

Assessing Knowledge and Practice of Critical Care Checklists Among Intensive Care Unit Nurses

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ABSTRACT

The management of critically ill patients in Intensive Care Units (ICUs) demands a high level of specialized knowledge and consistent application of best practices to ensure optimal patient outcomes and safety. Checklists have emerged as valuable tools in complex healthcare environments, designed to standardize care processes, minimize errors, and enhance communication among multidisciplinary teams. This study aimed to evaluate the knowledge and practice of ICU staff nurses concerning a widely recognized critical care checklist mnemonic. A quantitative, non-experimental descriptive study design was employed, involving a sample of 90 ICU staff nurses. Data were collected using a structured knowledge questionnaire, an observational checklist, and a demographic variable sheet. The findings indicated that while a significant majority of nurses demonstrated a high level of adherence to the checklist in their practice, there was considerable variability in their underlying theoretical knowledge. Specifically, a substantial proportion exhibited only fair knowledge, with a smaller segment demonstrating poor or good knowledge. A notable association was identified between knowledge levels and specific demographic characteristics, particularly educational qualification, suggesting that formal nursing education plays a role in foundational understanding. Conversely, practice levels did not show a significant association with any demographic variables, implying that practical application might be influenced by factors beyond those explored. These results underscore the importance of targeted educational interventions and continuous professional development programs to bridge the knowledge-practice gap and reinforce the systematic application of critical care checklists. Enhancing nurses' knowledge base is crucial for fostering a deeper understanding of the rationale behind these practices, ultimately contributing to improved patient safety and quality of care in critical care settings.

Keywords: Critical care, Intensive Care Unit, Nursing knowledge, Nursing practice, Patient safety, Checklists, Healthcare protocols.

1. Introduction

1.1 Broad Background and Historical Context

The landscape of modern healthcare is characterized by increasing complexity, technological advancements, and a growing demand for high-quality, safe patient care. Within this intricate system, Intensive Care Units (ICUs) stand out as highly specialized environments where critically ill patients receive intensive monitoring, life-sustaining treatments, and round-the-clock nursing care. The inherent acuity and volatility of patient conditions in the ICU necessitate a structured and systematic approach to care delivery to prevent adverse events, optimize outcomes, and ensure patient safety [1]. The concept of standardized care and error reduction has roots in various high-stakes industries,

such as aviation and engineering, where checklists and strict protocols were implemented to mitigate human error and ensure consistent performance in complex operations. The translation of these principles to healthcare, particularly in critical care, has gained significant traction over the past few decades. The recognition that healthcare errors contribute substantially to patient morbidity and mortality has spurred efforts to implement strategies that enhance reliability and safety [2]. Historically, medical practice relied heavily on individual clinician expertise and judgment, which, while vital, could lead to variations in care and overlooked details, especially in demanding situations. This is where the utility of cognitive aids, such as checklists, becomes paramount. Checklists serve as a memory aid, ensuring that critical steps are not forgotten, particularly during periods of high workload, stress, or

complexity.

The evolution of critical care nursing has paralleled these advancements. Critical care nurses are at the forefront of patient management in the ICU, responsible for continuous assessment, intervention, and coordination of care. Their role extends beyond technical skills to include critical thinking, rapid decision-making, and effective communication with the interdisciplinary team. Given their continuous presence at the patient's bedside, nurses are uniquely positioned to implement and reinforce standardized care practices. Therefore, their knowledge and consistent application of critical care protocols and checklists are fundamental to the provision of safe and effective intensive care [4].

1.2 Critical Literature Review

The effectiveness of checklists in improving patient outcomes and safety across various medical disciplines has been extensively documented in the literature. In surgery, for instance, the implementation of the World Health Organization Surgical Safety Checklist has demonstrably reduced rates of complications and mortality. This success has inspired the adoption of similar checklist-based approaches in other high-risk areas, including critical care. The rationale behind using checklists in the ICU is multifaceted. They promote a culture of safety by standardizing care processes, fostering teamwork, and improving communication among healthcare providers. By providing a systematic framework, checklists help ensure that essential elements of care, such as prophylaxis against common ICU complications, are consistently addressed. The components of these bundles are often distilled into mnemonic checklists to facilitate their adoption and consistent use by clinical staff.

Despite the growing evidence supporting the benefits of checklists, their successful implementation is not without challenges. One significant factor influencing their effectiveness is the knowledge and acceptance of the healthcare professionals who are expected to use them. If nurses and other care providers do not understand the rationale behind the checklist components or perceive them as an additional burden rather than a helpful tool, adherence may suffer. Educational deficits regarding the specific elements of a checklist or the broader principles of critical care

management can impede its effective utilization.

Moreover, the literature suggests a potential disparity between knowledge and practice. It is possible for healthcare professionals to possess theoretical knowledge of best practices but struggle with consistent application in the dynamic and often chaotic environment of the ICU. This gap can be attributed to various factors, including time constraints, high patient-to-nurse ratios, lack of adequate resources, and insufficient training or reinforcement. Therefore, studies that not only assess knowledge but also observe actual practice are crucial for gaining a comprehensive understanding of adherence to critical care protocols.

The importance of continuing education and in-service training for ICU staff nurses has been highlighted as a critical strategy to enhance both knowledge and practice. Regular educational programs can update nurses on the latest evidence-based guidelines, reinforce the significance of checklist components, and provide opportunities for skill refinement. Furthermore, the integration of critical care checklists into nursing curricula at the undergraduate and postgraduate levels can establish a strong foundational understanding among future generations of nurses.

1.3 Research Gap

While the literature generally supports the utility of critical care checklists in enhancing patient safety and standardizing care, there remains a need for specific research focusing on the knowledge and practice of ICU staff nurses concerning these tools within diverse healthcare settings. Many studies tend to focus on the impact of checklist implementation on patient outcomes, or on broader aspects of teamwork and communication in the ICU. However, detailed assessments of nurses' individual knowledge and direct observational evaluations of their practical application of specific critical care mnemonics are less common, particularly in the context of particular hospital environments.

There is a gap in understanding the specific factors that might contribute to variations in knowledge and practice among ICU staff nurses regarding these specialized checklists. While general demographic variables are often collected, the nuanced relationship between these variables (such as years of experience in the ICU,

educational background, or prior exposure to related training) and both theoretical knowledge and observed practical adherence to these checklists warrants further exploration. Identifying these associations can provide valuable insights for tailoring educational interventions and professional development programs more effectively.

Furthermore, a comprehensive assessment that simultaneously evaluates both knowledge and observable practice allows for the identification of a potential knowledge-practice gap. Without directly assessing both components, it is challenging to determine if observed deficiencies in practice stem from a lack of understanding or from other systemic or environmental barriers. Bridging this specific gap in the literature can offer actionable insights for nursing educators, administrators, and policymakers aiming to optimize critical care delivery.

1.4 Objectives and Hypotheses

Objectives:

1. To assess the level of knowledge regarding a critical care checklist mnemonic among ICU staff nurses in a selected hospital.
2. To assess the level of practice regarding a critical care checklist mnemonic among ICU staff nurses in a selected hospital.
3. To determine the association between the knowledge level regarding a critical care checklist mnemonic and selected demographic variables of ICU staff nurses.
4. To determine the association between the practice level regarding a critical care checklist mnemonic and selected demographic variables of ICU staff nurses.

Hypotheses:

- **H1:** There will be a significant association between the knowledge level of ICU staff nurses regarding the critical care checklist mnemonic and selected demographic variables (e.g., educational qualification, years of experience in ICU, attendance at relevant continuing education

programs).

- **H2:** There will be a significant association between the practice level of ICU staff nurses regarding the critical care checklist mnemonic and selected demographic variables (e.g., educational qualification, years of experience in ICU, attendance at relevant continuing education programs).

2. Methods

2.1 Research Design

This study adopted a quantitative research approach utilizing a non-experimental descriptive study design. A descriptive design was chosen to accurately portray the existing levels of knowledge and practice concerning a critical care checklist mnemonic among ICU staff nurses without manipulating any variables or establishing cause-and-effect relationships. This design is particularly suitable for describing the characteristics of a population or phenomenon, which aligns with the study's objectives of assessing knowledge and practice levels and identifying their associations with demographic variables. The non-experimental nature implies that the researchers observed and measured variables as they naturally occurred, rather than intervening or assigning participants to different groups. This approach allowed for the collection of data in a naturalistic setting, minimizing disruption to the routine activities of the ICU staff.

2.2 Participants / Sample

The study population comprised ICU staff nurses working in a selected hospital. A total sample size of 90 ICU staff nurses was recruited for the study. The sampling technique employed was purposive sampling. Purposive sampling, a non-probability sampling method, was chosen to select participants who met specific inclusion criteria relevant to the study's objectives. The inclusion criteria for participants were: being a registered staff nurse currently working in the Intensive Care Unit of the selected hospital and providing informed consent to participate in the study. Exclusion criteria included nurses who were on leave during the data collection period or those unwilling to participate. This sampling technique ensured that the participants possessed the necessary experience and context relevant to the critical care

environment, thereby enhancing the relevance of the findings to the target population.

2.3 Materials and Apparatus

To achieve the study objectives, three primary tools were utilized for data collection:

1. **Demographic Variables Sheet:** This tool was designed to gather personal information from the participating ICU staff nurses. It included items related to age (in years), total number of years of experience in the ICU, highest educational qualification (e.g., Diploma, BSc Nursing, MSc Nursing), and whether they had attended any Continuing Nursing Education (CNE) or in-service education programs specifically on critical care checklists or similar standardized care protocols. This information was crucial for exploring associations between demographic characteristics and knowledge/practice levels.
2. **Structured Knowledge Questionnaire:** This self-administered questionnaire was developed to assess the theoretical knowledge of ICU staff nurses regarding the critical care checklist mnemonic. The questionnaire consisted of a series of multiple-choice and/or true/false questions covering various components of the mnemonic, its purpose, benefits, and practical application. The questions were formulated based on standard critical care guidelines and relevant literature concerning the checklist. Each correct answer was assigned a specific score, and the total score provided an objective measure of the nurse's knowledge level. The questionnaire was designed to be clear, unambiguous, and comprehensive, ensuring that it covered the essential aspects of the checklist.
3. **Observational Checklist:** This tool was used to objectively assess the actual practice of ICU staff nurses regarding the critical care checklist mnemonic in their daily patient care activities. The observational checklist comprised a list of observable behaviors and actions directly related to the components of the mnemonic. For each observed element, a binary scoring system (e.g., "performed" or "not performed") was utilized. The

researchers, or trained observers, directly observed the nurses during their routine patient care, noting the presence or absence of each specified practice. This direct observation method provided a more accurate reflection of actual behavior compared to self-reported practice, minimizing potential biases associated with recall or social desirability. To ensure consistency in observation, clear operational definitions were established for each item on the checklist.

Tool Validation:

Prior to data collection, all three tools underwent rigorous validation by a panel of nine experts. These experts included nursing educators, critical care specialists, and statisticians with extensive experience in nursing research and critical care. The validation process involved reviewing the content, clarity, relevance, and appropriateness of each item in the demographic sheet, knowledge questionnaire, and observational checklist. Feedback from the experts was incorporated to refine the tools, ensuring their face validity, content validity, and reliability. This process helped to ensure that the tools accurately measured the intended constructs and were suitable for the study population.

2.4 Data Collection Procedure

Formal ethical clearance was obtained from the ethical committee of the selected hospital prior to commencing the study. Additionally, formal permission to conduct the study was secured from the administration of the hospital and the Principal of the Holy Family College of Nursing, New Delhi. This ensured that all research activities adhered to ethical guidelines and institutional policies.

Data collection was conducted over a specific period, from January 22, 2024, to January 27, 2024. Before any data collection commenced, each potential participant was approached, and the purpose, objectives, benefits, and voluntary nature of their participation were thoroughly explained. Informed consent was obtained from all 90 participating ICU staff nurses. Confidentiality and anonymity of the participants' responses were strictly maintained throughout the study. Each participant was assigned a unique identification number, and no personally identifiable information was recorded alongside their responses.

The data collection process involved two distinct phases for each participant:

1. **Knowledge Assessment:** Participants were provided with the structured knowledge questionnaire to assess their theoretical understanding of the critical care checklist mnemonic. Nurses were given approximately 10-15 minutes to complete the questionnaire. The questionnaires were collected immediately upon completion to ensure all responses were captured.
2. **Practice Assessment:** Following the completion of the knowledge questionnaire, the observational checklist was used to assess the nurses' actual practice. Trained observers discreetly observed the nurses during their routine patient care activities in the ICU. The observation period for each nurse was approximately 15-20 minutes, during which the observer noted the presence or absence of the specific practices listed on the observational checklist related to the critical care mnemonic. To minimize observer bias and ensure consistency, the observers were thoroughly trained on the use of the checklist and the operational definitions of each practice item. The observations were conducted in a manner that did not interfere with the nurses' regular duties or patient care.

The sequential nature of data collection (knowledge assessment followed by practice observation) ensured that the knowledge assessment did not inadvertently influence the observed practice during the study period. All collected data were securely stored to maintain confidentiality.

2.5 Data Analysis

The data obtained from the demographic variables sheet, structured knowledge questionnaire, and observational checklist were compiled and analyzed using appropriate statistical methods. Both descriptive and inferential statistics were employed to interpret the findings.

Descriptive Statistics:

Descriptive statistics were used to summarize and

describe the basic features of the data. This included:

- **Frequency and Percentage Distribution:** Used to describe the demographic characteristics of the sample (e.g., age, years of ICU experience, educational qualification, attendance at CNE programs).
- **Mean, Median, and Standard Deviation:** Calculated for the scores obtained from the knowledge questionnaire and the observational checklist to describe the central tendency and variability of knowledge and practice levels, respectively. These measures provided a clear picture of the average performance and the spread of scores within the sample.

Inferential Statistics:

Inferential statistics were used to draw conclusions and make inferences about the population based on the sample data, and to examine relationships between variables.

- **Chi-square Test:** This non-parametric statistical test was primarily used to find out the association between the knowledge level and selected demographic variables, and between the practice level and selected demographic variables. The chi-square test is appropriate for analyzing categorical data and determining if there is a significant association between two nominal variables. The p-value was set at <0.05 level of significance, meaning that a p-value less than 0.05 would indicate a statistically significant association between the variables.

The statistical analysis was performed using suitable statistical software to ensure accuracy and efficiency in processing the collected data. The results were presented in a clear and concise manner, often utilizing tables and figures to facilitate understanding of the findings.

3. Results

This section presents the major findings of the study, categorized into preliminary analyses of demographic variables, assessment of knowledge levels, assessment of practice levels, and the associations between knowledge/practice and demographic variables.

3.1 Preliminary Analyses

A total of 90 ICU staff nurses participated in the study. The demographic characteristics of the sample were analyzed to provide a comprehensive profile of the study participants.

- **Age Distribution:** The majority of the samples, 52(57.78%), were in the age group of 21-24 years. This indicates a relatively young nursing workforce in the ICU setting.
- **Years of Experience in ICU:** A significant proportion of the nurses, 46(51.11%), had less than 1 year of experience as an ICU staff nurse. This suggests a notable presence of newly recruited or less experienced nurses in the critical care unit.
- **Educational Qualification:** The dominant educational qualification among the participants was B.Sc. Nursing, with 53(58.89%) of the sample holding this degree. This highlights the foundational educational background of the ICU nursing staff.
- **Attendance at CNE or In-service Education on Critical Care Checklists:** A substantial majority of the samples, 71(78.89%), reported that they had not attended any Continuing Nursing Education (CNE) or in-service education specifically focused on critical care checklists or similar standardized care protocols. This finding is particularly noteworthy as it suggests a potential gap in formal, ongoing education related to these critical tools.

These demographic insights provide important context for interpreting the findings related to knowledge and practice levels, particularly in understanding potential influencing factors.

3.2 Main Findings

Knowledge Assessment:

The study assessed the knowledge of ICU staff nurses regarding the critical care checklist mnemonic using a structured knowledge questionnaire. The findings revealed varying levels of knowledge among the participants:

- **Overall Knowledge Levels:** Out of the 90 ICU staff nurses, 59(65.55%), were found to have fair knowledge regarding the critical care checklist mnemonic. A smaller proportion, 18(20%), demonstrated poor knowledge, while only 13(14.44%) exhibited a good knowledge level. This indicates that while the majority possesses a moderate understanding, there is a significant segment with limited knowledge and a relatively small group with strong knowledge.
- **Knowledge Mean, Median, and Standard Deviation:** The mean value of knowledge among the ICU staff nurses was 12.84. The median value was 13, suggesting that half of the scores were above and half were below this point. The standard deviation was 2.99, indicating a moderate spread or variability in knowledge scores around the mean.

Practice Assessment:

The practice of ICU staff nurses regarding the critical care checklist mnemonic was assessed using an observational checklist. The results demonstrated a high level of adherence to the checklist in practice:

- **Overall Practice Levels:** The majority of the sample, 87(96.67%), demonstrated a good practice level concerning the critical care checklist mnemonic. Only 3(3.33%) of the nurses exhibited fair practice, and notably, no sample showed poor practice. This indicates a strong adherence to the practical application of the checklist components in the ICU setting.
- **Practice Mean, Median, and Standard Deviation:** The mean value of the level of practice was 9.83. The median value was 10, indicating that most nurses performed highly in the observed practices. The standard deviation was 1.05, suggesting a very low variability in practice scores, reinforcing the high and consistent level of practice across the sample.

3.3 Exploratory Findings

Association between Knowledge Level and Selected Demographic Variables:

The study explored the association between the knowledge level of ICU staff nurses and their selected

demographic variables using the chi-square test.

- **Educational Qualification:** There was a statistically significant association between knowledge level and educational qualification (chi-square =19.55, p-value =0.0033 at $p<0.05$ level of significance). This suggests that nurses with higher educational qualifications tend to have a better understanding of the critical care checklist mnemonic. This finding aligns with the hypothesis that educational background influences knowledge.
- **Other Demographic Variables:** No significant association was found between knowledge level and other demographic variables such as age or years of experience in the ICU. This indicates that for this sample, age and general ICU experience did not significantly predict a nurse's theoretical knowledge of the checklist.

Association between Practice Level and Selected Demographic Variables:

The association between the practice level of ICU staff nurses and their selected demographic variables was also examined using the chi-square test.

- **All Demographic Variables:** There was no significant association observed between the practice level and any of the selected demographic variables (age, years of experience in ICU, educational qualification, or attendance at CNE/in-service education) at $p<0.05$ level of significance. This is a crucial finding, indicating that while educational qualification influences knowledge, it does not appear to significantly impact the consistent application of the checklist in practice for this group of nurses. Similarly, other demographic factors did not show a statistical relationship with practice levels.

In summary, while a high level of practice regarding the critical care checklist mnemonic was observed among the ICU staff nurses, their knowledge levels were predominantly fair. A significant association was identified between knowledge and educational qualification, but interestingly, practice levels did not show similar associations with any demographic variables. This suggests a potential disconnect where

practical application is high, possibly driven by standardized unit protocols or direct supervision, even if the underlying theoretical knowledge among all nurses is not uniformly strong.

4. Discussion

4.1 Interpretation

This study aimed to assess the knowledge and practice of ICU staff nurses regarding a critical care checklist mnemonic and to explore the associations between these levels and selected demographic variables. The findings present a nuanced picture: while nurses demonstrate a high level of practical adherence to the checklist, their theoretical knowledge base appears to be less robust.

The demographic profile of the participants revealed a relatively young workforce with a significant proportion having less than one year of experience in the ICU. This demographic characteristic could influence both knowledge acquisition and practice integration. Early career nurses might be more amenable to adopting new protocols and checklists as part of their initial training, potentially contributing to the observed high practice levels, as these tools are often integral to unit-specific onboarding and patient safety initiatives. The predominance of B.Sc. Nursing graduates highlights a baseline level of formal education, which is a critical factor when considering the acquisition of scientific and theoretical knowledge. A concerning finding, however, was that a vast majority of nurses had not attended any specific CNE or in-service education on critical care checklists. This suggests a potential gap in formal, ongoing education directly related to these critical tools.

The assessment of knowledge levels indicated that the majority of ICU staff nurses possessed only "fair" knowledge, with a notable segment having "poor" knowledge, and a minority demonstrating "good" knowledge. This finding suggests that while nurses might be performing the checklist components, their understanding of the underlying rationale, specific nuances, or the broader implications of each item might not be comprehensively developed. For instance, they might know *what* to do, but not necessarily *why* each step is critical or the specific physiological consequences of omission. This knowledge deficit, if unaddressed, could potentially limit their ability to adapt to complex

situations, troubleshoot issues, or fully engage in evidence-based decision-making beyond rote application.

In stark contrast to the knowledge findings, the practice assessment revealed exceptionally high levels of adherence to the critical care checklist mnemonic, with almost all nurses demonstrating "good" practice. This suggests that the checklist is effectively integrated into the daily workflow of the ICU. This high practice level could be attributed to several factors: strong unit-level protocols, regular supervision, team-based reinforcement, or a culture that prioritizes the consistent use of patient safety tools. It is possible that even with fair or poor underlying knowledge, nurses are diligently following established procedures. This highlights the effectiveness of system-level interventions in driving compliance.

The exploratory findings on associations are particularly insightful. The significant association between knowledge level and educational qualification suggests that a higher academic background contributes to a better theoretical understanding of the checklist. This reinforces the importance of foundational nursing education in equipping professionals with the cognitive abilities to grasp complex medical concepts and protocols. However, the lack of a significant association between practice level and *any* demographic variable, including educational qualification, is a compelling observation. This implies that while education may facilitate knowledge, factors beyond age, experience, or formal schooling are driving consistent practice. These factors might include the unit's safety culture, leadership support, peer influence, or the direct utility of the checklist in preventing errors, which acts as a powerful motivator for consistent application regardless of individual knowledge nuances.

In essence, the findings indicate a successful implementation of the checklist at the behavioral level, likely due to strong procedural enforcement, but a need for deeper intellectual engagement with the tool among a segment of the nursing staff.

4.2 Comparison with Literature

The findings of this study, particularly the high adherence to checklist practice, align with a growing

body of literature that supports the effectiveness of checklists in standardizing care and improving patient safety in critical care environments [1]. Checklists are increasingly recognized as essential cognitive aids that reduce the reliance on memory and ensure critical steps are not overlooked, especially in high-pressure settings like the ICU. The observed high practice levels in this study are consistent with the general positive impact reported by many institutions after implementing similar safety tools.

However, the disparity between knowledge and practice observed in this study warrants further discussion in light of existing literature. While some studies focus predominantly on the positive outcomes associated with checklist use, fewer delve deeply into the nuanced relationship between staff knowledge and their actual procedural compliance. The finding that a majority of nurses had only "fair" knowledge, despite demonstrating "good" practice, suggests a potential "knowing-doing gap" [2]. This gap has been described in various healthcare contexts, where clinicians may intellectually understand best practices but face barriers or simply lack the deeper understanding needed for consistent, autonomous application. In this case, the high practice levels might be more reflective of a strong organizational culture that mandates checklist use, rather than a uniformly profound individual understanding across all staff members.

The significant association between knowledge and educational qualification resonates with previous research highlighting the role of formal education in building a strong theoretical foundation for nursing practice [3]. Nurses with higher academic qualifications are generally exposed to more in-depth theoretical concepts, research methodologies, and critical thinking frameworks, which can facilitate a better understanding of evidence-based tools like critical care checklists. This finding underscores the ongoing importance of baccalaureate and graduate nursing education in developing well-rounded critical care professionals.

Conversely, the lack of a significant association between practice and any demographic variable, including educational qualification, is a point of divergence or further nuance compared to some expectations. While one might intuitively assume that more experienced or

highly educated nurses would inherently demonstrate superior practice, this study suggests that consistent practice of a standardized tool can be achieved across various demographic profiles. This could be attributed to the checklist's design, which aims for simplicity and ease of use, making it accessible even to less experienced staff. Moreover, the strong emphasis on team communication and adherence within the ICU, as highlighted by Ervin et al. [2] in the context of teamwork, may flatten differences in individual practice levels, as the collective responsibility for checklist completion becomes paramount. Sharma and Sharma [3] also discussed the knowledge and practice of FAST HUGS BID among staff nurses, and while they likely showed some positive correlations, the specific nuances of our findings on the dissociation between knowledge and practice for certain demographic variables warrant further investigation. Similarly, Nair et al. [4] explored the mnemonic, indicating its structured nature. Such structured tools often lead to high compliance when integrated into daily workflows, irrespective of individual variability in background knowledge.

The high percentage of nurses who had not attended specific CNE or in-service education on critical care checklists is a crucial finding that merits comparison. While professional development is generally encouraged, this specific deficit could explain the "fair" knowledge levels. If ongoing education on the *rationale* and *components* of these checklists is not consistently provided, nurses might rely on initial training and observational learning, which may lead to procedural compliance without a deeper conceptual understanding. This finding suggests a critical area for intervention to bridge the knowledge gap.

In summary, this study reinforces the efficacy of checklists in promoting consistent practice in the ICU, aligning with the broader literature on patient safety tools. However, it also uncovers a potential discrepancy where high practice levels might be maintained through procedural adherence rather than uniformly strong theoretical knowledge, especially across different demographic groups, except for a clear link between higher education and better knowledge.

4.3 Strengths and Limitations

Strengths:

1. **Dual Assessment of Knowledge and Practice:** A significant strength of this study is the comprehensive approach of assessing both theoretical knowledge through a questionnaire and actual practice through direct observation. This provides a more holistic and accurate understanding of the nurses' engagement with the critical care checklist, as opposed to relying solely on self-reported data which can be prone to social desirability bias. The use of an observational checklist offers objective evidence of behavioral adherence.
2. **Purposive Sampling for Relevance:** Employing a purposive sampling technique ensured that all participants were currently working as ICU staff nurses, thus possessing direct and relevant experience in the critical care environment. This enhances the internal validity of the study by focusing on the target population directly impacted by the subject matter.
3. **Tool Validation:** The use of validated tools, with input from a panel of experts, strengthens the reliability and validity of the data collected. This rigorous validation process ensures that the instruments accurately measure what they intend to measure.
4. **Specific Focus on a Critical Care Mnemonic:** The study's narrow focus on a widely recognized critical care checklist mnemonic allows for specific and actionable insights into a practical tool used in daily ICU operations, making the findings highly relevant to clinical practice.
5. **Ethical Considerations:** Obtaining ethical clearance and informed consent, while ensuring confidentiality and anonymity, demonstrates adherence to ethical research principles, protecting the rights and well-being of the participants.

Limitations:

1. **Generalizability:** The study was conducted in a single selected hospital in New Delhi. Therefore, the findings may not be generalizable to all ICU settings or other geographical regions, as organizational cultures, training programs, and patient populations

can vary significantly.

2. **Non-experimental Design:** The non-experimental descriptive design, while suitable for assessing existing levels, precludes the establishment of cause-and-effect relationships. It is not possible to definitively conclude why certain associations exist or why practice levels are high despite varying knowledge levels.
3. **Sampling Technique:** While purposive sampling ensured relevant participants, it is a non-probability sampling method, which inherently limits the generalizability of findings compared to probability sampling techniques. The specific characteristics of the selected 90 nurses might not fully represent the broader population of ICU nurses.
4. **Observation Bias:** Although efforts were made to minimize observer bias through training and clear definitions, direct observation can still introduce a degree of Hawthorne effect, where participants modify their behavior simply because they know they are being observed. This could potentially inflate practice scores.
5. **Limited Scope of Demographic Variables:** While several demographic variables were explored, other potential influencing factors, such as specific unit policies, workload, staffing levels, peer influence, or individual attitudes towards checklists, were not extensively investigated. These unexamined variables could also play a significant role in knowledge acquisition and practice adherence.
6. **Duration of Observation:** The 15-20 minute observation period for practice assessment, while practical, might not fully capture the complete range of practice over an entire shift or across different patient scenarios. Some aspects of the checklist might be performed less frequently or at different times.

4.4 Implications

The findings of this study have significant implications across several domains of nursing, including practice,

education, administration, and research.

Nursing Practice:

The observed high level of practice adherence to the critical care checklist mnemonic is commendable and indicates a strong foundation for patient safety in the ICU. However, the concurrent finding of fair to poor knowledge among a considerable proportion of nurses suggests a critical need for reinforcing the theoretical underpinnings of these practices. It is essential for nursing personnel to not only perform the checklist tasks but also to deeply understand the rationale behind each component. This deeper understanding enables nurses to apply the checklist more effectively in diverse clinical situations, recognize deviations, and contribute to critical decision-making. Therefore, regular in-service training, seminars, and workshops specifically focused on the "why" behind each checklist item are crucial. These educational initiatives should aim to enhance critical thinking and problem-solving skills related to checklist implementation, ensuring that nurses can extend their existing knowledge and provide truly evidence-based, quality care, especially in dynamic critical care environments.

Nursing Education:

The study highlights a clear mandate for nursing education, both at the academic and continuing professional development levels. Nursing curricula, particularly for programs specializing in critical care, should formally incorporate comprehensive modules on critical care checklists and their updated knowledge. This proactive integration can equip student nurses with foundational knowledge of these vital tools even before they enter clinical practice. For practicing nurses, continuing nursing education (CNE) providers and nurse educators must prioritize the delivery of engaging and informative in-service educational classes. Given the high percentage of nurses who had not attended such programs, there is a substantial opportunity to bridge knowledge gaps through structured and accessible educational interventions. These programs should not only cover the procedural aspects but also delve into the evidence base, clinical significance, and practical challenges of implementing checklists. Nurse educators should also empower nurses to become internal trainers, capable of teaching junior staff and nursing students in

clinical settings about the importance and proper application of critical care checklists.

Nursing Administration:

Nurse administrators and managers play a pivotal role in fostering a culture of safety and continuous improvement. The findings suggest that while their efforts in promoting practice adherence are successful, there's a need to invest further in knowledge enhancement. Administrators should take the initiative to organize and fund regular, mandatory in-service educational programs on critical care checklists. This includes allocating dedicated time for nurses to attend these sessions without compromising patient care, providing necessary resources (e.g., educational materials, expert facilitators), and incorporating knowledge assessments into performance evaluations. Encouraging and incentivizing participation in external CNE programs related to critical care safety tools would also be beneficial. By prioritizing both knowledge and practice, administrators can create an environment where nurses are not just following protocols but actively understanding and championing patient safety initiatives.

Nursing Research:

This study contributes to the existing body of literature and opens avenues for future nursing research. The findings provide a baseline understanding of knowledge and practice levels in a specific context. Future research could focus on interventional studies designed to evaluate the effectiveness of various educational strategies (e.g., online modules, simulation-based training, peer-led education) in improving nurses' knowledge of critical care checklists. Comparative studies could also be conducted to assess knowledge and practice across different types of ICUs or hospitals to identify best practices and areas for improvement. Research exploring the impact of organizational culture, leadership styles, and staffing models on both knowledge acquisition and practice adherence would also be valuable. Furthermore, longitudinal studies could track the sustained impact of educational interventions and checklist implementation over time. Nurses themselves should be encouraged and supported to participate in and lead such research efforts, contributing to the evidence base that guides

critical care nursing practice.

4.5 Conclusion and Future Directions

This study provides valuable insights into the knowledge and practice of ICU staff nurses regarding a critical care checklist mnemonic in a selected hospital. The findings reveal a commendable high level of practical adherence, suggesting effective integration of the checklist into daily workflow, likely driven by strong unit protocols and a culture of safety. However, the study also highlights a significant area for improvement: the underlying theoretical knowledge of these vital tools among a substantial portion of the nursing staff. While educational qualification was significantly associated with knowledge levels, practice levels appeared consistent across various demographic profiles, implying that procedural compliance might be maintained through means other than uniformly deep individual understanding.

The implications for nursing practice, education, administration, and research are clear. There is an urgent need for targeted educational interventions and continuous professional development programs to bridge the identified knowledge gap. These programs should focus on elucidating the rationale behind each checklist component, fostering critical thinking, and ensuring that nurses possess a comprehensive understanding of the evidence base underpinning their actions. Nursing curricula must formally integrate updated knowledge of critical care checklists, and administrators must prioritize resources for ongoing education and training.

Future Directions:

Building upon these findings, future research should consider:

1. **Replication with Larger and Diverse Samples:** Replicating this study with larger sample sizes across multiple hospitals and diverse geographical locations would enhance the generalizability of the findings and provide a broader understanding of the issue.
2. **Interventional Studies:** Conducting intervention studies to evaluate the effectiveness of specific educational programs (e.g., workshops, online modules, simulation training) on improving both

knowledge and practice levels.

3. **Qualitative and Mixed-Methods Approaches:** Utilizing qualitative research methods (e.g., interviews, focus groups) or a mixed-methods approach to explore nurses' perceptions, barriers, and facilitators to consistent checklist use, which might provide deeper insights into the knowledge-practice gap.
4. **Longitudinal Studies:** Implementing longitudinal studies to track the long-term impact of educational interventions and sustained checklist use on both knowledge retention and patient outcomes.
5. **Comparative Studies:** Performing comparative studies between different types of critical care units (e.g., medical ICU, surgical ICU, cardiac ICU) or between hospitals with varying levels of resources and training programs to identify best practices.
6. **Impact on Patient Outcomes:** Future research should also directly link the knowledge and practice of critical care checklists to measurable patient outcomes (e.g., reduction in complications, length of stay, mortality rates) to further demonstrate the clinical significance of these interventions.

By addressing these future directions, the nursing profession can continue to enhance the quality and safety of care delivered in Intensive Care Units, ensuring that nurses are not only proficient in performing tasks but also possess the foundational knowledge to truly excel in critical care.

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