



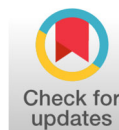
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Research Article

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Assessment of Healthcare Providers' Knowledge on Needle Stick Injuries in Primary Care Centers: A Cross-Sectional Study in Erbil

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Abstract | Objective: This study aimed to assess the level of knowledge regarding needle stick injuries among healthcare providers. **Setting and Duration:** The research was carried out in 25 primary healthcare centers located in Erbil city, Kurdistan Region, Iraq, over a period from March 2020 to August 2022. **Methodology:** A total of 687 healthcare providers, including nurses, physicians and paramedical staff, were enrolled in the study. Data were gathered through a structured questionnaire consisting of five items, specifically designed to evaluate knowledge related to needle stick injuries and their preventive measures. **Results:** Out of all participants, 402 (58.5%) were female and 285 (41.5%) were male. Nurses represented 41.5% of the total sample, while 39.9% of participants held diploma-level qualifications. Although more than half of the respondents had over ten years of professional experience, a significant majority 656 participants (96%) exhibited inadequate knowledge regarding needle stick injuries. Only 10.8% had previously received formal training on the subject. Additionally, 76.4% of participants showed limited awareness about the importance of hepatitis B vaccination as a preventive strategy. **Conclusion:** The study highlights a considerable deficiency in knowledge and preventive practices related to needle stick injuries among healthcare providers. There is a critical need for the implementation of standardized training programs and strengthening of occupational safety protocols to enhance awareness and minimize risks in healthcare environments.

Key Words Needle Stick Injuries, Healthcare Worker Knowledge, Occupational Exposure, Infection Prevention, Hepatitis B Vaccination, Cross-Sectional Survey, Primary Healthcare, Erbil

INTRODUCTION

Needle Stick Injuries (NSIs) remain a significant occupational hazard for healthcare providers (HCPs) and represent a major global public health concern due to the transmission of more than 20 blood-borne diseases, including Hepatitis B, Hepatitis C and HIV [1,2]. Several factors influence the likelihood of NSIs, including the type of equipment used, sharps waste management practices, level of expertise among HCPs, availability of training programs and adherence to universal precautionary measures [3].

According to the National Monitoring System, incidents such as acupuncture injuries, percutaneous injuries, needle penetrations, or exposure to sharp objects contaminated with blood, tissue, or other bodily fluids are recorded and reported as part of preventive

surveillance for healthcare providers [4]. Estimates from the Centers for Disease Control and Prevention indicate that approximately three million healthcare providers experience needlestick and sharps injuries annually, reflecting a substantial occupational burden [5,6].

Furthermore, factors such as extended working hours, fear of job loss and lack of awareness regarding safe needle handling contribute to the increased incidence of NSIs among HCPs. Inadequate knowledge, limited access to protective resources and improper use of Personal Protective Equipment (PPE) further exacerbate the risk. Although reporting of needlestick injuries are essential for effective treatment and prevention, underreporting remains a significant issue due to fear, negligence and lack of perceived importance [7].

Any program aimed at preventing blood-borne viral infections in the workplace must incorporate effective strategies for the prevention of Needle Stick Injuries (NSIs). An active infection control committee within each Primary Healthcare Center (PHCC) should be responsible for supervising and implementing infection prevention and control measures. The present study addresses the critical issue of NSIs by examining their prevalence among Healthcare Providers (HCPs), identifying contributing factors and exploring the circumstances under which these injuries occur. It also evaluates the potential for prevention through improved knowledge and awareness.

In addition, the study assesses HCPs' awareness regarding NSI-related policies, proper sharps segregation at the point of use and the availability and utilization of safety measures to prevent such injuries [8]. Previous studies have reported varying prevalence rates of NSIs, with approximately 68% in Jordan [9] and around 30% in Turkey [10]. Another study reported that among 137 healthcare providers, 59.3% consistently recapped needles after use, with an average knowledge score of 3.8 [11]. Similarly, Sadoh *et al.* [12], found that nearly one-third (31.9%) of respondents reported routinely removing used needles.

Healthcare providers who are vaccinated against Hepatitis B and have developed immunity are considered to be at lower risk of infection. However, it remains essential to protect all healthcare workers from occupational exposure to blood-borne pathogens through comprehensive strategies, including immunization, proper use of Personal Protective Equipment (PPE) and adherence to standard safety protocols.

Therefore, this study aimed to assess the level of knowledge regarding NSIs among healthcare providers working in PHCCs in Erbil, Kurdistan Region, Iraq. Furthermore, it sought to identify gaps in knowledge and practices related to NSI management and to provide a foundation for implementing targeted educational interventions in future phases.

METHODS AND MATERIALS

A cross-sectional study was conducted from March 1, 2020, to August 1, 2022, across 25 Primary Healthcare Centers (PHCCs) in Erbil, Kurdistan Region, Iraq. The total sample comprised 687 Healthcare Providers (HCPs) working in these facilities.

Data were collected using a structured, self-administered questionnaire distributed among HCPs in primary healthcare settings. The questionnaire consisted of seven items designed to assess participants' sociodemographic characteristics as well as their knowledge and awareness regarding Needle Stick Injuries (NSIs).

The reliability of the instrument was evaluated using the test-retest method. The calculated correlation coefficient was 0.90, indicating high reliability and consistency of the tool used to measure the knowledge level of HCPs.

Data analysis was performed using Statistical Package for the Social Sciences (SPSS), Version 24.

RESULTS

There were 687 competitors in all. Of the sample, 41.8% of participants were between the ages of 41 and 50, while 37% belonged to the age range of 31 to 40. The majority (83.3%) were Islam and more than half (58.5%) were female.

According to Table 1, nurses made up 41.7% of the sample, followed by doctors (12.9%), medical assistants (11.1%), dentists (9%), pharmacists (8.3%) and other specialists listed. In terms of education, 32.6% held a bachelor's degree, while 40% held a diploma. Only 10.9% of the sample had received training, even though the majority had more than 11 years of experience. The participants were employed by several health facilities departments.

Less than 10% of individuals had intermediate awareness of Needle Strike Injuries (NSI), while nearly all participants lacked a strong understanding of the subject. Compared to basic cost, hand hygiene is the most efficient infection management approach; antiseptics are used to clean needle stick injuries; more than 50% of the sample lacked this knowledge.

Table 1: Frequency and Percentage of Study Samples Concerning Details of the Type of Occupation (N = 687)

Dominos	#	%
Work status		
Nurses	287	41.7
Doctors	88	12.9
Medical assistants	76	11.1
Dentists	62	9
Pharmacists	57	8.3
Laboratory-technician	54	7.8
Biologists	41	5.7
Pharmacist-technician	12	1.7
Biochemist	9	1.1
Biochemist-technician	1	0.2
Midwifery-technician	1	0.2
Level of Education		
Intermediate school	26	3.8
High school	120	17.4
Diploma holder	275	40
Bachelor degree	223	32.5
MSc	40	6.1
PhD	3	0.4
Experience by years		
1-5	2	0.2
6-10	31	4.6
11-15	134	19.5
16-20	222	32.4
21-25	103	14.9
26-30	97	14.3
>30	99	14.3
Training received on NSI		
Yes	75	10.9
No	612	89.1
Working Departments		
Vaccinations	125	18.1
Laboratory	109	15.9
Pharmacy	104	15.2
Dressing room	95	13.8
Dental Clinic	85	12.3
Medical department	80	11.7
Maternity and Child	59	8.5
Family regulation	30	4.4

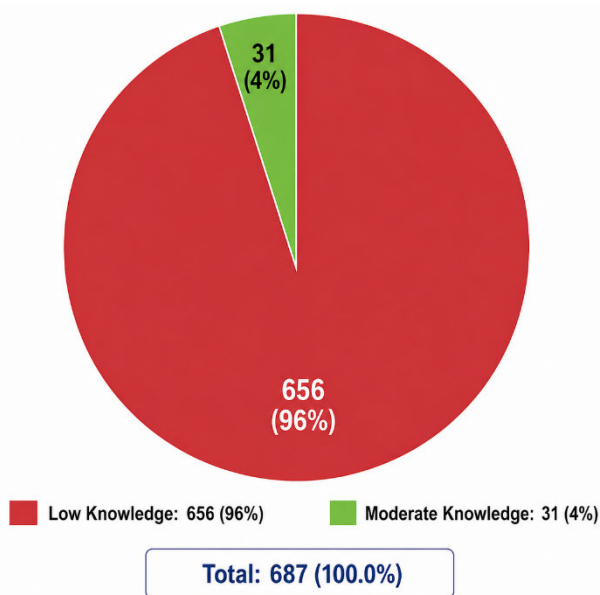


Figure 1: Knowledge Scores Regarding Needle Stick Injuries (N = 687)

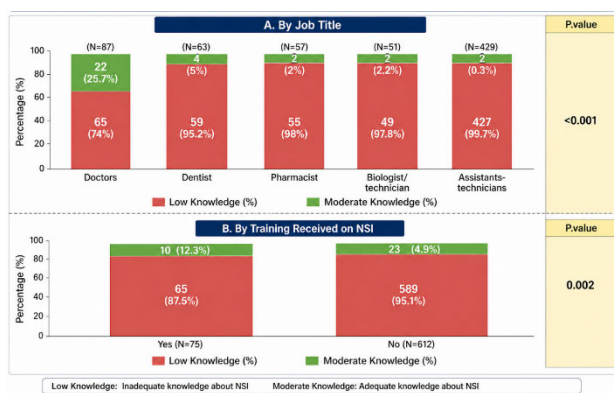


Figure 2: Relationship Between the Job Title of HCPs and the Training They Receive from NSI (N = 687)

Figure 1 indicates that 4% of participants got intermediate scores and 96% of health care providers had low knowledge scores.

The Doctors exhibited the highest percentage of knowledge (25.7%), followed by dentists (5%). The remaining professions showed lower percentages of knowledge (p<0.001). Furthermore, a noteworthy correlation indicates that 12.3% of those who had prior training have moderate knowledge, in contrast to 4.9% of those who had no prior instruction (p = 0.002) (Figure 2).

DISCUSSION

The present study was conducted in Primary Healthcare Centers (PHCCs) under the Department of Health (DoH) in Erbil city to evaluate the knowledge, attitudes and practices of Healthcare Providers (HCPs) regarding Needle Stick Injuries (NSIs). The findings revealed that a considerable proportion of participants (40.8%) were aged between 41–50 years. This distribution reflects DoH

policies, where experienced healthcare workers are often shifted to PHCCs after extended service in hospitals. A similar pattern was reported in a study by Uddine *et al.* [13], which assessed senior nurses’ knowledge of hospital waste management in Bangladesh.

Among the 687 participants, 401 (58.4%) were female, indicating a predominance of female healthcare workers, particularly in nursing roles. NSIs remain one of the most common and potentially serious occupational hazards among healthcare providers, with nurses being at particularly high risk due to the nature of their duties. Notably, 23.3% of participants lacked awareness regarding diseases transmitted through NSIs involving contaminated blood, highlighting a critical knowledge gap.

The study further demonstrated that needle recapping was the leading cause of NSIs, accounting for 50.9% of cases. This finding aligns with previous studies by Mobasherizadeh *et al.* [14] and Galougahi [15], which reported similar trends. These results reinforce existing recommendations to avoid recapping needles as a key preventive strategy.

Despite some awareness, gaps remain in comprehensive knowledge. While 96.5% of participants recognized that NSIs contaminated with blood can transmit Hepatitis B, overall knowledge levels were still inadequate. A significant proportion (95.8%) of HCPs demonstrated low knowledge, whereas only 4.2% showed moderate knowledge.

Participation in training programs was notably low, with 89.2% of HCPs reporting that they had never attended NSI-related training sessions. This finding is consistent with previous research conducted in Sulaymania, Iraq [16] and studies from India, which also reported low training participation rates. These findings emphasize the urgent need for regular and mandatory training programs to enhance knowledge and promote safe practices among healthcare workers.

Furthermore, although 67.4% of participants acknowledged the moderate importance of Hepatitis B vaccination in reducing NSI-related risks, this awareness alone is insufficient without proper implementation of preventive measures. A statistically significant difference in knowledge levels was observed among different professional groups, with doctors demonstrating relatively higher knowledge 25.8% compared to dentists 4.9% and other healthcare staff (p<0.001).

Additionally, a significant association was found between prior training and knowledge level, as 12.3% of trained participants demonstrated moderate knowledge compared to only 4.9% among those without training (p = 0.002). This finding supports previous research by Kumar [17], highlighting the positive impact of training on improving knowledge and awareness.

According to Singaporean research [18], syringe needles are the cause of injury for around 23.2% of healthcare workers, whereas professional nurses in Korea and Australia [19,20] report 52% of injuries. The conditions surrounding needle stick injuries have been

the subject of contradictory studies worldwide. An American hospital study, for instance, found that the highest prevalence of needle stick injuries happened "after use and before disposal" [19,20]. In the current investigation, recapping a needle was involved in 42.1% of NSI incidents. According to Smith *et al.* [19,20], recapping needles is the most prevalent cause of Needle Stick Injuries (NSI) and a high-risk activity. The Occupational Safety and Health Administration of blood-borne pathogen regulations prevent recapping needles in the United States [21].

CONCLUSIONS

The findings of this study indicate that Healthcare Providers (HCPs) frequently engage in unsafe practices related to environmental safety and Needle Stick Injuries (NSIs), while their overall level of awareness remains inadequate. NSIs continue to represent a major occupational hazard for HCPs, posing significant risks for the transmission of blood-borne infections.

The study identified needle recapping as the most common cause of NSIs, contributing substantially to the occurrence of such injuries. This highlights the need for strict adherence to standard safety protocols and avoidance of unsafe practices.

There is an urgent need to implement comprehensive training programs and awareness campaigns focusing on NSI prevention and occupational safety. Strengthening education, promoting safe handling practices and ensuring compliance with infection control guidelines are essential steps to reduce the incidence of NSIs and protect healthcare workers.

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