RESEARCH ARTICLE

Mental health support need among health care workers post needle stick injuries: A sequential mixed method study

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Abstract

Objective: To measure anxiety and stress levels among healthcare workers having experienced needlestick injury, and to explore their perceived necessity of mental health support services.

Method: The sequential mixed-method study was conducted from July to December 2024 at Hayatabad Medical Complex, Peshawar, Pakistan, and comprised healthcare workers of either gender who had experienced needlestick injury during the preceding one month. Data was collected using the Beck Anxiety Inventory and the Perceived Stress Scale, while qualitative insights were obtained through in-depth interviews. Data was analysed using SPSS 27.

Results: Of the 199 healthcare workers, 118(59.3%) were male and 81(40.7%) were female. The overall mean age was 34.61±5.53 years. There were 86(43.22%) participants who had experienced severe anxiety, and 103(51.76%) participants reported high levels of perceived stress. Age, job role and hepatitis B vaccination status significantly influenced anxiety, while stress levels were associated with age and hepatitis B vaccination status ($p<0.05$). Thematic analysis highlighted the emotional toll, coping strategies, and a general lack of awareness. The participants unanimously favoured mental health support services.

Conclusion: Needlestick injuries were found to significantly impact the psychological wellbeing of healthcare workers, underscoring the need for comprehensive mental health support services.

Keywords: Needle stick injuries, Healthcare workers, Mental health, Anxiety disorders, Stress, Psychological.

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Introduction

Needlestick injuries (NSIs) are penetrating cuts and wounds caused by medical instruments, including blood collection syringes and intravenous (IV) lines potentially contaminated with another person's blood. NSIs poses a serious threat of bloodborne infections, such as hepatitis B virus (HBV), hepatitis C cirus (HCV) and human immunodeficiency virus (HIV) among healthcare workers (HCWs).[1] Regardless of safety measures to reduce NSIs through certain precautionary measures, exposure to many bugs during routine work is inevitable. Occupational exposure to bloodborne bugs is a shocking happening for a number of HCWs, making them feel scared and even leading to long-term psychological problems.[2]

HCWs experience a high rate of NSIs with a global prevalence of 44.5%. Hypodermic needles are the most common cause of NSIs, accounting for 55.1% of cases. The highest prevalence is in southeast Asia (58.2%) and the lowest among American nurses (26.7%).[3] In Pakistan, the prevalence of NSIs among HCWs varies across different studies and settings. A study at the Hayatabad Medical Complex in Peshawar reported that 31.1% of HCWs had experienced NSIs.[4] Another study indicated that the prevalence of NSIs among dental HCWs ranged 30-73%.[5]

In a study, the anxiety level, calculated using four components of the Hospital Anxiety and Depression Scale (HADS), was significantly higher among those having suffered an NSI ($p<0.01$), and psychological consequences after injury had a lot of impact on work performance, terms and sexual health.[6] It has also been reported that up to 12% of trainee doctors in the United Kingdom had posttraumatic stress disorder (PTSD) following an NSI.[7]

The healthcare system in Pakistan faces significant challenges that exacerbate the risks of NSI. The country's high patient load and limited resources create an environment where HCWs are often forced to prioritise efficiency over safety protocols, which increases the likelihood of NSIs. Lack of comprehensive training programmes and limited awareness among HCWs about the risks and prevention of NSIs increases the problem. To our knowledge, local data is scarce on the level of stress, anxiety and trauma HCWs suffer from post-NSI.

The current study was planned to fill the gap in literature by measuring anxiety and stress levels among HCWs having experienced NSIs, and to explore their perceived necessity of mental health support services.

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Subjects and Methods

The sequential mixed-method study was conducted from July to December 2024 at Hayatabad Medical Complex (HMC), Peshawar, Pakistan, which is a tertiary care hospital, employs all types of HCWs, and handles a significant patient load. The sample was raised using consecutive non-probability sampling technique for the quantitative part, while purposive sampling technique was used for the qualitative part.

After approval from the ethics review committees of Khyber Medical University (KMU), Peshawar, and HMC, both male and female HCWs were enrolled, including doctors, nurses, laboratory samplers, and operation theatre (OT) technicians who had been exposed to NSIs during the preceding one month. HCWs not willing to participate, having history of any psychological illness, using psychiatric medicines and those with any recent event causing anxiety, like the death of someone close were excluded. The sample size for the quantitative part was calculated in the light of literature[8] by using Openepi version 3 calculator[9] with 5% margin of error and 95% confidence interval (CI). For the qualitative part, in-depth interviews using a semi-structured guide were conducted with individuals till saturation was achieved. After taking informed consent, demographic details, such as age, gender, marital status, job title and known infection status of the patient, were noted using a predesigned questionnaire. Data regarding anxiety levels was measured using the Beck Anxiety Inventory (BAI) score[10] while stress was assessed using the Perceived Stress Scale (PSS).[11] The study questionnaire was prepared in English, and each participant was assisted in understanding the questions in Urdu by the interviewer, who was a doctor. Participants' responses were recorded, and total scores were calculated.

For the qualitative part of the study, interviews were conducted from some of the participants in a quiet meeting room, and voice recordings were made.

Quantitative data was analysed using SPSS 27 Continuous variables were represented as mean±standard deviation, while categorical variables were expressed as frequencies and percentages. Anxiety level (minimal, mild, moderate, severe) and perceived stress levels (low, moderate and severe) were stratified. Post-stratification, chi-square test was applied, with $p \leq 0.05$ being significant.

For the qualitative part, the data was subjected to thematic analysis, making initial codes, searching themes, and summarising key ideas.

Results

Of the 199 healthcare workers, 118(59.3%) were male and 81(40.7%) were female. The overall mean age was 34.61±5.53 years, with 120(60.3%) subjects aged 31-40 years. Most participants were married 162(81.4%), while 37(18.6%) were single. There were 71(35.7%) doctors, 58(29.1%) nurses, 47(23.62%) OT technicians and 23(11.6%) laboratory samplers. Overall, 76(38.2%) sujects reported NSIs involving non-infectious patients, while 54(27.1%) were exposed to patients with HCV, 3(1.5%) to those with HIV, and 22(11.1%) to patients having HBV. In 44(22.1%) cases, the infection status of the patient was unknown.

Of the total, 86(43.22%) participants experienced severe anxiety, followed by moderate anxiety 48(24.12%), mild anxiety 36(18.09%) and minimal anciety 29(14.57%). Further, 103(51.76%) participants reported high perceived stress, followed by moderate stress 75(37.69%), and 21(10.55%) low stress (Figure).

Age, job role and HBV vaccination status significantly

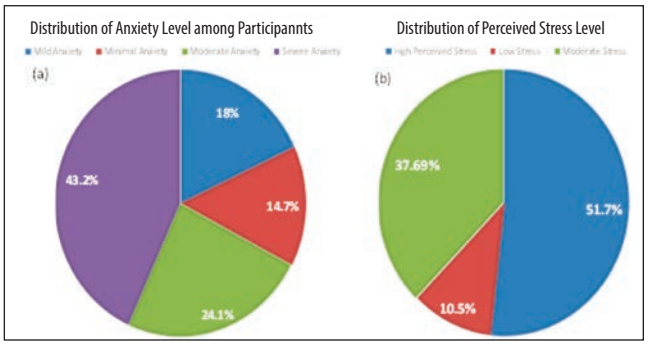

Figure: Pie Chart represents the Distribution of Anxiety Levels (a) and perceived stress (b) Among participants.

Table-1: Association of anxiety level with study variables [n (%)].

Category	Mild Anxiety	Minimal Anxiety	Moderate Anxiety	Severe Anxiety	Total	*p* value
Age Group 1 (21-30) (years)	5 (9.8)	6 (11.8)	18 (35.3)	22 (43.1)	51(100)	0.048
Age Group 2 (31-40) (years)	20(16.7)	19 (15.8)	26 (21.7)	55 (45.8)	120(100)	
Age Group 3 (41-50) (years)	10 (37)	4 (14.8)	4 (14.8)	9 (33.3)	27(100)	
Age Group 4 (51-60) (years)	1 (100)	0 (0)	0 (0)	0 (0)	1(100)	
Total	36(18.1)	29 (14.6)	48 (24.1)	86 (43.2)	199 (100)	
Job Title - Doctor	15(21.1)	5 (7)	9 (12.7)	42 (59.2)	71 (100)	0.004
Job Title – Lab. Sampler	4 (17.4)	1 (4.3)	10 (43.5)	8 (34.8)	23 (100)	
Job Title – Nurse	9 (15.5)	14 (24.1)	17 (29.3)	18 (31)	58 (100)	
Job Title -- OT Tech	8 (17)	9 (19.1)	12 (25.5)	18 (38.3)	47 (100)	
Total	36(18.1)	29 (14.6)	48 (24.1)	86 (43.2)	199 (100)	
HBV Vaccination – Incomplete	9 (15.3)	0 (0)	27 (45.8)	23 (39)	59 (100)	<0.001
HBV Vaccination – No	0 (0)	0 (0)	20 (47.6)	22 (52.4)	42 (100)	
HBV Vaccination – Yes	27(27.6)	29 (29.6)	1 (1.0)	41 (41.8)	98 (100)	
Total	36(18.1)	29 (14.6)	48 (24.1)	86 (43.2)	199 (100)	

Lab: Laboratory, OT: Operation theatre, HBV: Hepatitis B virus.

Table-2: Association of perceived stress with study variables [n (%)].

Category	High Stress	Low Stress	Moderate Stress	Total	*p*-value
Age Group 1 (21-30) (years)	37 (72.5%)	4 (7.8%)	10 (19.6%)	51 (100%)	0.025
Age Group 2 (31-40) (years)	5 (46.7%)	13 (10.8%)	51 (42.5%)	120 (100%)	
Age Group 3 (41-50) (years)	10 (37%)	4 (14.8%)	13 (48.1%)	27 (100%)	
Age Group 4 (51-60) (years)	0 (0%)	0 (0%)	1 (100%)	1 (100%)	
Total	103 (51.8%)	21 (10.6%)	75 (37.7%)	199 (100%)	
Job Title – Doctor	30 (42.3%)	9 (12.7%)	32 (45.1%)	71 (100%)	0.211
Job Title – Lab. sampler	17 (73.9%)	2 (8.7%)	4 (17.4%)	23 (100%)	
Job Title – Nurse	30 (51.7%)	7 (12.1%)	21 (36.2%)	58 (100%)	
Job Title - OT Tech	26 (55.3%)	3 (6.4%)	18 (38.3%)	47(100%)	
Total	103 (51.8%)	21 (10.6%)	75 (37.7%)	199 (100%)	
HBV Vaccination – Incomplete	46 (78%)	8 (13.6%)	5 (8.5%)	59 (100%)	<0.001
HBV Vaccination – No	42 (100%)	0 (0%)	0 (0%)	42 (100%)	
HBV Vaccination - Yes	15 (15.3%)	13 (13.3%)	70 (71.4%)	98 (100%)	
Total	103 (51.8%)	21 (10.6%)	75 (37.7%)	199 (100%)	

Lab: Laboratory, OT: Operation theatre, HBV: Hepatitis B virus.

influenced anxiety (Table 1), while stress levels were associated with age and HBV vaccination status (Table 2).

Of the 12 participants who were interviewed for qualitative data, 9(75%) were males and 3(25%) were females. There were 3(25%) doctors, 5(41.7%) nurses and the remaining 4(33.3%) were other HCWs. Of the seven themes that emerged, themes 1, 2 and 7 emerged more among doctors, while themes 1, 4 and 6 emerged more among the rest of the subjects (Table 3).

Discussion

The current study found that anxiety and stress levels among HCWs were alarmingly high, with nearly half of them reporting severe anxiety and over half of them experiencing substantial stress. Wicker et al. in

Table-3: Perception of healthcare workers (HCWs) having experienced needlestick injuries (NSIs).

Themes	Participants Perception
Theme One: Causes of Needlestick Injuries	Blood sampling was identified as one of the most frequent causes, with common cause as drawing blood and handling needles during routine patient care. A doctor responded, "*I am a junior house officer, three weeks ago, I came for night duty and there was a new patient admitted and I had to take his BLIs (baseline lab investigations) but his vein was not palpable, so I was maneuvering and accidently got pricked.*" (interview 3) • Unsafe practices, such as the improper placement of used needles in trays or their disposal. A nurse from Emergency Unit responded, "*I got pricked while attending the emergency patient from undisposed sharps needle left on table after blood sampling of the patient by a doctor*". (e.g., Interview 7).
Theme Two: Emotional Reaction	Blood sampling was identified as one of the most frequent causes, with common cause as drawing blood and handling needles during routine patient care. A doctor responded, "*I am a junior house officer, three weeks ago, I came for night duty and there was a new patient admitted and I had to take his BLIs (baseline lab investigations) but his vein was not palpable, so I was maneuvering and accidently got pricked.*" (interview 3) • Unsafe practices, such as the improper placement of used needles in trays or their disposal. A nurse from Emergency Unit responded, "*I got pricked while attending the emergency patient from undisposed sharps needle left on table after blood sampling of the patient by a doctor*". (e.g., Interview 7).
Theme Three: Coping Mechanisms	Discussions from friends, colleagues, and family members were crucial for many participants, while a few got engaged in recreational activities like cricket, social media, or television as a distraction, few consulted senior colleagues about medications to regain a sense of control over the situation. A doctor expressed her feelings, "I *kept myself busy by reading books, cooking food and watching dramas and movies, to avoid flashbacks my family tried to keep me busy and not letting me sit alone, as I wanted to avoid medicines.*" (Interview 4)
Theme Four: Vaccination and Post-Exposure Actions	Some were vaccinated against hepatitis B prior to the injury, others were either unaware or had not completed immunizations. A nurse said that, "*I don't know about any vaccination or don't have any idea of my childhood vaccination course and didn't use any medication as no one guided me.*" (Interview 1).
Theme five: Financial Implications	Many participants reported significant out-of-pocket expenses for blood tests, medications (post exposure prophylaxis), and follow-up treatments, with costs. A responder said "*As I got pricked from a patient who was PCR positive, I was prescribed immunoglobulin, 2 vials I got for free, but rest I bought for around Rs.72000, in which my husband supported me financially*". (Interview 11).
Theme six: Family Involvement	Few chose not to disclose their injuries to their family members to avoid causing them stress or worry, while others received emotional and practical support. One of the participant said, "*As I am afraid that my husband and son can get infected from me, that I am in severe trauma, I immediately told my husband after getting pricked from hepatitis B positive, who supported me*." (Interview 11)
Theme seven: Awareness of Mental Health Services and its importance	Most were unaware of any mental health support systems or counseling services available in their hospitals. Despite this, there was unanimous agreement on the importance of such services, the need for counseling and separate department. A junior doctor responded, "*we need some professional help, to cope with this mental trauma apart from medical help". (Interviewer 3).* *One of the participant recommended that "actually we need two types of services from hospital, one is financial and other mental health services to enhance productivity of health care staff*". (Interviewer 1)

2014 reported that >80% of the participants at the Frankfurt University Hospital had concerns about NSI consequences, leading to some level of anxiety, especially in cases where the patient was known to have a chronic virus infection which caused significantly higher levels of anxiety.[12] Matsubara et al. in 2020 6 used four items of the hospital anxiety and depression scale (HADS)[13] and showed that participants with NSIs had significantly higher anxiety scores (p=0.004) compared to those with no NSI exposure, and 42.7% were more afraid of needles and sharp devices in the 2 weeks after the NSI exposure .[6] Both these studies reported higher prevalence of psychological issues after NSI6,[12] which was in alignment with the current results.

In the current study, 103(51.76%) HCWs reported experiencing high perceived stress on Perceived Stress Scale (PSS).[11] In a 2013 study, Naghavi et al. found that 12% of trainee doctors, evaluated on the Impact of Event Scale (IES), had PTSD compared to 3% in the general population, signifying the need of timely addressing psychological impacts in HCWs.[7] Data from the current study had almost four times higher rate of stress, and the finding was consistent with prior research.

In qualitative terms, the theme 'Emotional Reactions' identified in the current study links with the theme 'The impact of the sharps injury' described by Hambridge in 2019.[14] This finding reported in both the studies, were related to some of the emotions expressed, such as being shocked, traumatised and feeling anxiety. The current study showed some more emotions, like sleep disturbances, fear of recurrence, and appetite changes.

Another theme of 'The role of my family and friends' from the Hambridge study[14] and the theme 'Family Involvement' from the current study showed similar results that HCWs and family were very supportive. The current study, in fact, showed that the participants received emotional and practical support from their families and friends.

To address these challenges, healthcare institutions must prioritise the establishment of accessible mental health support systems tailored to the needs of HCWs. These initiatives should include counselling services, stress management workshops, and peer support groups to foster resilience and emotional wellbeing. Additionally, implementing robust safety protocols, enhancing vaccination coverage, and providing affordable access to post-exposure prophylxis can significantly reduce the incidence and impact of NSIs.

The current study has limitations of being a single-centre research, which means that sample was not fully representative of all hospitals in the country. Besides, communication inconveniences may have occurred during the interviews because of the language issues, and there was a risk of selection bias among the participants.

Conclusion

Significant psychological and systemic challenges were being faced by HCWs following exposure to NSIs. The alarmingly high levels of anxiety and stress increased manifiold owing to insufficient institutional support, limited access to mental health resources, and systemic gaps in safety protocols. Psychological toll, including fears of infection, stigma and professional apprehensions, demonstrated the urgent need for comprehensive interventions. Additionally, financial burdens and inadequate reporting systems further exacerbated the vulnerability of HCWs in low-resource settings.

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MS: Concept, design, drafting, final approval and agreement to be accountable for all aspects of the work.
S: Data interpretation, revision, final approval and agreement to be accountable for all aspects of the work.