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Sepsis: The Overlooked Epidemic in Modern Medicine

"Sepsis is the final common pathway to death from most infectious diseases worldwide and is the number one cause of preventable death worldwide." — World Health Organization (WHO) (1)

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A Silent Global Crisis

In today's world, where pandemics and emerging infections dominate the news, sepsis remains an invisible yet lethal force. Despite medical advances, it claims more lives than many different types of cancers combined. Globally, sepsis causes about 11 million deaths each year—one in five—or one every 2.8 seconds. Its burden disproportionately affects India and other low- and middle-income countries (LMICs) (2), where mortality from sepsis can reach 36.3%, rising to over 50% in cases of septic shock. A *Lancet Global Health* investigation in Indian neonatal units highlighted alarmingly high rates of multidrug-resistant sepsis, stressing the need for improved infection control, laboratory capabilities, and antimicrobial stewardship in district hospitals (3, 4).

What Is Sepsis?

Sepsis is not a single disease but a **life-threatening syndrome** arising from an excessive immune reaction to infection that injures the body's organs. The Sepsis-3 definition, adopted by international consensus in 2016, defines it as "life-threatening

organ dysfunction caused by a dysregulated host response to infection." Unlike conventional infections, sepsis involves systemic inflammation and organ impairment that can lead to rapid deterioration (5, 6).

Evolution of the Definition

The concept of sepsis has evolved over more than a century (6). In early 20th century definition, Hugo Schottmüller's focused on bloodstream pathogens and symptoms. In 1992, the U.S. introduced SIRS (Systemic Inflammatory Response Syndrome)—based on fever, heart rate, respiratory rate, and white blood cell counts—to identify sepsis. Though widely used, SIRS lacked specificity (7). In response, a task force including experts from the Society of Critical Care Medicine and European Society of Intensive Care Medicine convened in 2014 to update the definition. Their work produced the Sepsis-3 criteria, centered on **organ dysfunction**, assessed via the Sequential [Sepsis-related] Organ Failure Assessment (**SOFA) score (8).** Further streamlined early-warning tools like **qSOFA**—a quick bedside tool based on altered mental state, high respiratory rate, and low systolic blood pressure. Though qSOFA is more specific than SIRS, a negative result does not rule out sepsis.

Sepsis Pathophysiology

Sepsis can arise from infections caused by bacteria, viruses (e.g., influenza, SARS-CoV-2), fungi, or parasites. What distinguishes it is the body's overzealous immune response. This triggers damage to the vascular lining, abnormal clotting, oxygen delivery failure, mitochondrial injury, and multi-organ dysfunction—involving the lungs, kidneys, heart, brain, liver, and intestines. These processes can evolve rapidly, demanding urgent intervention. Risk factors influencing the severity of sepsis include age, immune status, chronic diseases, and nutritional status. Even routine infections such as septic wound, gallbladder or kidney stones, pneumonia, urinary tract infections, skin infections, etc. can spiral into sepsis (9, 10).

Recognizing the Signs and Who Is Most Vulnerable

Sepsis often presents with non-specific symptoms that can be mistaken for less serious conditions. These may include confusion, reduced clarity of thought, fever, chills,

shortness of breath, jaundice, decreased urine output, and extreme discomfort. Although people of any age can develop sepsis, certain groups are at heightened risk: infants, older adults (particularly those over sixty), asplenic individuals, and people with chronic illnesses such as diabetes, heart or lung disease. Likewise, the immunocompromised—whether due to HIV/AIDS, cancer therapy, or organ transplantation—are especially vulnerable (11, 12).

Balancing Speed with Precision

No single test can confirm sepsis. Diagnosis relies on clinical suspicion, SOFA or qSOFA scores, and biomarkers like serum lactate (indicating tissue oxygen deprivation), procalcitonin, and C-reactive protein (to suggest bacterial infection). Although blood cultures help identify causative agents, delays are common. Critically, mortality increases by **7–8% for every hour** that effective antibiotic treatment is delayed. Rapid recognition and treatment are key to survival.

It is essential that **public awareness campaigns educate individuals and caregivers** to recognize signs of serious infection that could indicate sepsis—such as high fever, confusion, rapid breathing, or decreased urine output. These symptoms should never be dismissed or managed solely at home. **Timely hospital presentation can mean the difference between life and death**. By understanding when an infection appears to be worsening, especially in vulnerable individuals such as infants, the elderly, or those with chronic illnesses, the public can play a critical role in preventing fatal delays.

Sepsis as a Medical Emergency

Sepsis demands immediate action. The **Surviving Sepsis Campaign** prescribes a "sepsis bundle" of interventions: administer broad-spectrum antibiotics within one hour, initiate aggressive fluid resuscitation, and, if needed, use vasopressors like norepinephrine to maintain blood pressure (13, 14). Organ support—ranging from mechanical ventilation to dialysis—may be required. While these guidelines are evidence-based, their implementation remains uneven, especially in under-resourced healthcare settings (15).

Recovery and Long-term Consequences

Although many patients recover fully after sepsis, some endure lingering effects, collectively called **post-sepsis syndrome**. Survivors may suffer fatigue, muscle weakness, cognitive impairment, sleep disturbances, and irregular heart rhythms. Research indicates that the long-term sequelae of sepsis closely mirror those seen in individuals with long COVID—underscoring the need for ongoing care and rehabilitation (2, 16).

Sepsis in India: A Public Health Emergency

India's struggle with sepsis reflects systemic weaknesses. Healthcare access is uneven, with public hospitals suffering from staffing shortages and equipment gaps (17). The country ranks 145th of 195 nations in healthcare access and quality (Global Burden of Disease), and health insurance coverage remains low (just 15%). As a result, many patients face crippling out-of-pocket medical costs (18). Widespread antibiotic misuse, water and sanitation challenges, and environmental health issues further fuel the sepsis burden, often creating a breeding ground for drug-resistant infections (15, 19, 20).

Awareness, Prevention, and Policy

Ultimately, sepsis can be prevented and treated—if recognized early. Raising awareness among healthcare providers and the public is a vital step. Education campaigns that highlight warning signs, combined with improved diagnostic tools, provider training, and policy initiatives, can make measurable impact. Strengthening sanitation and vaccination programs and promoting responsible antibiotic use are equally essential, especially in settings with high infection rates (19, 9, 21).

A Call to Recognize and Act

Sepsis is both common and deadly, yet preventable when caught in time. It creeps into gaps in healthcare systems and defies easy detection, but simple vigilance—asking "Could this be sepsis?"—can save lives. As a matter of public health, sepsis urgency must become a shared concern—across hospitals, communities, and policymakers. By

advancing awareness, ensuring rapid treatment, and supporting survivors in their recovery, we can significantly reduce preventable deaths from this hidden epidemic.

References

1. Sepsis; 2025 [cited 2025 Aug 21]. Available from: URL: https://www.who.int/news-room/fact-sheets/detail/sepsis.
2. Duda J. On the front lines of the sepsis crisis: hurdles faced by sepsis researchers, survivors, and family advocates. The Lancet Respiratory Medicine 2025; 13(3):205–6. Available from: URL: https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(24)00420-X/fulltext.
3. Jain K, Kumar V, Plakkal N, Chawla D, Jindal A, Bora R et al. Multidrug-resistant sepsis in special newborn care units in five district hospitals in India: a prospective cohort study. The Lancet Global Health 2025; 13(5):e870-e878. Available from: URL: https://www.thelancet.com/journals/langlo/article/PIIS2214-109X%2824%2900564-3/fulltext?utm_source=chatgpt.com.
4. Reinhart K, Kluge S, Welte T. Schwierigkeiten bei der Bekämpfung der Sepsis in Deutschland – Lernen aus den Erfahrungen anderer und aus der COVID-19-Pandemie. Med Klin Intensivmed Notfmed 2023; 118(Suppl 2):65–7.
5. Monti G, Landoni G, Taddeo D, Isella F, Zangrillo A. Clinical Aspects of Sepsis: An Overview. Methods Mol Biol 2015; 1237:17–33.
6. Gerard R, Dewitte A, Gross F, Pradeu T, Lemoine M, Goret J et al. Is "pre-sepsis" the new sepsis? A narrative review. PLoS Pathog 2025; 21(7):e1013372.
7. American College of Chest Physicians/Society of Critical Care Medicine Consensus Conference: definitions for sepsis and organ failure and guidelines for the use of innovative therapies in sepsis. Crit Care Med 1992; 20(6):864–74. Available from: URL: https://pubmed.ncbi.nlm.nih.gov/1597042/.
8. Singer M, Deutschman CS, Seymour CW, Shankar-Hari M, Annane D, Bauer M et al. The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). JAMA 2016; 315(8):801–10.

9. Brunkhorst FM, Adamzik M, Axer H, Bauer M, Bode C, Bone H-G et al. S3-Leitlinie Sepsis – Prävention, Diagnose, Therapie und Nachsorge – Update 2025. Med Klin Intensivmed Notfmed 2025:1–69. Available from: URL: https://link.springer.com/article/10.1007/s00063-025-01317-1#citeas.
10. Gyawali B, Ramakrishna K, Dhamoon AS. Sepsis: The evolution in definition, pathophysiology, and management. SAGE Open Med 2019; 7:2050312119835043.
11. Born S, Fleischmann-Struzek C, Abels W, Piedmont S, Neugebauer E, Reinhart K et al. Most patients with an increased risk for sepsis-related morbidity or death do not recognize sepsis as a medical emergency: results of a survey study using case vignettes. Crit Care 2023; 27(1):446.
12. Fleischmann C, Scherag A, Adhikari NKJ, Hartog CS, Tsaganos T, Schlattmann P et al. Assessment of Global Incidence and Mortality of Hospital-treated Sepsis. Current Estimates and Limitations. Am J Respir Crit Care Med 2016; 193(3):259–72.
13. McGregor C. Improving time to antibiotics and implementing the “Sepsis 6”. BMJ Qual Improv Rep 2014; 2(2).
14. Johnston ANB, Park J, Doi SA, Sharman V, Clark J, Robinson J et al. Effect of Immediate Administration of Antibiotics in Patients With Sepsis in Tertiary Care: A Systematic Review and Meta-analysis. Clinical Therapeutics 2017; 39(1):190-202.e6.
15. Juneja D, Nasa P, Chanchalani G, Cherian A, Jagiasi BG, Javeri Y et al. The Indian Society of Critical Care Medicine Position Statement on the Management of Sepsis in Resource-limited Settings. Indian J Crit Care Med 2024; 28(Suppl 2):S4-S19.
16. Fleischmann-Struzek C, Joost FEA, Pletz MW, Weiß B, Paul N, Ely EW et al. How are Long-Covid, Post-Sepsis-Syndrome and Post-Intensive-Care-Syndrome related? A conceptional approach based on the current research literature. Crit Care 2024; 28(1):283.
17. Kasthuri A. Challenges to Healthcare in India - The Five A’s. Indian J Community Med 2018; 43(3):141–3.

18. Nanda M, Sharma R. A comprehensive examination of the economic impact of out-of-pocket health expenditures in India. Health Policy Plan 2023; 38(8):926–38.
19. Jeganathan N. Burden of Sepsis in India. Chest 2022; 161(6):1438–9.
20. Virk HS, Biemond JJ, Earny VA, Chowdhury S, Frölke RI, Khanna SM et al. Unraveling Sepsis Epidemiology in a Low- and Middle-Income Intensive Care Setting Reveals the Alarming Burden of Tropical Infections and Antimicrobial Resistance: A Prospective Observational Study (MARS-India). Clin Infect Dis 2025; 80(1):101–7. Available from: URL: https://pubmed.ncbi.nlm.nih.gov/39352692/.
21. Saito H. Sepsis in Global Health: Current global strategies to fight against sepsis. Acute Med Surg 2025; 12(1): e70045.

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