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A Report on Critical Impact on the Treatment of Sepsis

Joshua Ikoni Ogaji*
Department of Pharmaceutics, University of Jos, Nigeria

Editorial

Sepsis is a life-threatening infection that can quickly lead to tissue damage, organ failure, and even death. An estimated 18 to 31 million cases occur globally every year with 850,000 occurring in the United States. With the mortality rate of sepsis at up to 30%, it is the leading cause of death for patients in the ICU.

Sepsis can arise from any source of infection, with 2 of the most common sources being pneumonia and urinary tract infection. The rapid progression of sepsis makes it imperative to diagnose and start goal-oriented treatments as soon as possible. It has been shown that patient survival rate decreases by 7.6% for every hour that antimicrobial therapy is delayed. After sepsis is diagnosed, immediate care is indicated to prevent decompensation, organ damage, and death. A 5-step process called the 1-hour bundle was developed to facilitate rapid, goal-oriented treatment in sepsis situations. The 1-hour bundle presents a step-wise algorithm for the initial treatment of sepsis.

The data show that proper recognition of sepsis indicators and adherence to goal-driven therapies decreases mortality and length of stay in the hospital. Pharmacists are ideally positioned to assist the health care team with achieving these goals and therefore improving patient outcomes. Adherence to the 1-hour bundle has been shown to significantly reduce mortality from 20.4% without bundle adherence to 17.9% mortality with bundle adherence (p-value = 0.035). One study showed that patients who received antimicrobials within 1 hour of hypotension had a survival rate of 79.9%. Furthermore, the choice of appropriate broad-spectrum antimicrobials is vital to patient survival. Results from another study investigating this topic showed that patients who received appropriate empiric therapy were 5 times as likely to survive compared to those who did not (52% *vs.* 10.3%, p <0.001).

Additionally, one 2-year study conducted at a teaching hospital showed that the management of patients admitted to the emergency department for sepsis decreases significantly when clinical pharmacists conduct consultations. During the 2-year study, 585 consultations were provided by pharmacists for patients with sepsis. These consultations included dosing recommendations (53%), addition of appropriate antibiotics (22%), and medication preparation (19%), with the main medication classes discussed being antibiotics (83%) and vasopressors (8%). In this way, pharmacists can impact the early management of patients with sepsis in multiple ways, especially in terms of the optimization of antibiotic selection and medication dosing.

Pharmacists have also proven to be valuable members of sepsis response teams and tend to improve adherence to early goal-driven therapy, leading to better patient outcomes. Several studies have shown that a pharmacist's presence on a sepsis team has a statistically significant impact on the time to antimicrobial administration (0.61 hours *vs.*0.88 hours, p=0.001). Additionally, pharmacists have been shown to have a significant impact on patients successfully receiving antimicrobials within 1 hour (100% *vs.* 95%, p=0.025), patients receiving appropriate antimicrobials (97% *vs.* 81%, p=0.0008), and decreased mortality (4.8%, p=1.08).

Furthermore, the study showed that a pharmacist's presence at bedside during initial sepsis treatment reduced the time from antimicrobial order to administration from 157 minutes to 54 minutes. In this way, the impact of the pharmacist extends beyond the bedside and clinical patient outcomes to other areas as well, including significantly reducing billing costs, extra drug charges, and extra laboratory charges, which helps to decrease the economic strain on hospitals and patients. Sepsis is a serious disease that can culminate in organ damage and even death, if handled inappropriately, but there is clear evidence that with the right screening tools and policies, along with early goal-driven therapy, the risk of serious complications and mortality can be significantly reduced.

Currently, pharmacists take on several roles during patient management of sepsis. With such a rapidly progressing and deadly disease state, it is imperative to have proper strategies paired with inter-professional collaboration to increase positive patient outcomes when treating sepsis, with pharmacists playing a critical role on a sepsis response team.

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***Address for Correspondence:** Joshua Ikoni Ogaji, Department of Pharmaceutics, University of Jos, Nigeria, E-mail: joshua.ogaji22@gmail.com*

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