, Mohammadi E, Hasanpour-Dehkordi A. Factors associated with needlestick injuries in health care occupations: A systematic review. J Clin Diagnostic Res. 2016;10(8):IE01-4.

[6] Jahan S. Epidemiology of needlestick injuries among the health care workers in a secondary care hospital in Saudi Arabia. Ann Saudi Med. 2005;25(3):233-8.

[7] A bhardwaj, N S, MF Y, AH M, KMM S, NK S. The Prevalence of Accidental needle Stick Injury and their reporting among healthcare Workers in orthopaedic Wards in General hospital Melaka, Malaysia. Malaysian Orthop J. 2014;8(2):6-13.

[8] Zaidi MA, Beshyah SA, Griffith R. Needle Stick Injuries: An Overview of the Size of the Problem, Pre- vention & Management. 2022;(2010).

[9] Aldakhil L, Yenugadhati N, Al-Seraihi O, Al-Zoughool M. Prevalence and associated factors for needlestick and sharp injuries (NSIs) among dental assistants in Jeddah, Saudi Arabia. Environ Health Prev Med. 2019;24(1):1-7.

[10] Abalkhail A, Kabir R, Elmosaad YM, Alwashmi ASS, Alhumaydhi FA, Alslamah T, et al. Needle-Stick and Sharp Injuries among Hospital Healthcare Workers in Saudi Arabia: A Cross-Sectional Survey. Int J Environ Res Public Health. 2022;19(10).

[11] Abere G, Yenealem DG, Wami SD. Occupational Exposure to Blood and Body Fluids among Health Care Workers in Gondar Town, Northwest Ethiopia: A Result from Cross-Sectional Study. J Environ Public Health. 2020;2020:18-20.

[12] Gleason S. BUSINESS OF MEDICINE Preventing and Responding to Needle Stick Injuries.

[13] Afridi AAK, Kumar A, Sayani R. Needle stick injuries--risk and preventive factors: a study among health care workers in tertiary care hospitals in Pakistan. Glob J Health Sci. 2013;5(4):85-92.

[14] Bijani B, Azimian J, Soleymani M, Mohammadi N. Epidemiology and risk factors of needle stick injuries. J Shahid Beheshti School Nurs Midwifery. 2013;22(78):1-9.

[15] Nsubuga FM, Jaakkola MS. Needle stick injuries among nurses in sub-Saharan Africa. 2005;10(8):773-81.

[16] Lotfi, R, Gashtasbi A. NEEDLE STICK AND SHARPS INJURIES AND ITS RISK FACTORS AMONG HEALTH CENTER PERSONNEL (ASTARA IRAN, 2006). J Babol Univ Med Sci. 2008 Oct;10(4):71-7.

[17] Zhang X, Chen Y, Li Y, Hu J, Zhang C, Li Z, et al. Needlestick and Sharps Injuries Among Nursing Students in Nanjing, China. 2017;(October).

[18] Rampal L, Zakaria R, Sook LW, Zain AM. Needle stick and sharps injuries and factors associated among health care workers in a Malaysian hospital. Eur J Soc Sci. 2010;13(3):354-62.

[19] Al-qahtani SM, Elzahrany YR, Alahmed MA, Alanezi SL, Marei RO, Alqhtani AD, et al. Prevalence, Underreporting and Barriers of Needle Stick and Sharps Injuries (NSSIs) among Nurses at Primary Healthcare Centers, Riyadh, Saudi Arabia. 2022;5(02):1-11.

[20] Liyew B, Sultan M, Michael M, Tilahun AD, Kassew T. Magnitude and Determinants of Needlestick and Sharp Injuries among Nurses Working in Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia. Biomed Res Int. 2020;2020.