



Nurses' Performance Regarding Care for patient with Sepsis in Intensive Care Units and Patient Outcome

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Abstract

Background: Sepsis remains a major cause of morbidity and mortality among critically ill patients, requiring timely and evidence-based nursing interventions. **The study aimed to** evaluate nurses' performance regarding care for patients with sepsis in intensive care units and its impact on patient outcomes. **Research design:** descriptive design was utilized, **Setting;** The intensive care units of New Surgery Hospital and Emergency Hospital at Zagazig university hospitals. **Subjects;** The study aimed to evaluate nurses' performance regarding care for patients with sepsis in intensive care units and its impact on patient outcomes. **Three tools were used: Tool 1:** an Interviewing Questionnaire to assess nurses' demographic characteristics and nurses' knowledge regarding sepsis, **Tool 2:** Observational checklist to evaluate nurses' practices in sepsis care, and **Tool 3:** Patients' Assessment Questionnaire to assess patient demographics and outcomes. **Results;** regarding to studied nurses, 92.5% were aged 20–30 years and 65% had 5–10 years' experience. Total score of studied nurses' knowledge and practice was 87.5% and 90.0% respectively. The studied patient had a mean age of (61.00 ± 10.13) years; UTI (27.5%) and pneumonia (25.0%) were leading causes; 95% had comorbidities (diabetes 85%, hypertension 55%). Outcomes showed ICU stay <10 days in 70%, frequent complications (hypotension 100%, coma/delirium 60%). 42.5% of studied patient died with sepsis, 95.0% need vasoactive drugs, 65.0% need mechanical ventilation support. Total studied nurses' Knowledge score correlated with total practice score ($r = 0.360$, $p = 0.023$), though neither significantly affected patient outcomes ($p > 0.05$). **Conclusion;** Studied nurses showed insufficient knowledge and poor practice regarding sepsis management, and Patient outcomes indicated that the most studied patients requiring advanced supportive measures such as vasoactive drugs and mechanical ventilation, Septic shock is a frequent complications and had a considerable mortality rate **Recommendations;** Implement continuous evidence-based educational programs for nurses to enhance their knowledge and clinical practice related to sepsis bundle care in critically ill patients

Keywords: Sepsis, Nurses Performance and Clinical Outcome



Introduction

Sepsis, a life-threatening condition caused by a dysregulated host response to infection, remains a major global health challenge, particularly in low- and middle-income countries (**Rudd et al, 2020**). Sepsis syndrome defined as a complex systemic inflammatory condition with clinical suspicion of microbial infection. If the syndrome is not detected and treated at the very earliest stage, both morbidity and mortality will increase greatly. Systemic Inflammatory Response Syndrome accounts 10% mortality, severe sepsis had 20% mortality, septic shock accounts 40% mortality (**Tang et al., 2022**).

Critical care nurses are essential in detecting and managing sepsis at an early stage. Numerous nurse-driven initiatives in sepsis care highlight their crucial contribution to improving patient outcomes. By adhering to evidence-based protocols such as promptly recognizing sepsis, initiating diagnostic blood tests without delay, and coordinating rapid response efforts nurses significantly enhance treatment effectiveness. (**Santacroce et al., 2024**).

Effective sepsis management relies on rapid identification and the prompt initiation of appropriate treatment. Immediate fluid resuscitation and ensuring adequate circulation are vital steps in stabilizing the patient, while the early administration of antibiotics is essential to control the infection. (**Patnaik, et al., 2020**).

Assessing the knowledge and competencies of critical care nurses in sepsis management is essential not only for their professional development but also for ensuring that patients receive safe, effective, and high-quality care. Given the complex nature of sepsis, nurses must have a thorough understanding of its pathophysiology, diagnostic criteria, and treatment strategies. By evaluating their current level of knowledge, healthcare institutions can identify gaps that require targeted education and training, ultimately strengthening nurses' ability to provide evidence-based care and improve patient outcomes (**Sinha et al. 2023**)

Significance of the study

Sepsis is a global health issue associated with increased morbidity and mortality worldwide. According to **Madkour et al., (2022)** in study conducted in the Abasia Chest Hospital, Cairo, Egypt reported that prevalence of sepsis in respiratory ICU was 26.5% and it is usually associated with higher mortality rate in those patients. Furthermore, **Mansour et al., (2022)** found that 23% of patients admitted to surgical intensive care unit, Zagazig university hospitals had sepsis and 16% of readmission because of sepsis. (**Rudd et al., (2020)** stated that studying sepsis is vital due to its high prevalence, especially in low- and middle-income countries, and its preventability through early detection and proper treatment. Understanding its patterns, risks, and outcomes helps shape effective public health strategies and improve patient cares, and practice related to caring for patients with sepsis. So that assessing nurses' knowledge of sepsis and their competence in carrying out key sepsis-related interventions, healthcare organizations can pinpoint areas that require improvement and implement targeted strategies to enhance the quality of sepsis care.

Aim of the Study

This study aimed to Assessment of Nurses' Performance Regarding Care for patient with Sepsis in Intensive Care Units and Patient Outcome

This aim will be fulfilled through the following objectives:

1. To assess nurses' knowledge regarding sepsis and its management in intensive care units
2. To evaluate nurses' practical skills in providing care for patients with sepsis.
3. To examine the relationship between nurses' performance and patient outcomes in sepsis care.
4. To identify factors influencing nurses' performance in managing sepsis patients.



Research questions

This study will have two research questions including:

1. What is the level of nurses' knowledge regarding sepsis and its management in intensive care units?
2. How competent are nurses in performing essential care for patients with sepsis?
3. What is the relationship between nurses' performance and patient outcomes in sepsis care?
4. What factors influence nurses' performance in managing sepsis patients?

Research design; A descriptive design was utilized. **Setting;** The current study was executed at ICUs of New Surgery Hospital and Emergency Hospital at Zagazig university hospitals. **Subject; For nurses;** Purposive sample of (40) nurses working in previously mentioned setting with **inclusion criteria;** Nurses with at least one year of experienced at ICU. While, **for patients;** Purposive sample of (40) patients who admitted to ICU, adult patients with age ≥ 18 years. With **exclusion Criteria:** All pediatric patients, pregnant women and patient with sepsis and having end stage organ dysfunction such as end stage renal disease, liver cell failure, immune compromised patients, end stage cancer and acute brain and heart attack.

Tools for data collection:

The following tools was used to collect data in this study. They were designed by the researcher after extensive review of the updated and relevant literature (Ejlal et al., 2022, Nakiganda et al., 2022 & Zanaty et al., 2016)

Tool I: An Interviewing Questionnaire: It includes two parts as the following:

Part 1: Sociodemographic Characteristics for Nurses:

Part 2: It was included tool of (29) questions and concerned with **The Nurses' Knowledge** regarding sepsis identification and sepsis management. This questionnaire was developed by researcher after reviewing the updated and relevant literature (Salameh & Aboamash, 2022).

Scoring system for Nurses' interviewing questionnaire

Each question was scored "zero" for the incorrect or unanswered question and "one" for the correct answer, and these points were counted for each nurse. The general nurses' knowledge was classified into satisfactory knowledge if the score $\geq 80\%$ from the maximum score and unsatisfactory knowledge if it $< 80\%$ based in statistical analysis.

Tool II; An Observational Checklist: It was contained two parts

Part I; observational checklist used to assess general nurse's practices regarding care for patient with sepsis. This tool published and validated by Lino et al., (2019) and adopted by researcher.

Part II; observational checklist used to assess nurses practices for administering oxygen by mask, administering oxygen by nasal cannula, suctioning an endotracheal tube: open system, assist in central venous insertion and peripheral line insertion (Lynn, 2022, Dambaugh, 2019. and Malyaman, 2019).

Scoring System for Observational Checklist

Each step was scored "zero" for not done and "one" for done in the correct way; and not applicable items was excluded then these points are counted for each nurse. The general nurses' practice is classified into satisfactory practice if the score is $\geq 80\%$ and unsatisfactory practice if it is $< 80\%$ based in statistical analysis.

Tool III; Patients Assessment Questionnaire:

It had three parts as the following:

Part 1: It was concerned with **Sociodemographic characteristics of patients**

Part 2: It was concerned with the **Patients' Past and Current Medical and Surgical History**

Part 3: It was concerned with outcomes of patients with sepsis as vital signs values, GCS score, length of hospital stay, complications associated with sepsis, prognosis of the patient and lab investigations (including Serum lactate, Procalcitonin, Total leukocytic count, C-reactive protein; that was assessed at three times upon admission, post 3rd day and post 7th day). (Khalil et al., 2022)

**Administrative Design and ethical consideration;**

To conduct this study, official approval was first secured from the Dean of the Faculty of Nursing and then submitted to the General Director of Zagazig University Hospitals. Following this, authorization to proceed was granted by the managers of the Emergency and New Surgery Hospitals after the study's purpose was explained. Verbal consent for participation was also obtained from both the nurses and the patients involved.

For patients who were unconscious and therefore unable to provide informed consent, approval to participate in the study was obtained from their legal guardians or next of kin after explaining the purpose and procedures of the research.

Before the initial interview, each potential subject was informed about the nature, purpose, benefits of the study, and informed that his/her participation is voluntary. Confidentiality and anonymity of the subjects were also assured through coding of all data. The researcher assured that the data collected, and information will be confidential and would be used only to improve their knowledge and practice and for the purpose of the study. There was no risk in study subject during application of the research.

Pilot study

A pilot study for data collection was carried out in order to test whether the tools are clear, understandable, feasible, applicable, and time consuming. Ten percent from the total sample size that equal four nurses' and four patients were selected randomly from intensive care units to participate in testing of the tools; these four nurses and patients were selected outside the original study sample which consisted of 40 nurses and 40 patients.

Field work

The study was implemented from beginning of January 2024 to end of July 2024 where the researcher was available two days weekly (Sunday and Thursday) during afternoon shift from 12 pm to 5 pm.

During these sessions, the researcher introduced himself, explained the purpose of the study, and provided clear instructions on how to complete the data collection tool. Participants were assured that all information gathered would remain strictly confidential and used exclusively for research purposes. After a thorough explanation of the study's objectives, written informed consent was obtained from each nurse. Completing the questionnaire required approximately 25 to 30 minutes following the researcher's guidance. Once finished, the questionnaires were returned directly to the researcher, who checked them for completeness. Throughout the data collection period, the researcher was consistently present during afternoon shifts in ICU to follow the nurses practices while caring for patient with Sepsis.

1. Regarding patient outcome evaluation;

Researcher interview the patient to explain purpose of the study and obtaining verbal consent to participate, then patient interview implemented to assess demographics of them and review of medical file to assess medical history, present illness and patient outcome. The interview performed during that times

Content validity

The tools were reviewed by a panel of one professors and four assistant professors in medical surgical nursing, faculty of nursing, Zagazig University to ensure their content validity. The tools were also reviewed for clarity, relevance, comprehensiveness, applicability, and understanding. According to the expertise's modifications and the results of the pilot study, some modifications were applied in the form of rephrasing or rewording accordingly.

Tools reliability

Nurses' knowledge practice and patient outcome were tested for reliability and showed high reliability through measuring its alpha Cronbach coefficient; (knowledge was 0.787, General practice regarding care bundles was 0.795, Administering Oxygen by Mask was 0.786, Administering Oxygen by Nasal Cannula was 0.784, Suctioning an Endotracheal Tube was 0.721, Central venous catheter was 0.714, Peripheral venous catheter was 0.733, and Patient Outcome was 0.785) indicating high reliability.



Statistical Design

All data were collected, tabulated and statistically analyzed using IBM SPSS for windows (Version 25; IBM Corp., Armonk, NY, USA, 2017). Quantitative data were expressed as the mean \pm SD and qualitative data were expressed as absolute frequencies (number) & relative frequencies (percentage). Mc nemar test was used to compare between two dependent groups of categorical data. paired t-test was used to compare between two dependent groups of normally distributed variables. Percent of categorical variables were compared using Chi-square test or Fisher's exact test when appropriate.

ANOVA (One way analysis of variance) test was used for comparison between more than two different groups of quantitative data which were normally distributed. The student "t" test was used for comparison of means of two independent groups of quantitative data which were normally distributed. Pearson correlation coefficient was calculated to assess relationship between study variables, (+) sign indicate direct correlation & (-) sign indicate inverse correlation.

Multiple linear regression (step-wise) was also used to predict factors which affect knowledge and practice scores. Cronbach alpha coefficient was calculated to assess the reliability of the scales through their internal consistency. P-value < 0.05 was considered statistically significant, p-value < 0.01 was considered highly statistically significant, and p-value ≥ 0.05 was considered statistically non-significant.

Results;

Regarding the age (92.5%) of the studied nurses were aged between 20 and 30 years, with a mean age of 27.75 ± 2.25 years. regarding the education (62.5%) graduated from a nursing technical institute, while (37.5%) held a bachelor's degree. In terms of experience, (65%) had between 5 to 10 years of experience, with a mean of 6.15 ± 2.02 years. And (10%) had received formal training on sepsis bundles (Table 1).

Figure (1) indicates that most nurses had unsatisfactory knowledge (87.5%) and practice (90.0%) regarding sepsis care. With mean scores (knowledge: 15.32 ± 3.78 , practice: 90.40 ± 8.32).

Regarding to nurses' practical performance regarding sepsis care; The majority demonstrated unsatisfactory practice across most domains, particularly in general care bundle implementation (2.5% satisfactory), suctioning an endotracheal tube (12.5%), and oxygen administration by both mask and nasal cannula (20% each) (Table 2).

Table (3) and (4) show that half of the studied patients were older than 60 years, with a mean age of 61.00 ± 10.13 years, and the majority were male (57.5%), married (65.0%), and from rural areas (55.0%). Most participants were educated (77.5%) but not working (87.5%), reflecting a predominantly older, retired population. Clinically, septic shock (52.5%) was the most frequent diagnosis, and urinary tract infection (27.5%) and pneumonia (25.0%) were the leading causes of sepsis. Nearly all patients (95.0%) had chronic diseases, most commonly diabetes (85.0%) and hypertension (55.0%).

Regarding the patient outcome, the current study shows that most patients (70.0%) had a relatively short ICU stay of less than 10 days, with a mean duration of 9.50 ± 3.74 days. However, complications were frequent, with hypotension (100.0%), septic shock (52.5%), and coma or delirium (60.0%) being the most common. A significant proportion required intensive interventions, including mechanical ventilation (65.0%) and vasoactive drugs (95.0%). Regarding prognosis, only 25.0% of patients achieved complete recovery, while 42.5% died (Table 5).

Table (6) demonstrates a statistical significant positive correlation between nurses' total knowledge and total practice scores ($r = 0.360$, $p = 0.023$).

Table (7) shows no statistical significant correlation between nurses' knowledge or practice and patient outcomes ($p > 0.05$).

Table (8) shows that educational level is the strongest predictor of nurses' knowledge about sepsis ($\beta = 0.677$, $B = 3.133$, $p < 0.001$), with clinical experience also contributing positively ($\beta = 0.258$, $B = 0.290$, $p = 0.027$). While age, gender, marital status, formal training on bundles, and income were not retained.

Table (9) indicates that practice is independently associated with higher knowledge ($\beta = 0.388$, $B =$



1.036, $p = 0.013$) and greater experience ($\beta = 0.304$, $B = 0.913$, $p = 0.047$), whereas reporting insufficient income is linked to worse practice ($\beta = -0.340$, $B = -4.435$, $p = 0.028$). Overall, these findings highlight the pivotal role of education and experience in building knowledge, and show that knowledge translates into better practice, while financial strain may hinder performance; suggesting multifaceted interventions (education upskilling, mentorship, and addressing workplace stressors) to optimize sepsis care.

Table (1): Frequency and Percentage Distribution of Sociodemographic Characteristics for the Studied Nurses (n=40).

Characteristics	No.	%
Age		
20-30	37	92.5
>30	3	7.5
Mean± SD	27.75± 2.25	
Sex		
Male	20	50.0
Female	20	50.0
Education		
Diploma of nursing	0	0.0
Nursing technical institute	25	62.5
Bachelor degree	15	37.5
Years of experience		
≤5 years	14	35.0
5-10 years	26	65.0
Mean± SD	6.15±2.02	
Marital state.		
Married	36	90.0
Not married	4	10.0
Income		
Enough	12	30.0
Not enough	28	70.0
Formal training on sepsis bundles		
Yes	4	10.0
No	36	90.0

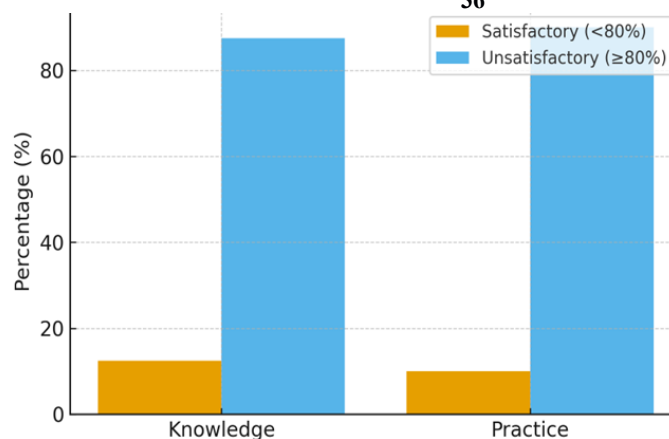


Figure (1): Distribution of Nurses' Knowledge and Practice Levels Regarding Sepsis Management (n=40)



Table (2) : Frequency and Percentage Distribution of Total Satisfactory Levels of Studied Nurses' Practice Domains (n=40).

Domains	Satisfactory		Unsatisfactory	
	No.	%	No.	%
General practice regarding care bundles	1	2.5	39	97.5
Administering Oxygen by Mask	8	20.0	32	92
Administering Oxygen by Nasal Cannula	8	20.0	32	92
Suctioning an Endotracheal Tube	5	12.5	35	95
Central venous catheter	22	55.0	18	45
Peripheral venous catheter	39	97.5	1	2.5
Total	4	10.0	37	92.5

MC: Mcnemar test, non-significant($p>0.05$), **: statistically highly significant ($p<0.01$)

Table (3): Frequency and Percentage Distribution of Sociodemographic Characteristics for The Studied Patients (n=40).

Characteristics	No.	%
Age		
40-<50	8	20.0
50-<60	12	30.0
>60	20	50.0
Mean± SD	61.00 ± 10.13	
Gender		
Male	23	57.5
Female	17	42.5
Residence		
Rural	22	55.0
Urban	18	45.0
Social status		
Married	26	65.0
Not married	14	35.0
Educational level		
Educated	31	77.5
Not educated	9	22.5
Current work		
Not work	35	87.5
Work	5	12.5



Table (4): Frequency and Percentage Distribution of the Studied Patients Regarding Current and Past Medical and Surgical History (n=40).

History		
	No.	%
Diagnosis		
Pneumonia	5	12.5
Diabetic foot	4	10.0
Septic shock	21	52.5
Sepsis	6	15
Others	3	7.5
The cause of sepsis		
Pneumonia	13	32.5
Central line associated infection	2	5.0
Urinary tract infection	11	27.5
Diabetic foot	6	15.0
Others	8	20
Chronic medical condition		
No	2	5.0
Yes	38	95.0
If yes, what is it* (patients had comorbidities)		
Respiratory diseases	6	15.0
Diabetes	34	85.0
Heart diseases	8	20.0
Hypertension	30	75.0
Others	11	27.5

Table (5): Frequency and Percentage Distribution of the studied patients regarding Outcome (n=40).

Patients' Outcome		
	No.	%
Length of stay due to sepsis (days) in ICU		
<10	28	70.0
>10	12	30.0
Mean±	9.50±3.74	
Complications due to sepsis		
ARDS	17	42.5
Hypotension	40	100.0
Septic shock	21	52.5
Coma or delirium	24	60.0
Others	20	50.0
Mechanical ventilation due to sepsis		
No	14	35.0
Yes	26	65.0
Need of Vasoactive drugs due to sepsis		
No	2	5.0
Yes	38	95.0
Patient prognosis		
Complete improvement	10	25.0
Partial improvement	13	32.5
Death	17	42.5

FET: Fisher's Exact Test, χ^2 : Chi square test, non-significant ($p > 0.05$), #: not mutually exclusive.



Table (6): Correlation between total Knowledge and total Practice of Studied Nurses.

	Practice	
	r	p
Knowledge	0.360	0.023*

Table (7): Correlation between Total Knowledge and Total Practice of Studied Nurses and Patients Outcomes.

Pre	Patient outcome	
	r	p
Knowledge	-0.199	0.218
Practice	-0.111	0.494

Non significant ($p > 0.05$), *: significant ($p < 0.05$), r: correlation coefficient

Table (8): Step Wise Multiple Linear Regression for Predicting Factors Which Affect Knowledge of Studied Nurses.

Model	Unstandardized Coefficients		Standardized Coefficients		Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta	t		Lower Bound	Upper Bound
(Constant)	18.854	1.440		13.092	.000	15.936	21.772
Educational level	3.133	.516	.677	6.068	0.001**	2.087	4.179
Experience	.290	.125	.258	2.311	0.027*	.036	.543

*: statistically significant ($p < 0.05$). **: statistically highly significant ($p < 0.001$)

R-square=0.540, ANOVA: $F = 21.759$, $P < 0.001$

Variables entered and excluded: age, gender, marital status, formal training on sepsis bundles and income

Table (9): Step Wise Multiple Linear Regression for Predicting Factors Which Affect Practice of Studied Nurses.

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta	t			Lower Bound	Upper Bound
(Constant)	113.950	4.209		27.073	.000	105.422	122.478	
Income (not enough)	-4.435	1.936	-.340	-2.291	0.028*	-8.357	-.513	
Experience	.913	.445	.304	2.053	0.047*	.012	1.814	
Knowledge	1.036	.399	.388	2.592	0.013*	.227	1.844	

*: statistically significant ($p < 0.05$).

R-square=0.388, ANOVA: $F = 6.720$, $P < 0.001$

Variables entered and excluded: age, gender, education, marital status, and formal training on sepsis bundles



Discussion;

Regarding studied nurses knowledge about sepsis, the current study found that the majority of studied nurses had unsatisfactory knowledge. This finding aligned with a study of **Regina et al., (2023)**, which identified significant deficiencies in sepsis awareness among studied nurses. In contrast, **Alaro et al. (2024)** found, in a study conducted at the emergency departments in selected public hospitals in Addis Ababa, that about half of studied nurses had satisfactory level of knowledge about sepsis. Furthermore, a descriptive study conducted in a college hospital in northern Jordan reported that half of studied nurses had good knowledge about sepsis and it's management, this increase in nurses knowledge related to the majority of studied nurses had bachelor education (**Rababa et al., 2022**).

In terms of sepsis definition, the current study found that only one-quarter of studied patients initially recognized what sepsis is, Likewise, the ability to identify high-risk patients for sepsis improved, rising from one-eighth. These findings are consistent with **Khaleel et al., (2023)** in a study conducted at pediatric teaching hospitals in Mosul city revealed that only 3.3% of participants provided fully correct answers, while 96.7% gave partially correct responses. Similarly, regarding the causes of sepsis, only 11.7% answered completely correctly, whereas 86.7% provided incomplete but correct answers.

Regarding identification of high risk group for developing sepsis, and serum lactate in patient with sepsis the current study demonstrated that more than one tenth of studied nurses had correct answers. In contrary of that, a study conducted at El-Minia hospitals revealed that more than three quarters of them had satisfactory knowledge related to risk factors. While the majority of them had unsatisfactory knowledge related to laboratory investigations. (**Araby et al., 2019**)

Current study revealed that small proportion of studied nurses had good practices regarding general practices of sepsis care. This study aligned with study conducted at intensive care unit at Fayoum university hospital revealed that less than half of studied nurses were competent in care for patients with sepsis. (**Elsayed et al., 2023**).

The current study found that less than half of studied nurses comply with central line associated blood stream infection. In contrary of that a study was conducted on China in 22 large tertiary hospital revealed that the proportion of ICU nurses with good ($\geq 80\%$ accurate response) knowledge, attitude and practice regarding Central Line Associated Blood Stream Infection (CLABSI) preventive measures was 31.14%, 45.50% and 89.99%, respectively. (**He et al., 2025**).

Regarding to endotracheal tube suctioning, the current study revealed that one-eighth of studied nurses had satisfactory nursing practices. This in the same line with **Aboalizm and Elhy (2019)** in a study conducted at Menoufia University showed that the mean nurse' practice pre- intervention was 29.25%, while there was an improvement of mean nurse' practice post-intervention 61.59%.

The findings indicate that the majority of patients admitted with sepsis were older adults, predominantly over 60 years of age. Most patients were male, married, and residing in rural areas, with a large proportion being educated but not actively employed. Clinically, septic shock emerged as the most frequent diagnosis, while urinary tract infections and pneumonia were the primary sources of infection. Additionally, the high prevalence of chronic comorbidities, particularly diabetes and hypertension.

This study aligned with **El-Hefny et al. (2024)** revealed in a study conducted at Critical Care Unit of the Internal Medicine Department, Assiut University Hospital that the mean and SD age group of patient with sepsis was (58.34 ± 14.69) about two thirds of them were male. **Hammond et al. (2022)** in a study conducted for adult patients admitted to ICUs in India revealed that the most relevant chronic condition in patients with sepsis were diabetes mellitus, chronic renal diseases, , respiratory disorders, cardiac problems, then malignancy (45%, 14.4%, 11.5%, 10% and 8.1%) respectively. Aldo, **Osman, et al. (2025)** in a study conducted at the Intensive Care Unit of the Internal Medicine Department at Zagazig University Hospitals revealed that about half of studied patients had septic shock with large proportion in non survivor group.

Regarding the patient outcome, the current study shows that most patients had a relatively short ICU stay of less than 10 days, with a mean duration of 9.50 ± 3.74 days. However, complications were



frequent, with hypotension, septic shock, and coma or delirium being the most common. A significant proportion required intensive interventions, including mechanical ventilation and vasoactive drugs. Regarding prognosis, only one quarter of patients achieved complete recovery, while 42.5% died. This finding aligned with **Li et al. (2022)** conducted a study across ICUs in 22 Asian countries/regions and reported that the median ICU length of stay (LOS) for patients with sepsis was 12 days, while the median hospital LOS was 21 days. The ICU mortality rate was 32.7%, and the hospital mortality rate was 41.7%. Also, in a study, conducted at respiratory intensive care unit of Abbassia Chest Hospital, Cairo, Egypt, by **Madkour et al. (2022)** revealed that most frequent complications were septic shock, acute kidney injury, and ARDS (42%, 11.76%, and 19.29%) respectively.

The current study demonstrates a significant positive correlation between nurses' total knowledge and total practice scores ($r = 0.360$, $p = 0.023$). This study aligned with **Abdelfattah, et al. (2022)** found in study conducted at Obstetrics and Gynecology Department in Tamia General Hospital at Fayoum city, that there was a significant positive correlation between total knowledge score and a total practice score of postpartum mothers with ($p < 0.001$ & $p < 0.001$) post and follow up respectively, while represent significant difference at pre intervention point (0.046). Furthermore, **Rahman, et al, (2019)** who conducted a study that there was a positive strong relationship between knowledge and practice regarding sepsis bundle during care for critical ill patient.

The current study revealed that educational level and clinical experience are the predictors of nurses' knowledge about sepsis. This finding aligned with a study conducted at Singapore revealed that the multiple linear regression analysis revealed that nursing job grade, educational level, and clinical work area were significantly associated with nurses' knowledge about sepsis. (**Chua et al., 2023**).

Regarding the predictors of studied nurses practices for patient with sepsis, the current study revealed that the significant predictors for nurses' satisfactory level of practice throughout the study phases were low income, years of experience, and knowledge level, with p-values of 0.028, 0.047, and 0.013, respectively. This finding constant with a study conducted at 21 hospitals in Hubei Province, rendered that the univariate analysis indicated that the predictors of good practice (ie, practice score > 38 points) were higher level of education ($p=0.018$) and working in a public tertiary hospital ($p=0.002$) (**Yue et al., 2024**).

Also, **Alaro et al., (2024)** found in a study conducted at Emergency Departments of Public Hospitals in Addis Ababa, Ethiopia, revealed that the predictors of goods knowledge about sepsis were level of education, working experience, and training in sepsis management

Conclusion;

In the light of current study; studied nurses demonstrated insufficient knowledge of sepsis and its management, with notable gaps in recognizing risk factors, clinical signs, and treatment priorities. Practical performance was generally poor, especially in implementing care bundles and performing critical interventions such as airway management and oxygen therapy. A positive correlation was observed between knowledge and practice; however, these factors alone did not significantly influence patient outcomes due to the complexity of sepsis. Educational level, clinical experience, and knowledge significantly improved performance, while inadequate income and limited training were associated with poorer practice.

Recommendations;

Implement continuous evidence-based educational programs for nurses to enhance their knowledge and clinical performance related to sepsis bundle care in critically ill patients

Organize regular training workshops to strengthen nurses' practical skills in applying sepsis management protocols.

Integrate key components of the sepsis bundle into the patient assessment documentation to ensure consistent implementation



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