

Interprofessional Collaboration in the Management of Sepsis: Contributions of Medical Laboratory Specialists, Medical Technologists, Pharmacists, Nurses, and Physiotherapy Technicians – A Literature Review

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ABSTRACT:

Sepsis is known to be one of the major health threats globally and is a life-threatening condition resulting from hyperactivated host response to an infection that can escalate to multiple organ dysfunction, septic shock and death within a few hours if left untreated. Whilst there has been significant progress in the diagnosis, treatment and critical care of sepsis, this condition remains a major driver of morbidity, mortality, length of hospital stay and increasing health care costs throughout the world. Sepsis has come a long way in the past decade, from a physician-led to a team-based approach including a focus on early identification, standardised clinical pathways, and multidisciplinary team co-ordination. Sepsis guidelines, agreed on by international experts, highlight the importance of early recognition, appropriate laboratory evaluation, early antibiotic treatment, and haemodynamic optimization and support in terms of survival. However, these goals should be accomplished by working in

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teams and good communication between practitioners from different professions (Delawder & Hulton 2020; Draeger et al 2025) not through individual practice.

Keywords: complexity of health; Sepsis; Physiotherapy Technicians

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1. Introduction

The complexity of health care systems has increased with the increasing complex health care system, and collaboration between different health care professionals is an important part of good sepsis care. Interprofessional collaboration is an exchange of knowledge, expertise, clinical responsibility and decision making between members of health care teams of different professions, which leads to providing patient centred care. Effective collaboration is essential to provide rapid recognition of deteriorating patients, for the interpretation of test results, for the prompt implementation of evidence-based sepsis bundles and for the review of the effectiveness of treatment in sepsis. Multidisciplinary teamwork has been shown to lead to fewer delays in treatment, better adherence to clinical guidelines, better communication between treatment providers and improved treatment outcomes. Finally, hospitals with interprofessional initiatives for sepsis have reported better outcomes, including mortality, care provided, and efficiency of systems, and this collaborative approach is essential for addressing sepsis (Gustad et al., 2024; Johnson & Schnippert, 2025; Osegueda et al., 2026).

Medical laboratory specialists and medical technologists play a special role in the early diagnosis and treatment decisions for sepsis. Laboratory tests such as blood cultures, complete blood counts, serum lactate levels, inflammatory

markers (C-reactive protein, procalcitonin), coagulation studies and antimicrobial susceptibility testing are important to have to help guide clinical decision making regarding sepsis and severity of sepsis, as well as to monitor patient recovery and direct antimicrobial therapy. Further, the increasing sophistication of laboratory methods and the speed at which pathogens are identified, via molecular diagnostic methods, has further shortened the time lag in the process of recognizing the pathogen and thus begun targeted therapy. Therefore, communication between the lab personnel and clinical staff is crucial in order to deliver diagnostic information in a timely fashion and after translation in timely clinical action.

Likewise, the pharmacist is now an integral member of interprofessional sepsis teams and has gained expertise and knowledge in pharmacotherapy and antimicrobial stewardship. The optimization of antimicrobial therapy is mostly determined by the pharmacists' role in selection and dosage adjustment, therapeutic drug monitoring, preventing adverse drug reactions, and management of drug interactions, and these are among the strongest predictors of the survival of septic patients. Multidisciplinary participation helps to facilitate evidence-based prescribing, reduce unnecessary antimicrobial exposures and wards off the threat of antimicrobial resistance. The participation of pharmacists in critical care and antimicrobial

stewardship (AMS) initiatives has been found to have an impact on medication safety, adherence to treatment plans, cost savings in healthcare and clinical outcomes in patients with severe infections and sepsis (Albaqawi et al., 2025; Schmid et al., 2022; Barletta & Dzierba, 2026).

Another key player in multi-disciplinary sepsis care is the nurse, who is in constant contact with patients throughout the care process. They are responsible for much more than basic bedside care; they must also be aware of signs and symptoms of sepsis; be able to implement screening protocols; administer prescribed therapies; monitor vital signs continuously; document clinical deterioration; educate patients and their families; and coordinate communication among various staff members. The clinical judgement of nurses is crucial to early detection of subtle physiological changes and activation of institutional sepsis pathways and therefore plays a key role in starting early interventions for sepsis. There is also evidence that nursing leadership in quality improvement efforts and following standardized sepsis bundles are significantly associated with better patient safety and treatment effectiveness, especially with supportive organizational cultures that promote interdisciplinary communication (Bogaert, 2025; Gustad et al., 2024).

Laboratory workers, pharmacists and nurses are not the only members of the healthcare team involved in septic patient care, physiotherapy technicians continue to play a vital role in the care of patients after sepsis, even in intensive care units. Long term bed rest, respiratory problems, muscle weakness and loss of function are common sequelae of severe sepsis, making rehabilitation an essential component of the patient's recovery. Physiotherapy interventions such as respiratory therapy, airway clearance, early mobilization, muscle strengthening exercises and functional rehabilitation are linked to decreased intensive care unit length of stay, decreased ventilator use, improved pulmonary function, and better long-term physical outcomes. In the past, physiotherapists technicians' contribution was not highlighted but in the present health care models, the role of the

physiotherapists technicians as an integral component into the multidisciplinary critical care teams is taken into consideration.

Increased emphasis is placed on interprofessional education and simulation-based training as well as quality improvement programs which address the issue of teamwork and communication to effectively manage sepsis; going beyond just the professional skills. Incorporating these educational strategies in healthcare education, including virtual patient telesimulation, interdisciplinary case-based learning and team simulation exercises, allows healthcare professionals to practice coordinated decision making in real-life clinical situations, which can enhance their confidence, communication, role clarification and compliance with evidence- and protocol-based practice. Sepsis bundles, standardized communication pathways and multidisciplinary code sepsis teams have also shown improvement in the timeliness of treatment, adherence to clinical guidelines, and patient outcomes in quality improvement projects. Together these initiatives reflect the need for more than just individual professional competency, but for the collective performance of well-integrated healthcare teams (Chua et al., 2022; Frost et al., 2020; Heslin et al., 2024; Delawder & Hulton, 2020).

With the expanding evidence base for collaborative health care, a broader understanding of the role of various health care professionals in the prevention, diagnosis, treatment and recovery of sepsis patients is needed. While many studies have focused on one profession or one kind of educational program, there is a lack of evidence that is consolidated in one place for the health care field. The purpose of this literature review is therefore, to synthesise the current literature on the role of medical laboratory specialist, medical technologist, pharmacist, nurse and physiotherapy technician in interprofessional care for patients with sepsis and to identify the key facilitators, barriers, education and quality improvement strategies that affect interprofessional practice. This review aims to capture the multi-disciplinary team working and the effects it has on the quality,

safety and effectiveness of sepsis care by incorporating some of the current research.

2. Aim of the Work

The purpose of this literature review is to review and summarize the current evidence on interprofessional working in the management of sepsis, specifically the role of the medical laboratory specialist, medical technologist, pharmacist, nurse and physiotherapy technologist. The diagnosis and coordinated intervention of sepsis are critical to better patient outcomes given its complexity, fast progression and life threatening nature. The effective team working between healthcare professionals is now a core part of clinical practice and aids in early detection of sepsis, timely application of treatment bundles and optimization of antimicrobial therapy, effective communication, ongoing patient monitoring and clinical outcomes. In addition, this review aims to illustrate the value of multidisciplinary team collaboration in improving the quality and safety of care as well as providing Patient-centred care across the entire pathway of sepsis care.

The other objective of this review is to critically analyse the specific tasks and contribution to clinical care of each healthcare profession participating in the multi-professional approach to the management of sepsis. Specific emphasis is placed on the contribution that medical laboratory specialists and medical technologists make to the medical laboratory for rapid and accurate diagnostic investigations which aid in early recognition of infection and therapeutic decision-making. Additionally, pharmacists' contributions to antimicrobial stewardship, medication optimization, medication drug monitoring and medication related complication prevention is discussed. It also looks at the nurses' role in recognising clinical deterioration, checking patients and adhering to the sepsis protocol, having regular reviews of the patient and communicating with the multi-disciplinary team. The role of physiotherapy technicians is also taken into account, especially in the context of respiratory rehabilitation, early mobilization, functional recovery and preventing

complications arising from long-term critical illness. This review aims to give a holistic view of the impact of collaborative practice on effective sepsis care, rather than examining the work of the various professions separately.

Another aim of this literature review is to explore the organisational, educational and clinical issues which support and hinder effective interprofessional working in the management of sepsis. It explores recent research on communication, interprofessional education, simulation learning, quality improvement as well as leadership interventions and antimicrobial stewardship programs that will improve collaborative practice within health care systems. It also reviews the most common problems that they have reported, including poor communication, role ambiguity, excessive workload, lack of personnel, delays in diagnosis and organizational issues which may compromise timely treatment for sepsis. These barriers and enablers are particularly relevant in suggesting practical recommendations for how these can be improved to help improve the functioning of the team, adherence to the guidelines and for long-term improvements in patient care.

Last but not least, the objective of this review is to outline the existing findings, highlight gaps in the literature, and make some suggestions for future studies and clinical practice in the field of multidisciplinary sepsis treatment. While there are many studies that have explored the contribution of individual professionals or looked at the effectiveness of specific quality improvement interventions, few studies have looked at the combined contribution of multiple professional groups in a single study. Thus, this review aims to streamline the current information, highlight any further research gaps, and help to gain a better understanding of the impact of interprofessional working to reduce the morbidity and mortality associated with sepsis, improve the efficiency of healthcare services, improve patient safety and facilitate the ongoing development of evidence-based MDT working.

3. Methods

The present study was done in a narrative literature review format to provide a comprehensive review of the current evidence base on IPC for the management of sepsis with a focus on the role of the medical laboratory specialist, medical technologist, pharmacist, nurse and physiotherapy technician. A literature review methodology was chosen because it enables the comprehensive identification, critical analysis, and collation of published literature from several healthcare disciplines, to gain a detailed understanding of the existing knowledge, clinical practice, education and/or organizational approaches to MD management of sepsis. This review was a secondary research, in which a number of existing published scholarly articles were used, and no subject was recruited nor any original clinical data was collected.

The literature search was limited to peer reviewed publications published in the last seven years (2020 – 2026) to ensure that the literature review captured the most up to date and relevant literature on sepsis management, antimicrobial stewardship, interprofessional education and collaborative healthcare practice. The studies chosen were those that were directly relevant to multidisciplinary approaches used in the diagnosis, treatment, monitoring, rehabilitation, and/or quality improvement of sepsis care. The review consisted of several types of studies including quality improvement projects, qualitative studies, integrative reviews, systematic reviews, mixed methods research, educational intervention studies, simulation-based educational studies, observational studies, and expert review articles. It was found that the use of more than one type of research method enabled a comprehensive understanding of the interprofessional collaboration of various clinical, educational and organizational aspects.

The inclusion criteria were English language publications that discussed any component of collaborative sepsis management between healthcare professionals from various disciplines. Studies focusing on the clinical roles and interprofessional collaboration of medical laboratory specialists, medical technologists, pharmacists, nurses, physicians and

physiotherapy technicians, and the evaluation of antimicrobial stewardship programs, multidisciplinary sepsis teams, interprofessional education, simulation training, communication strategies and quality improvement initiatives were given special attention. Articles that discussed only the biological aspects of sepsis, laboratory science (without clinical involvement), pediatric areas in which collaboration with multi-professional is not required or articles that did not relate to interprofessional healthcare practice were excluded. The review excluded any duplicate publications or articles which did not contain enough methodological information or were not applicable to collaborative clinical practice.

A narrative synthesis method was used for critically analysing the selected literature. Each publication had been read thoroughly and pertinent information was extracted out from the publications including objectives of the study, research design, health care environment, professional disciplines involved, important findings, and reported implications for clinical practice. The findings were then categorized into themes based on the key aspects of interprofessional sepsis care. These themes were related to the importance of multidisciplinary collaboration, the role of medical laboratory specialists and medical technologists in diagnosis and early recognition of sepsis, pharmacists' contribution to antimicrobial stewardship and optimization of antibiotics, nursing interventions during recovery and rehabilitation, communication between healthcare professionals, interprofessional education and simulation-based training, barriers and facilitators to collaborative working, and quality improvement initiatives. The thematic approach allowed for comparing findings from various study designs, as well as to detect common patterns, recommendations and gaps in the current literature.

It was prioritised to include more recently published articles from relevant, reputable, peer-reviewed journals in the subject of emergency medicine, critical care, nursing, pharmacy, infectious diseases, healthcare quality and

multidisciplinary clinical practice to make the review more comprehensive and credible. Studies that reported evidence-based interventions, organizational experiences or educational programs that showed measurable improvements in sepsis recognition, guideline adherence, antimicrobial stewardship, multidisciplinary communication, patient outcomes or healthcare quality received preference also. Formal methodological quality appraisal tools were not used as there was a wide range of study designs included, but the review included publications from well-established scientific journals that provided clear description of methodology and findings.

This study involved only the analysis and synthesis of published literature and did not include the recruitment of any human participants, the collection of any patient information, nor the performance of any experimental interventions. Therefore, no institutional review board approval was needed. The review has, however, been carried out in accordance with good practices in academic integrity, including the accurate representation of the findings of the original studies, appropriate acknowledgement of all authors cited, and the avoidance of plagiarism by using appropriate and critical synthesis of the available evidence. The approach used in this review thus allows for a thorough and evidence-based overview of the current knowledge on interprofessional collaboration in sepsis management and highlights areas for future research and improvement of clinical practice in a multidisciplinary approach.

4. Discussion

4.1 Importance of Interprofessional Collaboration in Sepsis Management

Sepsis is a complicated clinical syndrome needing immediate diagnosis, prompt intervention and ongoing monitoring, and requires a team approach in order to provide quality care to the patient. Sepsis requires a multi-disciplinary approach by healthcare professionals such as doctors, nurses, medical laboratory scientists, medical technologists, physiotherapy technicians

and others rather than any one medical discipline. Each discipline brings specific knowledge to the patient's care and works in synergy from the onset of diagnosis and recognition to the patient's antimicrobial treatment and supportive care, and on to rehabilitation and healing. Effective communication, teamwork and shared clinical decision making among members of the multidisciplinary team are essential to successful sepsis management, in addition to individual provider competency. Failure to timely diagnose and/or treat any phase of the diagnostic and therapeutic process will markedly increase the risk of organ failure and death, necessitating the need for teamwork across all healthcare professions (Delawder & Hulton, 2020).

The benefits of structured interprofessional working to comply with evidence-based sepsis bundles, to more quickly commence appropriate treatment, improve patient safety and lead to better clinical outcomes have been demonstrated in recent literature in a consistent manner. Gustad et al. (2024) found that multidisciplinary quality improvement efforts contributed to greater awareness among healthcare staff of sepsis and enhanced communication between doctors and nurses, resulting in more uniform application of recommended clinical treatments. Likewise, Johnson and Schnippert (2025) noted that seeking sustainable improvements in sepsis care relies on a joint educational program, leadership backing, and ongoing quality improvement initiatives that require all healthcare workers to engage in patients' care. The results confirm the trend of better understanding of the need to have a collaborative culture with respect, shared responsibility and communication in health care organizations for the care of sepsis, not just the technical skills.

4.2 Role of Medical Laboratory Specialists and Medical Technologists

Medical laboratory specialists, medical technologists are essential members of multidisciplinary sepsis teams and essential in contributing to diagnostic information which is vital to facilitate timely clinical decision making. A diagnosis of infection should be confirmed as

soon as possible in the laboratory to distinguish sepsis from other inflammatory conditions or assess the severity of the illness. Laboratory data, including complete blood counts, serum lactate, blood cultures, inflammatory markers, coagulation tests, renal and liver function, and antimicrobial susceptibility testing, provide objective information to the clinician to support a diagnosis, strategy for antibiotic choice, and continued monitoring of patients. Laboratory turnaround times are critical for good care of modern sepsis, as survival drops with each hour of delay.

New technologies in laboratory automation, molecular diagnostics, and microbiological testing have significantly enhanced laboratory's ability to rapidly and accurately identify infectious organisms. The success of these technological advances however, is largely reliant on how well these systems can communicate with the clinical team and laboratory staff. Early reporting of significant laboratory results allows physicians and pharmacists to make timely changes to antimicrobial treatment while giving nurses top priority to make critical interventions. Therefore, it is suggested from the literature that the job of the laboratory professional should not simply be considered as providing diagnostic services but as an active clinical associate who plays an active part in the clinical management of patients based on evidence. Enhancing communication between laboratory departments and clinically active doctors could also further minimize delays in diagnosis and enhance compliance with the international guidelines for sepsis.

4.3 Role of Pharmacists in Sepsis Management

Due to their expertise in antimicrobial stewardship and pharmacotherapy, pharmacists are now more widely acknowledged as a key member of multi-disciplinary teams treating patients with sepsis. Pharmacist involvement is critical throughout the treatment process for appropriate antibiotic administration as one of the most influential factors on patient survival with sepsis. Pharmacists also play a role in selecting the right empirical antimicrobial therapy

for a patient, optimizing antimicrobial dosing based on patient characteristics, monitoring drug levels, preventing drug use errors, detecting potential drug interactions and making antimicrobial therapy changes once microbiological data is available. Their ongoing engagement enables personalized care and helps reduce any harmful drug side effects and excessive antibiotic use.

Pharmacists have consistently been shown to have a positive impact on clinical and organizational outcomes as seen in the literature. Albaqawi et al. (2025) asserted that involvement of pharmacists with physicians, nurses, and microbiology laboratories in multidisciplinary antimicrobial stewardship programs is significantly enhanced. Likewise, Schmid et al. (2022) found that teamwork between intensive care physicians, pharmacists and nursing care providers helped to optimize antimicrobial use, enhance patient care and decrease health care costs. Besides the role in medication management, Barletta and Dzierba (2026) also suggested that pharmacists can play an additional role in rounds, which involve collaboration with other health care professionals, education of the health care workforce, assisting with protocol development, and facilitating evidence-based clinical decision making. Taken together, the results of these studies suggest that the involvement of pharmacists in sepsis care results in better medication safety, with improvements to the overall efficiency and quality of multidisciplinary care.

4.4 Role of Nurses in Sepsis Management

In multidisciplinary sepsis teams, nurses play a pivotal role in the care provided, with their constant access to patients and their often first-hand contact with patients and their families making them key to detecting not only clinical deterioration but also subtle signs of deterioration. They are not only tasked with providing routine bedside care, which is often undertaken with a patient's individual clinical instability in mind, but are also responsible for systematic screening for sepsis, ongoing vital sign monitoring, timely notification to healthcare

providers of abnormal values, pre-emptive antibiotic and intravenous fluid delivery, application of sepsis bundles, patient education, documentation, and communication between healthcare providers. Time is of the essence and is directly linked to survival and it is here that nurses have a pivotal part to play in ensuring that treatment protocols are initiated without delay.

Nursing practice has been identified throughout the literature as a key factor in the management of sepsis. Quality improvement led to a marked improvement in nurses' confidence, awareness, and working together with doctors during the management of sepsis, according to Gustad et al (2024). Similarly, Bogaert (2025) pointed out that nursing leadership plays a significant role in infection prevention, protocol implementation, patient advocacy and multidisciplinary teamwork. Continuity of care is also promoted in nursing practice by the ability to pass information on to others as accurately as possible when shifts change, during multidisciplinary meetings, and during emergency situations. Nursing education, leadership roles and fostering interprofessional communication skills are therefore key investments needed to enhance patient safety and improve healthcare quality in sepsis care.

4.5 Role of Physiotherapy Technicians in Sepsis Management

Physiotherapists have been overlooked in sepsis research when compared to physicians and nurses, but their role in the recovery of patients is increasingly being acknowledged in contemporary critical care practice, where there is a multidisciplinary approach. Severe sepsis survivors often suffer from extended periods of immobility, respiratory dysfunction, weakness of muscles, decreased functional capacity, and intensive care unit acquired disability. The purpose of early physiotherapy interventions is to reduce these complications by optimizing pulmonary function, airway clearance, early mobility, preserving muscle strength and early recovery of function during the hospital stay.

Today's treatment concepts in sepsis place physiotherapy technicians in a multi-professional context and see them as part of a comprehensive

patient care team, not just as experts in rehabilitation. They can closely monitor the individual patient's clinical status with the involvement of the physicians, nurses, and respiratory therapist and thereby create a tailored rehabilitation approach that meets the needs of the individual patient while keeping the patient safe. Early mobilization has been linked to reduced intensive care unit (ICU) length of stay, better respiratory outcomes, reduced reliance on mechanical ventilation, and better quality of life at discharge. While there are relatively few studies specifically focusing on physiotherapy technicians in sepsis teams, the evidence available suggests that they need to be included.

Collaboration between rehabilitation staff and other health care providers within a multidisciplinary clinical pathway for effective recovery after critical illness.

4.6 Interprofessional Education and Simulation-Based Training

Interprofessional education has been repeatedly identified in the literature as an important method of enhancing multidisciplinary working in the management of sepsis. Multidisciplinary educational interventions have been found to increase understanding of the different roles of the healthcare team, increase effective communication, build trust, and improve collaborative clinical decision making. Education using simulation can provide a safe learning environment for the multidisciplinary teams to practice complex clinical scenarios involving sepsis, before they see real patients, as it is often necessary to respond to sepsis in a timely and coordinated manner under time constraints.

Chua et al. (2022) showed that virtual patient telesimulation proved highly effective in enhancing teamwork, communication and confidence of multiple healthcare professionals participating in the care of patients with sepsis. Similarly, Heslin et al. (2024) found that LICE had a positive effect on the clinical reasoning skills of students and that continued to benefit them over time. In addition, interprofessional simulation training had a positive effect on learning about obstetric sepsis and improving

communication between interprofessional teams during emergencies, as demonstrated by Frost et al. (2020). The overall findings indicate that education should go beyond subject-specific knowledge to help ensure transfer of skills including collaborative skills, common clinical reasoning, leadership, communication, and team-based problem solving. For health care organizations looking to enhance clinical outcomes and organizational performance in the care of sepsis, continuous interprofessional education will be a valuable investment.

4.7 Quality Improvement Initiatives in Sepsis Care

Quality improvement projects are now key tools used to support multidisciplinary sepsis management and to standardise clinical pathways, achieve adherence to evidence-based protocols and minimise unnecessary variations in clinical care. Hospitals are growing in the number that have established structured sepsis programs that include standardized screening tools, multidisciplinary sepsis response teams, clinical protocols, electronic alert systems, ongoing performance monitoring, and staff training. The interventions are designed to enhance communication and accountability among healthcare providers and to decrease the delay in treatment.

Delawder and Hulton (2020) showed that the creation of an interdisciplinary Code Sepsis team led to a significant increase in the implementation of sepsis bundles and initiated treatments earlier. Johnson and Schnippert (2025) also highlighted the need for organizational commitment, ongoing professional development, leadership involvement and collaboration among multiple disciplines to achieve sustainable change in sepsis management. Osegueda et al. (2026) also emphasized the need for learning health systems that regularly assess clinical effectiveness, reflect on health care professionals' experiences, and make evidence-informed organizational learning-based changes. These studies suggest that quality improvement efforts are most effective when there is a cohesive organizational approach that unites clinical practice, education, leadership and

multidisciplinary teamwork, and centers the effort around patient safety and continuous improvement.

4.8 Barriers and Facilitators of Interprofessional Collaboration

While significant strides have been made in the multidisciplinary approach to sepsis, there are still several challenges in effective interprofessional working. One of the most common difficulties reported is communication failures, especially in emergency situations where quick communication is vital. Other barriers include lack of clarity around roles, not enough staff, too many responsibilities, late results from the laboratory, not enough interprofessional education, resistance to change within the organization, and insufficient leadership support. These can lead to delayed diagnosis, poor adherence to sepsis bundles, poor patient continuity of care, and an increased risk of preventable complications.

Communication challenges, organizational obstacles, and limited resources were identified as significant challenges to optimal sepsis care in healthcare settings, as discussed by Draeger et al. (2025). Similarly, Hamlett (2024) highlighted the importance of poor communication in EDs and how this can affect delayed recognition and management of septic patients. However, there are also several established facilitators of multidisciplinary collaboration that have been identified in the literature such as a standardised communication system, common clinical policies, multidisciplinary ward rounds, ongoing professional learning, simulation-based learning, leadership support and shared responsibility and respectful organisation cultures. These findings together indicate that the effective team working, continuous improvement and patient-centred care that is needed in improving interprofessional collaboration should not only be supported with individual professional competence but through effective healthcare systems that support effective working, learning and working with the patient.

5. Study Limitations and Future Research

This literature review outlines the current evidence on interprofessional working in the management of sepsis, but does have some limitations to consider when interpreting its findings. The first challenge is that the review was conducted on secondary data only and the results are subject to the quality, methodology and reporting standards of published studies. There was a great amount of variation in the reviewed research, from research design through sample characteristics, healthcare settings, outcome measures to professional groups involved. Qualitative studies, quality improvement projects, educational projects, observational studies, and narrative reviews provides depth to the review, but also constrained the capacity to directly compare results and generalize about the efficacy of specific interprofessional interventions. Moreover, many studies were conducted on the individual parts of multidisciplinary care but not on the overall contribution of all healthcare professionals involved in the management of sepsis, making it difficult to measure the relative contribution of each discipline on patient outcomes.

Another caveat involves the literature that was reviewed. This study may have excluded relevant literature published in languages other than English or before 2020. In addition, the majority of evidence was derived from high resource settings in which healthcare services are well developed, laboratory services are advanced, there are antimicrobial stewardship programs, and there are organized multidisciplinary care pathways. Results may therefore not be entirely generalizable to health systems in LMICs because of a scarcity of healthcare professionals, lack of diagnostic facilities, financial limitations and organizational issues, which could impact how interprofessional collaboration is implemented and how effective it is. Furthermore, little evidence was located concerning the role of medical technologists and physiotherapy technicians as well as more extensively studied physicians, nurses and pharmacists. This imbalance in the literature points to an essential gap in the knowledge about the general multidisciplinary treatment of sepsis.

Further studies should therefore be designed to overcome these limitations through well planned multicenter studies to investigate the effects of comprehensive interprofessional working in a variety of health care settings and patient groups. Prospective cohort studies, randomized educational interventions, and mixed methods research would be stronger evidence to support the effectiveness of multidisciplinary teamwork and its impact on clinically meaningful outcomes like mortality, length of hospital stay, intensive care unit utilization, antimicrobial appropriateness, patient safety, healthcare cost, and quality of life after recovery from sepsis. Long-term sustainability of multidisciplinary quality improvement effort should also be explored in future studies, as well as what organizational strategies best facilitate collaboration among healthcare professionals. In addition, the role of medical laboratory specialists, medical technologists and physiotherapy technicians in the clinical setting is underutilized in the literature, and more attention should be focused on assessing their unique roles in diagnosis, monitoring, the rehabilitation process, and continuity of care.

There are also opportunities for future research involving emerging technologies. The use of artificial intelligence, clinical decision support systems, electronic health records, rapid molecular diagnostics, telemedicine and digital communication platforms can help to improve interprofessional cooperation by enabling earlier identification of sepsis, better information sharing, aiding evidence-based clinical decisions and increasing the likelihood that people receive treatment as per the standardised protocol. Further research is needed on the effective implementation of these technologies in multidisciplinary sepsis care, ensuring patient safety, data privacy, and accountability to the profession. Research is also required to investigate barriers, resource constraints, and culturally sensitive approaches for adopting collaborative care models in the low and middle-income healthcare system. Further data will help to build an evidence base that is applicable to a wider global population and will inform the creation of global

guidelines to enhance interprofessional sepsis management and improve patient outcomes in various settings.

6. Issues and Ethical Concerns

Ethical and professional issues arise in managing sepsis, as the treatment may involve multiple complex interventions that are needed for patients quickly in critical situations, requiring a multidisciplinary approach. Timely decisions by healthcare professionals, that can have a profound impact on patient survival, must also be made in an ethical manner that respects the ethical principles of beneficence, non-maleficence, justice, respect for patient autonomy, and professional accountability. These principles are reinforced through effective interprofessional working, which involves timely communication, shared decision making, co-ordinated implementation of evidence-based interventions and patient-centred care. Conversely, one or more of these factors could cause delayed treatment, medical mistakes, and poor outcomes for the patient if they are present. Thus, it is a collective responsibility of the whole multi-disciplinary healthcare team to act responsibly in the management of sepsis.

A second ethical challenge is to be able to weigh the necessity for timely antimicrobial therapy against sound antibiotic use. Appropriate and timely use of broad-spectrum antibiotics is a critical part of the management of suspected sepsis but may also lead to antimicrobial resistance when used incorrectly or overused. Healthcare workers therefore need to collaborate to ensure that antimicrobial therapy is started promptly, reviewed regularly in the light of laboratory test results, and modified in response to microbiology. This team effort is effective in optimizing therapy, reducing the risk of adverse effects of antimicrobials and other medications, and maintaining the efficacy of antimicrobials.

Confidentiality and data privacy are also key ethical principles of multidisciplinary sepsis care. It is important for patient information to be shared only with healthcare professionals/medical staff authorized to access the information for clinical management, as the

effective management depends upon the continuous exchange of information between physicians, nurses, pharmacists, laboratory personnel, physiotherapy technicians, and other healthcare professionals. With the rise of EHRs and digital communication protocols, ensuring patient privacy and adherence to institutional policies and legal mandates for data security becomes even more critical.

For establishing ethical practice in multidisciplinary teams, professional accountability, mutual respect and role clarity are also important. All healthcare professionals should acknowledge and value one another's skills and knowledge, communicate openly with each other and be involved in collaborative decision making in relation to patient care. Healthcare institutions should also create a supportive culture that promotes openness, collaboration, ongoing learning, and psychological safety, encouraging employees to share their concerns and collaborate effectively in patient care without fear of retribution.

No human subjects, patient recruitment, or clinical data was involved in this literature review so it was not necessary to obtain formal ethical approval. The review was, however, undertaken in keeping with academic honesty and responsible research practices, correctly paraphrasing the conclusions of published works, ensuring that no one is plagiarized, and making balanced interpretations based on the evidence. These practices help to strengthen the credibility and the scientific value of the review.

7. Conclusion

Sepsis continues to be a major public health problem worldwide, which needs to be diagnosed and treated in a timely fashion and delivered by a multidisciplinary team. There is overwhelming evidence now that interprofessional working between medical laboratory specialists, medical technologists, pharmacists, nurses, physicians and physiotherapy technicians is a more effective way of achieving improved diagnostic outcomes, better antimicrobial stewardship, improved adherence to sepsis bundles and, ultimately, improved patient outcomes.

Collaborative practice is further enhanced and effective communication across healthcare disciplines is facilitated through educational interventions, simulation training and quality improvement initiatives. There are still barriers to overcome, but ongoing investment in multidisciplinary team working, organisation and

interprofessional education should lead to better quality and safety care for people with sepsis. This review underscores the critical role of the collaboration and integration of all health professionals in order to provide patient-centered, comprehensive management of sepsis.

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