

Surviving Sepsis Is Not Enough, Time to Confront Post-sepsis Syndrome, A Narrative Review

Hana Souri,^{1,2} Mohammad Mehdi Shadravan,^{1,2}
Ilad Alavi Darazam^{2,3}

¹Student Research Committee, Shahid Beheshti University of Medical Sciences, Tehran, Iran

²Infectious Diseases and Tropical Medicine Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

³Department of Infectious Diseases and Tropical Medicine, Lohman Hakim Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Keywords. sepsis, post-sepsis syndrome, survivorship, long-term outcomes, rehabilitation, critical illness recovery; quality of life

While global advances in sepsis care have reduced acute mortality, many survivors face a persistent burden of Post-Sepsis Syndrome (PSS), a complex condition encompassing physical, cognitive, psychological, immunologic, and social sequelae. Despite its prevalence, post-sepsis care remains fragmented and under-recognized within routine critical care pathways.

Relevant literature on post-sepsis outcomes was reviewed through major scientific databases, focusing on studies exploring the physical, cognitive, psychological, immunologic, and social consequences of sepsis. Observational, interventional, and review articles contributing to the understanding of post-sepsis syndrome were evaluated, and findings were synthesized narratively across key thematic domains. Recent multi-center and population-based studies reveal that over half of sepsis survivors experience at least one PSS component within the first year after discharge. Persistent fatigue, neuromuscular weakness, cognitive dysfunction, depression, anxiety, and increased susceptibility to infections are the most common manifestations. Hospital readmission and long-term functional decline remain frequent, while structured follow-up and rehabilitation services are scarce. Awareness among clinicians and policy frameworks addressing survivorship are limited. The reduction of in-hospital sepsis mortality has unveiled a new challenge; survivorship. Long-term recovery requires coordinated and multidisciplinary care extending beyond ICU discharge. Integrating PSS surveillance, rehabilitation programs, and patient education into national sepsis strategies is essential to improve functional outcomes and quality of life.

RJCCN 2025; 1: 5-8

www.rjccn.org

DOI: [10.60186/RJCCN.16](https://doi.org/10.60186/RJCCN.16)

At its core, sepsis is the dysregulation of the body's defenses against infection, triggering organ dysfunction and posing one of the greatest unresolved dilemmas in critical care medicine. A large multicenter cohort study involving over 426,000 intensive care unit (ICU) patients with sepsis in the United Kingdom found that hospital mortality rates decreased from 54.6% in the period

of 1988 to 1990 to 32.4% in 2017 to 2019. Notably, 8.8% of this absolute reduction, accounting for 40% of the overall decline, was due to advancements in treatment and critical care management.¹ However,



Please cite this article as: Souri H, Shadravan MM, Alavi Darazam I. Surviving Sepsis Is Not Enough, Time to Confront Post-sepsis Syndrome. IJCCN 2025; 1(1): 5-8

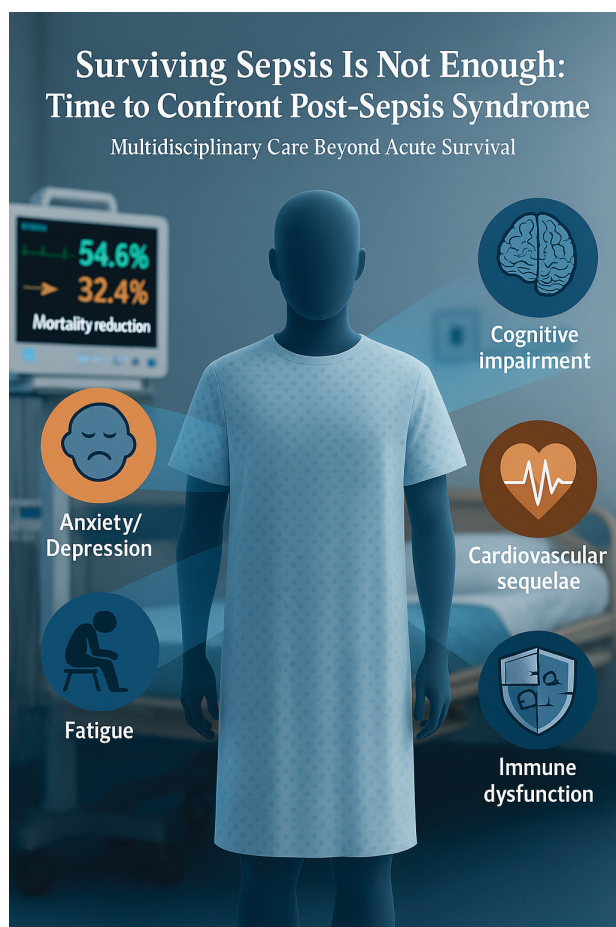
surviving the acute phase of sepsis is not the end of the story; for many patients, it marks the beginning of a new struggle with long-term sequelae that remain largely underrecognized in clinical practice.

Post-sepsis syndrome (PSS) is marked by prolonged immune dysregulation, chronic inflammation, and metabolic dysfunction, which increases survivors' risk of recurrent infections, cardiovascular complications, and neurocognitive decline (Figure).² In a German cohort of 159,684 survivors, 74% developed at least one new diagnosis within the first year following hospital discharge. The prevalence remained high in subsequent years, with 65.8 and 59.4% experiencing new medical, cognitive, or mental health conditions in the second and third years, respectively.³ As shown in Table, PSS manifests through a broad spectrum of long-term complications that extend far beyond the acute phase of illness. On the physical level, survivors often struggle with persistent muscle weakness, chronic fatigue, and reduced exercise tolerance, sometimes

compounded by residual organ dysfunction. Cognitive challenges are equally prominent, with many patients experiencing memory deficits, impaired attention, and difficulties in executive functioning. The psychological burden is also profound, encompassing depression, anxiety, post-traumatic stress disorder (PTSD), and persistent sleep disturbances. In addition, immunological alterations leave survivors more vulnerable to recurrent infections and, in some cases, even malignancies. Beyond these medical and psychological domains, PSS deeply affects social and functional reintegration, as individuals may become dependent on caregivers, face difficulties returning to their professional roles, and experience limitations in engaging with social activities. Collectively, these complications illustrate the pervasive and multidimensional impact of PSS on survivors' lives. Adult sepsis survivors have lower health related quality of life (HRQoL) compared with normal population but not worse than other ICU survivors.⁴ When a family member develops PSS, the economic and social impact on the family can be substantial. Families face direct costs such as repeated medical visits, medications, physiotherapy, and rehabilitation, as well as indirect costs including lost income, work absenteeism, and the need to provide long-term care. In addition, the emotional and social strain can disrupt daily routines and personal plans, significantly increasing stress levels for family members. PSS also places a considerable burden on the healthcare system. Survivors often require hospital readmissions, long term care including physiotherapy, psychological counseling, and regular medical follow ups, which increase overall healthcare costs. The syndrome also demands higher utilization of resources such as ICU beds, nursing care, medications, and home healthcare services. Given the points discussed, greater attention should be directed to the post sepsis condition, which has so far been overlooked.

The striking gaps revealed in recent studies raise a fundamental question: are we truly prepared to care for patients beyond the acute phase of sepsis?

Recent evidence highlights profound structural barriers in sepsis care that extend into the post-discharge period. Healthcare providers consistently reported deficits in sepsis knowledge, limited interdisciplinary communication, and fragmented



Clinical Domains and Reported Outcomes of PSS in Recent Studies

First author	Year	Domain	Sample size	Key findings	References
Sell S et al.	2025	Psychological	21,980 sepsis patients	Within 12 months, 54.8% diagnosed with any mental health impairment; 25.4% developed a new MHI; depression most common (32.2%), followed by anxiety (8.9%) and PTSD (0.6%); co-occurrence frequent; pre-existing psychiatric disorders were strongest risk factors (OR up to 8.9)	5
Halvorsen P et al.	2025	Quality of life / Functional	14,006 sepsis patients	Health-related quality of life was consistently lower than population norms up to 15 months after ICU discharge, with only partial improvement. Sick leave substantially increased after sepsis; 50% of working-age survivors had not regained work capacity by 20 months. Female sex, lower education, and comorbidities predicted poorer recovery, while severity of acute illness had minimal long-term impact	6
Liu et al.	2025	Social / Functional	339 sepsis patients	At 12 months, 65% of patients had died or developed PICS; among survivors, prevalence of PICS declined from 85% at discharge to 45% at 12 months. Only 44% of previously employed patients returned to work, ~40% were rehospitalized, and 31% required emergency care. Despite this burden, rehabilitation (15%) and psychiatric service use (7%) remained low, highlighting major gaps in follow-up support	7
Fleischmann-Struzek C et al.	2024	Physical / Cognitive / Psychological	753 sepsis patients	At 3-year follow-up: ~25% remained functionally dependent, ~30% regained independence, ~45% died; > 90% had new physical impairments, 58% cognitive deficits, ~41% psychological problems	8
Kattlun F et al.	2024	Cognitive	35 sepsis vs 35 controls	Survivors showed persistent deficits in working memory capacity ($P = 0.013$), with impairments in attention, memory, and executive functions; deficits independent of age, sex, depression, or anxiety	9

care transitions as critical shortcomings. Particularly concerning is the absence of standardized protocols for follow-up and aftercare, leaving primary care physicians, patients, and families without clear guidance. Providers also emphasized that information sharing between hospital and outpatient sectors is frequently incomplete, resulting in poorly coordinated rehabilitation, psychological support, and chronic disease management. Collectively, these deficiencies not only compromise recovery for survivors but also impose a significant burden on families and the healthcare system.¹⁰ These findings underscore systemic weaknesses, but they also highlight a more profound issue. PSS is still managed as an optional afterthought rather than being recognized as an essential dimension of critical care. The absence of standardized follow-up structures reflects a lack of prioritization at the policy level, where survival rates continue to

be the dominant outcome measure. This narrow focus risks neglecting the multifaceted disabilities and psychosocial burdens that define PSS for survivors and their families. Without a paradigm shift that embeds rehabilitation, mental health care, and chronic disease management into routine pathways, the healthcare system will continue to fail a growing population of sepsis survivors.

Addressing the profound unmet needs of sepsis survivors requires a paradigm shift toward structured, multidisciplinary, and patient-centered post-sepsis care. Evidence highlights the necessity of early and continuous rehabilitation that encompasses physical, cognitive, and psychological domains, complemented by nutritional guidance and speech-language therapy. To ensure equitable access, policy efforts must target both financial and structural barriers, while also expanding caregiver education and peer support initiatives. Furthermore, establishing dedicated

post-sepsis clinics, staffed by critical care specialists, rehabilitation experts, psychiatrists, and primary care providers, would provide a systematic framework for long-term follow-up. At a health systems level, integration of sepsis-specific screening protocols into routine outpatient care, coupled with sustainable funding models for rehabilitation services, represents a crucial step toward improving survivors' quality of life and reducing the long-term societal burden of sepsis.^{11,12}

Sepsis care has long been measured in lives saved, but survival alone is no longer a sufficient outcome. The growing recognition of PSS demands that we look beyond the ICU and confront the enduring physical, cognitive, and psychological scars left behind. Every unaddressed impairment represents not just an individual struggle, but a systemic failure to deliver truly comprehensive care. While continuous advances in acute-phase management and critical care remain vital to further reducing mortality, equal attention must now be directed toward enabling survivors to reclaim meaningful lives. The time has come for clinicians, researchers, and policymakers alike to embrace post-sepsis care as a central priority, because surviving sepsis should mark the beginning of recovery, not the start of another silent epidemic.

ACKNOWLEDGEMENTS

Conflicts of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding / Support

No financial support or funding was received for this study.

Authors' Contributions

All authors contributed to the study and approved the final version of the manuscript.

REFERENCES

1. Prescott HC, Harrison DA, Rowan KM, Shankar-Hari M, Wunsch H. Temporal trends in mortality of critically ill patients with sepsis in the United Kingdom, 1988–2019. *American Journal of Respiratory and Critical Care Medicine*. 2024;209(5):507-516.
2. Torres JSS, Tamayo-Giraldo FJ, Bejarano-Zuleta A, et al. Sepsis and post-sepsis syndrome: a multisystem challenge requiring comprehensive care and management—a review. *Frontiers in Medicine*. 2025;12:1560737.
3. Fleischmann-Struzek C, Rose N, Freytag A, et al. Epidemiology and costs of postsepsis morbidity, nursing care dependency, and mortality in Germany, 2013 to 2017. *JAMA Network Open*. 2021;4(11):e2134290-e2134290.
4. De Silva S, Urwin A, Grimwood C, Goh EKE, Higgins AM, Hodgson CL. Health-Related Quality of Life of Adult Sepsis Survivors Following Critical Illness: A Systematic Review. *Critical care explorations*. 2025;7(4):e1238.
5. Sell, S, Fleischmann-Struzek C, Spoden M, Rosendahl J. Mental health in the first year after ICU-treated sepsis: Analysis of administrative diagnoses in German health claims data. *General Hospital Psychiatry*. 2025;93:109-115.
6. Halvorsen P, Marks-Hultström M, Wallin E, Ahlström B, Lipcsey M. Health-related quality of life and functional recovery after intensive care for sepsis in a national cohort. *Intensive Care Medicine*. 2025;51(7):1282-1291.
7. Liu K, Watanabe S, Nakamura K, et al. One-year outcomes in sepsis: a prospective multicenter cohort study in Japan. *Journal of intensive care*. 2025;13(1):23.
8. Fleischmann-Struzek C, Born S, Kesselmeier M, et al. Functional dependence following intensive care unit-treated sepsis: three-year follow-up results from the prospective Mid-German Sepsis Cohort (MSC). *The Lancet Regional Health–Europe*. 2024;46:101066.
9. Kattlun F, Hertel E, Geis C, et al. Persistent neurocognitive deficits in cognitively impaired survivors of sepsis are explained by reductions in working memory capacity. *Frontiers in psychology*. 2024;15:1321145.
10. Draeger L, Fleischmann-Struzek C, Gehrke-Beck S, et al. Barriers and facilitators to optimal sepsis care—a systematized review of healthcare professionals' perspectives. *BMC Health Services Research*. 2025;25(1):591.
11. Smith-Turchyn J, Alborzi M, Hong J et al. Rehabilitation needs, preferences, barriers, and facilitators of individuals with sepsis: a qualitative study. *International Journal of Nursing Studies Advances*. 2025:100339.
12. Born, S, Matthäus-Krämer C, Bichmann A, et al. Sepsis survivors and caregivers perspectives on post-acute rehabilitation and aftercare in the first year after sepsis in Germany. *Frontiers in Medicine*. 2023;10:1137027.

Correspondence to:

Ilad Alavi Darazam, MD

Attending Physician (Infectious Diseases), Clinical Fellowship in

Immunodeficiency and Transplantation Infectious Diseases

Department of Infectious Diseases, Lohman Hakim Hospital,

Makhsoos St, South Kargar Ave, Tehran, Iran

ORCID: <https://orcid.org/0000-0002-4440-335X>

E-mail: ilad13@yahoo.com, ilad.alavi@sbmu.ac.ir

Received August 2025

Revised September 2025

Accepted October 2025