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Assessment of Critical Care Nurses' Knowledge and Skills Regarding Sepsis in Critical Care Units

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Abstract:
Background: Sepsis is a serious condition that can be life-threatening and affects many people around the world every year. Nurses who care for critically ill patients need to know a lot about sepsis so they can recognize it early and help prevent it. **Aim:** This study aimed to assess critical care nurses' knowledge and skills regarding sepsis in critical care units. **Research design:** A descriptive design was utilized in implementation this study. **Setting:** The study was implemented at intensive care units (acute care (med-surg), critical care (ICU) and emergency department) of Assiut University Hospital, Egypt. **Subjects:** (**80**) all available critical care staff nurses **Tools:** Two tools were used to assess the critical care nurses' sepsis knowledge and skills namely; critical care nurses' sepsis knowledge and critical care nurses' skills sepsis assessment. **Results:** Revealed that (15%) of participants nurses had good knowledge level. While, (30%) of participants had average knowledge level (55%) of participants had poor knowledge level. In addition, (22.5%) of participants had high skills. While, (27.5%) of participants had moderate skills. Also, about half (50%) of participants had low skills. **Conclusion:** The study results concluded that there was a stronge positive relation between total knowledge and total skills of the critical care nurses toward sepsis. **Recommendations:** The study recommended that the begin of the execution of sepsis bundle among ICU nursing staff seem have implied a period of a compliance to both sepsis care bundle and nurses executing the bundle inside the desired time convention.

Keywords: Critical Care Nurses, Critical Care Units, Knowledge, Sepsis &Skills

Introduction:
Critical care nurses play a pivotal role in the early identification and management of sepsis. Several nurse-led projects focusing on sepsis care show how important nurses are in helping patients with sepsis. For example, when nurses follow special guidelines to quickly find and treat sepsis, start blood tests early, and lead response teams, it has been shown to help. This nurse-led teamwork can reduce deaths, shorten time spent in the ICU, and lower the chances of returning to the ICU (**Santacroce et al., 2024).**

Severe sepsis is a potentially fatal illness that still poses a major threat to world health and affects millions of people annually. Organ disfunction results from a dysregulated host response to infection in this intricate disease. It is a major global source of morbidity and mortality, putting a heavy financial strain on healthcare systems and driving up healthcare expenses. Sepsis affects over 50 million individuals globally and accounts for 11 million fatalities annually. In order to slow the spread of sepsis and increase patient survival rates, prompt diagnosis and appropriate treatment are essential **(Guarino et al., 2023**).

There are negative physiological, psychological, and financial effects linked to sepsis. Acute kidney failure, sudden breathing problems, irregular heartbeats (like atrial fibrillation), and widespread blood clotting issues. are only a few of the various organ dysfunctions that can result from sepsis. Sepsis can have detrimental emotional effects, like worry, sadness, and stress after a bad experience.. For critical care patients with sepsis admitted to intensive care units (ICUs), the cost of medical supplies and services is considerable, and thirty percent of these patients pass away before being released from the ICU **(Bodinier et al., 2021).**

The key to managing sepsis well is quickly recognizing it and starting strong and suitable treatment right away. To treat the illness effectively, it's important to give fluids to the patient and make sure their blood is circulating well. It's also crucial to start antibiotics as soon as possible. Nurses need to know a lot about sepsis because many of them have wrong ideas about it. For example, some nurses don't know that low blood pressure, low oxygen levels, and very little urine can be signs of sepsis. This lack of awareness may cause a delay in spotting sepsis, starting timely treatment, and giving antibiotics **(Patnaik, et al., 2020).**

The healthcare organization is ever-changing, with new developments in clinical procedures, technology,

and research. Periodically evaluating critical care nurses' knowledge and abilities is essential to make sure they are knowledgeable about the most recent evidence-based recommendations and best practices for managing sepsis. Healthcare institutions can create focused educational interventions and training programs to close knowledge gaps by identifying such areas, which will ultimately improve patient outcomes **(Baghela et al., 2022).**

Evaluating critical care nurses' sepsis knowledge and skills is crucial for their own professional growth as well as for guaranteeing that septic patients receive safe and efficient care. Because sepsis is such a complicated illness, nurses need to be well-versed in its underlying causes, diagnostic standards, and management techniques. Healthcare organizations can assess nurses' knowledge to determine what areas require further education and training to improve their capacity to deliver evidence-based care **(Sinha et al., 2023).**

Significance of the Study

Assessing a knowledge and skills of critical care nurses regarding sepsis is crucial for optimizing patient care and outcomes **(Santacroce et al., 2024).** By evaluating their understanding of sepsis and their proficiency in performing essential sepsis-related tasks, healthcare organizations can find areas that need to get better and take specific actions to improve care for sepsis **(Salama et al., 2021).** The findings of this study will advise the development of tailored educational programs, guidelines, and policies that promote evidence-based sepsis management, ultimately improving patient outcomes and the overall quality of care in critical care settings.

Sepsis is a life-threatening condition that arises when the body's response to infection causes widespread inflammation, leading to tissue damage, organ failure, and potentially death. It is a leading cause of mortality worldwide, accounting for approximately 11 million deaths annually, which constitutes about 20% of all global deaths **(World Health Organization, 2024).**

The significance of studying sepsis lies in its high incidence, particularly in low- and middle-income countries, and its potential for prevention through early detection and appropriate treatment. Despite its severity, sepsis remains underrecognized and underreported, especially in regions with limited healthcare resources. Understanding its epidemiology, risk factors, and outcomes can inform public health strategies and clinical practices to reduce its burden **(Rudd et al., 2020)**

Globally, sepsis affects an estimated 48.9 million people annually, with 11 million sepsis-related deaths reported in 2020 . The incidence rate varies significantly across regions, with the highest rates observed in low- and middle-income countries. In these regions, sepsis often results from infections acquired in healthcare settings, particularly among immunocompromised patients **(World Health Organization, 2024 & Pan American Health Organization, 2021)**

In Egypt, specific national data on sepsis incidence are limited. However, the country's healthcare system faces challenges such as limited access to advanced medical care, which may contribute to higher sepsis-related morbidity and mortality rates. Efforts to improve infection prevention, early detection, and timely treatment are crucial to addressing this issue.

The incidence was estimated to be 270 sepsis cases/100,000 persons/year, with a mortality of 26%. In the last three decades, considerable effort has been expended in improving the recognition and management of sepsis **(Madkour et al., 2022).** Enhancing the knowledge about sepsis helped nurses understand better and improve their skills for taking care of patients with this condition. Critical care nurses keep a direct contact with patients and are in charge of spotting changes in their health and test results. So, we need to help critical care nurses learn more about how to early detection and treatment the signs of sepsis.

Aim of the Study:

The present study was aimed to assess critical care nurses' knowledge and skills regarding sepsis in critical care units

Research Question:

1- What is a level of the critical care nurses' knowledge regarding sepsis?
2- What is a level of the critical care nurses' skills regarding sepsis?
3- Is there a relation between total knowledge and total skills of the critical care nurses regarding sepsis?

Patients and Methods:

Study design:

A descriptive research design was used to achieve the aim of the study.

Setting:

The study was implemented at intensive care units (acute care (med-surg), critical care (ICU) and emergency department) of Assiut University Hospital, Egypt. Total number of nurses (100 nurses) with total bed capacity (71 bed).

Sampling:

A convenience sample was employed for participant recruitment. The study included all available and consenting critical care staff nurses (n = 80) working in the aforementioned units. These nurses were

actively involved in the direct care of septic patients and agreed to participate voluntarily.

Tools for Data Collections

Two tools were used to assess the critical care nurses' sepsis knowledge and skills. **First tool** consists of two parts: The first part is critical care nurses characteristics, and the second part is critical care nurses' sepsis knowledge. **Second Tool**: critical care nurses' skills sepsis assessment

First tool consists of two parts:

The first part is critical care nurses characteristics, it was consisted of (age, gender, marital status, education level, years of experience, and nurses received education specific to sepsis or sepsis screening).

The second part: **Critical Care Nurses Assessment Questionnaire:**

This questionnaire was developed by the researcher based on literature review of **(Jeffery, Mutsch & Knapp, 2014 & Morgan, 2020).** This questionnaire used to assess critical care staff nurse's knowledge regarding sepsis. It consisted of fifty items in the form of multiple-choice grouped under five main dimensions namely: Case scenarios for sepsis identification (6 items), sepsis indicators (17 items), diagnostic tests (9 items), and criteria used to objectively determine patient experiences sepsis (16 items).

Responses of participants were measured (1) for "right" and (zero) for " the wrong answer or do not known response ". The maximum possible total scores were fifty. If was scored from 0 to 28 score was considerd poor level, scored from 29 to 36 score was considerd average level, and scored from 37 to 50 score was considerd good level **(Morgan, 2020).**

Tool-II: Critical Care Nurses' Skills Sepsis Assessment

This tool was developed by the researcher based on literature review of **(Lino, et al., 2019 & Taylor et al., 2011)** to assess the critical care nurse's sepsis skills. Self-administered questionnaire consisted of (39 items) grouped under nine main dimensions namely: initial assessment and recognition (5 items), sepsis screening and scoring (2 items), communication and documentation (2 items), fluid resuscitation (3 items), antibiotic administration (3 items), hemodynamic monitoring and support (3 items), ongoing assessment and interventions of sepsis (3 items), patient and family education (3 items), and infection control practices (15 items).

Responses of participants were measured on a three-point Likert scale. The items were scored " done correctly " 2 points, " done incorrectly " 1 point and" not done " Zero point. The scores wer summed and conerted to percent. Low skills less than 60%,, Moderate skills 60% - 75%, and High skills

Method: This study was conducted in two phases:

Preparatory Phase:

Tools Development:

The tools validity were formulated and submitted to five experts in nursing three experts from the specialty of critical nursing, one expert in medical surgical nursing and one expert in medicine speciality to review the tools for clarity, relevance, comprehensiveness, and understandable. The researcher asked to express their pointviews toward face and content of the proposed tool. Expert comments and recommendations were taken into account, and the items were modified, corrected, and clarified as needed.

The reliability test was done to assure the consistency, determining how powerfully the attributes were related to each other and to the composite score. Reliability of tools was tested using Cronbach Alpha Coefficient test, its value for critical care nurses' sepsis knowledge was (0,87). While, the value of critical care nurses' skills sepsis assessment was (0,89). Both of two results indicates accepted internal consistency of the tools.

Pilot Study:

A pilot study was done with 10% of the nurses, which included 8 nurses. It was done before gathering data to check fesability,time, and to spot any problems. This helps make the study better before doing the complete research. The needed modifications were made. Eight nurses in the pilot study were included the sample.

Ethical Consideration

The research proposal was approved by the Ethical Committee of the Faculty of Nursing at Assiut University, under approval code [11202440744], in November 2024. Throughout the study, no physical, psychological, or professional hazards were posed to the participating nurses. The research adhered to widely accepted ethical principles in clinical research, including respect for autonomy, beneficence, non-maleficence, and justice.

Informed written consent was obtained from all nurses and, where applicable, from management after a full explanation of the study's nature, purpose, and voluntary nature of participation. Confidentiality and anonymity were strictly preserved, with no personal identifiers collected or disclosed in any form. Nurses retained the right to decline participation or withdraw from the study at any stage without the need to provide a reason and without any repercussions. Additionally, the privacy of all participants was carefully respected during data collection to ensure a secure and ethical research environment.

Assessment Phase:

The Dean of the Nursing faculty at Assuit University sent a formal letter to the re(Mohamed, Ismail & Bayoumi, 2017 *an*

for permission to conduct the study. Written consent to conduct were obtained from the hospital managers to carry out the activities in the mentioned setting. The goal of the study was discussed and the time for collecting information was set.

Data Collections:

Data collection commenced after obtaining official approval from the management of Assiut University Hospital. The data collection process spanned a period of three months, beginning in April 2024 and concluding in July 2024. The researcher met with staff nurses five days a week during the morning shift within their respective work units.

During these meetings, the researcher introduced himself, provided a brief explanation of the study's purpose, and guided the participants on how to complete the data collection tool. Nurses were reassured that all information collected would be used solely for scientific research and treated with strict confidentiality. Written consent was obtained from each participant following a clear explanation of the study's objectives. Each nurse took approximately 25 to 35 minutes to complete the questionnaire after receiving instructions from the researcher. Upon completion, the questionnaires were returned directly to the researcher, who reviewed them for completeness. The researcher remained consistently available during morning shifts throughout the data collection period across all critical care areas to support participants and ensure smooth data collection.

Statistical Analysis:

The collected data were prepared, categorized, tabulated and statistically analyzed using the statistical package for social science (SPSS) version 26 and Microsoft Excel version 2010. Quantitative data were existing as mean and standard deviation (SD) . Chi-square test and Fisher exact test (FET) were utilized to test the significance of relationship between categorical variables as the variables were not normally distributed. The observed differences and associations were considered $P > 0.05$ was considered non- significant (NS) or $P \leq 0.05$ was considered Significant (S).

Result:

Table (1): Demographic Characteristics of the Critical Care Nurses (N = 80)

Characteristic		No	%
Gender	Male	28	35.0%
	Female	52	65.0%
Age Group	< 20 Years	6	7.5%
	From 20 to < 30 Years	60	75.0%
	30 to < 40 Years	6	7.5%
	40 Years and More	8	10.0%
Marital Status	Single	40	50.0%
	Married	34	42.5%
	Divorced	0	0.0%
	Widow/er	6	7.5%
Educational Qualification	Diploma	18	22.5%
	Bachelor's Degree	50	62.5%
	Masters in Nursing	10	12.5%
	PHD in Nursing	2	2.5%
Critical Care Nurses Experience Years	< 6 months	6	7.5%
	6 Month – 2 Years	16	20.0%
	2-5 Years	24	30.0%
	6-10 Years	22	27.5%
	11-15 Years	6	7.5%
	16-20 Years	2	2.5%
	21-25 Years	4	5.0%
Received Specific Educational Program for Sepsis	Yes	18	22.5%
	No	62	**77.5%**
Critical Care Nurses Experience Years in Different Areas	Acute Care (Medical/ Surgical)	10	12.5%
	Critical Care Unit (ICU)	59	73.8%
	Emergency Department	11	13.8%

Table (2): Distribution of critical care nurse's sepsis knowledge regarding their dimensions (N = 80)

Dimensions	Level		
	Poor	Average	Good
	NO, (%)	NO, (%)	NO, (%)
Case scenarios for sepsis identification	44 (55%)	22 (26.5%)	14 (17.5%)
Sepsis indicators	45 (56.2%)	25 (31.3%)	10 (12.5%)
Diagnostic test	42 (52.5%)	27 (33.8%)	11 (13.8%)
Criteria used to objectively determine patient experiences	47 (58.7%)	21 (26.3%)	12 (15%)

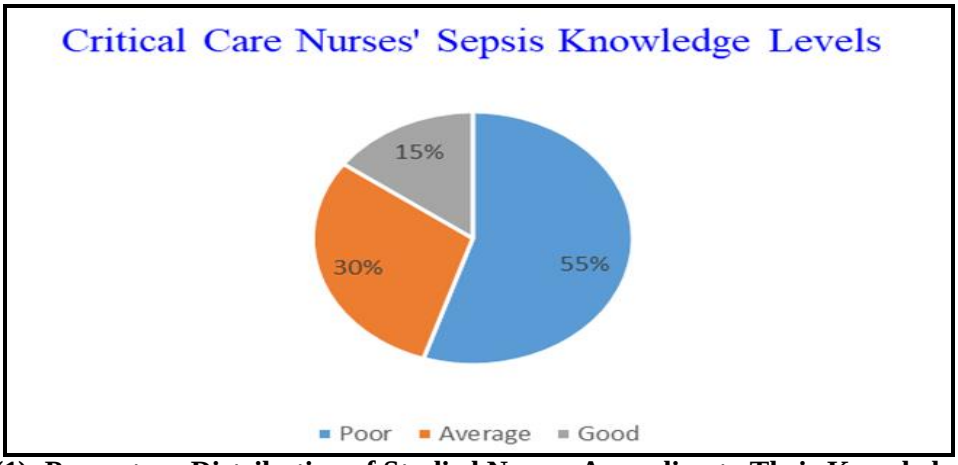

Figure (1): Percentage Distribution of Studied Nurses According to Their Knowledge Levels Regarding Sepsis (N = 80)

Table (3): Distribution of the critical care nurse's sepsis skills dimensions (n = 100)

Dimensions	Level		
	Low	Moderate	High
	NO, (%)	NO, (%)	NO, (%)
Initial Assessment and Recognition	40 (50%)	22 (27.5%)	18 (22.5%)
Sepsis screening and scoring	42 (52.5%)	23 (28.7%)	15 (18.8%)
Communication and Documentation	39 (48.8%)	21 (26.2%)	20 (25%)
Fluid Resuscitation	41 (51.3%)	25 (31.2%)	14 (17.5%)
Antibiotic Administration	43 (53.8%)	27 (33.7%)	10 (12.5%)
Hemodynamic Monitoring and Support	36 (45%)	20 (25%)	24 (30%)
Ongoing Assessment and Interventions	45 (65.3%)	30 (37.5%)	5 (6.2%)
Patient and Family Education	48 (60%)	18 (22.5%)	14 (17.5%)
Infection control practices	38 (47.5%)	17 (21.3%)	25 (31.2%)

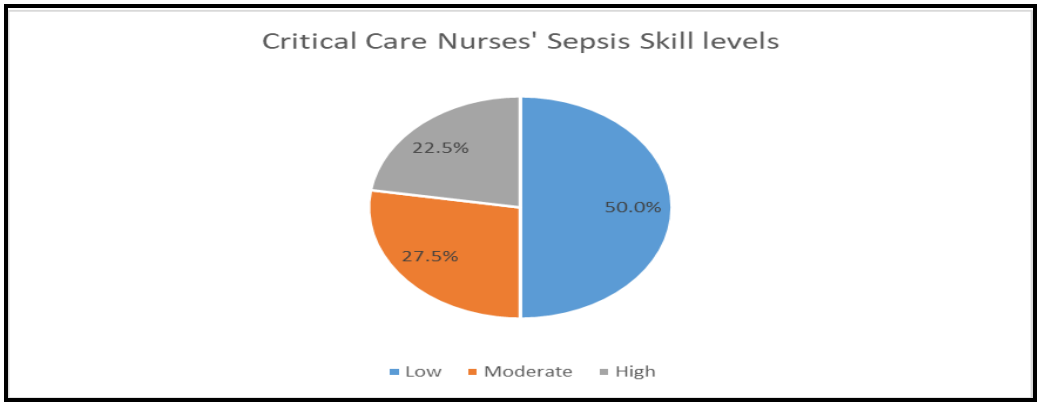

Figure (2): Percentage Distribution of Studied Nurses According to Their Skills Levels Regarding Sepsis (N = 80)

Table (4): Correlation Between Studied Nurses Demographic Characteristics and Total Knowledge and Skill Levels of Critical Care Nurses Regarding Sepsis (n = 80):

Critical Care Nurses Demographic Characteristics	Critical Care Nurses Total Knowledge Levels		Critical Care Nurses Total Skill Levels	
	Co.	P-value	Co.	P-value
Gender	.295	.008*	.173	.001*
Age group	.062	.584	.167	.139
Marital status	-.136	.229	-.023	.839
Educational qualification	.357	.001*	.344	.002*
Critical Care Nurses Experience Years	.225	.044*	.245	.029*
Received Specific Educational Program for Sepsis	.643	.001*	.758	.001*

- *Pearson correlation, Co. means correlation.*

Table (5): Correlation between knowledge and skills of sepsis among critical care nurses

Variables	Person correlation	Skill
Knowledge	P	.873
	R	.001*

(*) statistically significant at p<0.01

Table (1): Shows the frequency distribution of the studied nurses according to their demographic characteristics. 75.0% of the studied nurses were aged between 20 to < 30 years. 65.0% of them were female. In regard to marital status, half (50.0%) of them were single. Slightly more than half of the studied nurses (62.5%) had a bachelor's degree in nursing. With reference to years of experience, 30.0% of studied nurses had experience ranging from 2 to 3 years. The majority of the studied nurses (77.5%) reported they had not received previous training courses related to sepsis. Most of them had experience in critical care units, with a 73.8% percentage.

Table (2): Displays the frequency distribution of the studied nurses according to total dimensions knowledge level; it was noticed that a minority, 12.5% of the studied nurses, had a good knowledge level regarding sepsis indicators dimension . While, more than half (58.7%) of the studied nurses had a poor knowledge level regarding criteria used to objectively determine patient experiences dimension.

Figure (1): Displays the frequency distribution of the studied nurses according to knowledge level; it was noticed that a minority, 15% of the studied nurses, had a good knowledge level. More than one quarter (30%) of them had an average knowledge level. The majority (55%) of the studied nurses had a poor knowledge level.

Table (3): Displays the frequency distribution of the studied nurses according to total dimensions skill level; it was noticed that a minority, 6.2 % of the studied nurses, had a good skill level regarding ongoing assessment and interventions dimension . While, more than half (60%) of the studied nurses had a poor knowledge level regarding criteria used to objectively determine patient experiences dimension.

Figure (2): The result revealed that more than one fifth (22.5%) of participants had high skills,. While, about half (50%) of participants had low skills .

Table (4): Depicts correlations between the nurses' knowledge levels and nurses demographic characteristics. The table shows that there were positive correlations between the overall knowledge levels and the gender. Educational qualification, years of experience, and having received previous training were documented by P = .008, P = .001, P = .002, P = .044, and P = P=.001. respectively. Also, there were positive correlations between the overall skill level and the gender. Educational qualification, years of experience, and having received previous training documented by byP=.001, P =.002, P =.029, .001, respectively.

Table (5): Reveals that there was the strong positive correlation between total knowledge and total skills of the critical care nurses regarding sepsis.

Discussion:

Sepsis is a serious condition where the body's response to an infection causes problems in its organs. In septic shock, blood flow to the body is severely reduced, which can lead to serious problems with multiple organs, like the lungs, kidneys, and liver. You can help prevent sepsis by staying current with your vaccinations, including getting shots for the flu, pneumonia, and other common illnesses. Stay away from people who don't live with you, and try not to travel or do activities that aren't necessary **(Amrollahi, 2023).**

The findings of the current study revealed notable deficits in both knowledge and skill levels among the studied nurses regarding sepsis and related clinical indicators. Specifically, minority of the participants demonstrated a good level of knowledge concerning sepsis indicators, which is alarmingly low given the

critical importance of early recognition in improving patient outcomes. This finding aligns with previous studies, such as those by **Alenezi et al. (2022)**, which reported insufficient knowledge levels among nurses working in acute care settings, potentially due to limited access to continuous professional development programs.

Moreover, more than half of the nurses exhibited poor knowledge levels regarding the criteria used to objectively determine patient experiences—a crucial component in the holistic management of critically ill patients. This reflects a significant gap in integrating patient-centered approaches within clinical practice and supports the findings of **Koy et al. (2021),** who emphasized that understanding patients' subjective experiences can lead to improved care quality and satisfaction.

The result of present study similar to a study by **Martínez-Mateo et al. (2023)** found that more than half of the nursing staff in their survey lacked adequate knowledge about sepsis protocolsregarding the criteria used to objectively determine patient experiences.

The findings of this study are consistent with previous research showing that nurses often demonstrate insufficient knowledge regarding the criteria used to objectively determine patient experiences. For instance, a study by Smith et al. (2021) found that more than half of nurses lacked adequate understanding of objectively determine patient experiences, particularly in recognizing early warning signs such as elevated lactate levels and abnormal urine output.

Similarly**, Choy etal (2022)** reported that more than half of nurses in their research were unaware of key sepsis management protocols, highlighting the need for enhanced training and regular updates in sepsis care. Both studies agree with the current findings, where more than half of the nurses were poor knowledge, emphasizing the global challenge of ensuring that nursing staff are well-equipped to recognize and manage sepsis effectively.

When examining the overall knowledge distribution (Figure 1), it was observed that minority of the nurses had good knowledge, whereas more than half of nurses fell into the poor knowledge category. This general pattern indicates a pressing need for structured educational interventions and targeted training programs to enhance nurses' competence in sepsis care.

This result supported by **Martínez-Mateo et al. (2023)** who reported that more than half of studied sample had poor knowledge level regarding sepsis. On the same level with **Bloch, et al., (2023)** who found that more than half of studied sample had poor knowledge level regarding sepsis.

This result disagreed with **Regina et al., (2023)** revealed that although nurses showed strong knowledge of sepsis, In contrast, some studies have reported higher levels of knowledge among nurses. For example, **Green et al., (2023)** found that a larger proportion of nurses demonstrated a higher level of knowledge regarding sepsis. Their study reported that around three quarters of nurses were good level of critical sepsis knowledge, likely due to more robust educational programs and frequent sepsis training. Similarly, **Brown & Davis (2022)** observed that more than half of nurses showed a good understanding of sepsis management, attributing this to comprehensive continuing education and regular updates on sepsis protocols.

Regarding critical care nurses' sepsis skills levels, the study showed similarly concerning trends. Minority of nurses displayed a good level of skill in ongoing assessment and intervention, despite this being a fundamental aspect of sepsis management. Furthermore, more than half of the participants had poor skills in applying objective criteria for patient assessment (Table 3), suggesting a potential disconnection between theoretical knowledge and clinical application. This is consistent with findings by **Mohamed et al. (2020)**, who highlighted that inadequate clinical exposure and lack of simulation-based training contribute to skill deficiencies among critical care nurses.

Similar findings have been reported in recent studies **Johnson, et al., (2023)** observed a similar trend, with approximately more two fifths of nurses exhibiting poor skill in ongoing assessment and intervention.They attributed this poor performance to gaps in training and inconsistent adherence to protocols, which aligns with the current study's results. **Lee, et al., (2024)** also reported that around 50% of nurses demonstrated poor skill adherence to ongoing assessment and intervention.

In contrast, some studies have reported inconsistent findings. **Bloch, et al., (2023)** found that a lower percentage of nurses exhibited poor practices, with only one third of nurses having poor ongoing assessment and intervention. Their study suggested better adherence to protocols and possibly more effective training programs. Similarly, **Chen & Wei (2021)** observed higher compliance rates with ongoing assessment and intervention among studied sample, with only more than one quarter showing poor practice.

The skill level distribution (Figure 2) further supported these observations, with only more than one fifth of participants exhibiting high skill levels, compared to half of nurses who demonstrated low skills. Such results raise concerns about the ability of nursing staff to effectively manage complex, time-

sensitive conditions like sepsis, and underscore the urgent need for institutional support and continuous competency assessments.

This study result agreed with **Sinha et al. ,(2023)** who reported that more than half of studied sample had low skill level of sepsis. Also, this study result supported with **Brown & Davis, (2022)** who found that more than two fifths of studied sample had low skill.

Correlational analysis (Table 4) indicated statistically significant positive relationships between nurses' knowledge and their demographic variables, including gender, educational qualification, years of experience, and previous training. A similar pattern was observed between skill levels and these demographic factors. These findings are in line with prior studies, such as those by Ahmed et al. (2021), which found that higher educational attainment and greater clinical experience positively influence nurses' clinical decision-making capabilities and practical competencies.

The results are consistent with research showing that targeted education about sepsis leads to improved sepsis skills scores, as evidenced by the higher median scores and narrower range among nurses who received education compared to those who did not. For instance, **Johnson et al. (2020)** found that nurses who participated in sepsis training programs demonstrated significantly better performance on observational assessments, underscoring the positive impact of specialize d education.

Recent research by **Friganovi et al. (2024)** supports these findings, highlighting similar trends. They found that educational qualifications positively influenced sepsis knowledge and adherence to sepsis skill among nurses. Experience also showed a positive relationship with sepsis knowledge and skills. Furthermore, education specifically about sepsis was strongly associated with improved knowledge and skills scores. This underscores the importance of comprehensive and targeted education in enhancing nurses' competence in sepsis management.

Conversely, **Singh et al. (2023)** observed that while educational interventions did lead to some improvements, the overall effect varied significantly depending on the consistency and reinforcement of the training, suggesting that education alone may not always uniformly enhance performance without effective support mechanisms.

The current study revealed a strong positive correlation between the total knowledge and total skills of critical care nurses regarding sepsis management. This finding indicates that as the nurses'- knowledge levels increase, their practical skills in identifying and managing sepsis symptoms and interventions also improve. Such a relationship emphasizes the interdependent nature of theoretical understanding and clinical application in critical care settings.

This result is consistent with findings from several previous studies. For instance, **Mohamed et al. (2020)** reported that enhanced theoretical knowledge gained through simulation-based training significantly improved nurses' performance and decision-making in sepsis care. Similarly, **Ahmed et al. (2021)** emphasized that strong foundational knowledge equips nurses with the confidence and competence needed to carry out timely assessments, recognize early signs of deterioration, and implement life-saving interventions.

The positive correlation may also reflect the effectiveness of integrative education strategies that combine evidence-based knowledge with hands-on clinical practice. According to **Alenezi et al. (2022),** nurses who received targeted training sessions on sepsis not only demonstrated better cognitive understanding but also translated that knowledge into more accurate clinical assessments and timely interventions in ICU settings.

Furthermore, the World Health Organization **(WHO, 2021)** has advocated for the enhancement of both knowledge and clinical competency as a unified goal to reduce global sepsis-related morbidity and mortality. This supports the notion that investment in continuous education and competency-based training programs is vital to improving both knowledge acquisition and skill execution.

Conclusion:

The study findings concluded that there was the strong positive relation between total knowledge and total skills of the critical care nurses regarding sepsis, this confirmed the research question.

Recommendation:

Based on prsesnt finding the recommendation include implementing the compliance of sepsis bundle among criticat care units, implementing the bundle within the definite time protocol among the nursing staff, developing guidelines protocol for Initiate appropriate fluid resuscitation promptly based on sepsis patient condition, following the facility's antibiotic guidelines and protocols for sepsis management, and ensuring the nursing staff documented all nursing interventions regarding sepsis management.

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