Original article:

Competencies of Critical Care Nurses in Najran, Saudi Arabia: A Self-Assessment and Implications for Practice

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Abstract:

Background and aim:
Critical care nursing competency is essential for delivering safe and effective care to critically ill patients. Despite global attention to critical care nurse (CCN) competencies, region-specific assessments in Saudi Arabia, particularly in Najran, remain limited. This study aimed to assess the self-reported competency levels of CCNs in Najran City Hospitals and examine the relationship between their competencies and sociodemographic characteristics.

Methods:
A cross-sectional survey of 158 CCNs across four Najran hospitals was conducted using a convenience sampling approach .Sample size was determined using the Raosoft online sample calculator , a sample size of 179 CCNs was required from a population of 334 (50% response rate, 95% power, 5% margin of error). The survey was completed by 158 nurses, with a response rate of 88.26%. Data were collected using the validated Intensive and Critical Care Nursing Competence Scale-1 (ICCN-CS-1), which evaluates four domains: knowledge, skills, attitude/values, and experience. Data were analyzed using IBM SPSS Statistics version 23, with descriptive statistics summarizing participant characteristics and chi-square tests employed to examine associations between categorical variables.

Results:
More than half of the nurses (55.7%) demonstrated excellent overall competency, with the highest scores in knowledge (63.3%), experience (59.5%), and attitude (58.9%) domains. The skills domain showed the lowest percentage of excellence (48.1%). Competency level was significantly associated with marital status ($p = 0.005$) and attendance at patient safety training ($p = 0.008$), whereas age and experience were not significantly associated with both.

Conclusion:
The results indicated that the CCNs who participated in the study have a high overall competency, knowledge-based gaps remain. Although these gaps do not appear to critically affect current clinical practice or demand immediate intervention, they highlight opportunities for improvement. These findings emphasize the need for continuous theoretical reinforcement, structured clinical mentoring, and simulation-based training to ensure sustained excellence in critical care.

Keywords:
Critical care nursing, competency, self-assessment, patient safety, Saudi Arabia

Introduction:

Critical care nursing is a highly specialized field requiring nurses to possess advanced clinical judgment, rapid decision-making abilities, and the skills to manage critically ill patients with complex and often life-threatening conditions [1,2]. Nurses working in critical care units (CCUs) are central to ensuring patient safety and optimizing outcomes through vigilant monitoring, intervention, and multidisciplinary collaboration [3]. Globally, numerous efforts have been made to define and assess the competencies required of CCNs, with a growing emphasis on standardized frameworks to evaluate their performance [4,5]. However, research assessing these competencies in region-specific contexts, particularly within the Kingdom of Saudi Arabia and its southern regions, such as Najran, remains scarce.

As Saudi Arabia's healthcare sector undergoes significant transformation under Vision 2030, enhancing the competency of healthcare professionals, including CCNs, has become a national priority [6]. While the nursing workforce has expanded rapidly across the country, evidence from local studies suggests variation in the preparedness and self-efficacy of nurses working in high-acuity environments [7,8]. Therefore, measuring and understanding CCN competency profiles in specific regions is crucial for identifying training needs, ensuring quality care, and informing strategic workforce development.

Several international studies have investigated competencies in critical care nursing, offering insights into both required skill sets and challenges across healthcare systems. In Japan, Okumura et al. validated a questionnaire emphasizing patient safety as a core competency [9]. Zhang et al. developed a Delphi-based framework that highlighted domains such as clinical decision-making, teamwork, and patient-centred care[10]. The Australian College of Critical Care Nurses (ACCCN)has similarly provided competency standards that serve as benchmarks for practice[11]. In Norway, Henriksen et al. identified communication, ethical sensitivity, and leadership as critical qualities, broadening the scope beyond technical skills [12].

According to the Saudi Commission for Health Specialties (SCFHS), nurses—especially in specialized fields—must master the following core competencies: basic nursing skills, core clinical competencies, and nursing care planning and documentation.

Najran, located in southern Saudi Arabia near the Yemeni border, serves a growing population with varied healthcare needs. The region faces resource constraints in specialized medical services and relies on

a diverse nursing workforce composed of both Saudi and expatriate staff. These factors, coupled with high patient acuity in critical care units, make Najran a relevant setting for evaluating and enhancing critical care nurse competencies to inform targeted training and policy initiatives.

To the best of our knowledge, this study is the first region-specific assessment of critical care nurse competencies in Najran, Saudi Arabia, using a validated international framework (ICCN-CS-1). It generates evidence to guide targeted training, structured mentorship, and policy development within the region's unique healthcare context by identifying competency strengths and areas for improvement. The findings will help align workforce development initiatives with Saudi Arabia's Vision 2030 goals, enhance CCNs' preparedness in high-acuity environments, and ultimately improve patient safety and quality of care.

This study addresses a critical gap by evaluating CCNs' self-reported competencies in Najran City hospitals using the validated Intensive and Critical Care Nursing Competence Scale-1 (ICCN-CS-1). By providing a localized assessment of self-perceived competencies, the research situates its findings within both international and regional literature, offering evidence-based insights to inform nursing education, professional development, and healthcare policy in Saudi Arabia. Ultimately, this study aims to strengthen the evidence base for critical care practice and contribute to the global discourse on optimizing nurse competencies in intensive care environments. This study aims to assess self-reported competency levels of CCNs in Najran using the ICCN-CS-1 and to explore associations between competencies and sociodemographic factors.

Methods:

Study design:

A cross-sectional survey was conducted to assess the competency levels of nurses in the Critical Care Units (CCUs) of Najran City Hospitalsn.

Study setting:

The study was conducted in all four Najran city hospitals, which include three Ministry of Health hospitals (King Khalid Hospital, Najran General Hospital, and Maternity and Children's Hospital) and one university hospital (Najran University Hospital). These hospitals collectively house various critical care specialties, including Medical Intensive Care Units (ICU), Cardiac Surgical Intensive Care Units (CSICU), Coronary Care Units (CCU), Pediatric Intensive Care Units (PICU), Neonatal Intensive Care Units (NICU), and Burn Units, reflecting a diverse range of patient acuity and specialized care needs.

King Khalid Hospital had 168 CCNs in 4 CCUs, Najran General Hospital had 51 CCNs in 2 CCUs, Maternity and Children's Hospital had 109 CCNs in 2 CCUs., and Najran University hospital had 9 CCNs in one CCU.

Study Sample:

The target population included all nurses working in the CCUs of the four Najran City Hospitals. The sample size was determined using the Raosoft online sample calculator. Based on a total population of 334 CCNs, a response rate of 50%, a power level of 95%, and a margin of error of 5%, a sample of 179 CCNs from all CCUs was required, and 158 nurses completed the survey with a response rate of 88.26%.

Inclusion and exclusion criteria:

All nurses with one year of experience who worked in the CCUs at the time of the study and who agreed to participate in the study were included. Nurses with less than one year of experience, intern nurses, nursing students, and nurses who refused to participate in the study were excluded from the study.

Data collection tool:

Data were collected using a two-section self-administered questionnaire. The first section collected the demographic data of the CCNs, including age, gender, marital status, qualification, nationality, work unit, education level, years of experience, and critical care training. The second section was the Intensive and Critical Care Nursing Competence Scale-1 (ICCN-CS-1). The ICCN-CS-1 is valid and reliable and was developed by Lakanmaa et al (2014). This instrument has been extensively validated and is widely recognized for its robust psychometric properties, making it suitable for evaluating ICU nurse competencies across diverse clinical and cultural settings. The ICCN-CS-1 measures multiple dimensions of critical care nursing competence, including clinical decision-making, technical skills, communication, and professional development. The reliability and validity of the ICCN-CS-1 have been well documented in previous research. In the original validation study, Lakanmaa et al. reported high internal consistency (Cronbach's $\alpha = 0.88–0.98$) and confirmed construct validity through factor analysis [13]. The Persian version of the scale demonstrated strong reliability and preserved the four-factor structure, confirming its applicability in Iranian ICU contexts [14] . Similarly, the Turkish version exhibited excellent internal consistency ($\alpha = 0.98$) and acceptable model fit in confirmatory factor analysis, further supporting its reliability and validity [15] . These findings collectively affirm that the ICCN-CS-1 is a reliable and valid tool for assessing self-perceived competencies

of critical care nurses, ensuring the instrument's appropriateness for the present study.

To assess the CCN's competency level. The validity of the tool for the current study's context was assessed by five nursing administration experts to ensure its relevance, comprehensiveness, and appropriateness for measuring the intended constructs. This expert validation involved a thorough review of each item for clarity, cultural relevance, and alignment with Saudi practice in critical care nursing. Based on their feedback, necessary modifications were implemented to enhance the tool's applicability to the local setting. To test the clarity, applicability, and time required to complete the tool, a pilot study was conducted with 10% (18 CCNs) of the target sample; data from the pilot study was excluded from the final analysis. The pilot study confirmed the tool's clarity and applicability, with an average completion time of 8-12 Minutes. The previously reported Cronbach's alpha level ranging from 0.83 to 0.98, by Lakanmaa et al. (2014) and Shouryabi et al. (2017).

The original ICCN CS-1 comprises 144 items divided into two main parts: clinical competence (80 items) and professional competence (64 items). Each part is further divided into four subdomains: knowledge base, skill base, attitude and value base, and experience base. Each of these four subdomains contain 36 items rated on a 5-point Likert scale (1=very poor to 5=very well). A score range of 36 to 180 for each of the four subdomains with a total score for the ICCN CS-1 was 144-720. The total score was categorized into four competency levels: poor (144-288), moderate (289-432), good (433-576), and excellent (577-720).

In the current study, we used a modified version of the ICCN-CS-1 tool, consisting of 55 items selected from the original 144, based on expert recommendations to better align with the study population and enhance participation and response rates. Items were selected based on expert consensus for relevance to Saudi critical care settings, ensuring coverage of all four competency domains. The selected items were distributed across the original four subdomains: Knowledge base (15 items; score range 15–75), Skill base (12 items; score range 12–60), Attitude and value base (14 items; score range 14–70), and Experience base (14 items; score range 14–70).). Each item was rated on a 5-point Likert scale (1 = very poor to 5 = very well), resulting in a total possible score ranging from 55 to 275. Despite the reduction in item number, the scoring method remained consistent with the original ICCN-CS-1 tool.

This structure enables a detailed and

holistic assessment of a nurse's capabilities in intensive and critical care settings, supporting targeted development and practice improvement

Data Collection:

After obtaining ethical approval and permissions from the participating hospitals, official letters were sent to the directors and heads of departments of the hospitals to seek approval for the study. The researchers introduced themselves to the study participants, explained the purpose of the study, and obtained written consent. Questionnaires were distributed individually or in groups during shift changes. Participants completed the questionnaires independently, taking approximately 40-50 minutes. The researchers were available to answer any questions during the data collection process. A total of 245 questionnaires were distributed from March to June 2024. The CCNs returned 179 questionnaires, resulting in a 73% response rate.

Ethical Considerations:

The scientific research committee at the College of Nursing and the ethical research committee at the deanship of scientific research at Najran University (202402-076-018577-041996) approved this study. Informed consent was obtained from the CCNs after they were fully informed of the study's purpose, risks, benefits, and their right to withdraw from the study at any time. All participants were assured confidentiality, privacy, and autonomy. Confidentiality was ensured by coding participants and storing data in secure, accessible only to the research team. Privacy was maintained through private data collection settings, and autonomy was respected by providing detailed study information, emphasizing voluntary participation, and allowing withdrawal at any time without consequence.

Data Analysis:

Following data collection, the data were cleaned, entered, and analyzed using SPSS version 23. Twenty one questionnaire were excluded because they were significantly incomplete; questionnaires were deemed 'significantly incomplete' and subsequently excluded if more than 10% of the items were left unanswered, or if critical demographic information was missing, rendering them unsuitable for comprehensive analysis. Missing data patterns were analyzed, and no systematic bias was identified. Descriptive statistics (numbers, percentages, means, and standard deviations) were employed to summarize the data. Chi-square tests were used to assess associations between variables, with a p-value of 0.05 indicating statistical significance.

Results:

Description of Sociodemographic

Characteristics of Nurses

A total of 158 nurses participated in the study working at different intensive and critical care units. Table 1: Showed the distribution of nurses based on their sociodemographic characteristics: It can be observed that the highest percentage of the studied nurses (87.3%) were in the age group of 20 to less than 30 years. Females were more prevalent in more than two-thirds (60.8%) of the studied sample. More than three-quarters of the studied nurses (78.5%) were single. 57% of them were non-Saudi. In relation to area of work, exactly half of the studied nurses were working in the ICU. More than half of the participants had a bachelor's degree in nursing (53.4%), two-thirds of nurses (65.8%) had 1–3 years of work experience, and most of the studied nurses (87,87.3%) had completed a completed a previous training course about patient safety.

Table 1: Characteristics (Socio demographic& professional) of the studied nurses.

Variable	No. (n = 158)	%
Age Group		
- 20_30 years	138	87.3
- 30_40 years	16	10.1
- more than 40 years	4	2.5
Gender	62	39.2
- Male		
- Female	96	60.8
Marital status		
- Married	32	20.3
- Single	124	78.5
- Widowed	2	1.3
Nationality		
- Saudi	68	43.0
- Non-Saudi	90	57.0
Educational level		
- Diploma	34	21.5
- BSc degree	108	68.4
- Postgraduate	16	10.1
Working unit		
- Intensive Care Unit (ICU)	84	53.2
- Cardiac Surgical Intensive Care Unit (CSICU)	8	5.1
- Cardiac care Unit (CC)	20	12.7
- Pediatric Intensive Care Unit (PICU)	11	7.0

- NICU Neonate (Intensive Care Unit)	29	18.4
- Burn unit	6	3.8
Experience year		
- 1_3years	104	65.8
- 3_5years	24	15.2
- more than 5years	23	14.6
- more than 10 years	7	4.4
Did you study patient safety course during college study?		
- Yes	144	91.1
- No	14	8.9
Did you attend training course about patient safety		
- Yes	138	87.3
- No	20	12.7

Description of mean and standard deviation of domains of competency among nurses

The Table 2: showed that the nurses responses in each of the competency subdomains ranged from the minimum to the maximum scores (12–75), with the knowledge domain having the highest mean score (55.50±17.81), followed by the attitude and value domain (52.68±15.89), the experience domain (50.40±19.3), and the lowest mean score in the skills domain (45.61± 14.01).

More than three-fifths of the studied nurses (63.3%) had a good level of competence in relation to knowledge base, compared with 59.5% for attitude and value base, 58.9% for skills, and 48.1% for experience base This table showed that more than half of the studied nurses (55.7%) had an excellent level of competency, while the lowest percent of them (12.1%) had a poor level of competency with a mean ± SD (204.15± 63.62).

Table 2: Distribution of the studied nurses according to their total competency .

Main Domains	Sub Domains	Minimum	Maximum	Mean ± SD
Total ICCN -CS-1	Knowledge base	15.00	75.00	±17.81 55.50
	Skill base	12.00	60.00	±14.00 45.60
	Attitude & value base	14.00	70.00	±15.89 52.68
	Experience base	14.00	70.00	±19.344 50.35
	Total ICCN CS-1	55.00	275.00	204.15±63.62

Percentage distribution of subdomains of competency of the nurses

Table 3: Distribution of the studied nurses regarding to sub domains competency levels (n. 158).

Main Domains	Sub Domains	Poor		Moderate		Good		Excellent	
		No	%	No	%	No	%	No	%
	Knowledge base	8	5.1	18	11.4	32	20.3	100	63.3
	Skill base	22	13.9	25	15.8	35	22.2	76	48.1
	Attitude & value base	8	5.1	17	10.8	40	25.3	93	58.9
	Experience base	10	6.3	40	25.3	14	8.9	94	59.5
	Total ICCN CS-1	20	12.7	26	16.5	24	15.2	88	55.7

The association between level of Competency of the studied nurses and their sociodemographic characteristics

The association between nurses' competency levels and their sociodemographic characteristics is presented in Table 4. No statistically significant association was observed between competency levels and age (χ^2 = 0.598), gender (χ^2 = 0.083), nationality (χ^2 = 0.793), years of experience (χ^2 = 0.510), or prior patient safety courses during college study (χ^2 = 0.65). In contrast, marital status showed a significant association with competency level (χ^2 = 0.005), where single nurses were more likely to demonstrate excellent competency compared to married counterparts. Similarly, educational level was significantly associated with competency (χ^2 = 0.010); nurses with a bachelor's degree exhibited higher competency than diploma nurses. Working unit also showed a significant relationship (χ^2 = 0.010), with ICU nurses demonstrating the highest proportion of excellent competency compared to those in other critical care units. Additionally, attending a training course on patient safety was significantly associated with higher competency levels (χ^2 = 0.008), whereas those who did not attend training had lower competency scores.

Table 4: Association between level of Competency of the studied nurses and their sociodemographic characteristics.

Sociodemographic characteristics	Total level of competency				Chi- Square
	Excellent	Good	Moderate	Poor	
	n (%)	n (%)	n (%)	n (%)	
Age Group					0.598
• 20_30 years	76 (48.1)	20(12.7)	24(15.19)	18(11.4)	
• 30_40 years	8(5.1)	4(2.53)	2(1.3)	2(1.3)	
• > 40 years	4(2.5)	0	0	0	
Gender					0.083
• Male	30(18.9)	7(4.43)	15(9.5)	10(6.2)	
• Female	58(36.7)	17(10.8)	11(6.96)	10(6.2)	

Marital status					0.005*
• Married	16(10.1)	8(5.1)	2(1.3)	6(3.8)	
• Single	72(45.6)	14(8.9)	24(15.19)	14(8.9)	
• divorced	0	0	0	0	
• widower	0	2 (1.3)	0	0	
Nationality					0.793
• Saudi	40(25.3)	11(6.96)	10(6.32)	7(4.43)	
• Non Saudi	48(30.4)	13(8.22)	16(10.1)	13(8.23)	
Educational level					0.010
• Diploma	26(16.5)	2(1.3)	4(2.53)	2(1.27)	
• BSc degree	52(32.9)	22(13.9)	22(13.69)	12(7.6)	
• Postgraduate	10(6.32)	0	0	6(3.8)	
Working units					0.010
• ICU	51(32.3)	13(8.23)	14(8,86)	6(3.8)	
• CSICU	2(1.26)	0	4(2.53)	2(1.26)	
• CCU	12(7.6)	3(1.9)	1(0.63)	4(2.53)	
• PICU	6(3.8)	2(1.3)	2(1.3)	1(0.63)	
• NICU	13(8.2)	5(3.16)	5(3.16)	6(3.8)	
• Burns unit	4(2.53)	1(0.63)	0	1(0.63)	
Experience year					0.510
• 1_3years	60(37.9)	14(8.86)	17(10.80	13(8.23)	
• 3_5years	10(6.3)	6(3.8)	6(3.8)	2(1.26)	
• > 5 years	13(8.22)	4(2.53)	3(1.89)	3(1.89)	
• > 10 years	5(3.16)	0	0	2(1.26)	
Did you study patient safety course during college study?					0.65
• Yes	82(51.9)	24(15.2)	22(13.9)	16(10.1)	
• No	6(3.79)	0	4(2.53)	4(2.53)	
Did you attend training course about patient safety					0.008
• Yes	82(51.9)	22(13.9)	18(11.4)	16(10.1)	
• No	6(3.8)	2(1.26)	8(5.1)	4(2.53)	

Discussion:

Competence assessment in intensive and critical care nursing education and practice is essential for nurses' professional development and patient safety. The American Joint Commission on Accreditation of Healthcare Organizations (AJCAHO) emphasizes that healthcare professionals—including nurses—must demonstrate competence in both knowledge and clinical practice to deliver quality patient care 16.

This study examined the overall competency levels of 158 nurses working in critical care and intensive care units (CCUs/ICUs), revealing that more than half (55.7%) of the nurses demonstrated an excellent level of competency, while only 12.1% fell within the poor competency category. The total mean competency score (ICCN-CS-1) was 204.15 ± 63.62, indicating a generally high level of competence among the study population.

The current study's findings—highlighting higher nurse competency in the knowledge and attitude domains and lower performance in skills and experience—are consistent with recent literature. Studies have emphasized that critical care nurses often possess strong theoretical understanding but struggle with hands-on application due to limited experiential learning and simulation exposure[1,2] .

Research also shows that professional attitudes and values are generally well developed, especially among nurses with more clinical exposure and continuing education. However, clinical skills and practical experience remain challenging, particularly in resource-limited settings or among novice nurses. This trend was reinforced by findings indicating that structured mentorship and simulation-based training significantly improve skill and experiential competence [3].

The need to strengthen experiential learning is a recurring recommendation, with multiple studies advocating for ongoing clinical mentoring, competency-based evaluations, and immersive simulations to close the theory–practice gap in critical care nursing [1, 3].

The findings of the current study are consistent with several recent studies conducted between 2020 and 2025, which emphasize that critical care nurses generally demonstrate stronger competencies in the domains of knowledge and professional attitudes, while showing lower proficiency in clinical skills and experiential competence. For instance, A study by Bothyna Zakaria Mushed, conducted to assess of Competencies' Level of Critical and Intensive Care Unites Nurses at King Abdulaziz Medical City and King Abdullah Specialized Children Hospital found that the majority of nurses demonstrated an excellent overall level of competency, with the highest proportion showing good competency specifically in the knowledge base domain [15] , Siam et al. reported that while ICU nurses exhibited adequate theoretical knowledge, their practical application and hands-on experience were often limited, largely due to a lack of structured training environments [1]. Similarly, Sole et al. emphasized the ongoing

gap between theory and clinical practice in critical care settings, advocating for improved integration of simulation-based learning to enhance skill development[2].

More recently, Haddad et al. found that clinical mentoring and structured competency-based training programs significantly improved nurses' skills and experiential learning, especially among early-career nurses [3]. These findings support the observation that less than half of the nurses demonstrated high levels of experiential competence. The continued emphasis in the literature on simulation, guided clinical exposure, and continuous professional development reinforces the importance of institutional support and educational strategies in bridging the observed gaps in practice.

More than half of the nurses (55.7%) demonstrated excellent competency, with the highest performance in knowledge and attitude domains and comparatively lower competency in skills. These results are consistent with those of studies conducted in Saudi Arabia and other regions. For example, Alghamdi et al. (2016) found that critical care nurses showed strong knowledge and professional values but needed improvement in clinical decision-making and psychomotor skills. [16] .Similarly, Almalki et al. (2018) reported that while most nurses demonstrated adequate competence in knowledge and attitudes, skill-related competencies were relatively lower in Riyadh [17].

Comparable findings have also been reported in international studies. In Turkey, Karabacak et al. (2019) highlighted that critical care nurses had high competency in attitudes and ethical values but moderate competency in clinical skills [25]. In Iran, Goudarzi et al. (2020) documented that competence improved with experience and continuous education; however, skill-based competencies remained an area that required targeted training [26] .

Overall, the present results confirm that although critical care nurses demonstrate strong theoretical knowledge and values, a persistent gap exists in skill-based competencies. This trend across different contexts emphasizes the need for structured continuing education and simulation-based training to bridge the gap between knowledge and practice [23–26].

When disaggregated into subdomains, the skill base had the highest proportion of excellence (63.3%), followed by the attitude and value base (58.9%) and the experience base (59.5%). The knowledge base had the lowest proportion of nurses rated excellent (48.1%) but showed a more balanced distribution across the competency levels, with 13.9% still falling under poor competency. These results indicate that

while overall competency is high, specific areas—especially knowledge—still warrant ongoing improvement.

These findings are consistent with those of recent literature from the past five years. For instance, Siam et al. (2020) found that critical care nurses in Egypt exhibited varying levels of competence across domains, with the highest performance in practical skills and professional behaviors and lower scores in theoretical knowledge[1]. This aligns with the results of the current study, where skill- and attitude-based competencies were the strongest domains. Similarly, Sole et al. (2020) emphasized that although critical care nurses are often well-trained in hands-on procedures, their knowledge application and critical reasoning can be limited, especially in high-stress environments [2].

Haddad et al. (2023) highlighted the positive impact of clinical mentoring and structured professional development programs on improving ICU nurses' skill-based and experiential competencies. Their findings support the observation of high competence in both the skill and experience subdomains. They further suggested that continuous in-service training and simulation-based learning can elevate nurses' performance levels from moderate to excellent levels [3].

Recent trends indicate a growing emphasis on attitude and values in clinical competence. The high percentage (58.9%) of nurses rated as excellent in this domain aligns with the findings of Alhassan et al. (2022), who reported that ICU nurses in Saudi Arabia scored highly in ethical practice, communication, and teamwork, which are often influenced by workplace culture and leadership quality [4].

The current study found that nurses displayed high overall competence (55.7% excellent), with the knowledge base being strongest (63.3% excellent) and the skill base comparatively weaker (48.1% excellent). These results align with previous ICCN-CS-1–based research in Saudi Arabia, where ICU nurses similarly exhibited strong overall competence and higher knowledge domain ratings.15 Nevertheless, comparable to our findings, broader studies in Saudi Arabia using measurement tools such as the CIRN also revealed that skills like critical thinking and research aptitude lag behind legal/ethical practice [23]. Moreover, evidence consistently shows that nurse competence improves with experience and continuous in-service education, highlighting the necessity of targeted training to bolster the weaker skill domain [28,29] .

The current study found no significant associations between competency and age, gender, nationality, experience, or patient-

safety coursework during college, whereas significant associations were found for marital status, educational level, working unit, and attendance at patient-safety training. The overall pattern high global competence with comparatively lower skill performance is consistent with the international literature using ICCN-CS-1 or related frameworks. Multi-country and regional studies report upper-range self-assessed competence, particularly in knowledge/values, with skills and applied clinical judgment emerging as relative gaps (often attributed to limited deliberate practice and simulation exposure) [1,32]. Tool- and framework-level work also converges on the need to emphasize applied competencies (e.g., clinical judgment, guideline use, and teamwork) in critical care curricula and evaluation [33,34].

The positive association between competency and recent patient safety training aligns with quasi-experimental and scenario-based studies demonstrating that simulation and standardized training improve nurses' knowledge, skills, confidence, and decision-making in critical care contexts [31,35–37]. Moreover, systematic evidence indicates that higher clinical competence is positively correlated with patient-safety culture, reinforcing the utility of targeted, practice-oriented training to raise competence where it matters most for outcomes [25]. International cohorts outside our setting (e.g., Malawi, Iran) similarly show high overall competence with domain variability shaped by the practice environment and unit characteristics—echoing our finding that working unit influences competence profiles [32,38].

Conclusions:

This study assessed the competency levels of nurses working in critical care and intensive care units and found that more than half of the participants demonstrated excellent overall competence. The highest competency was observed in the skills, professional attitudes, and clinical experience domains, whereas the knowledge domain lagged slightly, suggesting a need for strengthened theoretical reinforcement in practice settings.

A significant association was found between the competency levels of nurses and both marital status and attendance at patient safety training, highlighting the influence of personal factors and ongoing education on professional development. Overall, the study underscores the importance of integrating ongoing experiential learning and knowledge-based support to ensure that critical care nurses maintain high standards of practice and deliver safe, evidence-based care. These findings support Vision 2030's goal of enhancing healthcare workforce capacity

by identifying targeted training needs

Implications for Practice:

The study highlights the need to strengthen nurses' theoretical knowledge through continuous education and evidence-based updates. Hospitals should collaborate with nursing colleges to deliver annual simulation-based workshops focusing on knowledge reinforcement. Simulation-based training and structured mentorship should be prioritized to enhance clinical skills and experiential learning. Regular patient safety training should be mandated, as it significantly correlates with higher competency. Tailored professional development strategies that consider individual nurse characteristics can further support sustained competence in critical care settings.

Limitations:

This study has several limitations. The cross-sectional design restricts the ability to draw causal inferences. The use of self-reported data may have introduced response bias, as participants could overestimate or underestimate their competencies. Additionally, since the study was conducted in overload work environment as CCUs, the generalizability of the findings to other settings may be limited.

Authors' Contributions:

All authors contributed equally to the research process, including study design, data collection, analysis, and manuscript preparation. All authors have read and approved the final version of the manuscript.

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Conflicts of Interest:

The authors declare no conflicts of interest.

Ethical Approval:

Ethical approval for the study was obtained from the Najran University Research Committee (Approval No. 20402-076018577-041996) on February 20, 2024.

Informed Consent:

Informed consent was obtained from all participants, and confidentiality was maintained throughout the study.

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