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ORIGINAL ARTICLE

A comparative study of needle stick injury incidence, safety practices, and impact between doctors and nurses at tertiary care hospitals in Peshawar

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ABSTRACT

Background: Needle Stick Injuries (NSIs) increase the risk of blood-borne disease among healthcare workers due to frequent, accidental exposure to sharp instruments during patient care, leading to physical and psychological consequences. We intend to compare the incidence, knowledge, attitude, practice, and impact of needle stick injuries among doctors and nurses in tertiary care hospitals in Peshawar, Pakistan.

Methods: A cross-sectional study was conducted from March to August 2025 in public and private tertiary care hospitals in Peshawar, involving 400 healthcare workers through a stratified convenience sampling technique. A pre-tested, self-structured questionnaire assessed the incidence, knowledge, attitudes, practices, and impacts of needle stick injuries among doctors and nurses. SPSS version 27 was used for analysis, with chi-square tests comparing groups($p<0.005$).

Results: Among 400 healthcare workers in Peshawar tertiary hospitals, 73.5% of the participants reported NSIs, significantly higher in nurses (79.5%) than doctors (67.5%) ($p < 0.005$). Only 37.5% showed good knowledge ($p = 0.018$ between professions). Moderate concern was reported by 77%, with no significant difference by profession ($p=0.434$). Registered nurses and interns were perceived as the highest-risk groups ($P < 0.001$), especially in private hospitals ($P < 0.001$). Safe practices were followed by 52%, with nurses showing better adherence ($p=0.003$). NSIs caused physical pain (57.8%), psychological distress (45.3%), and impacted work behaviour (78%). Non-reporting occurred in 42.8% of cases, mainly due to minor injury perception (37.8%) or lack of reporting awareness (16.8%).

Conclusion: Needle stick injuries are prevalent, particularly among healthcare workers, driven by procedural exposure and unsafe practices. Although knowledge and attitudes are similar in doctors and nurses, nurses exhibit safer practices due to better training. Interventions to reduce the incidence should focus on mandatory training, no-recapping policies, improved reporting, and safety devices to reduce NSI incidence and impacts, especially in public hospitals.

Keywords: Needle Stick Injury, Occupational hazard, Healthcare worker, Incidences, Knowledge, Attitude, Safety Practice, Impact, Post-exposure prophylaxis, psychological stress

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Introduction

Needle Stick injuries (NSI) are a significant occupational hazard and sometimes life-threatening for healthcare workers, particularly in settings where invasive procedures are performed. Hepatitis B, Hepatitis C, and HIV are the most common blood-borne pathogens transmitted through needle stick injuries among healthcare workers (1).

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Despite the known risks of NSIs, the awareness and perception often vary among healthcare workers, influencing their safety practices and adherence to preventive measures (2). In Pakistan, the prevalence of NSIs among Healthcare professionals has been highly reported, with studies indicating that nurses are at greater risk compared to doctors because they actively participate in drawing blood, administering injections, securing IV Lines, disposing of the needles or sharp objects, and handling waste (3). While doctors are mostly exposed to NSIs during surgical procedures, especially when operating on Hepatitis B, Hepatitis C, and HIV positive patients. Awareness programs and proper standardized training are needed to lessen the risk of NSIs (4). Existing literature suggested that a lack of knowledge regarding safe practices, including proper use of personal protective equipment (PPE), contributes to the frequency of NSIs (5). Moreover, the perception of risk regarding NSIs can impact the behaviour of healthcare workers, which affects their compliance with safety protocol (6). Comparative studies between doctors and nurses can provide valuable insights into the disparities in awareness and safety practices (7).

Furthermore, organizations can support healthcare workers by providing personal protective equipment and implementing effective reporting systems that play a crucial role in minimizing NSIs (8). The World Health Organization (WHO) emphasized the implementation of global strategies to improve safety practices among health care workers (9). Lack of awareness, accidental, improper equipment, lack of training, and uncooperative patients are reported as the causes of sharp injury among nurses in Pakistan (10).

In a tertiary care hospital in Peshawar, Pakistan, this study aims not only to compare the incidence of NSI, it also seeks to evaluate the knowledge, attitude, and safety practices, regarding NSIs and their impact on doctors and nurses. We also try to identify gaps in knowledge and practice; these findings can inform targeted educational interventions to enhance safety measures.

Methods

A comparative cross-sectional study was conducted from April 2025 to August 2025 among doctors and nurses in public and private tertiary care hospitals in Peshawar, to evaluate the incidences, knowledges, attitude, practice and impact regarding Needle stick injury (NSIs) among doctor and nurses. Ethical approval was obtained from Northwest General Hospital & Research Centre Ethics Committee, (Refno: IRB&EC/2025-GH/0216). Eligible participants included doctors, trainee medical officers, house officers, registered nurses, and nursing interns who had at least six months of clinical experience and

directly handles needles, syringes or sharps. Administrative staff, and those with less than six months of experience were excluded. All Healthcare workers who voluntarily consent to participate in the study were included in study and all healthcare workers who do not directly deal with needles, syringes, or sharps during their work activities were excluded. Using stratified convenience sampling,400 healthcare workers were recruited, ensuring equal representation of doctors and nurses from both public and private sectors.

The calculated sample size was 384; however, data were collected from 400 healthcare workers to reduce selection bias and ensure equal sample sizes for comparison between doctors and nurses.

This study employed a cross-sectional survey design with a self-administered structured questionnaire as the primary data collection tool. This approach is standard and widely used in similar KAP (Knowledge, Attitude and Practice) studies on NSIs. The questionnaire was developed through a literature review and adaptation. Questions were drawn from established tools and previous research on NSI prevalence, KAP, reporting behavior, and prevention (e.g., WHO guidelines, CDC recommendation and prior studies on NSIs among Healthcare workers).

The questionnaire was pre-tested on a small group of fifty healthcare workers (not included in the final sample) to check clarity, relevance, comprehension, and time required. Ambiguous items were revised, and experts ensured content validity. Reliability may have been assessed via Cronbach's alpha for attitude/practice scales.

Knowledge is scored as poor, moderate, or good based on the percentage of correct responses. Attitude is categorized as low, moderate, or high concern/commitment. Practice is classified as unsafe, inconsistent, or safe. The data analysis was comprehensive, combining descriptive and inferential statistics, primarily using SPSS, as indicated by the presentation of percentages, frequencies, cross-tabulations, and p-values. Frequencies and percentages were calculated for all variables, including lifetime incidence of NSI, distribution across professions, and hospital types. Association and significant difference between knowledge level, practice levels, and profession were assessed by Chi-square tests ($p<0.005$)

Results

The study included 400 healthcare workers, comprising 200 doctors (100 Trainee Medical Officers and 100 House Officers) and 200 nurses (140 Registered Nurses and 60 Nursing Interns). The mean age was similar across groups, with doctors at 26.65 years (±2.47) and nurses at 26.67 years (±5.28). Gender distribution showed 60% males and 40% females among doctors, while males were 40 % and 60% females among nurses. All participants were from Medicine and Allied (50%) or Surgery and Allied (50%) departments. For nurses and nursing interns, the highest education levels were Bachelor's Degree/Interns (51%), Registered Nurse (41.5%), High School Diploma (6.5%), and Doctorate (1%) (Table1).

Table 1: Demographic Data

Demographic Information		Doctors (TMO & HO)	Nurses (RN & Intern)
Age (in years)		26.65 years (±2.47)	26.67 years (± 5.28)
Gender	Male	120 (60%)	80 (40%)
	Female	80 (40%)	120 (60%)
Profession	Trainee Medical Officer	100 (25%)	
	House Officer	100 (25%)	
	Registered Nurse	140 (35%)	
	Nursing Intern	60 (15%)	
Department	Medicine and Allied	200 (50%)	
	Surgery and Allied	200 (50%)	
Highest Level of Education (Only for Nurses and Nursing Interns)	High School Diploma	13 (6.5%)	
	Bachelor's Degree /Interns	102 (51%)	
	Registered Nurse	83 (41.5%)	
	Doctorate	2 (1%)	

A total of 73.5% of participants reported experiencing at least one NSI at the workplace, with a higher incidence among nurses (79.5%) than doctors (67.5%). In the past 12 months, 31% experienced 1 NSI, 28.3% experienced 2-3, 9% experienced 4-5, and 5.3% more than 5, while 26.5% reported none. The primary source was needles/syringes (59.8%), followed by sharp instruments (12.8%) and broken glass (12.8%). Common procedures included drawing blood (25%), administering injections (22.8%), handling sharps (21.5%), and performing surgeries (15.3%). NSIs most often occurred in patient wards (40.8%). The nature was predominantly percutaneous with a sharp object (46.8%) or hollow-bore needle (26.8%). Injuries happened during needle recapping (20%), cleaning up (19.3%), during procedures (17.8%), and preparation (16.5%). Risky situations were encountered occasionally (37.5%) or very frequently (23.3%) (Table 2).

Table 2: Incidence of Needle Stick Injuries (NSIs)

Incidence of Needle Stick Injuries (NSIs)	Responses	Doctor	Nurses	Total
Incidence of a needle stick injury at the workplace	Yes	135(67.5%)	159 (79.5%)	294 (73.5%)
	No	65 (32.5%)	41 (20.5%)	106 (26.5%)
Number of needle stick injuries experienced in the past 12 months	1	65 (32.5%)	59 (29.5%)	124 (31%)
	2–3	52 (26%)	61 (30.5%)	113 (28.3%)
	4–5	1(6.5%)	23 (11.5%)	36 (9%)
	More than 5	5 (2.5%)	16 (8%)	21 (5.3%)
	Not Experienced	65 (32.5%)	41 (20.5)	106 (26.5%)
Source of the needle stick injury	Needle/Syringe	112 (56%)	127(63.5%)	239 (59.8%)
	Sharp Instrument (e.g., scalpel, scissors)	25 (12.5%)	26 (13%)	51 (12.8%)
	Broken Glass	10 (5%)	41 (20.5%)	51 (12.8%)
	All of these	-	-	26 (6.5%)
	Not Experienced	-	-	100 (25%)
	Broken Glass	-	41 (20.5%)	100 (25%)
	Drawing Blood	65 (32.5%	35 (17.5%)	100 (25%)

Procedure during which the needle stick injury occurred	Administering Injections	17 (8.5%)	74 (37%)	91(22.8%)
	Performing Surgeries	41 (20.5%)	20 (10%)	61 (15.3%)
	Handling Sharps (e.g., needles, scalpels)	40 (20%)	46 (23%)	86 (21.5%)
Location where the needle stick injury occurred	Operating Room	37 (18.5%)	22 (11%)	59 (14.8%)
	Emergency Department	31 (15.5%)	26 (13%)	57 (14.3%)
	Patient Ward	68 (34%)	95 (47.5%)	163 (40.8%)
Nature of Needle Stick Injury	Percutaneous with a hollow-bore needle	58 (29%)	49 (24.5%)	107 (26.8%)
	Percutaneous with a sharp object	77 (38.5%)	110 (55%)	187 (46.8%)
	Not Experienced	65 (32.5%)	41 (20.5%)	106 (26.5%)
Stage of the procedure when NSI occurs	Preparing for the procedure	34 (17%)	32 (16%)	66 (16.5%)
	Cleaning up after the procedure	31 (15.5%)	46 (23%)	77 (19.3%)
	During the procedure	34 (17%)	37 (18.5%)	71 (17.8%)
	Needle recapping	36 (18%)	44 (22%)	80 (20%)
	Not Experienced	65 (32.5%)	41 (20.5%)	106 (26.5%)
Frequency of encounter situations with risk of needle stick injuries (e.g., during injections, blood draws)?	Very Frequently	50 (25%)	43 (21.5%)	93 (23.3%)
	Occasionally	71 (35.5%)	79 (39.5%)	150 (37.5%)
	Rarely	68 (34%)	52 (26%)	120 (30%)
	Never	11 (5.5%)	26 (13%)	37 (9.3%)

Knowledge levels varied significantly by profession (p=0.018), with 149/398 (37.4%) showing good knowledge, 217/398 (54.5%) moderate, and 32/398 (8%) poor; Trainee Medical Officers had the highest good knowledge (50%). Attitude showed no significant differences (p=0.434), with most at moderate concern/commitment (308/400, 77%). Practice levels differed significantly (p=0.003), with 208/400 (52%) safe, 175/400 (43.8%) inconsistent, and 17/400 (4.3%) unsafe; Registered Nurses had the highest safe practices (93/140, 66.4%) (Table 3).

Table 3: Knowledge, Attitude, and Practice Level among healthcare workers regarding Needle Stick Injury

KAP LEVEL		Profession				Total	P value
		Trainee Medical Officer	House Officer	Registered Nurse	Nursing Intern		
Knowledge	Poor Knowledge	6	8	13	5	32	0.018
	Moderate Knowledge	44	50	81	41	216	
	Good Knowledge	50	42	46	14	152	
	Total	100	100	140	60	400	
Attitude	Low Concern/ Commitment	12	15	10	5	42	0.434
	Moderate Concern/ Commitment	73	72	115	48	308	
	High Concern/ Commitment	15	13	15	7	50	
	Total	100	100	140	60	400	

Practice	Unsafe	4	6	4	3	17	0.003
	Inconsistent	47	54	43	31	175	
	Safe	49	40	93	26	208	
	Total	100	100	140	60	400	

Overall, 61.8% correctly defined NSI as injury due to the penetration of the skin by a needle, and doctors (72%) outperformed nurses (51.5%). Soap and water washing were identified as standard precautions by 76.8%. Hospital (53.8%) and training courses (28.3%) were the main sources of information. 51% promoted annual training. Surprisingly, only 51.3% agreed that recapping avoidance avoids NSIs, with nurses (58%) more optimistic than doctors (44.5%). The right steps taken following NSI were reported to be reporting and washing by 82.8%. Outcomes were reported as infections (e.g., Hepatitis B/C, HIV) by 92.5%. Perception of PEP was 77.3%, which was higher among doctors (83.5%) than nurses (71%). Perception of bloodborne pathogens was 79.5%.

Most (78.8%) agreed or strongly agreed that NSIs are a serious risk, with 49% strongly agreeing. Confidence in prevention was moderate, with 63.3% agreeing or strongly agreeing. Workplace training was rated neutrally or negatively by 60.8%, and safety equipment was always available for 51.5%. Main reasons for NSIs included high workload/stress (54%) and unsafe handling (24%). Nurses were perceived at higher risk (56%), especially by nurses themselves (73.5%). Equal awareness between professions was believed by 64.5%. Suggested measures included increased training (71%) and better equipment (38%). Worry post-NSI was reported by 78.3%. Hepatitis B vaccination was 68%. Reporting was 57.3%, higher in nurses (66%). PEP was received within 72 hours by 55.8%. Non-reporting reasons included minor injury (37.8%) and lack of time (17.8%). Significant differences in non-reporting reasons by profession ($p<0.001$), with minor injury most common, and by hospital type ($p<0.005$), with public hospitals citing unaware of procedure more often. Nurses were found to be at significantly higher risk ($p < 0.001$).

Among 400 healthcare professionals surveyed, nurses (224 respondents, particularly registered nurses and interns) are perceived as being at higher risk for needlestick injuries compared to doctors (32 respondents), with 141 considering both equally at risk and only 3 unsure, showing statistical significance ($P < 0.001$). This perception varies by hospital type: private hospitals more frequently identify nurses as higher risk (137 vs. 87 in public hospitals), while public hospitals more often view both professions as equally at risk (95 vs. 46). The differences across professions (trainee medical officers, house officers, registered nurses, and nursing interns) and hospital types (public vs. private) are also statistically significant ($P < 0.001$), highlighting that nurses, especially in private settings, are seen as more vulnerable to needlestick injuries. (Table 4). Among 400 healthcare workers

Significant differences were seen by profession ($P < 0.001$) and hospital type ($P < 0.005$) (Table 5).

Table: 4 ATTITUDES: Who is at high risk of developing NSI

In your opinion, who is at higher risk for needle stick injuries in your department?	Profession						Hospital			
	Trainee Medical Officer	House Officer	Registered Nurse	Nursing intern	Total	P value	Public Hospital	Private Hospital	Total	P value
Doctors	20	8	2	2	32		18	14	32	
Nurses	36	41	101	46	224		87	137	224	
Both are equally at risk	44	49	37	11	141	<0.001	95	46	141	<0.001
Unsure	0	2	0	1	3		0	3	3	
Total	100	100	140	60	400		200	200	400	

Table 5: ATTITUDE: Reasons for NSIs not reported

What were the reasons the needle stick injury was not reported?	Profession						Hospital			
	Trainee Medical Officer	House Officer	Registered Nurse	Nursing intern	Total	P value	Public Hospital	Private Hospital	Total	P value
It was a minor injury	42	45	50	14	151		78	73	151	
lack of time	8	14	37	12	71		34	37	71	
too embarrassed to report	1	7	7	7	22	<0.001	5	17	22	<0.005
unaware of reporting	26	17	13	11	67		38	29	67	
reported	23	17	33	16	89		45	44	89	
Total	100	100	140	60	400		200	200	400	

Knowledge of hospital policy was 72%, which was greater among nurses (86%). Experience with NSI was 72.8%. Formal training was poor, with 44% never having received training and 24% ever in the last 6 months. PPE was used always (30%) or sometimes (41%). Gloves were worn with NSI by 59%. Safety devices were used by 66.5%, more among nurses (77%). Safe disposal was always/mostly practiced by 78.5%. Recapping was routine (80.8%), even in the presence of guidelines. Anti-HBs testing following vaccination was done by 46%. Testing following NSI was 65.3%. Minimization practices included following procedure (48.5%) and disposal (42.5%). Unsafe practices were observed by 45.3% (note: table lists 81% for doctors and 77.5% for nurses, but overall, 181/400 yes; likely typo in table). No significant differences in minimization practices by profession (p=0.055).

Among 400 healthcare professionals, practices to minimize needlestick injuries include proper sharps disposal (170, 42.5%, highest among registered nurses at 39.4%), following needle-handling protocols (194, 48.5%, led by trainee medical officers at 30.4%), using personal protective equipment (25, 6.3%, mostly registered nurses at 56%), and 11 (2.8%) not following any practice. Public and private hospitals showed similar adoption rates (P = 0.726), with protocol adherence highest in both (194 total). Differences by profession were not statistically significant (P = 0.055) (Table 6).

Table 6: PRACTICE: Practice to implement in reducing NSIs

What practice do you implement to minimize needle stick injury?	Profession						Hospital			
	Trainee Medical Officer	House Officer	Registered Nurse	Nursing intern	Total	P value	Public Hospital	Private Hospital	Total	P value
proper disposal of sharp	36 (21.2%)	45 (26.5%)	67 (39.4%)	22 (12.9%)	170	0.055	89	81	170	0.726
following protocol for handling needle	59 (30.4%)	48 (24.7%)	56(28.9%)	31 (16%)	194		95	99	194	
using personal protective equipment	4 (16%)	4 (16%)	14 (56%)	3 (12%)	25		12	13	25	
I don't follow such practice	1 (9.1%)	3 (27.3%)	3 (27.3%)	4 (36.4%)	11		4	7	11	
Total	100	100	140	60	400		200	200	400	

Physical pain was reported by 57.8%, psychological distress by 45.3%, PEP by 12.5%, time off by 7.8%, and no consequences by 12.5%. Work behavior was affected significantly/moderately in 78%. Medical attention/PEP sought by 57.8%. Professional confidence affected significantly/moderately in 81.3%. (Table 7)

Table 7: Impact of Needle Stick Injuries

Sr. #	Impact of Needle Stick Injuries	Responses	Doctors	Nurses	Total
1.	If you have experienced a needle stick injury, did you experience any of the following?	Physical pain or injury (e.g., swelling, bleeding)	103 (51.5%)	134 (67%)	231 (57.8%)
		Psychological distress (e.g., anxiety, stress about disease transmission)	105 (52.5%)	76 (38%)	181 (45.3%)
		Time off from work	18 (9%)	13 (6.5%)	31 (7.8%)
		Post-exposure prophylaxis (PEP) treatment	29 (14.5%)	21 (10.5%)	50 (12.5%)
		No significant consequences	21 (10.55)	29 (14.5%)	50 (12.5%)
2.	Do you feel psychologically distressed after experiencing a needle stick injury?	Very distressed	97 (48.5%)	83 (41.5%)	180 (45%)
		Moderately distressed	34 (17%)	38 (19%)	72 (18%)
		Slightly distressed	52 (26%)	60 (30%)	112 (28%)
		Not distressed at all	17 (8.5%)	19 (9.5%)	36 (9%)
3.	Do needle stick injuries affect your work behavior (e.g., reluctance to perform certain tasks)?	Yes, significantly	71 (35.5%)	63 (31.5%)	134 (33.5%)
		Yes, moderately	92 (46%)	86 (43%)	178 (44.5%)
		No, not at all	37 (18.5%)	51 (25.5%)	88 (22%)
4.	Have you sought medical attention or post-exposure prophylaxis (PEP) after a needle stick injury?	Yes	111 (55.5%)	120 (60%)	231 (57.8%)
		No	89 (44.5%)	80 (40%)	169 (42.3%)
5.	Do you think needle stick injuries affect your professional confidence or job performance?	Yes, significantly	66 (33%)	65 (32.5%)	131 (32.8%)
		Yes, moderately	97 (48.5%)	97 (48.5%)	194 (48.5%)
		No, not at all	37 (18.5%)	38 (19%)	75 (18.8%)

Among 400 healthcare workers, NSIs mainly caused physical pain (231, 57.8%, mostly registered nurses, 90) and psychological distress (181, 45.3%, led by trainee medical

officers, 54). Fewer reported time off (31, 7.8%), prophylaxis (50, 12.5%), or no consequences (50, 12.5%). By profession, pain (P < 0.001) and distress (P = 0.010) were significant; time off (P = 0.557), prophylaxis (P = 0.293), and no consequences (P = 0.377) were not. By hospital, private hospitals had more time off (20 vs. 11, P = 0.033) and less distress (64 vs. 117, P < 0.001); pain (P = 0.05), prophylaxis (P = 0.247), and no consequences (P = 0.810) showed little difference (Table 7.1).

Table 7.1: IMPACT: Consequences of Needle Stick Injury

Consequences of Needle Stick Injury	Profession						Hospital			
	Trainee Medical Officer	House Officer	Registered Nurse	Nursing intern	Total	P value	Public Hospital	Private Hospital	Total	P value
Physical Pain	37	60	90	44	231	<0.001	112	119	231	0.05
Psychological Distress	54	51	48	28	181	0.010	117	64	181	<0.001
Time off from Work	9	9	11	2	31	0.557	11	20	31	0.033
Post-exposure Prophylaxis Treatment	18	11	15	6	50	0.293	23	27	50	0.247
No Significant Consequences	11	10	23	6	50	0.377	26	24	50	0.810

Among 400 healthcare workers, 180 (45%) were very distressed (mostly registered nurses, 65), 112 (28%) slightly distressed, 72 (18%) moderately distressed, and 36 (9%) not distressed. By profession, distress levels were not significant (P = 0.207). By hospital, private hospitals had more very distressed (103 vs. 77, P = 0.001); public hospitals had more slightly (65 vs. 47) and moderately distressed (46 vs. 26), and private hospitals had more not distressed (24 vs. 12) (Table 7.3).

Table 7.2: IMPACT: Psychologically distressed after experiencing an NSIs

Psychologically distressed after experiencing an NSIs	Profession						Hospital			
	Trainee Medical Officer	House Officer	Registered Nurse	Nursing intern	Total	P value	Public Hospital	Private Hospital	Total	P value
very distressed	45	52	65	18	180		77	103	180	
slightly distressed	30	22	36	24	112		65	47	112	
moderately distressed	14	20	27	11	72	0.207	46	26	72	**0.001**
not distressed at all	11	6	12	7	36		12	24	36	
Total	100	100	140	60	400		200	200	400	

Discussion

The study puts a very high workload of needle-stick injury among the health workers in Peshawar's tertiary care hospitals, with more than seventy percent of the respondents reporting at least one exposure over their lifetime. This rate is much higher than aggregated prevalence rates from recent systematic reviews and large-scale surveys over the past five years, where lifetime exposures had been around 56% and one-year prevalence around 30%. The higher rate in our

sample may be partly due to the question wording to ask for lifetime exposure, the hectic workload in tertiary care hospitals, and the recall bias. Notably, the fact that nurses were more frequently affected than doctors can be seen in international reports that show that nursing staff, since they are exposed to injections, blood draws, and managing waste more frequently in direct contact, are more likely to be injured.

Under-reporting of incidents was also a prominent issue in our study, with more than forty percent of the participants not reporting their injuries. This finding is similar to recent research that has shown rates of under-reporting at about 28% to more than 60% across different settings, with common reasons including perception of the injury as minor, no time, and uncertainty about the procedure for reporting (11). Similarly, post-exposure prophylaxis application was inadequate, with less than a majority of exposed persons to infected sources receiving PEP within the first 72 hours. Recent studies substantiate these gaps in timely application of PEP attributed to inadequate reporting mechanisms, low levels of awareness, and inadequate occupational-health services (12, 13).

Psychological distress following needle-stick injury was a common complaint from almost half of our subjects, consistent with other recent studies, which emphasized the immense anxiety and stress caused by such injuries. The international literature indicates that exposure results not only in acute fear but also long-term psychological symptoms if appropriate counseling and care are not provided (14, 15). Notably, our findings indicated that public hospital staff reported greater levels of distress than private hospital staff, a discrepancy that could be attributed to increased patient loads, reduced resources, and poorer support mechanisms within the public facilities.

The study also revealed variance in safety behavior, where nurses exhibited greater compliance with safety practices compared to doctors, despite higher injury rates. Approximately two-thirds of all respondents reported the usage of safety-engineered devices, which was typically similar to that occurring internationally, where availability and enforcement by institutions is inconsistent (16). Evidence from the past five years has shown that the deployment of these devices, along with training, reduces the rate of injury (17, 18). Our evidence supports this claim, with interviews being extremely positive towards the use of extra training as a sound preventive measure.

Collectively, the findings validate and complement existing literature through the provision of qualitative data on needle-stick injury knowledge, attitudes, practices, and psychological impacts. The high prevalence underscores the urgent necessity for multidimensional interventions, including mandatory and periodic hands-on training, simplification of reporting processes, dispensation of safety-engineered equipment, and routinized psychosocial intervention for exposed staff. While cross-sectional design, self-reported information, and convenience sampling limit generalizability, the research still calls attention to the scope of the problem and provides solid local evidence congruent with international trends detailed in recent publications.

Conclusion

Needle stick injuries are prevalent, particularly among healthcare workers, driven by procedural exposure and unsafe practices. Although knowledge and attitudes are similar in doctors and nurses, nurses exhibit safer practices due to better training.

Interventions to reduce the incidence should focus on mandatory training, no-recapping policies, improved reporting, and safety devices to reduce NSI incidence and impacts, especially in public hospitals.

Limitation

The cross-sectional design of study restricts one from determining causation or tracing the trends in needle stick injury (NSI) incidence and practice over time. Use of the stratified convenience sampling technique, although convenient, may open the study to selection bias as it may not represent the diverse healthcare worker population of Peshawar's tertiary care facilities. Self-report data, which were obtained by use of questionnaires, are subject to recall bias and social desirability bias, and over- or under-estimation of NSI events, knowledge, or safety practices. The research was also limited to Peshawar's tertiary-level care facilities, which may not apply to other health care facilities in Pakistan or throughout the country. The limitation of longitudinal data also limits the understanding of the long-term psychological and career impact of NSIs. Evidently, despite these limitations, results are worth it to estimate NSI prevalence and safety practices and are a cornerstone for evidence-based interventions.

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All the authors agree to take responsibility for every facet of the work, making sure that any concerns about its integrity or veracity are thoroughly examined and addressed.