

To study the awareness of needle stick injuries among healthcare workers in an area select of tertiary care hospital



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ABSTRACT

Background: Needle stick injuries, or NSIs, refer to injuries produced by several types of needles, including hypodermic needles, blood collection needles, intravenous stylets, and needles used for connecting components of intravenous administration systems. **Aims and Objectives:** The study aimed to study the awareness of NSIs among healthcare workers (HCWs) in a selected area of a tertiary care hospital. **Materials and Methods:** A cross-sectional study was undertaken within the department of obstetrics and gynecology (OBG). The study's target group was all HCWs of varied experience levels (n = 272). This study employed a meticulously crafted questionnaire in the English language. The survey includes 22 items covering a variety of NSI-related topics. Subgroup analysis was conducted using the Pearson Chi-square test. **Results:** It was found that most of them were in the 20–30 age group (75%), the majority were females (72%), unmarried (61%), and from an urban background (85%). Almost all the participants (96%) were aware that NSIs are preventable. Similarly, 90% of the participants were aware that NSIs may cause the transmission of diseases, and 77% of the participants reported that they have training on biomedical waste management and its disposal. About 74% of the respondents stated that they had been exposed to NSIs. **Conclusion:** This study sheds light on the awareness levels and experiences of HCWs regarding NSIs in the OBG department. While a high level of awareness was observed, the study identified areas for improvement in the implementation of preventive measures, reporting practices, and post-exposure management.

Key words: Needle stick injury; Healthcare workers; Awareness; Post-exposure exposure prophylaxis; Obstetrics and gynecology; Center for Disease Classification; Hepatitis B virus; Hepatitis C virus; Human immunodeficiency virus

INTRODUCTION

Needle stick injuries¹ or NSIs refer to injuries produced by several types of needles, including hypodermic needles, blood collection needles, intravenous stylets, and needles used for connecting components of intravenous administration systems. Based on the Center for Disease Classification's calculations,² more than three million health-care professionals in the US experience exposure to blood and bodily fluids due to sharp and mucocutaneous injuries per year, leading to an estimated six million incidents of NSIs per year. The likelihood of infections

varies based on NSIs, with HIV having a chance as low as 0.2–0.5%, HCV ranging from 3% to 10%, and HBV at 40%.³ Health-care professionals are at the highest risk of harm from NSIs.⁴ Most individuals with the possibility of professional exposure are found in poor nations, with deficiencies in established reporting mechanisms.⁵ Occupational risks, such as NSIs, are highly preventable in the healthcare industry.⁶

Given the aforementioned context, the present research is designed to evaluate the level of knowledge regarding several elements connected with NSIs among all health

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care workers (HCWs) working in the Obstetrics and Gynecology (OBG) department.

Aims and objectives

To study the awareness of needle stick injuries among health care workers in a selected area of a tertiary care hospital.

MATERIALS AND METHODS

The approval of the institutional ethical committee was obtained from Pt. B. D. Sharma, PGIMS, Rohtak. This was a cross-sectional study undertaken within the Department of OBG. The study's target group was all HCWs of varied experience levels (i.e., senior residents, junior residents, final-year MBBS students posted in the labor room, and nursing staff) posted in the obstetrics and gynecology department (n=272). The simple random sampling method was used to select participants for the cross-sectional survey study on HCWs. This study employed a meticulously crafted questionnaire in the English language, which was divided into two sections. The study tool was designed by the researchers. The initial segment of the study centered on gathering data regarding the sociodemographic profile of the participants. The subsequent section contained statements aimed at evaluating their level of awareness pertaining to various aspects related to NSIs. The validity of the study tool was evaluated by pilot testing with a group of ten specialists, and subsequent changes were made depending on the results. The pilot testing was undertaken at the study institute. The survey includes 22 items covering a variety of NSI-related topics. Before administering the questionnaire, respondents provided informed consent. Subgroup analysis was conducted using the Pearson Chi-square test.

Inclusion criteria

All HCWs were included in the sample size.

Exclusion criteria

The research excluded individuals who did not provide their consent and experts who participated in the questionnaire pretesting.

RESULTS

On the distribution of participants based on different sociodemographic variables, it was found that most of them were in the 20–30 year age group (75%), the majority were females (72%), unmarried (61%), and from an urban background (85%). The majority of the participants were undergraduate medical students (56%) and postgraduation course participants (21%). Most of the participants

Table 1: Socio-demographic characteristics of study participants

Parameter	Count (%)
Age group (in years)	
20–30	203 (74.63)
31–40	34 (12.5)
41–50	9 (3.30)
>50	5 (1.83)
NA	21 (7.72)
Gender	
Male	73 (26.83)
Female	198 (72.40)
NA	1 (0.36)
Marital status	
Married	105 (38.60)
Unmarried	167 (61.40)
Place of residence	
Urban	230 (84.56)
Rural	40 (14.70)
NA	2 (0.74)
Educational qualification	
Undergraduate medical students	152 (55.89)
Postgraduate medical students	56 (20.58)
Post-MD/MS	36 (13.24)
Others	19 (6.98)
NA	9 (3.31)
Designation	
Staff nurse	64 (23.52)
Nursing sister	16 (5.88)
PG doctor	57 (20.96)
Intern medical student	108 (39.70)
NA	27 (9.93)
Year of experience	
0–5	122 (44.85)
6–10	52 (19.12)
11–15	16 (5.88)
16–20	5 (1.83)
>20	7 (5.57)
NA	70 (25.73)

(45%) were in their early careers with 0–5 years of work experience (Table 1).

The study also inquired about their patient workload, and it was observed that 29% of participants stated that they are dealing with more than 60 patients per day, and 25% of participants replied that they are dealing with 20–40 patients per day while performing their duties in the different patient care areas in the department of obstetrics and gynecology. Almost all the participants (96%) were aware that NSIs are preventable; however, 89% responded that they were aware of the universal precautions. Similarly, 90% of the participants were aware that NSIs may cause the transmission of blood-borne diseases, and 77% of the participants reported that they have training on biomedical waste management and its disposal. About 74% of the respondents stated that they had been exposed to NSIs. On further inquiry, the majority of the participants (54%) revealed that they had <5 needle exposures to date. Most of

the participants (47%) were not aware of the timing of the NSI, followed by 21% of respondents who stated needle stick exposure during the morning shift. On enquiring, most of the respondents (29%) declared that they had needle stick exposure while working in the labor room, followed by 28% of participants who revealed that they were exposed to the NSI while performing patient care activities in the high dependency unit of the department. On further elaboration, the majority of the participants (33%) informed us that they encountered a NSI while taking blood samples of the patients, followed by 26% of the respondents who attributed it to the recapping of the needle. Among the participants, 46% attributed the cause of injury to syringe needles, and 22% of the participants reported the injury to suture needles. In the majority of the cases (51%), the NSI led to a prick without visible blood on the skin. About 75% of the study participants revealed that the NSI was exposed to only fingers. Following 13% of participants who reported lack of sleep as the perceived cause, 54% of HCWs reported that an excessive patient load was the precipitating factor or perceived cause of their NSI. The majority of the participants (79%) reported that they took precautions like wearing gloves before the

procedure during which NSIs occurred. About 47% of the respondents stated that they washed the area with soap and water after exposure to NSIs. About 46% of participants informed that they had not reported the NSIs, and 56% revealed that they had not taken post-exposure prophylaxis after exposure to NSIs. About 38% of the participants informed the senior HCWs on duty about the NSIs; 27% of the participants stated that they revealed their NSIs as they were anxious about their consequences; and 22% of HCWs disclosed them for further investigation and prophylaxis. On enquiring about the psychological impact of NSIs, 41% of participants revealed that they felt very stressed and got scared of the transmission of blood-borne infections after exposure to NSIs. The significant association of various domains of study topics with different socio-demographic variables is shown in Table 2.

DISCUSSION

The findings of this study shed light on the awareness levels of HCWs regarding NSIs in the OBG department of a tertiary hospital. The study's demographic distribution revealed a predominant representation of young, unmarried,

Table 2: Cross-tabulation of different survey statements with sociodemographic variables

Statement	Age groups	Gender	Place of residence	Educational Qualifications	Designation	Year of experience
	Chi-square, P value					
Exposure to needle stick injuries	38.203, 0.001	17.621, 0.001	4.408, 0.110	26.967, 0.001	23.723, 0.001	19.540, 0.012
If yes, the numbers of needle stick exposures till date	31.522, 0.007	29.967, 0.001	7.850, 0.165	40.904, 0.001	54.325, 0.001	39.299, 0.001
Timing of a needle stick injury	6.352, 0.973	7.955, 0.159	4.105, 0.534	8.648, 0.895	12.791, 0.618	29.044, 0.087
Area where the needle-stick injury took place	13.873, 0.535	28.794, 0.001	3.039, 0.694	76.715, 0.001	60.444, 0.001	40.978, 0.004
Procedure during which a needle stick injury occurred	12.165, 0.666	25.800, 0.001	2.690, 0.748	117.683, 0.001	84.042, 0.001	34.062, 0.026
Cause of injury	13.402, 0.145	32.137, 0.001	6.230, 0.101	104.958, 0.001	84.279, 0.001	34.773, 0.001
Nature of the injury	17.443, 0.042	15.028, 0.002	2.532, 0.469	27.458, 0.001	28.162, 0.001	21.860, 0.039
Body part exposed to injury	21.097, 0.049	19.729, 0.001	7.915, 0.095	16.871, 0.155	34.725, 0.001	37.562, 0.002
Precipitating factor or perceived cause of needle stick injury	20.917, 0.052	13.211, 0.010	11.162, 0.025	15.222, 0.230	29.058, 0.004	14.930, 0.530
Precautions like wearing gloves before the procedure during which a needle stick injury occurred	4.755, 0.576	15.088, 0.001	0.867, 0.648	6.643, 0.355	7.388, 0.286	6.279, 0.616
If no, why not use protective measures?	23.309, 0.025	6.393, 0.172	7.859, 0.097	13.703, 0.320	7.723, 0.806	54.168, 0.001
What did you do after the needle stick injury?	26.521, 0.033	11.604, 0.041	7.560, 0.182	24.210, 0.062	24.179, 0.062	43.961, 0.002
Regarding post-exposure prophylaxis	11.522, 0.074	7.521, 0.023	0.385, 0.825	16.697, 0.010	14.879, 0.021	46.940, 0.001
Reporting about the needle stick injury	13.867, 0.031	10.446, 0.005	3.794, 0.150	12.577, 0.051	12.035, 0.061	24.161, 0.002
If yes, to whom you have reported	12.746, 0.388	10.802, 0.029	4.758, 0.313	12.556, 0.402	19.404, 0.079	23.240, 0.107
Reasons for reporting needle stick injury	41.997, 0.001	12.794, 0.025	12.259, 0.031	36.946, 0.001	42.097, 0.001	53.159, 0.001
Psychological impact of a needle stick injury	20.326, 0.160	22.169, 0.001	6.056, 0.301	19.964, 0.173	25.515, 0.043	30.670, 0.060

urban-dwelling females, mainly comprising MBBS students and postgraduate participants with early-career experience. The results indicate a high level of awareness among the participants regarding the preventability of NSIs, with 96% acknowledging their preventable nature. In addition, a significant majority (89%) reported awareness of universal precautions, underscoring the importance of these precautions in preventing occupational exposures. However, despite this awareness, a considerable proportion (74%) reported exposure to NSIs, indicating potential gaps in the implementation of preventive measures. This discovery is similar to the results of a study conducted at Safdarjung Hospital,⁷ where 80% of the HCWs reported a history of NSIs. Similarly, previous studies conducted in India⁷⁻⁹ have documented the occurrence of NSIs among HCWs, with prevalence rates ranging from 57% to 80%. While comparing with international studies, it was observed that the studies carried out in Pakistan,¹⁰ Iran,¹¹ and Saudi Arabia¹² showed a prevalence of NSIs of 54.2%, 63.3%, and 74%, respectively. The difference in prevalence of NSIs may vary depending on the variation in study settings, that is, whether the study was carried out in OPD, wards, ICUs, etc. Our study's discovery of a high awareness level among HCWs regarding the preventability of NSIs remains prevalent; however, the incidence of NSIs remains prevalent despite this awareness. This consistency in findings underscores the challenges of translating knowledge into effective prevention practices. The study highlights several important aspects related to NSIs, including the timing, location, and causes of injuries. A notable finding is that the majority of injuries happened during regular procedures such as blood sample collection (33%) and needle recapping (26%). This finding aligns with the literature, which found that routine tasks accounted for the majority of NSIs. These findings emphasize the need for targeted interventions in these specific clinical contexts to mitigate the risks associated with these procedures. Many devices contribute to NSIs. Syringe needles, suture needles, and intravenous cannulas were the most prevalent devices in our study that caused NSIs. This finding is supported by the results of other similar studies,^{7,13,14} which reported that the main reason for NSIs was the needles, followed by suturing needles. Seventy-nine percent of the HCWs who participated in the current study were wearing gloves when they were exposed to NSIs. This was consistent with an Iranian study¹⁵ that found 74% of NSI patients wore gloves. In our study, 40% of HCWs reported NSI to superiors. However, a few other studies indicated that approximately 15%,⁷ 32%,¹⁴ 18%,¹⁶ and 41%¹⁷ of the HCWs failed to report NSIs.

In our study, 32% of HCWs took post-exposure prophylaxis after NSIs. However, some other study¹⁸ revealed that around 21.6% of HCWs took post-exposure prophylaxis

after encountering an NSI. It is noteworthy that 46% of participants did not report NSIs, and 56% did not seek post-exposure prophylaxis, indicating underreporting and potential gaps in post-exposure management. The reasons for non-reporting were diverse, with lack of awareness, fear of consequences, and anxiety being significant factors. Healthcare institutions should focus on creating a supportive environment that encourages reporting and ensures prompt and appropriate post-exposure measures. These findings highlighted the demand for comprehensive strategies to address both reporting culture and adherence to post-exposure protocols. Our research also revealed that a noteworthy share of HCWs felt stressed and scared about the transmission of blood-borne infections after NSIs. This emphasizes the psychological impact of NSIs on healthcare professionals, indicating the need for psychological support services and training to cope with the emotional aspects of occupational exposures.

The strengths of this research include its cross-sectional design, a large sample size (n=272), and the inclusion of HCWs with varied experience levels. The use of a carefully designed questionnaire, validated through pilot testing, enhances the reliability of the data. However, certain limitations should be considered. The results of the study can't be applied to other healthcare environments because it was only carried out in one tertiary care facility. Cross-sectional studies make it difficult to prove causality, and self-reported data may introduce recollection bias. In addition, the study focused on a specific department, and variations in awareness and practices among different health-care specialties may exist.

Limitations of the study

The results of the study can't be applied to other healthcare environments because it was only carried out in one tertiary care facility. Cross-sectional studies make it difficult to prove causality, and self-reported data may introduce recollection bias. Additionally, the study focused on a specific department, and variations in awareness and practices among different healthcare specialties may exist.

CONCLUSION

This study sheds light on the awareness levels and experiences of HCWs regarding NSIs in the obstetrics and gynecology department. While a high level of awareness was observed, the study identified areas for improvement in the implementation of preventive measures, reporting practices, and post-exposure management. The findings underscore the need for targeted interventions, ongoing training, and psychological support to enhance occupational safety and well-being among health-care professionals.

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Nil.

Recommendations

1. Developing and implementing targeted training sessions focusing on specific procedures and practices that pose a higher risk of NSIs, such as blood sample collection and needle recapping,
2. Implementing strategies to improve reporting rates and promoting a culture of openness and non-punitive reporting.
3. Regular training on post-exposure prophylaxis guidelines ensures that HCWs are aware of the importance of seeking prompt medical attention after an NSI.
4. Establishing psychological support services, such as counseling and peer support, to address the psychological impact of NSIs.

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Authors Contribution:

L- Concept, design, literature survey, prepared first draft of manuscript, implementation of study protocol, data collection, data analysis, manuscript preparation, and submission of article; **RS-** Statistical analysis, editing, and manuscript revision; **PD-** Design of study, review manuscript, literature survey, data analysis, coordination, and manuscript revision.

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