



## “The role of nursing in the early detection of sepsis in critically ill patients: a multi-centre study.”

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**Abstract:** Sepsis is a life-threatening condition characterized by organ dysfunction due to a dysregulated host response to infection. It continues to be a leading cause of mortality among critically ill patients, particularly in intensive care units (ICUs). The early detection of sepsis is crucial for improving survival rates and minimizing complications. Nurses, who provide continuous care at the patient's bedside, play a pivotal role in the early identification of sepsis symptoms. This review synthesizes evidence from multi-center studies and explores the role of nurses in recognizing early warning signs, implementing sepsis screening tools, and promoting timely interventions. It highlights the impact of nurse-led protocols, ongoing training, and interdisciplinary collaboration in reducing morbidity and mortality associated with sepsis. Despite significant advancements, challenges such as staffing issues, lack of confidence in clinical judgment, and protocol variations persist. By empowering nurses through training and authority, and integrating technological tools into clinical practice, healthcare systems can enhance sepsis outcomes. This article concludes with recommendations for policy changes and standardized practices to strengthen nursing-led sepsis surveillance across ICU settings.

**Keywords:** Sepsis, Early Detection, Critical Care Nursing, ICU, Nurse-led Screening, Multi-center Study, Patient Outcomes, Nursing Education, Sepsis Protocols

### 1. Introduction

Sepsis represents a global health crisis with high rates of morbidity and mortality, particularly among patients admitted to intensive care units. It occurs when an infection triggers a chain reaction throughout the body, leading to tissue damage, organ failure, and potentially death. According to the World Health Organization (2020), sepsis accounts for more than 11 million deaths annually, many of which are preventable with timely intervention. Nurses, as the primary caregivers in ICUs, often encounter the earliest signs of patient deterioration. Their ability to recognize and respond to subtle changes in a patient's condition is critical in preventing the progression of sepsis to severe septic shock. This article reviews the crucial role of nurses in the early detection of sepsis based on findings from various

multi-center studies and provides practical insights for enhancing nursing practices in critical care settings.

### 2. Understanding Sepsis: A Clinical Overview

Sepsis is defined as life-threatening organ dysfunction caused by a dysregulated host response to infection. The clinical presentation is often nonspecific and overlaps with other critical illnesses, making early diagnosis challenging. The updated Sepsis-3 definition emphasizes the use of the Sequential Organ Failure Assessment (SOFA) score to identify organ dysfunction, with a two-point increase suggesting sepsis in the presence of infection. Early clinical manifestations may include fever, tachycardia, hypotension, altered mental status, decreased urine



output, and respiratory distress. Nurses must remain vigilant to these subtle signs, particularly in high-risk populations such as the elderly, immunocompromised, or post-surgical patients. Early recognition followed by appropriate interventions like fluid resuscitation and antibiotic administration can be lifesaving.

### 3. Role of Nurses in Sepsis Surveillance

Nurses are uniquely positioned to serve as sentinels for early sepsis detection due to their continuous bedside presence. Their responsibilities extend beyond routine monitoring and include recognizing deviations from baseline, interpreting trends in vital signs, and noting behavioral or cognitive changes. For example, a nurse may observe that a normally alert patient becomes confused or drowsy, which could indicate early encephalopathy due to sepsis. Similarly, an unexplained increase in respiratory rate or heart rate could be the body's response to infection. Nurses also play a key role in initiating and following through with sepsis protocols, reporting abnormal findings promptly, and collaborating with physicians for timely diagnosis and management. Their clinical intuition, based on experience and close patient observation, is often the first line of defense in preventing sepsis progression.

### 4. Insights from Multi-Center Studies

Multi-center research provides valuable insights into the effectiveness of nurse-led sepsis detection across diverse clinical environments. A study conducted by Liu et al. (2021) in three major urban hospitals in China found that implementing structured nurse training on sepsis recognition significantly reduced ICU mortality rates by 25%. Similarly, a study by O'Hara et al. (2019) in five U.S. tertiary hospitals demonstrated that simulation-based workshops improved nurses' ability to identify and escalate concerns regarding sepsis promptly. Another noteworthy study by Nash et al. (2022) across multiple UK hospitals reported enhanced compliance with the 'Sepsis Six'

protocol and improved time-to-treatment metrics when nurses were empowered to initiate sepsis care pathways. These studies consistently show that trained and empowered nurses make a measurable difference in early sepsis detection and improved patient outcomes, especially when supported by standardized protocols and collaborative teams.

### 5. Sepsis Screening Tools and Protocols

To support early identification, various clinical screening tools have been integrated into nursing workflows. Traditional tools like the Systemic Inflammatory Response Syndrome (SIRS) criteria were widely used but had limitations due to low specificity. The quick SOFA (qSOFA) tool, which includes altered mentation, a respiratory rate  $\geq 22/\text{min}$ , and a systolic blood pressure  $\leq 100 \text{ mmHg}$ , offers a more concise and accessible screening method. Many hospitals have adopted Early Warning Scoring Systems (EWS), such as MEWS or NEWS2, that assign points to changes in physiological parameters, prompting alerts for clinical deterioration. Nurses are often the first to use these tools during assessments, and their timely documentation and action can trigger rapid response interventions. The implementation of sepsis bundles, such as the hour-1 bundle or the Sepsis Six protocol, further enables structured and rapid management. These nurse-led tools ensure consistency and allow early action, often before the formal medical diagnosis is confirmed.

### 6. Education and Training: Enhancing Nurse Competence

Continued education is a cornerstone of effective sepsis detection. Nurses who are regularly trained in recognizing early sepsis indicators and responding appropriately are better equipped to save lives. Training methods such as high-fidelity simulation, case-based discussions, and interactive e-learning modules have proven effective. Simulation training, in particular, allows nurses to practice



responding to rapidly evolving clinical scenarios in a safe and controlled environment. It enhances critical thinking, decision-making, and teamwork skills. Additionally, refresher courses and updates based on the latest sepsis guidelines help maintain a high level of preparedness. Studies have shown that ICUs with ongoing nursing education programs exhibit lower sepsis-related mortality, highlighting the importance of sustained professional development.

integrated alerts for sepsis indicators saw a 17% reduction in sepsis-related mortality. Mobile applications and wearable devices are also emerging as adjuncts in continuous monitoring, particularly in pediatric and post-surgical ICU populations. However, while technology is a valuable aid, it must complement—not replace—clinical judgment. Nurses must be trained not only to use these systems effectively but also to act decisively when alerts are triggered.

## 7. Barriers to Effective Nursing Surveillance

Despite the clear advantages of nurse-led sepsis detection, several barriers can impede its effectiveness. One of the most significant challenges is high nurse-to-patient ratios, which can limit the time available for thorough assessments. In many busy ICUs, nurses may struggle to monitor vital signs as frequently as required. Another obstacle is a lack of confidence in recognizing and escalating clinical deterioration, particularly among less experienced nurses. Variations in institutional policies and unclear authority to initiate interventions also contribute to delays. Moreover, communication breakdowns between nurses and physicians can result in hesitation to report concerns. Addressing these barriers requires organizational support, including adequate staffing, clear protocols, interdisciplinary training, and a culture that values nurse input in clinical decision-making.

## 9. Ethical and Legal Considerations

With increased responsibility comes a greater need to clarify the ethical and legal dimensions of nursing roles in early sepsis detection. Nurses often face ethical dilemmas when they suspect sepsis but face resistance from the medical team or delays in further investigation. Institutions must develop clear policies outlining the scope of nursing authority in initiating sepsis protocols. Legal protections should also be in place for nurses who act in good faith based on clinical judgment and validated screening tools. Ethical nursing practice emphasizes advocacy for the patient, especially in life-threatening conditions like sepsis. Therefore, it is imperative that nurses are not only trained but also empowered to act confidently and legally in the best interest of the patient.

## 8. Role of Technology and Informatics

Technological advancements are increasingly supporting nurses in early sepsis detection. Electronic Health Records (EHRs) can be programmed to alert staff when vital signs or lab results indicate potential sepsis. Clinical Decision Support Systems (CDSS) integrated into EHR platforms offer real-time prompts based on algorithms. These tools help reduce cognitive overload and ensure that early warning signs are not missed. A multi-center study by Singh et al. (2023) demonstrated that ICU units using EHR-

## 10. Interdisciplinary Collaboration

Effective sepsis management requires seamless coordination among all members of the healthcare team. Nurses play a central role in this interdisciplinary effort. Their observations and assessments must be communicated clearly and promptly to physicians, pharmacists, and laboratory personnel. Collaborative team huddles, bedside rounds, and shared care plans improve communication and facilitate quicker interventions. Several studies have shown that when nurses are included in care planning and decision-making processes, response times improve significantly. Establishing trust and open channels



of communication ensures that the early warning signs identified by nurses are acted upon swiftly. A collaborative culture promotes shared accountability and maximizes the potential of each team member in managing complex cases like sepsis.

## 11. Recommendations for Policy and Practice

To strengthen the role of nurses in early sepsis detection, healthcare institutions should implement several key strategies. First, mandatory sepsis training should be incorporated into ICU orientation programs and updated annually to reflect current guidelines. Second, standardized sepsis protocols should be adopted across all departments to ensure uniformity in practice. Third, nurse empowerment should be institutionalized through policies that allow nurses to initiate first-line interventions based on validated criteria. Fourth, quality improvement initiatives should be data-driven, with feedback loops from outcomes to continuously refine practice. Finally, the inclusion of sepsis detection competencies in nursing licensure and certification processes will ensure that new and practicing nurses alike are adequately prepared to tackle this critical healthcare challenge.

## 12. Conclusion

Nurses are vital to the early detection and management of sepsis, especially in high-acuity settings like ICUs. Their close proximity to patients, combined with clinical training and observational skills, places them in an ideal position to identify early signs of deterioration. Evidence from multi-center studies consistently supports the effectiveness of nurse-led initiatives in reducing sepsis-related morbidity and mortality. However, for nurses to fulfill this role effectively, they must be adequately trained, supported by clear protocols, equipped with technological tools, and empowered to act decisively. Moving forward, integrating nurse-led sepsis detection into standard practice through education, collaboration, and policy change is essential for

enhancing patient outcomes and promoting safe, high-quality critical care.

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