RJNMSR
Review Journal of Neurological & Medical Sciences Review

Volume 3, Issue 6, 2025

FACTORS INFLUENCING CLINICAL NURSES' COMPLIANCE WITH INFECTION CONTROL PRACTICES AT RESOURCE-SCARCE TERTIARY CARE HOSPITAL

Suleman Khan (BSN, MSN) [*1], Iqdar Ali (BSN, MSN)[2], Ahmad Shah (BSN)[3]

*[*1]Principal/Assistant Professor Royal College of Nursing Swat, Saidu Sharif Swat, KP.*
[2] Principal/Assistant Professor Rabbani Institute of Health Sciences Kanju, Swat, KP.
[3]Nurse Intern, Saidu Group of Teaching Hospital, Saidu Sharif Swat, KP Pakistan

[*1]sulemankhan911@gmail.com; [2]ahmadshahswat877@gmail.com; [3]iqdarali1988@gmail.com

Corresponding Author: *
Suleman Khan
DOI: https://doi.org/10.5281/zenodo.17586307

Received	Accepted	Published
15 July2025	25 September 2025	06 October 2025

ABSTRACT

Background: *Healthcare-associated infections (HAIs) are a sizable threat to patient and healthcare workers wellbeing alike in low- and middle-income countries (LMICs), compounded by the rise of multidrug-resistant organisms (MDROs). Nurses' compliance with infection prevention and control (IPC) practices is crucial but influenced by multiple factors.*

Aim: *This study aimed to evaluate clinical nurses' compliance with IPC practices and predict factors associated with compliance in a large tertiary care hospital in Swat, Pakistan.*

Methods: *A descriptive cross-sectional study was conducted among 89 registered nurses at Saidu Group of Teaching Hospitals in 2025. Data were collected using validated tools assessing knowledge, attitude, perceived safe environment, and compliance with IPC practices. Descriptive statistics, Pearson's correlation, and multiple regression analysis were applied using SPSS v22.*

Results: *Participants demonstrated high overall compliance with IPC practices ($M = 3.83$, $SD = .32$), with the highest compliance in contaminated materials control ($M = 4.14$, $SD = 2.21$) and the greatest variability in MDRO control. Knowledge of standard precautions correlated positively with contaminated material control ($r = 0.27$, $p = .010$) and total compliance ($r = 0.26$, $p = .015$). Perceived safe environment showed significant positive associations with protective equipment use ($r = 0.29$, $p = .005$), MDRO control ($r = 0.28$, $p = .008$), and total compliance ($r = 0.32$, $p = .002$). Multiple regression analysis revealed perceived safe environment as the strongest predictor of compliance ($\beta = .31$, $p = .004$). Attitude and MDRO-related knowledge did not significantly predict compliance.*

Conclusion: *Nurses in this setting demonstrated generally good compliance with IPC practices; however, compliance with MDRO-related practices was inconsistent, largely due to systemic and resource-related constrains. Organizational support and a safe working environment emerged as more influential than knowledge or attitudes alone. Strengthening institutional resources, leadership support, and continuous education are essential for improving IPC compliance and combating HAIs in resource-limited settings.*

INTRODUCTION

Healthcare-associated infections pose a sizable threat to patients receiving care and healthcare workers alike. An infection is considered a Healthcare-Associated Infection (HAI) if it develops during a hospital stay or treatment and procedure, and the patient did not have it, or it was not incubating, at the time of admission(1). HAIs are among the leading causes of morbidity,

mortality, and a significant increase in healthcare costs around the globe, particularly in low and middle-income (LMICs) countries(2)(3). In low- and middle-income countries, the average rate of Healthcare-Associated Infections (HAIs) is estimated to range from 5.7% to 19.1% (4).

Although HAIs are a serious threat to patients and HCWs' well-being, they can be minimised through precautionary measures(5). Since 1996, the standard precaution for infection transmission control among patients and healthcare workers has been proposed by the US CDC, augmenting universal precautions(6). Universal precautions were implemented to ensure that blood and body fluid-related infections are prevented, irrespective of an individual's infection status(7). While standard precautions were designed to minimize the risk of transmitting infectious agents through contact with blood, all body fluids, non-intact skin, and mucous membranes(8).

More importantly, HAIs have become even more critical due to the widespread emergence of multidrug-resistant organisms (MDROs), which stems from the inappropriate use of various antimicrobial agents(9). Particularly in low and middle-income countries like Pakistan faces the challenge of MDROs, XDR (Extensively drug resistant), and PDR (Pan drug resistant) infectious bacteria. These infections can spread through direct or indirect patient contact, via medical devices, or by contamination of a patient's room(10). Since standard and contact precautions are insufficient, the CDC issued specific guidelines for MDRO prevention and control in 2007 to curb their dissemination(11).

Despite awareness of infection prevention and control's importance, low compliance with standard precautions remains a persistent hospital problem(12). Nurses are the frontline and most frequent contact of patients in any healthcare setting, yet their compliance with infection control measures is influenced by several factors. Knowledge, attitude, and perceived safe environment positively contribute to compliance(13). Other factors for compliance include training in infection prevention, nurse-patient ratio, work burden, and the availability of needed resources(3)(14)(15). Improving compliance requires addressing personal, psychosocial, and organizational factors through ongoing education and institutional support (16)(17)(18).

Previous researchers had primarily focused on standard precautions, especially handwashing. However, as healthcare providers encounter significant challenges posed by emerging microorganisms like MDROs, it's essential to assess their understanding and practices related to MDRO control alongside standard precautions. To our knowledge, this study will be the first to highlight recent trends in infection prevention and control (IPC) since the implementation of the latest HAI control guidelines. A well-rounded understanding of the factors affecting IPC compliance, including MDRO control, will lay the groundwork for developing customized educational and practice strategies for resource-limited settings.

1.1 AIM

This research study aims to evaluate clinical nurses' compliance with infection control practices at Saidu Group of Teaching Hospitals and to identify factors associated with compliance for IPC practices. The specific objectives of this study are (1) To Assess clinical nurses' knowledge, attitude, perceived safe environment, and compliance with IPC practices. (2) To ascertain the correlation among knowledge, attitude, perceived safe environment, and compliance with IPC practices. (3) To identify contributory factors having an impact on compliance with IPC practices.

2. Methods

2.1 Study Setting and Design

This descriptive cross-sectional study was conducted in 2025 at the Saidu Group of Teaching Hospital, Swat, Pakistan.

2.2 Participants

Licensed registered nurses with direct patient care responsibilities and having more than 1 year of experience who agreed to participate were included. Nurses in administrative and supervisory roles were excluded from the study. Based on a power analysis for multiple regression, a sample size of 89 participants was required, assuming a medium effect size of 0.15, an alpha level of 0.05, a power of 0.95, and 9

predictor variables. Keeping in mind the dropout rate, 100 questionnaires were distributed in the hospital. The response rate was 100 %.

2.3 Ethical consideration

This study was granted ethical approval by the ERB of SGTH. All participants provided informed consent before the conduct of the study. The anonymity of all study participants was ensured to protect their privacy and confidentiality. Data was protected using encrypted and password-protected files and secure cabinets.

2.4 Study Tools

2.4.1 Knowledge of infection prevention and control

This tool was adopted from Mitchel et al. (2014). The tool was modified to meet the local requirements. This tool consisted of 4 sections: (i) Knowledge of Standard Precautions with 6 multiple-choice questions, 5 True/False questions, and 2 select more than one option questions. (ii) Knowledge of Transmission-based precautions had 5 multiple-choice questions, 2 True/False questions, and 3 questions of selecting more than one option. (iii) Knowledge/Attitude of MDRO control had 9 items on a Likert Scale, and (iv) Perceived seriousness of MDROs had 10 questions on a Likert scale, assessing the perceived seriousness of MDROs. Each item could be answered with options 0, “not all”, to 5, “do not know”.

2.4.2 Infection prevention and control attitude

Participants' attitude was assessed using the attitude questionnaire adopted from Ali et al. (2024). The attitude questionnaire had 8 items on a Likert Scale with a reliability score of Cronbach’s alpha of 0.905. The reliability score of this questionnaire was Cronbach’s alpha of .632 in the current study.

2.4.3 Perceived safe environment for infection prevention and control

This tool was adopted from De Pedro-Gómez, J. et al, 2012, consisting of 31 items on a 4-point Likert scale. This tool had 5 dimensions that assessed the perceptions of the nursing work environment. The PSE scale was based on PES-NWI and comprised of 4 subdomains: Nurse Participation in Hospital Affairs; Nursing Foundations for Quality of Care; Nurse Manager Competence, Leadership, and Support for Nurses; Staffing and Resource Sufficiency; and Collegial Nurse-Physician Relationships. The reliability score of this tool during this study was 0.626.

2.4.4 Compliance with infection prevention and control practices.

This instrument was adopted from Kim H, Hwang YH (2019) and comprised of 20 items that were categorised into four areas: handwashing (four items), protective equipment (five items), contaminated material control (six items), and MDRO control (five items). On a 5-point Likert scale, with 1 denoting never, and 5 denoting always, nurses were asked how frequently they used each of the 20 IPC practices. The reliability of the tool was Cronbach's alpha 0.90.

2.5 Data Collection

This study was approved by the IRB of Saidu Group of Teaching Hospital. A proposal for the current research was forwarded to the IRB by the nursing superintendent after a written application and proposal submission. Upon approval, the Head Nurses of the participating units were requested to cooperate and distribute self-report questionnaire among the registered nurses working under their supervision. Data was collected from May to July 2025. Data was collected from the 1220-bed teaching hospital in Saidu Sharif, Swat, Pakistan. Respondents of the current research were provided with written informed consent, a full explanation of the study's purpose, methods of answering the questionnaires, confidentiality, anonymity assurance, and the right of withdrawal at any stage of the study. Those willing to participate signed the consent form and completed the questionnaire at their convenience.

The completed questionnaires were returned to the head nurses in closed envelopes to be collected by one of the research assistants.

2.6 Data Analysis

Data was analysed using IBM SPSS version 22 for descriptive and inferential statistics. Participants' characteristics were described using descriptive statistics. Inferential statistics, i.e.,

Pearson's correlation, were employed to ascertain the relationship between knowledge, attitude, perceived safe environment, and compliance with infection prevention and control. Multiple regression analysis was carried out to see the factors influencing compliance. To avoid multicollinearity issues, age and gender were excluded from the analysis. A total of 11 variables were analysed by multiple regression, including total years of experience, experience in the current unit, working unit, knowledge of SP, TP, MDRO knowledge/Attitude, perceived seriousness of MDRO, overall attitude, perceived safe environment as independent variables, and compliance as the dependent variable. Categorical variables were analysed as dummy variables. Cronbach's alpha was used to assess the reliability of the test.

3. Results

3.1 Sample Characteristics

Table 1. Sample Characteristics and Descriptive Statistics of Study Variables.

Sample Characteristics	Category	n (%) or Mean (SD)
Age		31.8 (3.4)
Gender	Male	47
	Female	42
Area of Work	Medical-Surgical	14
	ICU/CCU/NICU	15
	Emergency	18
	Paediatric	22
	Others	20
Years of experience	<2 years	19
	2 to 5 years	42
	5 to 10 years	23
	more than 10 years	5
Length of experience in the current department	<2 years	28
	2 to 5 years	42
	5 to 10 years	15
	more than 10 years	4
Attitude Towards IPC	1-5 on Likert Scale	3.9 (.51)
Perceived Safe Environment	1-4 on Likert Scale	3.1 (.29)
Knowledge of IPC Standard Precautions Transmission-Based Precautions Multi-Drug Resistance Knowledge/Attitude Multi-Drug Resistance Perceived Seriousness	 0-22 0-24 1-5 on Likert Scale 1-5 on Likert Scale	 12.9 (2.6) 11.58(2.8) 3.7 (0.36) 3.04(0.53)

The sample consisted of registered nurses working in different departments of SGTH. A total of 89 participants completed the self-reported questionnaire. Among them, 47 were males and 42 were females, highlighting an almost equal distribution, with a mean age of 32 years. Department-wise, i.e., (1) medical surgical, (2) ICU, CCU, NICU, (3) Paediatrics, and (4) Others, distribution was almost uniform, with the highest number of 22 participants from the Paediatric department. The highest number, 42, with a percentage of 47.2%, comprised participants who had a total clinical experience of between 2 and 5 years, followed by 23 participants with a percentage of 25.8% in the 5- to 10-year range. Experience in the current working unit with a number 42 was almost identical to a 2-5 year range of total experience. However, it differed in the less than 2-year range, with many at 28, suggesting a fresh to moderate level of experience in the current working unit.

3.2 Knowledge of IPC

Knowledge of IPC was divided into four sections: (i) Standard Precautions, (ii) Transmission-Based Precautions, (iii) Multi-drug Resistance Control Knowledge/Attitude, and (iv) Multi-drug Resistance Perceived Seriousness. The mean score for standard precautions was 12.9, and the SD was 2.6, demonstrating a moderate knowledge level with some variability. While most participants scored well, a portion showed a lower knowledge level. The score on the transmission-based precaution was also similar to the standard precaution, with a mean score of 11.58 and a standard deviation of 2.8. While multi-drug resistant organism control knowledge and attitude had a mean of 3.74/5 (74.7%), indicating that participants overall have a good level of knowledge and positive attitudes toward MDRO infection control.

The mean for the perceived seriousness score was 2.87 (SD = 0.45) on a 4-point scale (excluding the 'don't know' response in the analysis), indicating that participants generally considered multidrug-resistant organisms and related infection control issues to be a moderate problem. indicating a need for refresher training and continuous education to ensure consistency and up-to-date knowledge.

3.4 Attitude towards IPC

The mean score for attitude towards infection prevention and control (IPC) among participants was 3.90 (SD = 0.51), with scores ranging from 2.63 to 5.00. This indicates that overall, respondents demonstrated a positive attitude towards IPC, with most participants' responses clustering above the neutral midpoint. While attitudes were generally favourable, some variation existed, suggesting that not all participants equally endorsed IPC practices.

3.5 Perceived Safe Environment

The perceived safe environment (PSE) composite score among participants (N = 89) ranged from 1.74 to 4.10, with a mean score of 3.10 (SD = 0.29). This indicates that respondents generally perceived their environment as moderately safe, with scores slightly above the neutral midpoint of the scale. The relatively low standard deviation suggests consistency in responses across the sample.

Table 2. Compliance with Infection Prevention and Control Practices

Compliance with Infection Prevention and Control practices	Mean	Std. Deviation
Hand Washing	**3.6952**	**.95156**
I wash my hands before touching patients	3.5843	.91464
I wash my hands when I move from one patient to another	3.6136	1.10829
I wash my hands immediately if my hands become contaminated with blood, body fluids, or excretion	3.8876	.83173
Protective Equipment's	**3.9213**	**1.69298**
I wash my hands immediately after removing medical gloves	3.8090	1.08582
I wear gloves when I anticipate exposure to a patient's blood	3.8764	.95132
I wear gloves when I anticipate exposure to a patient's wound	4.3258	5.28887
wear a face mask when I am at risk of blood or body fluid splashing to my mouth	3.8539	1.01747
I wear eye protection when I am at risk of blood or body fluid splashed to my eyes	3.8539	.91142
I wear a protective gown when there is a possibility of exposure to a patient's blood or body fluid	3.8090	.90298
Contaminated Material Control	**4.1467**	**2.21594**
I change gloves when I move from one patient to another	3.7416	1.10297

I change gloves after contacting the patient's feces with VRE	3.8539	1.05044
I immediately remove/dispose of the contaminated gown and wash my hands after the completion of care	4.3295	4.48425
I am careful when I handle sharp tools used for patient care	4.7416	4.89556
I discard used needles or sharp tools into a sharps container.	4.1124	.92243
I discard objects contaminated with blood, body fluids, or excretions in a medical waste container	4.1011	.83998
MDRO Control	**3.8491**	**1.52976**
I wear a protective gown when I have contact with an MDRO patient	3.8764	1.02047
I use individual tools, such as a blood pressure cuff and thermometer, for each patient with MDRO	3.5843	1.09554
I clean blood pressure gauges and thermometers used on MDRO patients with disinfectant before using on another patient	3.7191	1.19648
I clean wheelchairs and stretcher carts used by MDRO patients with disinfectant, before other patients use them	4.2135	3.35909
I clean furniture, such as beds and tables, around MDRO patients with disinfectant at least once a day	3.8523	.97721

3.6 Compliance with Infection Prevention and Control Practices

Table 2 depicts self-reported compliance with IPC practices in the four domains. The composite mean score for compliance was 3.83(SD=.32), suggesting high average compliance with minimal variability, indicating consistency in compliance. Among the four domains, contaminated materials control showed the highest compliance with a mean of 4.14 (SD 2.21), reflecting good adherence to contaminated material disposal and sharp handling. However, the large variability suggests inconsistent implementation across respondents. In the domain of MDRO control, cleaning wheelchairs and stretchers with disinfectant was recorded with the highest mean (4.12 and SD of 3.36), indicating a possible resource limitation rather than limited knowledge.

Table 3. Correlation Among Knowledge, Attitude, Perceived Safe Environment, and Compliance with IPC Practices

Variable	Handwashing	Protective Equipment	Contaminated Materials	MDRO Control	Compliance (Total)
Knowledge SP	0.059 (0.584)	0.034 (0.753)	0.270 (0.010) *	0.180 (0.091)	0.258 (0.015)*
Knowledge TP	-0.095 (0.374)	0.117 (0.275)	0.171 (0.109)	0.223 (0.035)*	0.197 (0.064)
MDRO Knowledge/Attitude	0.011 (0.919)	-0.066 (0.541)	-0.057 (0.595)	-0.022 (0.838)	-0.057 (0.593)

MDRO Perceived Seriousness	0.178 (0.095)	0.172 (0.107)	-0.167 (0.117)	-0.065 (0.546)	0.004 (0.968)
Attitude Towards IPC practices	-0.146 (0.173)	0.163 (0.128)	0.044 (0.680)	-0.044 (0.682)	0.001 (0.989)
Perceived Safe Environment (PSE)	0.091 (0.395)	0.293 (0.005)**	0.121 (0.258)	0.280 (0.008)**	0.324 (0.002)**

* Significant at $p < 0.05$, ** Significant at $p < 0.01$. Abbreviations: SP, Standard Precautions; TP, Transmission-based Precautions; MDRO, Multi-drug resistant organism

3.7 Correlation among Knowledge, Attitude, Perceived Safe Environment, and Compliance with IPC Practices

Table 3 examined the associations between knowledge of SP, TP, MDRO Knowledge/Attitude, Perceived Seriousness of MDRO, overall attitudes towards IPC practices, and perceived safe environment (PSE) with compliance across different infection prevention and control (IPC) domains. Pearson's correlation analysis was conducted to examine the associations. Knowledge of standard precautions (SP) was significantly and positively correlated with contaminated materials control ($r = 0.270$, $p = 0.010$) and overall compliance ($r = 0.258$, $p = 0.015$). Knowledge of transmission-based precautions (TP) showed a significant positive correlation with MDRO control ($r = 0.223$, $p = 0.035$), but not with other compliance domains.

Perceived safe environment (PSE) demonstrated the strongest pattern of associations, showing significant positive correlations with protective equipment use ($r = 0.293$, $p = 0.005$), MDRO control ($r = 0.280$, $p = 0.008$), and total compliance ($r = 0.324$, $p = 0.002$).

On the other hand, attitude and perceived seriousness of MDRO infection did not show statistically significant correlations with any compliance domains or total compliance. Similarly, MDRO knowledge/attitude composite scores were not significantly correlated with compliance.

Table 4. Multiple Regression Predicting Compliance with IPC

Predictor Variable	B	SE B	β	t	p
Constant	**2.266**	**0.623**	**–**	**3.64**	**<.001**
Work Unit	0.02	0.023	0.087	0.86	0.39
Total Years of Experience	-0.01	0.069	-0.026	-0.15	0.885
Years of Experience in the current unit	0.093	0.068	0.24	1.37	0.176
Knowledge of SP	0.025	0.013	0.209	1.96	0.054
Knowledge of TP	0.01	0.012	0.089	0.83	0.409
MDRO Knowledge/Attitude	-0.017	0.088	-0.019	-0.19	0.852
MDRO Perceived Seriousness	-0.024	0.073	-0.035	-0.34	0.737
Attitude	-0.004	0.063	-0.007	-0.07	0.947
Perceived Safe Environment	0.337	0.112	0.307	3.01	.004**

Note. $R^2 = .25$, Adjusted $R^2 \approx .18$. $F(9,79) = 2.93$, $p = .005$. **$p < .01$.

3.8 Factors Influencing Compliance with IPC Practices

A multiple regression analysis was conducted to examine predictors of compliance with infection prevention and control (IPC) practices. The overall model was statistically significant, $F(7,79)=2.93$, $p = .005$, explaining 25% of the variance in compliance ($R^2=.25$, Adjusted $R^2=.18$).

Among the predictors, perceived safe environment (PSE) was the only significant predictor of compliance ($\beta = .31$, $p = .004$). Knowledge of standard precautions showed a marginal association ($\beta = .21$, $p = .054$). All other predictors,

including transmission-based precaution knowledge, MDRO knowledge/attitude, perceived seriousness, attitudes, years of experience, and clinical unit, were not statistically significant ($p > .05$).

4. Discussion

This study examined factors influencing clinical nurses' compliance with IPC practices in a resource-limited large tertiary care hospital of Swat. Overall, the findings suggested that nurses in this cohort demonstrated an adequate level of compliance with IPC practices. Specifically, in contaminated material control, while MDRO control practices compliance showed the greatest variability. The perception of a safe environment emerged as the strongest predictor among all the predictors. Only a marginal association was observed between knowledge of SP and overall compliance. Other factors appeared as non-significant predictors.

The high overall compliance demonstrated in this study aligns with international studies, where nurses usually adhere to routine IPC practices, particularly hand hygiene and safe disposal of contaminated materials(1)(3). This positive compliance indicator may be partly due to personal risk reduction, as well as strict institutional policies and high visibility to supervisor and infection control personnel. However, the recorded variability suggests that compliance is not consistent and may vary with workload and resource availability.

Compliance in the of MDRO control was less consistent, despite of good MDRO knowledge and attitude by the participants. This discrepancy in the finding is also highlighted in studies from LMICs, where knowledge does not always translate into consistent practice due to systemic barriers such as limited supplies of personal protective equipment, overcrowding, and insufficient staffing(3)(4). In resource scares setting like SGTH it is very clearly evident that the high mean score and greatest variability observed in MDRO control and compliance like cleaning wheelchairs and stretchers is due to lake of resources and overworked conditions. This finding was also endorsed in Qureshi et al., (2021) study on the prevalence and risk of MDRO in Pakistani Hospitals(10).

The emergence of Perceived safe environments as the strongest predictor of compliance highlights the central organizational support role and importance of environmental factors in IPC practices. This finding supported by international and local studies alike is evident from that of Korean hospital where a strong association was observed between organization support, work environment, resource availability and compliance with IPC Practice(1). Similarly local study from resource scarce setting highlighted organizational elements and scarcity of needed equipment and supplies as the most prevalent factors for non-compliance with IPC practices(3). These finding strongly suggests that organizational support and conducive environments for safe practice is highly desirable in concurrence with knowledge and training.

Attitude towards IPC practices interestingly did not show any significant influence in predicting compliance. In contrast to earlier studies where attitude was among a strong predictor(17)(18). Several possible explanation can be offered for this findings, such as lack of resources and organizational negligence coupled with lack of training and refresher course can make attitude a non-significant phenomenon in IPC practices in resource scarce setting. This finding may be also suggesting the weakness in self-report attitude and compliance due to social desirability bias, weakening the real result.

The weak positive association of SP knowledge with compliance is also worthy to note. While knowledge is a pre-requisite for adherence to IPC practices, it remains an insufficient intervention in ensuring consistency in compliance in setting where resources are constrained. As suggested by researcher that knowledge based intervention when coupled with organizational reforms have the potential to overcome the problem(19). These finding have several implications for practice. First of all, it is not enough to just teach healthcare workers about infection control. We also need to support them by making sure there are enough staff, strong leadership, and the right resources to do their jobs safely.

Secondly, we need to invest in supplies. This means making sure there's a reliable, consistent stock of personal protective equipment (PPE) and disinfectants, especially for dealing with multidrug-resistant organisms (MDROs), which are difficult to treat. Finally, we should regularly check up on how well these measures are being followed. By monitoring and giving feedback, we can help make

sure everyone is consistently following the rules and not just in certain areas.

5. Limitation of the study

The study has several limitations, the self-report nature of data make the finding prone to reporting bias, the single center study limit generalizability. Moreover, the tools used showed limited reliability in some areas which need further modification and validation for the local context.

6. Recommendations

Further research is needed with longitudinal and interventional approaches to make causal inferences and for the development of context specific tailored interventions for reducing HAIs and combating the menace of MDRO spread.

7. Conclusion

The findings from this study have highlighted good compliance with IPC practices in this resource limited setting. However, inconsistency in MDRO control remains a challenge, knowledge and attitude is insufficient in ensuring compliance until organizational support is strengthened in areas of resource availability safe working environment. To overcome HAIs and combat MDRO in such setting organizational reforms should prioritise systemic improvement alongside continuous educational initiatives.

Conflict of interest

The authors have no conflict of interest with any entity to report.

Authors contribution

Study design: Suleman Khan, Ahmad Shah
Data collection: Ahmad Shah
Data analysis and manuscript writing: Suleman Khan

References

1. Kim H, Hwang YH. Factors contributing to clinical nurse compliance with infection prevention and control practices: A cross-sectional study. Nurs Heal Sci. 2020;22(1):126–33. DOI: 10.1111/nhs.12659
2. Tartari E, Tomczyk S, Pires D, Zayed B, Coutinho Rehse AP, Kariyo P, et al. Implementation of the infection prevention and control core components at the national level: a global situational analysis. J Hosp Infect [Internet]. 2021;108:94–103. Available from: https://doi.org/10.1016/j.jhin.2020.11.025DOI: 10.1016/j.jhin.2020.11.025
3. Zeb A. Factors Affecting Nurses' Compliance to Standard Precautions in Resource Scarce Settings. Am J Biomed Sci Res. 2019;4(5):384–9. DOI: 10.34297/ajbsr.2019.04.000840
4. Storr J, Twyman A, Zingg W, Damani N, Kilpatrick C, Reilly J, et al. Core components for effective infection prevention and control programmes: New WHO evidence-based recommendations. Antimicrob Resist Infect Control [Internet]. 2017;6(1). Available from: http://dx.doi.org/10.1186/s13756-016-0149-9DOI: 10.1186/s13756-016-0149-9
5. Berríos-Torres SI, Umscheid CA, Bratzler DW, Leas B, Stone EC, Kelz RR, et al. Centers for disease control and prevention guideline for the prevention of surgical site infection, 2017. JAMA Surg. 2017;152(8):784–91.
6. CDC's Core Infection Prevention and Control Practices for Safe Healthcare Delivery in All Settings | Infection Control | CDC [Internet]. [cited 2025 Sep 20]. Available from: https://www.cdc.gov/infection-control/hcp/core-practices/index.html
7. Gerberding JL, Schecter WP, Lewis Jr FR. Are universal precautions realistic? Surg Clin North Am. 1995;75(6):1091–104.
8. Curran ET. Standard precautions: what is meant and what is not. J Hosp Infect. 2015;90(1):10.
9. Magiorakos AP, Burns K, Rodríguez Baño J, Borg M, Daikos G, Dumpis U, et al. Infection prevention and control measures and tools for the prevention of entry of carbapenem-resistant Enterobacteriaceae into healthcare settings: guidance from the European Centre for Disease Prevention and Control. Antimicrob Resist Infect Control. 2017;6(1):113.

10. Qureshi S, Maria N, Zeeshan M, Irfan S, Qamar FN. Prevalence and risk factors associated with multi-drug resistant organisms (MDRO) carriage among pediatric patients at the time of admission in a tertiary care hospital of a developing country. A cross-sectional study. BMC Infect Dis. 2021;21(1):547.
11. Geng Y, Liu Z, Ma X, Pan T, Chen M, Dang J, et al. Infection prevention and control measures for multidrug-resistant organisms: a systematic review and network meta-analysis. Infection. 2025;1–12.
12. Tareen MU, Babar K, Ghilzai D. MADER E MILAT INTERNATIONAL JOURNAL Infection Control Practices Among Nursing Staff in ICUs. 2025;3:112–28. DOI: 10.5281/zenodo.16784066
13. Batran R, Ayed A, Batran A, Ejheisheh MA, Alassoud B, Hayek MF, et al. Determinants of Nurses' Compliance with Infection Prevention and Control Practices in Critical Care Units. SAGE Open Nurs. 2025;11. DOI: 10.1177/23779608251339193
14. Abalkhail A, Alslamah T. Institutional Factors Associated with Infection Prevention and Control Practices Globally during the Infectious Pandemics in Resource-Limited Settings. Vaccines. 2022;10(11). DOI: 10.3390/vaccines10111811
15. Brown H, Odhiambo A, Mwaki A, Atieno N, Ouda R, Ngere I. Understanding the drivers of poor infection prevention control (IPC) practices in Kenyan health facilities: An interdisciplinary study. PLOS Glob Public Heal [Internet]. 2025;5(6 JUNE):1–17. Available from: https://doi.org/10.1371/journal.pgph.0004404DOI: 10.1371/journal.pgph.0004404
16. Yasmeen MS, Ali TS, Khalid W, Kurji MZ, Hazara MSM, Bashir MS. Knowledge and Practices Regarding Standard Precautions for Infection Control Among Nurses Working at a Public, Tertiary Care Hospital Islamabad, Pakistan. Int J Curr Res Rev. 2022;14(07):32–9. DOI: 10.31782/ijcrr.2022.14702
17. Mutaru AM, Balegha AN, Kunsu R, Gbeti C. Knowledge and determinants of infection prevention and control compliance among nurses in Yendi municipality, Ghana. PLoS One [Internet]. 2022;17(7 July):1–13. Available from: http://dx.doi.org/10.1371/journal.pone.0270508DOI: 10.1371/journal.pone.0270508
18. Ali A, Asiri M, Al-rafdan TA, Abdulrahman A. Knowledge , Attitudes and practices Towards Infection Control among health care staff in Saudi Arabia. 2024;7.
19. Valim MD, Marziale MHP, Richart-Martínez M, Sanjuan-Quiles Á. Instruments for evaluating compliance with infection control practices and factors that affect it: An integrative review. J Clin Nurs. 2014;23(11–12):1502–19. DOI: 10.1111/jocn.12316