

**KNOWLEDGE, ATTITUDE, AND PRACTICE OF HEALTHCARE PROFESSIONALS REGARDING INFECTION PREVENTION AT THE TERTIARY CARE HOSPITAL OF PESHAWAR KPK**

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**Abstract:** Occupational health and safety is a crucial element in every organization, especially in a health care setting. Health care workers (HCWs) play a role as vectors and reservoirs for the spread of infection from patient to patient and staff as well. Infection control and prevention practices are essential elements of quality health care and patient safety in health facilities.

**Objectives:** This study was aimed at assessing the levels of knowledge, attitude, and practice scores of the HCWs towards infection control at three public sector hospitals in Peshawar KPK. The study will help policymakers in the design and development of appropriate infection prevention programs and strategic plans by identifying the gap in infection control practices. **Method:** An institution-based cross-sectional study was conducted to assess the knowledge, attitudes, and practices of nurses regarding infection prevention and control by using a validated and structured questionnaire in three tertiary care hospitals in KPK. The sample size was calculated by using the Raosoft calculator, and the sample size was 318 nurses from these three hospitals, including those nurses who were willing to participate in the study and nurses who had more than one year of experience. Data was analyzed using SPSS version 22. **Result:** The participants were 55% male and 45% female; 55% were married, 42% were unmarried, 2% were divorced, 51% were diploma holders, 49% were degree holders, and most of the participants were charge nurses, which is 89%, and 11% were working in different administrative positions. Most of the participants who completed the survey were working in intensive care units, which is 66%, and others working in general wards and OPDs. 61% of nurses got information about safety precautions from training, 61% and 29% from books, and 10% from other resources. Participants who got training were 52%, and 48% of participants did not get any training on infection control precautions. Nurses who had knowledge about safety precautions were 84%; only 16% had not enough knowledge about infection control precautions. In attitude and practice about infection control, 58% were in compliance with practice, and 88% showed a positive attitude regarding infection control practices.

**Conclusion:** In the conclusion, we can say that there is enough knowledge among nurses regarding infection control practice, but implementation of this knowledge in practice should be ensured by doing strict supervision of infection control practices in every health care facility.

**Keywords:** Infection Control, Healthcare Workers, Knowledge, Attitude, and Practice, Public Sector Hospitals, Occupational Health and Safety

## Introduction

Occupational health and safety is a crucial element in every organization, especially in a health care setting (1). Infection is one of the most important challenges in the healthcare facility globally. It can cause morbidity and mortality in exposed groups. All individuals, especially health care workers, are potentially at risk of developing infection due to their exposure to the body fluids of infected patients and infected instruments. Health care workers (HCWs) play a role as vectors and reservoirs for the spread of infection from patient to patient and staff as well. Unprotected and mishandled body fluid can cause lethal infections like the hepatitis B virus, the human immunodeficiency virus HIV, and hepatitis C (2). Nosocomial infections affect nearly 10% of admitted patients and represent a major problem in health care facilities, resulting in prolonged hospital stays, substantial morbidity and mortality, and excessive costs (3). Therefore, knowledge about the frequency and distribution of nosocomial infections in health care workers is important to improve infection control measures as well as to develop effective preventive and curative strategies, which, in turn,

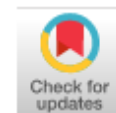
will help us in decreasing incidence, morbidity, and mortality of the patients (4).

Needle stick injuries or sharp injuries that are contaminated with infected body fluid or through contact with splash can cause serious problems or outcomes. Infection is one of the most important challenges in healthcare facilities worldwide. It constituted the morbidity and mortality among the exposed groups. Infectious patients are admitted into hospitals, and therefore hospitals have become common settings for the transmission of diseases. In hospitals, infected patients are a source of infection transmission to other patients, health care workers, and visitors (5).

Infection control and prevention practices are essential elements of quality health care and patient safety in health facilities. Health care-associated infections influence people worldwide and are the universal problem for patient safety (6).

Utilization of infection control practices and information helps to protect health care workers, patients, and families from these infections and health hazards (7). It comprises

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the use of personal protective equipment, including gloves, goggles, aprons, a mask, etc. It is also prevented through a professional immunization program and adequate infection prevention and control practices; the risk of getting an infection is considerable (8). According to a WHO report, about 3 million health care workers are at risk of getting a blood borne virus each year. Among this estimated 90% of the infections were in developing countries (9). The correlated burden of diseases related to hospital-acquired infection caused by long hospital stays, long-term disability, and increased resistance of microbes, financial instability, and death (10).

HCAIs have between 3.5–12% prevalence in high-income countries and 5.7–19.1% prevalence in low- to middle-income countries. These infections have resulted in 99,000 deaths in the USA and 37,000 deaths in Europe, with estimated annual financial losses of \$6.5 billion and \$7 billion, respectively, in 2011 (11), (9) Recent studies in Europe have shown that HAIs affect 4.6% to 9.3% of the hospitalized patients. In Europe, the estimated five million HAIs that occur annually have an assumed attributable mortality of 50,000 to 135,000 at a cost of €13 to €24 billion. In the United States, prevalence rates were estimated at 4.5% for 99,000 cases of excess mortality and an economic burden of US \$6.5 billion in 2004 (11). The most common complication of hospital care is hospital-acquired infection. The World Health Organization (WHO) estimates these infections to occur among 7%–12% of the hospitalized patients globally, with more than 1.4 million people suffering from infectious complications acquired in the hospital at any time during hospitalization (12). Limited accessibility of hand hygiene facilities has been shown to be an important risk factor for poor adherence to recommendations (13). HAIs contribute to increased length of hospital stay, high mortality, higher healthcare costs, and economic burden on families, communities, and countries as a whole. Hence, prevention and control of HAIs appear as a critical public health problem(14).

**Methodology**

An institution-based cross-sectional study was conducted from November 2020 to February 2021 at three tertiary care hospitals: KP Khyber Teaching Hospital, Lady Reading Hospital, and Hayatabad Medical Complex. Total nurses working in these three hospitals were 1818 who worked in three shifts 24/7. These three hospitals are situated in the capital of the province and provide health care facilities to the population of the entire province of KPK, with a population of 35.35 million.

Sample size was calculated by using a Raosoft calculator, and the sample size was 318 nurses from these three hospitals.

Inclusion Criteria: Nurses who are willing to participate in the study., Nurses who have more than one year of experience, and Nurses who are full-time employees are included in the study.

Exclusion Criteria: Nurses who were not willing to participate in the study, who have less than one year experience and students’ nurses were excluded.

Study duration from November 2020 to February 2021. Data were coded and entered into SPSS version 22 for analysis. Knowledge and practice questions were scored as 1 or 0 for correct and incorrect responses, respectively. Whereas, attitude responses were provided 1, 2, or 3 for “disagree,” “neutral,” and “agree,” respectively. Summary statistics such as frequencies and proportions were computed as appropriate.

**Results**

A total of 230 nurses were approached, and 218 (95%) agreed to participate and completed the KAP survey. The mean age of participants was 30 years, and 40% were male and 60% were female who completed the survey. The large majority of nurses (95%) who completed the survey reported direct patient care and working in intensive care units.

**Table1.1 socio demographic characteristic of the study participants**

Socio-demographic and HC related variable	Variable Category	Percentage (%)
Age group	≤ 25 years	(23%)
	26–30 years	(47%)
	31 to 35 years	(16%)
	36 and above	(14%)
Working department	OPD	(14%)
	Ward	(33%)
	Intensive care units	(53%)
Working hours per day	6hours	(36%)
	8 hours	(53%)
	12 hours	(11%)
Have you taken HBV vaccine	Yes	(65%)
	No	(35%)
Number of study participants by the dose of HBV vaccine they completed	First dose	(49%)
	Second dose	(16%)
	Third dose	(35%)
Availability of sufficient quantity PPE in the department	Yes	(39%)
	No	(55%)
	Not sure	(6%)

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Availability of safety guidelines/manuals in the department/section	Yes No Not sure	(42%) (50%) (3%)
Source of information about safety precaution	Training Guideline Friend Other sources	(57 %) (28%) (4%) (11%)
Have you taken infection control training	yes No	(52%) (48%)

Among 218 study participants, 54% were male, and the age ranged from 21 to 46. Concerning their job placement, 53% were working in intensive care units; the remaining were working in wards and outpatient departments. Their work experience was 147 (52.1%) with  $\leq 2$  years, 3–4 years, and  $\geq 5$  years of work experience, respectively. Most study participants (83.7%) were diploma holders. Only 44.7% of them received training regarding infection prevention and safety. The majority (65%) of the participants were vaccinated for HBV (Table 1).

In this study, the mean knowledge score of the study participants was 10.69. Among 282 study participants, 230

(81.6%) of them had adequate knowledge scores. About 230 (81.6%) of them correctly identified that a safety box should be filled only a maximum of three-fourths. Simultaneously, 231 (81.9%) of the study participants knew that 72 is the maximum time delay to start HIV post-exposure prophylaxis. Additional findings on the knowledge scores are attached as an Additional File 2.

The mean attitude score of the study participants was 9.65. Based on this cutoff value, 181 (64.2%) and 101 (35.8) of the study participants had favorable and unfavorable attitude scores, respectively. Almost all the study participants, 280 (99.3%), respond that safety precaution

**Table 2 Frequency of knowledge variable of the participants at tertiary care hospitals Peshawar KPK**

Variables	Response		
	Agree n (%)	Disagree n (%)	Neutral n (%)
Occupational safety training is important for health professionals	274 (97.2)	6 (2.1)	2 (0.7)
Healthcare environments can expose HCPs to a health hazard	(94%)	(6%)	(0.0%)
HCPs workplace related risk exposure is a major crisis	213 (75.5)	42 (14.9)	27 (9.6)
Workplace risk assessment is important for occupational safety	(92%)	(4.7%)	(3.3%)
Sharp materials should be discarded in a safety box	(93%)	(2.5%)	(4.5%)
Needles should be recapped before disposal	(40%)	(55%)	(5%)
Wearing PPE during the healthcare delivery process is mandatory	(87)	(7%)	(8%)
Vaccination of healthcare workers is necessary	(89%)	(7.0%)	(4%)
HBV can be transmitted through biomedical wastes	(87.3)	(8%)	(5%)

**Table 3 practice related variable frequency of the study participants at tertiary care hospitals in KPK**

Variables	Response		
	Always n (%)	Sometimes n (%)	Not at all n (%)
Use safety guideline/manual at the workplace	(63%)	(27%)	(12%)
Wear gloves during risky procedures	(80%)	(15%)	(5%)
Wash hands with detergent after contact with patients	(55%)	(42%)	(3%)
Use of PPE during professional practice	(57%)	(37%)	(6%)
Clean working environment at the end of the working time	(71%)	(21%)	(8%)
Monitor working environment waste management system	(81%)	(13%)	(6%)
Changing gloves between patients	(81%)	(13%)	(6%)
Wash hands after removal of gloves	(84%)	(10%)	(6%)
Recap used needles before disposal	(45%)	(40%)	(15%)
Treat infectious wastes with appropriate disinfectants	(88%)	(7%)	(5%)

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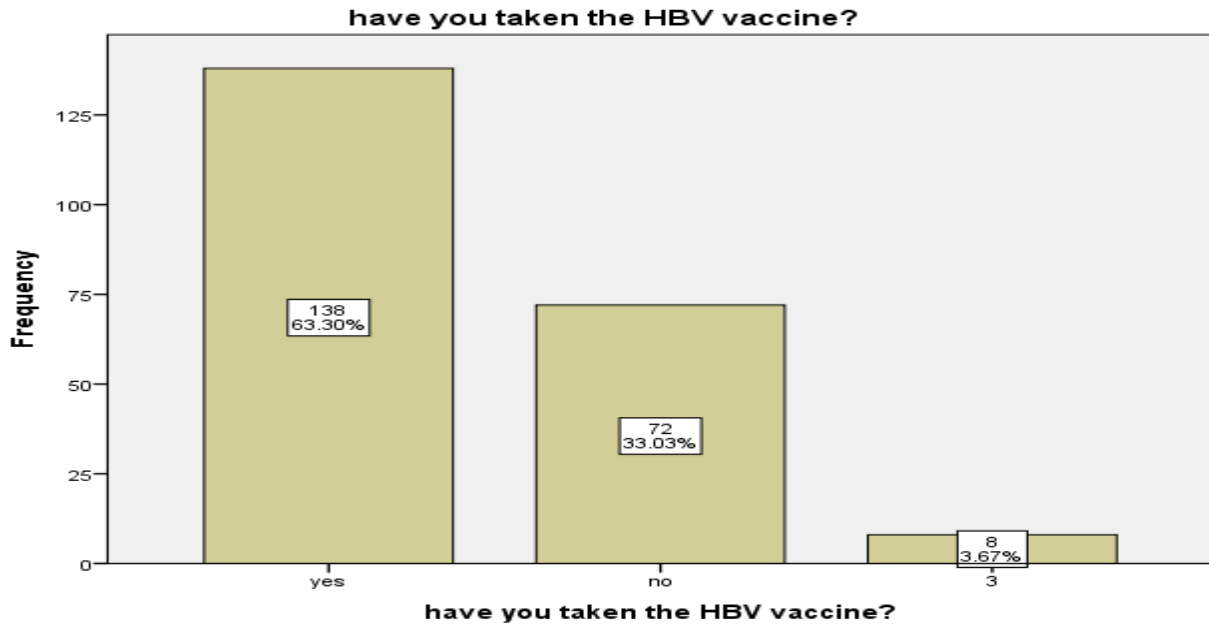


Figure 1: Vaccination status of study population

Table 4: Source of knowledge about safety Precautions

S.no	Source of knowledge about safety Precautions	No's Of People	% age
1	From Training	132	60.55 %
2	From Books	64	29.36%
3	Friends	10	4.59%
4	Other Sources	12	5.50%

The most of the respondents got knowledge about safety precaution from 60.55% from training from books 29% from friends 5% and other sources 5.5%.

Regarding the availability of personal protective devices in the units the response of nurses were 41% yes 58% were no and 1% were don't know about the availability of the personal protective devices in the unit (Table 4).

**Discussion**

Nurses can prevent infection transfer among the patients of a hospital with proper disinfecting the skin, wearing gloves and masks, changing infusion sets, applying prudential measures, proper isolation, using the principles of standard cautions, observing hand hygiene, preventing accidental contact of the hand with a needlestick, and avoiding the infected respiratory discharges. However, the results of the current study suggested that the majority of units under study had inadequate knowledge about controlling hospital infections. Nurses' knowledge about hospital infection prevention and control is reported differently and sometimes paradoxically. In the McBride study in America, most of the nurses (65%) had no proper knowledge about controlling hospital infection.

Our KAP survey conducted in three teaching hospitals of the Khyber Pakhtunkhwa found a good understanding regarding infection control practices and the importance of maintaining infection control practices in these three hospitals of Peshawar KPK.

Our results provide important baseline information about infection control practices in a resource-limited country and highlight some of the barriers to implementing effective infection control policies in these three hospitals of the government sector and, potentially, other similar settings.

Less than one-third of nurses felt that there was no need to perform hand hygiene before performing procedures that did not involve bodily fluids, and some nurses felt that the safety box should be filled completely, which is unacceptable. The result of the present study showed that the majority of total studied nurses had sufficient knowledge regarding infection control, some of them had unacceptable attitudes regarding infection control, and the majority of them had adequate practice found in these three hospitals. Similarly, the study done in Zimbabwe shows that 22 percent of the respondents had poor knowledge, 50 (50%) had moderate knowledge, and 28 percent had excellent knowledge regarding infection control practices (6). Unlike other studies done in Saudi Arabia, most of the participants disagreed/strongly disagreed regarding the need to wash hands after touching patients surroundings (13.2% and 68.4%, respectively (14).

**Conclusion**

In the conclusion, we can say that there is enough knowledge among nurses regarding infection control practice, but implementation of this knowledge in practice should be ensured by doing strict supervision of infection control practices in every health care facility.

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**Declarations****Data Availability statement**

All data generated or analyzed during the study are included in the manuscript.

**Ethics approval and consent to participate.**

Approved by the department Concerned. (IRB/MMCADH-210 dated 12-12-20)

**Consent for publication**

Approved

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**Conflict of interest**

The authors declared an absence of conflict of interest.

**Authors Contribution****SHAHNAZ BIBI (PRINCIPAL)**

*Data Analysis, Final Approval of version*

**FARMAN ULLAH KHAN (RN)**

*Data collection*

**SAHIL SAJJAD (RN)**

*Drafting and literature review*

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