Volume 3, Issue 7, 2025

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

FACTORS AFFECTING ADHERENCE OF NURSES' INFECTION CONTROL PRACTICES TO STANDARD PRECAUTIONS

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DOI: https://doi.org/10.5281/zenodo.17206580

Keywords
Adherence, Infection Control, Standard Precautions, Nurses and general well-being to prioritize sleep, breaks, and healthier work habits.

Article History
Received: 05 July 2025
Accepted: 15 September 2025
Published: 26 September 2025

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Abstract

Background: *Healthcare-associated infections remain a global concern, and while standard precautions are universally acknowledged as the cornerstone of infection prevention, evidence shows that nurses' adherence is often inadequate due to individual, organizational, and resource-related factors, necessitating focused investigation into the determinants of compliance.*

Materials and Methods: *A quantitative descriptive cross-sectional study was conducted over six months among 150 ICU nurses from Jinnah and Sheikh Zayed Hospitals, Lahore, selected through simple random sampling. The Influencing Practice of Standard Precautions Questionnaire was used to measure compliance-related factors among healthcare workers, and analyzed in SPSS 23 with descriptive statistics and chi-square tests.*

Results: *The study revealed that mean scores across all safety-related domains were high, ranging from 4.09 to 4.56 on a 5-point scale, indicating favorable perceptions among participants. Workload had the lowest mean score (M = 4.09 ± 0.60), making it the most influential factor on compliance, whereas protective behaviors (M = 4.56 ± 0.69) and protective knowledge (M = 4.49 ± 0.61) ranked highest, reflecting strong awareness and safe practices.*

Conclusion: *Overall, while healthcare workers demonstrated strong knowledge, attitudes, and behaviors toward standard precautions, addressing workload pressures and ensuring consistent access to protective resources are critical for optimizing compliance and sustaining infection prevention.*

1. Introduction

Healthcare-associated infections (HAIs) remain a major global concern, contributing to increased morbidity, mortality, and healthcare costs. Standard precautions (SPs) are universally recognized as the cornerstone for preventing and controlling infection in hospital settings, regardless of a patient's infectious status (Adib-Hajbaghery et al., 2021; Adly et al., 2014). These measures, which include hand hygiene, safe handling of sharps, and use of personal protective equipment, are designed to safeguard healthcare workers and patients alike. Despite their proven importance, adherence to SPs among healthcare providers—particularly nurses—has often been reported as inadequate across various settings, posing a significant risk for nosocomial infections (Bouchoucha & Moore, 2019; Efstathiou et al., 2011).

Nurses, due to their close and prolonged contact with patients, face higher exposure to occupational hazards such as bloodborne

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

infections and needlestick injuries (Abuduxike et al., 2021). Research highlights that adherence levels are influenced by multiple factors including knowledge, attitude, safety climate, workload, and the availability of protective equipment (Haile et al.; Oh & Choi, 2019). Moreover, psychosocial and behavioral barriers such as discomfort in using gloves, time constraints, and absent-mindedness have been identified as key obstacles to adherence (Faryad et al., 2018; Kim & Oh, 2015). Such challenges highlight the need to better understand the determinants of adherence, as inadequate compliance not only jeopardizes healthcare workers' safety but also facilitates the transmission of HAIs in critical care settings.

In Pakistan, the burden of HAIs is particularly concerning, with limited infection control strategies and high risks in intensive care units where immunocompromised patients are treated (Khan et al., 2021a; Khan et al., 2021b). Evidence indicates that adherence among nurses varies across socio-demographic and organizational factors such as age, experience, and hospital environment (Donati et al., 2019b; Eskander et al., 2013b). Therefore, this study aims to assess the factors affecting adherence of nurses' infection control practices to standard precautions in intensive care units of tertiary care hospitals in Lahore. By identifying these factors, the study has the potential to contribute toward developing targeted interventions that improve adherence, thereby enhancing patient safety and reducing the incidence of HAIs.

2. Materials and Methods

2.1 Study Design

This study employed a quantitative descriptive cross-sectional design to assess the adherence of nurses to standard precautions and the factors influencing this adherence. A cross-sectional design was chosen as it allows the researcher to measure adherence levels at a single point in time, providing a reliable snapshot of current practices (Polit & Beck, 2008).

2.2 Study Population

The target population consisted of 298 nurses working in general and special intensive care units (ICUs) of two tertiary care hospitals in Lahore: Jinnah Hospital and Sheikh Zayed Hospital.

2.3 Sample Size and Sampling

A total sample of 150 nurses was selected using simple random sampling based on inclusion and exclusion criteria. The sample size was calculated using the WHO formula for the estimation of population proportion with a 95% confidence level, 8% margin of error, and an anticipated adherence rate of 46.8% (Alice et al., 2013). This sample size was also approved by the synopsis review and ethical review committees.

2.4 Study Duration and Setting

The study was conducted over a period of six months following approval from the review committees. The research was carried out in the ICUs of Jinnah Hospital and Sheikh Zayed Hospital, Lahore, with academic supervision provided by the Institute of Nursing, University of Health Sciences, Lahore.

2.5 Sample Selection Criteria

Inclusion criteria included nurses directly involved in patient care, with at least one year of ICU experience, and those with prior foreign (developed country or Gulf) experience. Exclusion criteria comprised nurse managers or head nurses not directly involved in patient care, nurses with a master's degree, and auxiliary or aid nurses.

2.6 Ethical Considerations

Ethical approval was obtained from the University's Ethical Review Board. Informed written consent was taken from all participants. Confidentiality and anonymity were maintained, and the data collected was used solely for research purposes. Efforts were made to avoid any harm or risk to participants.

2.7 Pilot Study

A pilot study was conducted on 10% of the sample (15 nurses) to test the validity and

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ISSN: (e) 3007-1607 (p) 3007-1593

reliability of the questionnaire. Content validity was established through expert review. Cronbach's Alpha reliability coefficient for the adherence questionnaire was 0.814, indicating good internal consistency.

2.8 Data Collection Tool

The Influencing Practice of Standard Precautions Questionnaire was used to measure compliance-related factors among healthcare workers. It covered six domains—Protective Devices, Safety Climate, Workload, Protective Knowledge, Attitudes, and Behaviors—with structured items rated on a five-point Likert scale (Never to Always). The tool captured availability of resources, organizational support, workload demands, knowledge of SOPs, safety attitudes, and protective behaviors. Its domain-specific structure and quantitative scoring allowed a comprehensive assessment of factors influencing adherence to standard precautions.

2.9 Data Analysis

Data were analyzed using SPSS version 23. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize demographic data and adherence scores. A chi-square test was applied to determine associations between adherence levels and demographic variables. A p-value ≤ 0.05 was considered statistically significant.

3. Results

Table 1: Background Characteristics of the Respondents (N=150)

Characteristics	Categories	Frequency (n)	Percentage (%)
Age Group	21–30 years	88	58.7%
	31–40 years	54	36.0%
	40 and above	8	5.3%
Gender	Female	142	94.7%
	Male	8	5.3%
Hospital	Jinnah Hospital, Lahore	75	50.0%
	Sheikh Zaid Hospital, Lahore	75	50.0%
Qualification	Diploma in Nursing	73	48.7%
	Generic BSN	40	26.7%
	Post RN BSN	37	24.7%
Experience	1–5 years	64	42.7%
	5–10 years	54	36.0%
	More than 10 years	32	21.3%

The majority of respondents (58.7%) were between 21–30 years of age, while 36.0% were 31–40 years, and only 5.3% were above 40 years. This indicates that most participants were relatively young. The sample was predominantly female (94.7%), with only 5.3% male respondents, reflecting the female-dominated nature of the nursing profession. Half of the participants (50.0%) were from Jinnah Hospital, Lahore, and the remaining half (50.0%) from Sheikh Zaid Hospital, Lahore, ensuring equal representation from both institutes. Nearly half of the respondents (48.7%) held a Diploma in Nursing, 26.7% were Generic BSN degree holders, and 24.7% were Post RN BSN graduates, showing a mix of educational backgrounds. A considerable proportion (42.7%) had 1–5 years of experience, followed by 36.0% with 5–10 years, and 21.3% with more than 10 years, reflecting a balanced distribution of work experience levels.

Volume 3, Issue 7, 2025

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Table 2: Descriptive statistics of Influencing Practice of Standard Precautions Questionnaire

S. No.	ProtectiveDevices	Never	Rarely	Sometimes	Often	Always
1.	I have personal protective devices available at the workplace.	3	17	25	20	85
		2.0%	11.3%	16.7%	13.3%	56.7%
2.	All my protected devices are state-of-the-art and operational.	1	13	29	28	79
		.7%	8.7%	19.3%	18.7%	52.7%
3.	I am comfortable using protective devices.	1	5	17	30	97
		.7%	3.3%	11.3%	20.0%	64.7%
	Safety Climate					
4.	We have an established Infection Control Management Unit which fully takes up the responsibility	1	8	18	31	92
		.7%	5.3%	12.0%	20.7%	61.3%
5.	We have a set procedure for following standard precautions and regular training sessions are conducted in the clinical department.	4	22	11	35	78
		2.7%	14.7%	7.3%	23.3%	52.0%
6.	We have visible "warning signs" pertaining to standard precaution at the workplace.	2	2	21	40	85
		1.3%	1.3%	14.0%	26.7%	56.7%
7.	We are expected to actively participate in Standard Precautions management and implementation	1	5	6	34	104
		.7%	3.3%	4.0%	22.7%	69.3%
	Workload					
8.	Our average daily standing time is more than four hours. (>4 h/day)	0	5	9	28	108
		0.0%	3.3%	6.0%	18.7%	72.0%
9.	I have very long and demanding duty and y the time my duty ends, I feel very tired.	1	6	12	45	86
		.7%	4.0%	8.0%	30.0%	57.3%
10.	I get to avail my annual leave and statutory holidays.	31	24	24	31	40
		20.7%	16.0%	16.0%	20.7%	26.7%
11.	I have to deal and confront with critical patients on daily basis.	3	8	15	36	88
		2.0%	5.3%	10.0%	24.0%	58.7%
12.	In discharge of my duty, I must contact with patients' blood, bodily fluids, and other secretions.	12	5	18	38	77
		8.0%	3.3%	12.0%	25.3%	51.3%
13.	I have to contact with blood-borne and infectious agents. (Like hepatitis B/AIDS/gonorrhea/syphilis)	1	12	25	63	49
		.7%	8.0%	16.7%	42.0%	32.7%
	Protective knowledge					

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14.	Iam aware of all the "SOPS" and provided relevant frequent training regarding the importance of understanding and using standard precautions.	4	5	20	26	95
		2.7%	3.3%	13.3%	17.3%	63.3%
15.	We are educated regarding route of transmission of contagious diseases like hepatitis B /AIDS/gonorrhea/ syphilis etc. through regular training.	2	10	14	27	97
		1.3%	6.7%	9.3%	18.0%	64.7%
16.	We have placed reminders about hand hygiene in different places and have easy access to soap/hand wash /sanitizers etc.	1	2	14	24	109
		.7%	1.3%	9.3%	16.0%	72.7%
17.	Most of the staff adhere to standard precautions when touching blood, other bodily fluids, secretions, or excrement using protective devices as instructed.	0	2	13	46	89
		0.0%	1.3%	8.7%	30.7%	59.3%
18.	The medical waste is disposed of as per the guideline of WHO classification.	2	3	7	25	113
		1.3%	2.0%	4.7%	16.7%	75.3%
	Attitudes					
19.	It is very important to adhere to standard precautionary measures all the time.	1	0	14	25	110
		.7%	0.0%	9.3%	16.7%	73.3%
20.	Patients' blood and bodily fluid can be infectious.	3	2	12	27	106
		2.0%	1.3%	8.0%	18.0%	70.7%
21.	Depending on the circumstances we can do away with following the standard precautions.	2	5	20	45	78
		1.3%	3.3%	13.3%	30.0%	52.0%
	Behaviors					
22.	I always wear masks/gloves and protective goggles when contacting blood or bodily fluids.	0	8	9	33	100
		0.0%	5.3%	6.0%	22.0%	66.7%
23.	I frequently wash hands or use hand sanitizers when contacting different patients.	1	2	17	20	110
		.7%	1.3%	11.3%	13.3%	73.3%
24.	I always place sharp tools a in the sharps container immediately after the use	3	1	8	31	107
		2.0%	.7%	5.3%	20.7%	71.3%

The mean score of the protective devices' domain was 4.23 ± 0.92 with a range from 1.3 to 5.0. The mean score of the Safety Climate domain was 4.36 ± 0.69 with a range from 2.0 to 5.0. The mean score of the Workload domain was 4.09 ± 0.60 with a range from 2.2 to 5.0. The mean

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ISSN: (e) 3007-1607 (p) 3007-1593

score of the Protective knowledge domain was 4.49 ± 0.61 with a range from 1.8 to 5.0. The mean score of the Attitudes domain was 4.48 ± 0.65 with a range from 1.0 to 5.0. The mean score of the Behaviors domain was 4.56 ± 0.69 with a range from 1.7 to 5.0.

According to Likert scale, a lower score indicates most influencing factors on practices of standard precautions. As the mean score workload domain was lowest, it indicates that workload related factors were the most influencing factors on practices of standard precautions followed by protective devices, safety climate, attitudes, protective knowledge and behaviors.

Table 3: Showing comparison of mean score of factors influencing practice of standard precautions

Factors	Mean ± SD	Minimum	Maximum
Protective Devices	4.23 ± 0.92	1.3	5.0
Safety Climate	4.36 ± 0.69	2.0	5.0
Workload	4.09 ± 0.60	2.2	5.0
Protective knowledge	4.49 ± 0.61	1.8	5.0
Attitudes	4.48 ± 0.65	1.0	5.0
Behaviors	4.56 ± 0.69	1.7	5.0

The findings indicate generally high mean scores across all safety-related factors, with values ranging between 4.09 and 4.56 on a 5-point scale, suggesting favorable perceptions among participants. Protective behaviors (M = 4.56, SD = 0.69) and protective knowledge (M = 4.49, SD = 0.61) ranked highest, showing that respondents possess strong awareness and consistently adopt safe practices. Attitudes toward safety were also highly positive (M = 4.48, SD = 0.65).

The safety climate (M = 4.36, SD = 0.69) and use of protective devices (M = 4.23, SD = 0.92) reflected supportive organizational conditions, although device use showed more variability (minimum = 1.3). Workload (M = 4.09, SD = 0.60) was comparatively lower but still above average, indicating manageable but occasionally challenging demands.

4. Discussion

The findings revealed that workload factors had the lowest mean score (M = 4.09 ± 0.60), indicating that workload exerted the strongest influence on compliance with standard precautions. This aligns with Haile et al. (2017), who highlighted that high workloads often compromise adherence to infection prevention practices due to time pressure and fatigue. Similarly, Faryad et al. (2018) found that limited staffing and work overload negatively affected healthcare workers' compliance. These results suggest that even though participants demonstrated overall favorable perceptions of standard precautions, workload pressures remain a critical barrier that needs organizational attention to safeguard both patients and staff.

Protective devices (M = 4.23 ± 0.92) and safety climate (M = 4.36 ± 0.69) also emerged as influential domains. Variability in the use of protective devices, as indicated by the wide range

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ISSN: (e) 3007-1607 (p) 3007-1593

of responses, mirrors earlier studies that showed inconsistent availability and usage of personal protective equipment (Adib-Hajbaghery et al., 2021; Abuduxike et al., 2021). A supportive safety climate, however, was found to enhance compliance with infection prevention protocols (Efstathiou et al., 2011; Donati et al., 2019b). This implies that healthcare organizations must reinforce infection control policies, provide adequate protective supplies, and foster a culture where safety is prioritized and monitored continuously.

In contrast, protective knowledge (M = 4.49 ± 0.61), attitudes (M = 4.48 ± 0.65), and behaviors (M = 4.56 ± 0.69) scored the highest, indicating strong awareness and positive practices among participants. These findings echo those of Adly et al. (2014) and Alhumaid et al. (2021), who reported that enhanced training, positive attitudes, and routine reinforcement of infection control measures contribute to improved compliance. Furthermore, Bouchoucha and Moore (2019) emphasized that consistent educational interventions strengthen both knowledge and practice of standard precautions. Taken together, the results indicate that while healthcare workers in this study possess a solid foundation of knowledge and commitment to safe behaviors, organizational challenges—particularly workload and resource constraints—must be addressed to optimize compliance with standard precautions.

5. Conclusion

The study concludes that although healthcare workers demonstrated high levels of protective knowledge, positive attitudes, and safe behaviors, workload remained the most significant barrier to full compliance with standard precautions. Protective device use and safety climate also influenced practices, highlighting the importance of organizational support and consistent resource availability. Overall, strengthening institutional policies, reducing workload pressures, and ensuring adequate supplies can further enhance adherence to infection prevention standards.

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