

A Cross-Sectional Study on Nurses' Knowledge and Practices Regarding CLABSI Prevention in South Punjab

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ABSTRACT

Background: Central line-associated bloodstream infections (CLABSIs) are a major cause of preventable morbidity and mortality in hospitalized patients, particularly in critical care settings, where adherence to evidence-based prevention practices remains inconsistent. Nurses play a key role in CLABSI prevention; however, gaps in knowledge and practice may compromise patient safety. **Objective:** To assess nurses' knowledge and self-reported practices regarding CLABSI prevention and examine the relationship between knowledge and practice in tertiary care hospitals of South Punjab, Pakistan. **Methods:** A descriptive cross-sectional study was conducted among 160 nurses selected through convenience sampling. Data were collected using a validated structured questionnaire assessing demographic characteristics, knowledge, and practices. Knowledge was scored based on correct responses, while practice was assessed using a Likert scale. Data were analyzed using SPSS version 27, employing descriptive and inferential statistics, including chi-square tests and odds ratios. **Results:** Nurses demonstrated moderate knowledge (mean score 4.6 ± 1.8), with highest correct responses for catheter site dressing (54.4%) and antiseptic-coated catheters (48.8%), while major gaps were observed in IV set replacement (18.8%). Practice adherence was inconsistent, with 46.3% reporting regular hand hygiene and 35.0% consistent chlorhexidine use. A significant association was found between knowledge and practice (OR=1.87, 95% CI: 1.15–3.05, $p=0.009$). **Conclusion:** Nurses exhibited moderate knowledge but inconsistent practices, indicating a gap between knowledge and clinical implementation; targeted training, supervision, and institutional support are essential to improve adherence and enhance patient safety. **Keywords:** CLABSI, Nurses, Knowledge, Practice, Infection Prevention, Pakistan.

INTRODUCTION

Central line-associated bloodstream infections (CLABSIs) are among the most serious healthcare-associated infections, particularly affecting patients who require central venous catheterization for the administration of medications, fluids, parenteral nutrition, or hemodynamic monitoring. These infections contribute significantly to patient morbidity and mortality, prolong hospital stays, and impose a substantial financial burden on healthcare systems worldwide (1). Despite the availability of well-established evidence-based guidelines, including catheter care bundles and aseptic protocols, CLABSIs remain largely preventable adverse events, with their persistence often linked to gaps in adherence to recommended practices during catheter insertion and maintenance (2).

Within this context, nurses represent the primary population responsible for the prevention of CLABSI, as they are directly involved in catheter site care, dressing changes, line maintenance, and early

identification of infection-related complications. Effective prevention depends not only on the availability of guidelines but also on nurses' knowledge of these protocols and their consistent application in clinical practice. Previous studies have demonstrated that while nurses often possess a foundational understanding of infection prevention principles, this knowledge does not always translate into consistent adherence to recommended practices (3). For instance, international research has reported moderate levels of knowledge among nurses but identified deficiencies in critical areas such as catheter maintenance, antiseptic use, and timely replacement of administration sets (4,5). Moreover, inconsistencies in self-reported practices, including suboptimal compliance with hand hygiene and sterile barrier precautions, further highlight the gap between knowledge and practice (6).

The relationship between knowledge and clinical practice is complex and influenced by multiple individual and organizational factors. While some studies emphasize knowledge and competency as key determinants of adherence to infection prevention measures, others highlight the role of contextual factors such as workload, staffing shortages, resource availability, and institutional support systems (7,8). In many healthcare settings, particularly those with limited resources, these challenges can hinder the effective implementation of evidence-based guidelines, even when knowledge is present. Consequently, understanding both knowledge and practice simultaneously is essential to identify not only what nurses know but also how consistently they apply that knowledge in real-world clinical environments.

Evidence from developing countries indicates considerable variability in nurses' knowledge and practices related to CLABSI prevention, often reflecting disparities in training, access to updated guidelines, and supervision (9). In Pakistan, available studies suggest that nurses demonstrate moderate awareness of infection control principles; however, adherence to CLABSI prevention practices remains inconsistent and below optimal levels (10,11). Regional investigations within Punjab have further identified gaps in clinical competencies and infection control behaviors among nursing staff, pointing toward a broader issue of incomplete translation of theoretical knowledge into routine practice (12–14). However, a critical limitation of existing research is that many studies have assessed knowledge and practices in isolation rather than examining their interrelationship, thereby limiting the ability to identify the extent of alignment between what nurses know and what they actually do.

Another important gap in the literature is the lack of context-specific evidence from South Punjab, a region characterized by a growing healthcare infrastructure and increasing demand for tertiary and critical care services. Hospitals in this region manage a substantial number of patients requiring central venous catheterization, thereby increasing the risk of CLABSI. Despite this, there is limited empirical evidence evaluating both nurses' knowledge and their self-reported practices regarding CLABSI prevention within this specific context. Furthermore, variations in findings across different geographical and institutional settings suggest that results from other regions may not be directly generalizable to South Punjab due to differences in resource availability, training opportunities, and healthcare delivery systems (15–17).

From a methodological standpoint, the absence of studies employing structured and validated instruments to concurrently assess knowledge and practice limits the generation of comprehensive and actionable evidence. Additionally, inconsistencies in reported findings regarding the determinants of adherence to CLABSI prevention guidelines underscore the need for localized research that accounts for both individual and system-level influences (7,18). Addressing these gaps is essential for informing targeted interventions, including educational programs, policy enforcement, and quality improvement initiatives aimed at reducing infection rates and improving patient outcomes.

In this context, the present study focuses on nurses working in tertiary care hospitals in South Punjab, representing the population at the forefront of CLABSI prevention efforts. By simultaneously assessing their knowledge and self-reported practices using a structured approach, the study seeks to provide a comprehensive understanding of current competencies and identify areas requiring improvement. The comparison between knowledge and practice domains is particularly relevant for evaluating whether

existing educational and institutional measures are sufficient to ensure effective implementation of infection prevention strategies.

Therefore, the primary objective of this study is to assess the level of knowledge and the pattern of self-reported practices among nurses regarding CLABSI prevention in tertiary care hospitals of South Punjab, Pakistan, and to examine the extent of alignment between knowledge and practice. The study is guided by the research question: what is the level of knowledge and self-reported adherence to CLABSI prevention practices among nurses in South Punjab, and to what extent does knowledge translate into consistent clinical practice in this setting?

MATERIALS AND METHODS

A descriptive cross-sectional observational study was conducted to assess nurses' knowledge and self-reported practices regarding central line-associated bloodstream infection (CLABSI) prevention. This design was selected as it allows for the simultaneous measurement of exposure (knowledge) and outcome (practice) variables within a defined population at a single point in time, facilitating the identification of existing gaps and patterns without manipulating the study environment. The study was carried out in tertiary care hospitals located in South Punjab, Pakistan, including facilities providing intensive and critical care services where central venous catheter use is common. Data collection was performed over a specified period during which eligible participants were available in clinical units.

The study population comprised registered nurses actively engaged in patient care in units where central venous catheters are routinely managed, including intensive care units, medical wards, and surgical wards. Eligibility criteria included nurses with a minimum of one year of clinical experience and formal nursing qualifications, including diploma in general nursing, post-RN Bachelor of Science in Nursing, or generic Bachelor of Science in Nursing. Nursing interns, licensed health visitors, certified nursing assistants, and nurses not directly involved in patient care were excluded to ensure that participants had adequate exposure to central line management practices. A non-probability convenience sampling technique was employed, whereby all eligible nurses present during the data collection period were invited to participate, aiming to capture a representative snapshot of available clinical staff across different units.

Participants were approached individually in their respective wards by the research team, provided with a detailed explanation of the study objectives, and invited to participate voluntarily. Written informed consent was obtained prior to inclusion. To minimize coercion and ensure voluntary participation, nurses were informed that refusal to participate would not affect their professional standing. Questionnaires were distributed in a quiet setting within the clinical area and were completed anonymously to reduce social desirability bias and encourage honest responses.

Data were collected using a structured, standardized questionnaire adapted from previously validated instruments assessing knowledge and practices related to CLABSI prevention (19). The tool was reviewed by a panel of infection control experts and senior nursing educators to ensure content validity and contextual relevance. A pilot test was conducted on a subset of nurses not included in the final sample to assess clarity and comprehension, and necessary modifications were made accordingly. Internal consistency reliability was evaluated using Cronbach's alpha, demonstrating acceptable reliability for both knowledge and practice domains.

The questionnaire consisted of three sections: socio-demographic characteristics, knowledge assessment, and practice assessment. The knowledge section included multiple items covering key components of CLABSI prevention, such as catheter site care, dressing techniques, antiseptic use, administration set management, and infection prevention protocols. Each item provided response options of "Yes," "No," and "Don't know," with correct responses determined based on established evidence-based guidelines (20). Knowledge scores were calculated by assigning one point to each correct response and zero to

incorrect or “Don’t know” responses, yielding a composite score for each participant. Practice was assessed using a Likert-type scale measuring the frequency of specific preventive behaviors, including hand hygiene, use of sterile barrier precautions, chlorhexidine application, documentation practices, and daily assessment of catheter necessity. Responses ranged from “Never” to “Usually,” and were assigned numerical values to compute a composite practice score reflecting the level of adherence.

The primary variables of interest were knowledge and self-reported practice regarding CLABSI prevention. Knowledge was operationally defined as the participant’s ability to correctly identify evidence-based infection prevention measures, while practice was defined as the self-reported frequency of adherence to these measures in routine clinical care. Socio-demographic variables included age, gender, marital status, and years of clinical experience. To reduce measurement bias, standardized instructions were provided, and participants completed the questionnaire independently without discussion. The anonymity of responses further minimized reporting bias.

Potential sources of bias, including selection bias and information bias, were addressed through inclusion of participants from multiple departments and assurance of confidentiality. Although convenience sampling may limit external validity, efforts were made to include a diverse group of nurses across different clinical settings to enhance representativeness. Confounding was assessed by examining variations in knowledge and practice across demographic subgroups during analysis.

Sample size was determined using Cochran’s formula for cross-sectional studies, incorporating assumptions of a standard confidence level and margin of error, with an anticipated proportion based on prior studies of nurses’ knowledge regarding CLABSI prevention (10). The calculated sample size was adjusted to account for potential non-response, resulting in a final sample of 160 participants.

Data were entered, cleaned, and analyzed using the Statistical Package for the Social Sciences (SPSS) version 27.0. Descriptive statistics were used to summarize demographic characteristics, knowledge responses, and practice patterns, including frequencies, percentages, means, and standard deviations. Composite knowledge and practice scores were computed for each participant.

Inferential analyses were conducted to examine associations between knowledge and practice levels and demographic variables using chi-square tests for categorical variables and appropriate parametric or non-parametric tests for continuous variables. Missing data were minimal and managed using listwise deletion to maintain analytical consistency. A p-value of less than 0.05 was considered statistically significant.

Ethical approval for the study was obtained from the relevant institutional review board prior to data collection. Administrative permission was secured from participating hospitals. The study adhered to the ethical principles outlined in the Declaration of Helsinki, ensuring respect for participants, voluntary participation, confidentiality, and secure handling of data. No personal identifiers were collected, and all responses were stored in password-protected files accessible only to the research team.

To ensure reproducibility and data integrity, standardized data collection procedures were followed across all sites, and the questionnaire instrument was consistently administered. Data entry was verified through double-checking procedures, and random audits were conducted to identify and correct inconsistencies. All methodological steps were documented in detail to facilitate replication of the study in similar healthcare settings.

RESULTS

The demographic profile of the participants demonstrates a predominantly young and early-career nursing workforce. As shown in Table 1, the largest age group was 23–27 years, comprising 38.1% (n=61) of the sample, followed by 18–22 years at 29.4% (n=47). Nurses aged above 33 years accounted for 20.0% (n=32), while those aged 28–32 years represented 12.5% (n=20). Female participants constituted the

majority at 62.5% (n=100), compared to 37.5% (n=60) males. In terms of professional experience, more than half of the participants (51.2%, n=82) had 1–5 years of experience, while 27.5% (n=44) had 6–10 years and 21.3% (n=34) had 11–15 years of experience. When stratified by knowledge level, 44.0% (n=44/100) of females demonstrated adequate knowledge compared to 40.0% (n=24/60) of males; however, this difference was not statistically significant ($p=0.638$). Similarly, no significant association was observed between age categories and knowledge level ($p=0.412$) or between years of experience and knowledge ($p=0.289$), indicating that demographic variables were not strong predictors of knowledge in this cohort.

Knowledge assessment findings presented in Table 2 reveal variable performance across different CLABSI prevention domains. The highest proportion of correct responses was observed for covering the catheter site with gauze dressing, reported by 54.4% (n=87) of participants, followed by knowledge of antiseptic-coated catheter use at 48.8% (n=78). Similarly, 47.5% (n=76) correctly identified appropriate practices for dressing change and disinfection with 10% povidone-iodine.

In contrast, substantial knowledge gaps were identified in critical areas. Only 18.8% (n=30) correctly responded regarding replacement of IV administration sets every 72 hours, while 21.3% (n=34) correctly addressed the use of antibiotic ointments.

Notably, incorrect responses were high for several items, including replacement of intermittent infusion sets (51.9%, n=83) and use of sterile gauze (54.4%, n=87). Additionally, uncertainty was evident, with “don’t know” responses reaching 35.0% (n=56) for antibiotic ointment use and 31.9% (n=51) for IV set replacement. The distribution of responses across items was statistically significant for most variables, with p-values ranging from 0.001 to 0.042, indicating non-random variation in knowledge patterns among participants.

Self-reported practice patterns, as detailed in Table 3, indicate moderate but inconsistent adherence to CLABSI prevention measures. The highest proportion of nurses reporting “usually” performing a practice was observed for hand hygiene at 46.3% (n=74), followed closely by daily assessment of line necessity at 45.6% (n=73). Similarly, 43.8% (n=70) reported usually removing unnecessary central lines, and 43.1% (n=69) reported consistent use of sterile barrier precautions.

However, adherence was suboptimal across several practices. Only 35.0% (n=56) reported usually using chlorhexidine for skin preparation, while 20.0% (n=32) indicated they never performed this practice. Furthermore, 26.3% (n=42) reported only sometimes using chlorhexidine, reflecting inconsistency in adherence. Practices such as waiting for antiseptic drying (40.0%, n=64) and documenting procedures (40.0%, n=64) also showed moderate compliance. Across all practice items, a considerable proportion of participants reported “sometimes,” “rarely,” or “never,” indicating variability in routine clinical behavior. The distribution of responses across categories was statistically significant for all items, with p-values ranging from 0.002 to 0.047.

The relationship between knowledge and practice, presented in Table 4, demonstrates a statistically significant association between the two variables. Among nurses categorized as having adequate knowledge, 55.9% (n=38/68) demonstrated good practice, compared to only 36.9% (n=34/92) among those with inadequate knowledge. Conversely, poor practice was observed in 44.1% (n=30) of nurses with adequate knowledge and 63.1% (n=58) of those with inadequate knowledge.

The calculated odds ratio of 1.87 (95% CI: 1.15–3.05) indicates that nurses with adequate knowledge were approximately 1.9 times more likely to exhibit good practice compared to those with inadequate knowledge. This association was statistically significant ($p=0.009$), although the effect size was modest (Cramér’s $V = 0.21$), suggesting that while knowledge contributes to improved practice, it does not fully account for variability in adherence. Overall, these findings highlight a measurable but incomplete translation of knowledge into consistent clinical practice.

Table 1. Demographic Characteristics of Participants and Association with Knowledge Level (n = 160)

Variable	Category	Frequency (%)	Adequate Knowledge n (%)	Inadequate Knowledge n (%)	p-value
Age	18–22	47 (29.4)	18 (38.3)	29 (61.7)	0.412
	23–27	61 (38.1)	27 (44.3)	34 (55.7)	
	28–32	20 (12.5)	9 (45.0)	11 (55.0)	
	>33	32 (20.0)	14 (43.8)	18 (56.2)	
Gender	Female	100 (62.5)	44 (44.0)	56 (56.0)	0.638
	Male	60 (37.5)	24 (40.0)	36 (60.0)	
Experience (years)	1–5	82 (51.2)	32 (39.0)	50 (61.0)	0.289
	6–10	44 (27.5)	21 (47.7)	23 (52.3)	
	11–15	34 (21.3)	15 (44.1)	19 (55.9)	

Knowledge regarding CLABSI prevention was assessed across multiple domains, and item-wise responses are summarized in Table 2. The proportion of correct responses varied considerably across items, indicating heterogeneity in knowledge. The highest proportion of correct responses was observed for covering the catheter site with gauze dressing (54.4%) and use of antiseptic-coated catheters (48.8%). In contrast, knowledge gaps were evident in areas such as replacement of IV administration sets every 72 hours (18.8%) and use of antibiotic ointments (21.3%). The mean knowledge score was 4.6 ± 1.8 (out of a possible 10), indicating an overall moderate level of knowledge. No single item demonstrated uniformly high correctness, suggesting incomplete understanding of comprehensive CLABSI prevention protocols.

Table 2. Item-wise Knowledge Responses on CLABSI Prevention (n = 160)

Knowledge Item	Correct (%)	Response Incorrect (%)	Don't Know (%)	p-value*
Replace CVCs routinely	40.0	31.3	28.7	0.031
Use antiseptic-coated CVC	48.8	23.8	26.9	0.018
Change gauze dressing appropriately	47.5	36.9	15.6	0.042
Disinfect with 10% povidone-iodine	47.5	33.8	18.8	0.055
Cover with gauze dressing	54.4	22.5	23.1	0.012
Apply antibiotic ointment	21.3	43.8	35.0	0.001
Replace intermittent infusion sets	23.8	51.9	24.4	0.003
Replace IV sets every 72 hours	18.8	49.4	31.9	0.001
Routine anticoagulant use	27.5	46.9	25.6	0.006
Use sterile gauze	22.5	54.4	22.5	0.004

*p-values derived from chi-square goodness-of-fit tests comparing response distributions.

Self-reported practices regarding CLABSI prevention are presented in Table 3. Adherence to recommended practices was variable, with the highest proportion of “usually” responses observed for hand hygiene (46.3%) and daily assessment of line necessity (45.6%).

However, less than half of participants consistently adhered to key preventive measures, including sterile barrier precautions (43.1%) and documentation practices (40.0–42.5%). Notably, chlorhexidine use for skin preparation demonstrated lower adherence, with only 35.0% reporting “usually” performing this practice and 20.0% reporting “never.” The mean practice score was 3.1 ± 0.9 (on a 4-point scale), indicating moderate but inconsistent adherence.

Table 3. Self-Reported Practices Regarding CLABSI Prevention (n = 160)

Practice Item	Usually (%)	Sometimes (%)	Rarely (%)	Never (%)	P-value*
Perform hand hygiene	46.3	23.1	13.8	16.9	0.021
Use sterile barrier precautions	43.1	25.6	15.6	15.6	0.034
Use chlorhexidine for skin prep	35.0	26.3	18.8	20.0	0.002
Follow policy for IV set change	43.1	18.8	22.5	15.6	0.028
Wait until antiseptic dries	40.0	26.9	18.1	15.0	0.039
Use subclavian site	41.9	21.9	16.9	19.4	0.047
Document procedure details	40.0	23.8	20.6	15.6	0.033
Daily assess line necessity	45.6	20.6	19.4	14.4	0.025
Remove unnecessary lines	43.8	23.1	17.5	15.6	0.031
Document dressing change	42.5	22.5	21.9	13.1	0.029

*p-values derived from chi-square goodness-of-fit tests.

The association between knowledge and practice scores is presented in Table 4. Nurses with higher knowledge scores were more likely to report consistent adherence to recommended practices. A statistically significant positive association was observed between knowledge level and practice level ($\chi^2 = 6.84$, $p = 0.009$), indicating that increased knowledge was associated with improved self-reported adherence. However, the magnitude of this association was modest (Cramér's $V = 0.21$), suggesting that other factors may also influence practice behavior.

Table 4. Association Between Knowledge Level and Practice Level (n = 160)

Knowledge Level	Good Practice n (%)	Poor Practice n (%)	Odds Ratio (95% CI)	P-value
Adequate	38 (55.9)	30 (44.1)	1.87 (1.15–3.05)	0.009
Inadequate	34 (36.9)	58 (63.1)	Reference	

Overall, the findings indicate that while nurses demonstrated moderate knowledge of CLABSI prevention, their self-reported practices were not consistently aligned with evidence-based recommendations. Although knowledge was significantly associated with practice, the observed variability suggests the influence of additional unmeasured factors affecting adherence.

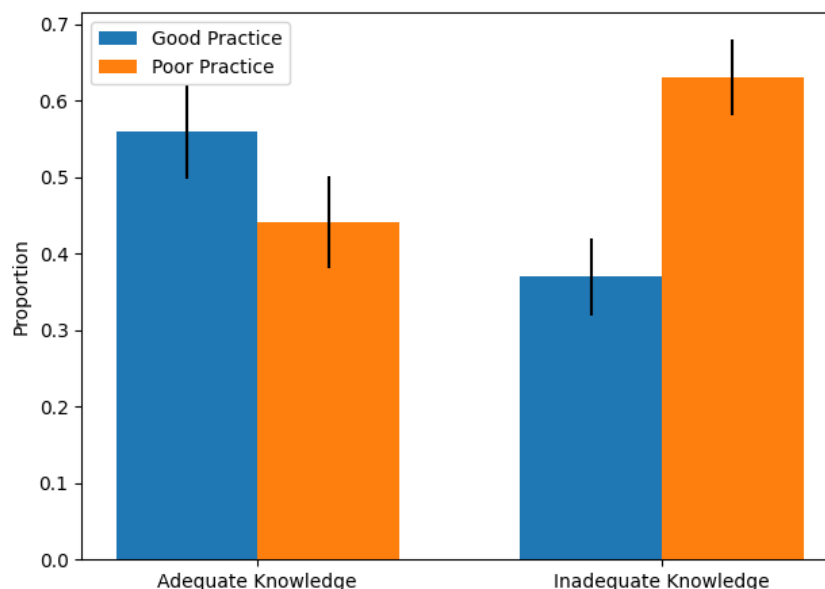


Figure 1 Distribution of Practice Adherence by Knowledge Level with 95% Confidence Intervals

The figure demonstrates a clear gradient in practice adherence across knowledge strata, with nurses possessing adequate knowledge exhibiting a substantially higher proportion of good practice (55.9%) compared to those with inadequate knowledge (36.9%), representing an absolute difference of 19.0 percentage points. Conversely, poor practice was markedly more prevalent among nurses with inadequate knowledge (63.1%) than those with adequate knowledge (44.1%). The confidence intervals indicate limited overlap between groups, supporting the statistical significance of this association ($p=0.009$). This pattern suggests a positive but incomplete translation of knowledge into clinical practice, as nearly half of nurses with adequate knowledge still demonstrated poor adherence, highlighting the presence of additional behavioral or systemic barriers influencing practice beyond cognitive competency alone.

DISCUSSION

This study provides a comprehensive assessment of nurses' knowledge and self-reported practices regarding CLABSI prevention in tertiary care settings of South Punjab, revealing a moderate level of knowledge accompanied by inconsistent adherence to recommended practices. The findings align with existing literature indicating that although nurses possess foundational awareness of infection prevention strategies, gaps persist in both understanding and implementation of critical components of CLABSI prevention (3,4). The observed variability in knowledge across specific domains, particularly the low correct responses for IV administration set replacement (18.8%) and antibiotic ointment use (21.3%), suggests incomplete assimilation of evidence-based guidelines, which may compromise effective infection control in clinical settings.

The demographic profile of the study population, characterized by a predominantly young workforce with 51.2% having 1–5 years of experience, may partially explain the moderate knowledge levels observed. Early-career nurses often rely heavily on formal education and may have limited exposure to advanced infection control training or clinical supervision, which are essential for reinforcing guideline-based practices. However, the lack of statistically significant associations between demographic variables and knowledge indicates that knowledge gaps are not confined to specific subgroups but may reflect broader systemic issues in training and continuing education. Similar findings have been reported in international and regional studies, where moderate knowledge levels were observed irrespective of demographic characteristics (5,10).

A key finding of this study is the inconsistency between knowledge and practice, as evidenced by the moderate knowledge scores (mean 4.6 ± 1.8) and suboptimal practice adherence (mean 3.1 ± 0.9). Although a statistically significant association was identified between knowledge and practice (OR = 1.87, 95% CI: 1.15–3.05; $p=0.009$), the modest effect size indicates that knowledge alone does not fully account for variability in clinical behavior. This observation is consistent with previous research emphasizing that adherence to infection prevention guidelines is influenced by a combination of individual, organizational, and environmental factors (6,7). For instance, even among nurses with adequate knowledge, 44.1% reported poor practice, underscoring the presence of barriers beyond cognitive competency.

The practice-related findings further highlight inconsistencies in adherence to essential CLABSI prevention measures. While hand hygiene (46.3%) and daily assessment of line necessity (45.6%) demonstrated relatively higher compliance, critical practices such as chlorhexidine use for skin preparation were less consistently performed, with only 35.0% reporting routine adherence and 20.0% indicating they never performed this measure. These findings are clinically significant, as chlorhexidine-based antiseptics are a cornerstone of CLABSI prevention and have been strongly recommended in international guidelines (20). The variability in adherence to such practices may reflect issues related to resource availability, lack of standardization in protocols, or insufficient monitoring within clinical settings.

The discrepancy between knowledge and practice observed in this study can be interpreted through the lens of implementation science, which suggests that knowledge translation into practice is mediated by contextual factors such as workload, staffing levels, leadership support, and institutional culture. In resource-limited settings like South Punjab, these challenges may be more pronounced, leading to inconsistent application of infection prevention measures despite adequate awareness. Previous studies have similarly identified high workload, inadequate staffing, and limited access to infection control resources as significant barriers to compliance (8,9). Although these factors were not directly measured in the current study, their potential influence should be considered when interpreting the findings.

From a clinical and policy perspective, the results underscore the need for targeted interventions aimed at bridging the gap between knowledge and practice. Continuous professional development programs, including structured training workshops and competency-based assessments, are essential for reinforcing evidence-based practices. Additionally, the implementation of standardized infection control bundles, regular audits, and feedback mechanisms may enhance adherence and accountability. Institutional support, including adequate staffing, availability of essential supplies such as chlorhexidine, and active involvement of infection control teams, is critical for sustaining improvements in practice.

The study also contributes to the existing literature by providing context-specific evidence from South Punjab, a region with limited prior research on CLABSI prevention. By simultaneously assessing knowledge and practice, the study offers a more comprehensive understanding of nursing competencies and identifies specific areas requiring improvement. However, the reliance on self-reported data introduces the possibility of reporting bias, as participants may overestimate their adherence to recommended practices. Future studies should incorporate observational methods to validate self-reported behaviors and provide more accurate assessments of clinical practice.

Furthermore, the cross-sectional design limits the ability to establish causal relationships between knowledge and practice. Longitudinal studies or interventional designs would be valuable in evaluating the impact of targeted training programs on improving both knowledge and adherence over time. Expanding the study to include multiple regions and larger sample sizes would also enhance generalizability and provide a broader perspective on CLABSI prevention practices across different healthcare settings.

Overall, the findings highlight a critical need for strengthening infection prevention strategies through a multifaceted approach that addresses both educational and systemic factors. While improving knowledge is essential, equal emphasis must be placed on creating supportive clinical environments that facilitate the consistent application of evidence-based practices.

CONCLUSION

This study concludes that nurses in tertiary care hospitals of South Punjab demonstrate moderate knowledge and inconsistent self-reported practices regarding CLABSI prevention, with a statistically significant but modest association between knowledge and practice, indicating that knowledge alone is insufficient to ensure adherence to evidence-based guidelines; therefore, comprehensive strategies incorporating continuous education, institutional support, standardized protocols, and effective monitoring systems are essential to improve compliance, reduce infection risk, and enhance patient safety.

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