

ASSESSMENT AND PRACTICE CONCERNING STANDARD PRECAUTIONS
AGAINST PATIENT BLOOD AND BODY FLUIDS AMONG HEALTH CARE
WORKERS IN ACCIDENT AND EMERGENCY DEPARTMENT AT A TERTIARY
CARE HOSPITALS PESHAWAR

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Keywords:

Standard precautions, Healthcare workers, Needlestick injuries, Blood and body fluid exposure

Received on 23 April, 2026

Accepted on 02 June, 2026

Published on 20 June, 2026

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Abstract

Background: Healthcare workers are at increased risk of occupational exposure to blood and body fluids through needlestick injuries and contact with contaminated sharp objects, potentially leading to transmission of blood-borne infections such as hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV). Adherence to standard precautions is essential for preventing healthcare-associated infections.

Objective: To assess the knowledge, attitudes, and practices regarding standard precautions against blood and body fluid

exposure among healthcare workers in the Accident and Emergency Department of a tertiary care hospital in Peshawar.

Methods: A descriptive cross-sectional study was conducted among 103 healthcare workers in the Accident and Emergency Department of a tertiary care hospital in Peshawar. Data were collected using a structured self-administered questionnaire and analyzed using SPSS version 26.0.

Results: Nurses constituted the largest professional group (58.3%), followed by paramedics (30.1%) and physicians (11.7%). Most participants demonstrated good knowledge and positive attitudes toward standard precautions, with high compliance with hand hygiene practices (87.4%). However, occupational exposures remained common, with 74.8% reporting exposure to blood or body fluids and 48.5% reporting needlestick injuries. Complete hepatitis B vaccination coverage was observed in 51.5% of participants, while 65.0% reported occupational exposure incidents.

Conclusion: Although healthcare workers demonstrated adequate knowledge and compliance with standard precautions, occupational exposures and incomplete hepatitis B vaccination coverage remain significant concerns. Strengthening infection control training, vaccination programs, and exposure reporting systems is essential to enhance workplace safety.

INTRODUCTION

Exposure to blood and body fluids (BBFs) is a significant occupational hazard among healthcare workers (HCWs). Such exposure occurs when healthcare personnel come into contact with potentially infectious blood or body fluids through intact or non-intact skin, mucous membranes, or percutaneous injuries while performing professional duties (1). Occupational exposure to blood-borne pathogens, particularly Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), and Hepatitis C Virus (HCV), remains one of the most serious health risks faced by HCWs worldwide. Healthcare workers are continuously exposed to infectious agents during patient care activities, making them vulnerable to acquiring infections through needle-stick injuries, sharp-related accidents, and direct contact with contaminated body fluids (2).

Emergency departments serve as the first point of contact for patients with various infectious and non-infectious conditions and are often the frontline of healthcare delivery (3). Due to the urgent nature of care and frequent exposure to trauma cases, emergency healthcare workers face an increased risk of occupational exposure to blood and body fluids. Since the first documented case of occupational transmission of an infectious disease through contaminated blood exposure in 1978, blood and body fluid exposure has been recognized as a major workplace hazard for healthcare personnel. Percutaneous and mucocutaneous exposures continue to pose substantial risks, particularly in high-pressure clinical environments such as accident and emergency departments (4).

Needle-stick and sharps injuries are among the most common causes of occupational exposure to blood-borne pathogens. Healthcare workers who frequently handle needles, scalpels, blood collection devices, and other sharp instruments are at risk of self-inoculation injuries that may result in the transmission of infectious diseases (5). According to the World Health Organization (WHO), approximately three million healthcare workers experience percutaneous exposure to blood-borne pathogens annually, resulting in an estimated two million HBV infections, 900,000 HCV infections, and 170,000 HIV exposures (6). These occupational injuries contribute substantially to the global burden of disease among healthcare workers and are responsible for approximately 40% of HBV and HCV infections and 2.5% of HIV infections among healthcare personnel worldwide.

To minimize the risk of infection transmission, infection prevention and control measures are essential in healthcare settings. Standard Precautions (SPs) are a set of evidence-based practices designed to prevent the transmission of infectious agents through blood, body fluids, secretions, excretions, and contaminated materials (7). These precautions include hand hygiene, the appropriate use of personal protective equipment (PPE) such as gloves, masks, gowns, and eye protection, safe handling and disposal of sharps, environmental cleaning and disinfection, waste management, respiratory hygiene, and adherence to sterilization protocols. The World

Health Organization and the Centers for Disease Control and Prevention (CDC) recommend alcohol-based hand rubs as an effective method for routine hand hygiene and emphasize strict compliance with standard precautions in all patient care settings (8).

Adherence to standard precautions is essential for protecting healthcare workers, patients, and visitors from healthcare-associated infections. However, compliance remains inconsistent in many healthcare facilities, particularly in developing countries (9). Factors such as inadequate knowledge, insufficient training, lack of personal protective equipment, heavy workload, time constraints, and limited institutional support contribute to poor adherence. Studies have shown that healthcare workers who receive regular infection prevention training demonstrate significantly better compliance with standard precaution guidelines compared to those who do not receive such training (10).

In addition to standard precaution practices, vaccination against vaccine-preventable diseases such as hepatitis B, influenza, measles, mumps, rubella, varicella, pertussis, tuberculosis, and COVID-19 plays a vital role in protecting healthcare personnel from occupational infections (11). Other preventive strategies include proper disposal of sharps, avoidance of needle recapping, prompt reporting of occupational exposures, and strict implementation of hospital infection control policies. Environmental infection prevention measures, including routine cleaning and disinfection of contaminated surfaces, further contribute to reducing the transmission of infectious agents within healthcare facilities (12).

Despite the availability of established infection prevention guidelines, healthcare workers in emergency departments continue to face substantial occupational risks. In Pakistan, particularly in tertiary care hospitals, limited data are available regarding healthcare workers' knowledge and practices concerning standard precautions against blood and body fluid exposure. Furthermore, the extent of adherence to these preventive measures and the factors influencing compliance among healthcare workers in emergency settings remain inadequately explored (13).

MATERIALS AND METHODS

A cross-sectional study was conducted over a period of six months in the Accident and Emergency Department of Lady Reading Hospital, Peshawar, Pakistan. The study included healthcare workers directly involved in patient care, including doctors, nurses, paramedics, and laboratory technicians. According to records obtained from the Human Resource Department, a total of 103 healthcare workers were employed in the department during the study period; therefore, all eligible healthcare workers were invited to participate. Data were collected using a structured, self-administered questionnaire designed to assess participants' knowledge and practices regarding standard precautions against exposure to patient blood and body fluids. Prior to data collection, informed consent was obtained from all participants, and confidentiality and anonymity were ensured throughout the study. Administrative staff, healthcare workers not directly involved in patient care, and those on leave during the data collection period were excluded. The collected data were entered and analyzed using Statistical Package for Social Sciences (SPSS) version 22.0. Descriptive statistics were used to summarize the data, and results were presented as frequencies, percentages, tables, and graphical representations where appropriate.

RESULTS

A total of 103 healthcare workers participated in the study. Most participants were aged 26–30 years (47.6%), followed by 20–25 years (33.0%) and 31–40 years (19.4%). Male and female participants were equally represented (49.5% each). Nurses constituted the largest professional group (58.3%), followed by paramedics (30.1%) and doctors (11.7%). Most respondents (60.2%) had 1–5 years of experience in the emergency department.

Regarding knowledge and training on standard precautions, 81.6% of participants reported receiving formal infection prevention and control training, while 64.1% had received training on standard precautions within the previous two years. The majority (85.4%) correctly recognized that standard precautions are intended to protect both healthcare workers and patients. Furthermore, 83.5% correctly identified safety boxes as the appropriate method for

disposing of used needles, and 71.8% were aware that hepatitis B vaccination provides protection against occupational infections.

The age-wise distribution of healthcare workers shows that the majority of respondents were between 26 and 30 years of age, accounting for 47.6% (n = 49) of the total participants. Healthcare workers aged 20 to 25 years represented 33.0% (n = 34), while those between 31 and 40 years comprised 19.4% (n = 20). This indicates that most participants were young adults in the early stages of their professional careers.

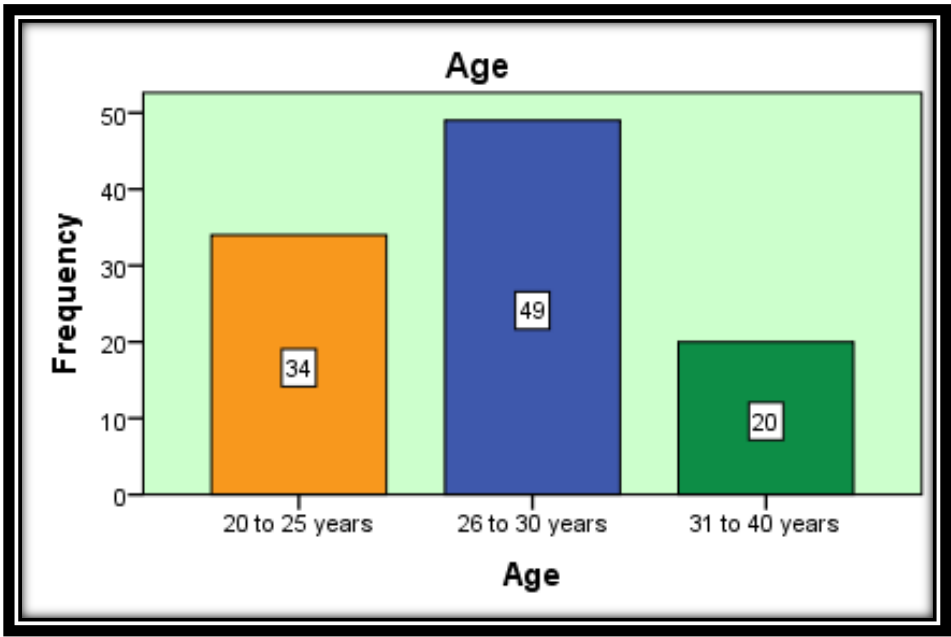


Figure 01 # Age

Male respondents made up 49.5% (n = 51) of the total participants, while female respondents made up 49.5% (n = 51). Just 1.0% (n = 1) said they would rather keep their gender a secret. Equal representation of male and female healthcare personnel is provided by this balanced gender distribution

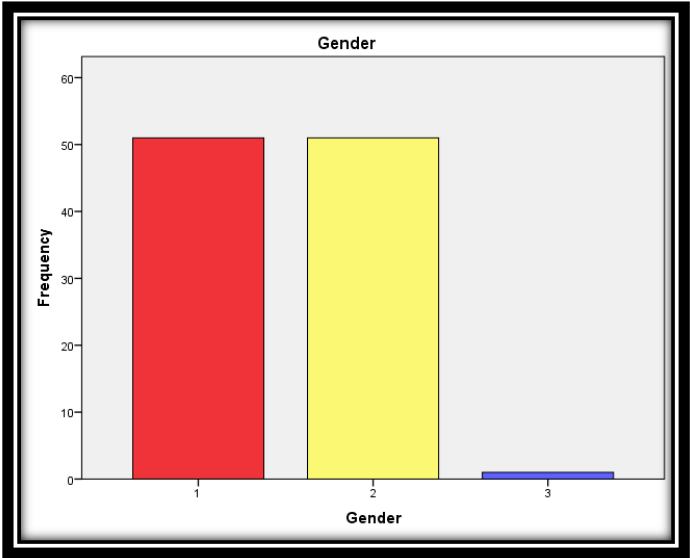
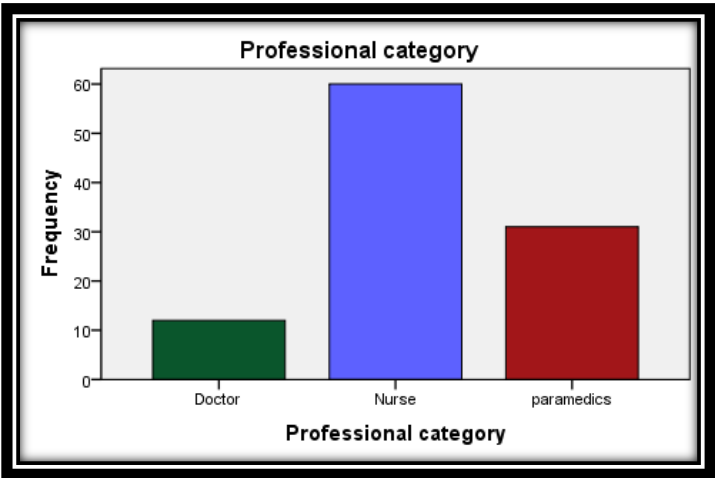


Figure 02 # Gender

58.3% (n = 60) of the participants were nurses, making up the majority of responders. 30.1% (n = 31) of the respondents were paramedics, while 11.7% (n = 12) were physicians. This shows that nurses made up the largest professional group in the study, which is indicative of their increasing exposure to patient bodily fluids and blood as well as their increased involvement in direct patient care.



Figure# 03 Professional Category

60.2% (n = 62) of the participants had one to five years of job experience, making up the majority of respondents. 26.2% (n = 27) of healthcare workers had less than a year's experience, whilst 12.6% (n = 13) had six to ten years' experience. Merely 1.0% (n = 1) possessed over ten years of work experience. These results show that the majority of participants were in the early stages of their careers.

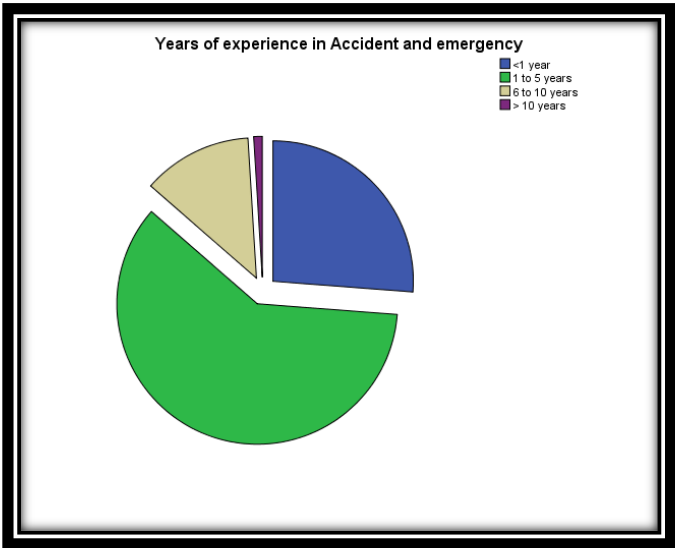


Figure 04 Experience In Emergency

A question on formal training in infection prevention and control was posed to the respondents. 81.6% (n = 84) of respondents said "Yes," while 18.4% (n = 19) said "No." In order to improve adherence to conventional precautions against exposure to patient blood and bodily fluids, it is crucial that the majority of healthcare professionals have undergone formal training in infection prevention and control.

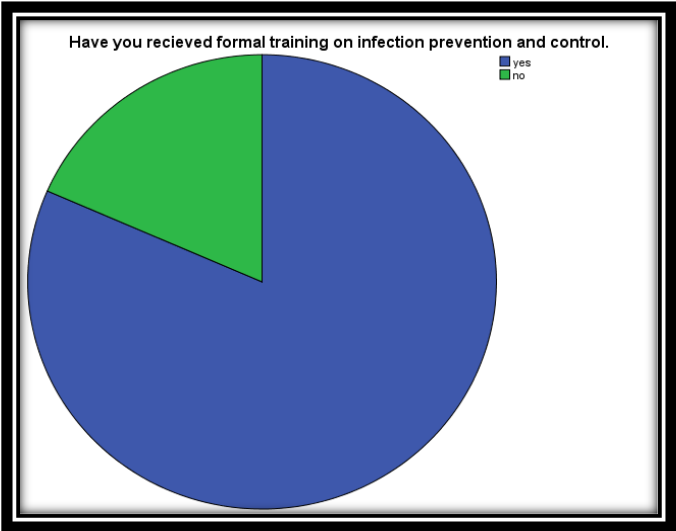


Figure 05 Training on Infection Prevention and Control

Respondents were asked if they had been trained on standard precautions during the previous two years. According to the findings, 64.1% of participants (n = 66) said they had gotten this kind of training, whereas 35.9% (n = 37) said they had not. This suggests that over 50% of healthcare professionals have recently received training on standard precautions, which could lead to increased knowledge of and adherence to infection prevention measures.

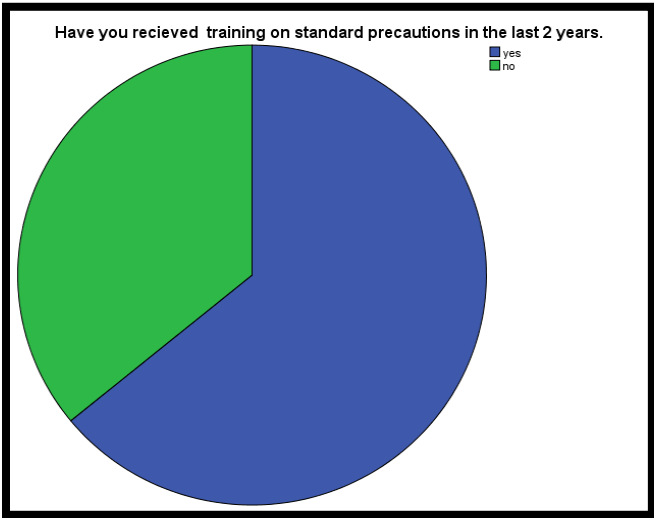


Figure 06 Formal Training on Standard Precaution in last 2 year

The findings demonstrated that healthcare workers possessed generally good knowledge regarding standard precautions. The majority of participants (85.4%) correctly identified that standard precautions are intended to protect both patients and healthcare workers. Furthermore, 83.5% recognized safety boxes as the appropriate method for disposing of used needles, while 71.8% correctly understood the protective role of hepatitis B vaccination against occupational infections. Most respondents (79.6%) were aware that universal precautions should be applied to all patients regardless of diagnosis. Additionally, 73.8% identified needle-stick injuries as the major route of occupational exposure. These findings indicate an overall satisfactory level of knowledge regarding infection prevention and control measures among healthcare workers in the emergency department.

Table 1. Knowledge Regarding Standard Precautions Among Healthcare Workers

Variable	Response	n (%)
Purpose of standard precautions	Protect both patients and HCWs	88 (85.4)
	Other responses	15 (14.6)
Standard precautions should be used	At all times in emergency department	48 (46.6)
	When exposure to blood/body fluids is anticipated	46 (44.7)
	Other responses	9 (8.7)
Correct disposal of used needles	Safety box/puncture-proof container	86 (83.5)
	Incorrect/Don't know	17 (16.5)

Hepatitis B vaccine protects against occupational infection	Yes	74 (71.8)
	No/Don't know	29 (28.2)
Universal precautions should be applied	To all patients	82 (79.6)
	Only selected patients	21 (20.4)
Main route of occupational exposure	Needle-stick/sharp injury	76 (73.8)
	Other routes	27 (26.2)

Healthcare workers exhibited a positive attitude toward standard precautions and occupational safety. A large majority of respondents (86.4%) perceived themselves to be at high risk of acquiring blood-borne infections such as HIV, HBV, and HCV while working in the emergency department. Similarly, 93.2% agreed that strict adherence to standard precautions is essential for ensuring the safety of both healthcare workers and patients. However, 67.9% believed that the use of personal protective equipment may interfere with the rapid performance of procedures in emergency situations. Moreover, 57.3% expressed concern that excessive barrier precautions could make patients feel uncomfortable. These findings suggest that although healthcare workers appreciate the importance of infection prevention measures, certain perceived barriers may influence their compliance with recommended practices.

Table 2. Attitudes Toward Standard Precautions Among Healthcare Workers

Variable	Response	n (%)
Perceived high risk of blood-borne infections in A&E	Agree/Strongly agree	89 (86.4)
	Neutral/Disagree	14 (13.6)
Following standard precautions is essential for safety	Agree/Strongly agree	96 (93.2)
	Neutral/Disagree	7 (6.8)
PPE interferes with rapid performance of procedures	Agree/Strongly agree	70 (67.9)
	Neutral/Disagree	33 (32.1)
Barrier precautions may make patients uncomfortable	Agree/Strongly agree	59 (57.3)
	Neutral/Disagree	44 (42.7)

The assessment of practices revealed generally satisfactory adherence to infection prevention measures among healthcare workers. Most participants reported consistently performing hand hygiene before and after contact with blood or body fluids (87.4%) and before patient contact (92.3%). Approximately 70.8% reported always or frequently reporting needle-stick injuries. Despite these positive practices, occupational exposure remained common, with 48.5% of respondents reporting a needle-stick injury and 74.8% reporting exposure to blood or body fluids during the previous year. Among those exposed, 65.0% reported the incident through the appropriate channels. Regarding vaccination status, only 51.5% of healthcare workers were fully vaccinated against hepatitis B, while 32.0% remained unvaccinated. These findings indicate that although compliance with standard precautions is relatively good, the high prevalence of occupational exposures and incomplete vaccination coverage highlight the need for continued training, monitoring, and preventive interventions.

Table 3. Practice and Occupational Exposure Related to Standard Precautions

Variable	Response	n (%)
Hand hygiene before/after blood or body fluid contact	Always	90 (87.4)
	Not always	13 (12.6)
Hand hygiene before patient contact	Always/Frequently	95 (92.3)
	Occasionally/Rarely	8 (7.7)
Immediate reporting of needle-stick injuries	Always/Frequently	73 (70.8)
	Occasionally/Rarely/Never	30 (29.2)
Needle-stick injury in previous 12 months	Yes	50 (48.5)
	No	53 (51.5)
Exposure to blood/body fluids in previous year	Yes	77 (74.8)
	No	26 (25.2)
Reported occupational exposure incident	Yes	67 (65.0)
	No	36 (35.0)
Hepatitis B vaccination status	Fully vaccinated	53 (51.5)
	Partially vaccinated	17 (16.5)

	Not vaccinated	33 (32.0)
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Chi-square analysis revealed several significant associations between demographic and training-related variables and knowledge or reporting practices among healthcare workers. Professional category was significantly associated with knowledge regarding the protective role of hepatitis B vaccination ($p < 0.05$). Years of experience in the Accident and Emergency department showed a significant association with correct knowledge of glove use ($\chi^2 = 21.536$, $p = 0.010$). Healthcare workers who had received training on standard precautions during the previous two years were significantly more likely to report occupational exposure incidents ($\chi^2 = 6.831$, $p = 0.009$). Similarly, Hepatitis B vaccination status was significantly associated with knowledge of correct glove use ($p = 0.016$), knowledge regarding protection offered by hepatitis B vaccination ($p = 0.015$), and reporting of exposure incidents ($p = 0.045$). No significant associations were observed between gender and knowledge, exposure, or reporting practices ($p > 0.05$). Furthermore, exposure to blood and body fluids was not significantly associated with recent training status or vaccination status.

Table 4. Association Between Demographic and Training Variables with Knowledge, Exposure, and Reporting Practices Among Healthcare Workers

Independent Variable	Dependent Variable	χ^2	df	p-value
Professional category	Knowledge: Hepatitis B vaccination protects against infection	21.474	6	<0.05*
Professional category	Knowledge: Correct glove use	11.790	6	0.067
Years of experience in A&E	Knowledge: Correct glove use	21.536	9	0.010*
Years of experience in A&E	Reporting of exposure incidents	7.226	3	0.065

Years of experience in A&E	Exposure to blood/body fluids	4.486	3	0.214
Training on standard precautions (last 2 years)	Reporting of exposure incidents	6.831	1	0.009*
Training on standard precautions (last 2 years)	Exposure to blood/body fluids	0.616	1	0.433
Hepatitis B vaccination status	Knowledge: Correct glove use	15.573	6	0.016*
Hepatitis B vaccination status	Knowledge: Hepatitis B protects against infection	15.747	6	0.015*
Hepatitis B vaccination status	Reporting of exposure incidents	6.181	2	0.045*
Hepatitis B vaccination status	Exposure to blood/body fluids	0.982	2	0.612
Gender	Exposure to blood/body fluids	3.666	2	0.160
Gender	Reporting of exposure incidents	0.715	2	0.699
Gender	Knowledge: Correct glove use	1.322	6	0.970

*Statistically significant at $p < 0.05$.

DISCUSSION

This study assessed the knowledge and practices regarding standard precautions against patient blood and body fluid exposure among healthcare workers in the Accident and Emergency Department of Lady Reading Hospital, Peshawar. Overall, healthcare workers demonstrated satisfactory knowledge of standard precautions, with most participants correctly identifying the purpose of standard precautions, appropriate disposal of used needles, and the protective role of Hepatitis B vaccination. These findings suggest an encouraging level of awareness regarding infection prevention and control measures among healthcare workers in emergency settings.

The findings are consistent with previous studies conducted among healthcare professionals and nursing students, which reported good knowledge regarding standard

precautions and prevention of blood-borne infections. A study among nursing students reported that 90% of participants had adequate knowledge of universal precautions and recognized the importance of Hepatitis B vaccination in preventing occupational infections. Similarly, our study found that the majority of respondents were aware of the role of vaccination and proper sharps disposal, indicating a satisfactory understanding of occupational safety measures.

Despite adequate knowledge, occupational exposure remained a significant concern. Nearly half of the participants reported experiencing a needle-stick injury during the previous year, and a substantial proportion had been exposed to blood or body fluids. Similar findings have been reported in other studies, where healthcare workers frequently experienced occupational exposure but often failed to take appropriate post-exposure actions. These findings emphasize the continued risk of blood-borne infections among healthcare workers, particularly in high-risk environments such as emergency departments.

The present study also found that recent training on standard precautions and Hepatitis B vaccination status was significantly associated with better knowledge and reporting practices. These findings support previous research indicating that continuous education, vaccination programs, and infection prevention training improve compliance with standard precautions. However, some healthcare workers reported that personal protective equipment may interfere with rapid patient management, highlighting the need to address practical barriers to compliance in emergency settings.

Overall, the study demonstrates that although healthcare workers possess good knowledge and positive attitudes toward standard precautions, occupational exposure to blood and body fluids remains common. Strengthening infection prevention training, improving compliance monitoring, ensuring complete Hepatitis B vaccination coverage, and promoting timely reporting of exposure incidents may further enhance occupational safety among healthcare workers in emergency departments.

CONCLUSION

According to the demographic profile, the majority of participants were young healthcare workers, with 62 (60.2%) having worked in the emergency room for one to five years and 49 (47.6%) being between the ages of 26 and 30. This highlights the significance of ongoing professional training and supervision by reflecting the participation of comparatively young and early-career healthcare workers in emergency healthcare services.

The current study found that healthcare professionals in Lady Reading Hospital's Accident and Emergency Department showed enough understanding of common safety measures to avoid coming into contact with bodily fluids like blood. Of the 103 participants, 88 (85.4%) correctly identified that standard precautions are meant to prevent occupational infections in both patients and healthcare workers. Standard precautions should always be followed during emergency care, according to almost half of the respondents, 48 (46.6%), while 46 (44.7%) said that measures should be taken whenever there is a chance of coming into contact with bodily fluids like blood. The survey also showed that 86 (83.5%) healthcare personnel properly recognized safety boxes as the proper way to dispose of used needles, whereas 6 (5.8%) were ignorant of the proper disposal technique and 11 (10.7%) continued to utilize traditional dustbins. Furthermore, 74 individuals (71.8%) correctly identified the hepatitis B vaccination's preventive function against occupational infections. These results show that while most healthcare professionals are well informed on infection prevention techniques, there are still gaps in the actual use of common safeguards.

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