Research Article
Artigo de Pesquisa
Artículo de Investigación

DOI: https://doi.org/10.12957/reuerj.2025.89187

Physical, psychological, and cognitive changes among sepsis survivors after ICU discharge: A systematic review

Alterações físicas, psíquicas e cognitivas entre sobreviventes de sepse após alta da UTI: revisão sistemática

Alteraciones físicas, psíquicas y cognitivas en supervivientes de sepsis tras el alta de la UCI: revisión sistemática

Jéssica Cristina Caretta Teixeira[I]; *João Vitor Cestari Lima*[II]; *Angelita Maria Stabile*[II]

[I]*Faculdade Dr. Francisco Maeda. Ituverava, SP, Brazil;* [II]*Universidade de São Paulo. Ribeirão Preto, SP, Brazil*

ABSTRACT

Objective: to synthesize the evidence on the physical, psychological, and cognitive changes presented by patients discharged from the ICU after an episode of sepsis. **Method**: this is a systematic review, guided by the question: "What are the physical, cognitive, and psychological changes presented by patients discharged from the ICU after an episode of sepsis?". Searches were conducted in The Cochrane Library, CINAHL, Embase, LILACS, PubMed, Scopus, and Web of Science databases, including studies published since the Consensus of the American College of Chest Physicians and the Society of Critical Care Medicine - 1991. **Results**: a total of 5,799 studies were identified, of which 18 met the eligibility criteria and were qualitatively analyzed. **Conclusion**: sepsis survivors may present varying degrees of impairment in the three areas analyzed. There may additionally be an overlap of physical, psychological, and cognitive changes in survivors, which may compromise their ability to live independently and with quality.

Descriptors: Intensive Care Units; Sepsis; Cognitive Dysfunction; Estresse Psicológico; Muscle Strength.

RESUMO

Objetivo: sintetizar as evidências sobre as alterações físicas, psíquicas e cognitivas apresentadas pelos pacientes que tiveram alta da UTI após um episódio de sepse. **Método**: revisão sistemática, norteada pela pergunta "Quais as alterações físicas, cognitivas e psíquicas apresentadas pelos pacientes que receberam alta hospitalar da UTI após um episódio de sepse?". As buscas foram realizadas nas bases *The Cochrane Library*, CINAHL, Embase, LILACS, PubMed, Scopus e *Web of Science*, incluindo estudos publicados a partir do Consenso do American College of Chest Physicians e da Society of Critical Care Medicine - 1991. **Resultados**: foram identificados 5799 estudos, dos quais 18 atenderam aos critérios de elegibilidade e foram analisados qualitativamente. **Conclusão**: os sobreviventes de sepse podem apresentar graus variados de comprometimento nas três esferas analisadas. Adicionalmente, pode haver uma sobreposição de alterações físicas, psíquicas e cognitivas nos sobreviventes, o que pode comprometer a capacidade desses indivíduos de viver de forma independente e com qualidade.

Descritores: Unidades de Terapia Intensiva; Sepse; Disfunção Cognitiva; Estresse Psicológico; Força Muscular.

RESUMEN

Objetivo: sintetizar las evidencias sobre las alteraciones físicas, psíquicas y cognitivas presentadas por pacientes dados de alta de la UCI tras un episodio de sepsis. **Método:** revisión sistemática, guiada por la pregunta: "¿Cuáles son las alteraciones físicas, cognitivas y psíquicas presentadas por los pacientes que recibieron el alta hospitalaria de la UCI después de un episodio de sepsis?". Las búsquedas se realizaron en las bases de datos The Cochrane Library, CINAHL, Embase, LILACS, PubMed, Scopus y Web of Science, incluyendo estudios publicados a partir del Consenso del American College of Chest Physicians y de la Society of Critical Care Medicine (1991). **Resultados:** se identificaron 5.799 estudios, de los cuales 18 cumplieron los criterios de elegibilidad y fueron analizados cualitativamente. **Conclusión:** los supervivientes de sepsis pueden presentar grados variables de compromiso en las tres esferas analizadas. Además, puede existir una superposición de alteraciones físicas, psíquicas y cognitivas en los supervivientes, lo que puede comprometer la capacidad de estos individuos para vivir de forma independiente y con calidad de vida.

Descriptores: Unidades de Cuidados Intensivos; Sepsis; Estrés Psicológico; Estresse Psicológico; Fuerza Muscular.

INTRODUCTION

Sepsis is a reaction of the body to an infection, in which several unbalanced physiological responses occur that lead to organ dysfunction[1]. The clinical picture can evolve into a more serious condition called septic shock due to the triggered organ dysfunctions[2]. It is a global health problem, with estimates indicating that approximately 49 million people are affected annually, and 11 million deaths are caused by sepsis, which corresponds to 19.7% of mortality worldwide[3,4].

Treatment is highly complex and requires specific and continuous intensive care with the aim of reducing harm to the patient. Affected individuals require longer hospital stays, being exposed to various invasive procedures and numerous microorganisms. Although this condition does not only develop in Intensive Care Units (ICUs), since it can

This study was supported in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brazil (CAPES) - Funding Code 001.
Corresponding author: Jéssica Cristina Caretta Teixeira. E-mail: jessicaccteixeira26@gmail.com
Editor-in-chief: Cristiane Helena Gallasch; Associate editor: Flavia Giron Camerini

Received: Jan 15th 2025 – Accepted: Dec 17th 2025

DOI: https://doi.org/10.12957/reuerj.2025.89187

be related to other hospital sectors and to microorganisms acquired in the community, treatment generally demands an environment with high technological complexity[5].

For those who survive sepsis, there is a high risk of clinical deterioration weeks and months after hospital discharge. Sepsis accounts for 12.2% of hospital readmissions, far exceeding other health conditions such as heart failure (6.7%), pneumonia (5.2%), chronic obstructive pulmonary disease (COPD) (4.6%), and acute myocardial infarction (1.2%)[6].

Thus, resolving symptoms is not synonymous with the end of the disease, and increased survival may be accompanied by an increased prevalence of physical, psychological, and cognitive changes due to prolonged hospitalization, exposure to medications, the need for mechanical ventilation, and prolonged immobilization, a condition known as post-sepsis syndrome[7,8].

Knowing the physical, psychological, and cognitive changes in sepsis survivors is essential to improve care after hospital discharge. The social, clinical, and scientific relevance of the topic lies in the high prevalence of sequelae and the need for interventions that promote rehabilitation.

Nursing, and especially specialist nurses in the field, play a fundamental role in the early identification of these changes and in the continuity of care from the ICU to the return to social life. However, there is a knowledge gap regarding scientific production that integrates these dimensions in a broader perspective of care, which justifies carrying out this study.

In this sense, the objective of this study was to highlight the physical, psychological, and cognitive changes presented by patients who were discharged from the ICU after an episode of sepsis.

METHOD

This is a systematic review (SR). SRs are studies which aim to provide a comprehensive and unbiased synthesis of relevant studies in a single document, using rigorous and transparent methods[9]. The protocol for this SR was registered in the International Prospective Register of Systematic Reviews – PROSPERO (CRDXXXXXXXXXXX).

The following guiding question was formulated: “What are the physical, cognitive, and psychological changes presented by patients who were discharged from the ICU after an episode of sepsis?”. The PICO strategy[10] was used to create the question, with: P – Critically ill adult patients; I – hospital admission; C – ICU discharge; O – physical, cognitive, and psychological changes after ICU discharge.

The time frame for delimiting the included studies was based on the Consensus of the American College of Chest Physicians and the Society of Critical Care Medicine, held in 1991 (Sepsis-1)[11]. The search for references was conducted in November 2022 in the Cochrane Library, CINAHL, Embase (Excerpta Medica), LILACS (Latin American and Caribbean Literature in Health Sciences), PubMed (U.S. National Library of Medicine), Scopus, and Web of Science electronic databases. Detailed search strategies were used in each database, including identification of descriptors, synonyms, and keywords. The search strategy in English was developed using MeSH descriptors; the searches were adapted for the other English-language databases and structured as follows: sepsis, patient’s discharge, intensive care units, and critical care, using AND and OR Boolean operators.

The database search was conducted in November 2022. Primary studies published in Portuguese, English, and Spanish that addressed the physical, cognitive, and psychological changes presented by patients discharged from the ICU after an episode of sepsis were included.

Studies that exclusively addressed pediatric or neonatal populations, secondary studies such as reviews, meta-analyses, and theoretical studies, publications without peer review such as editorials, letters to the editor, and commentaries, as well as academic works not published in scientific journals, such as theses, dissertations, monographs, and event abstracts, were excluded. Studies whose full text was not available or had restricted access were also excluded, as well as those that did not present clear and objective data after being read in full on physical, psychological, and/or cognitive changes in adult survivors of sepsis after discharge from the ICU.

The studies identified in the databases were exported in Research Information Systems (RIS) format and stored in a specific folder on the principal investigator’s computer. Then, the files were imported into the Rayyan platform, used for reference management and to support the selection of studies. Duplicates were automatically identified and removed by the system. The initial screening was independently conducted by two reviewers (J.C.C.T. and J.V.C.L.) using the blinding feature through reading the titles and abstracts based on previously defined eligibility

DOI: https://doi.org/10.12957/reuerj.2025.89187

criteria. A third reviewer (A.M.S.) with expertise in the subject matter was consulted for a consensus decision in cases of disagreement. Studies considered potentially relevant were selected for full-text reading to confirm their inclusion in the review.

Data from the studies included in the SR were collected using an adapted instrument[12] and the quality analysis followed the completion of the Joanna Briggs Institute (JBI) Data Extraction Form for Prevalence Studies, consisting of nine objective questions. In turn, the AXIS tool[13], available at: https://bmjopen.bmj.com/content/6/12/e011458, was applied to all studies by two independent reviewers to verify methodological quality.

RESULTS

A total of 5,799 publications were obtained and exported to the Rayyan bibliographic reference manager, with 218 documents obtained from The Cochrane Library, 368 from CINAHL, 656 from Embase, 251 from LILACS, 916 from PubMed, 2,722 from Scopus, and 769 from Web of Science. The flowchart of the study selection process is presented in Figure 1.

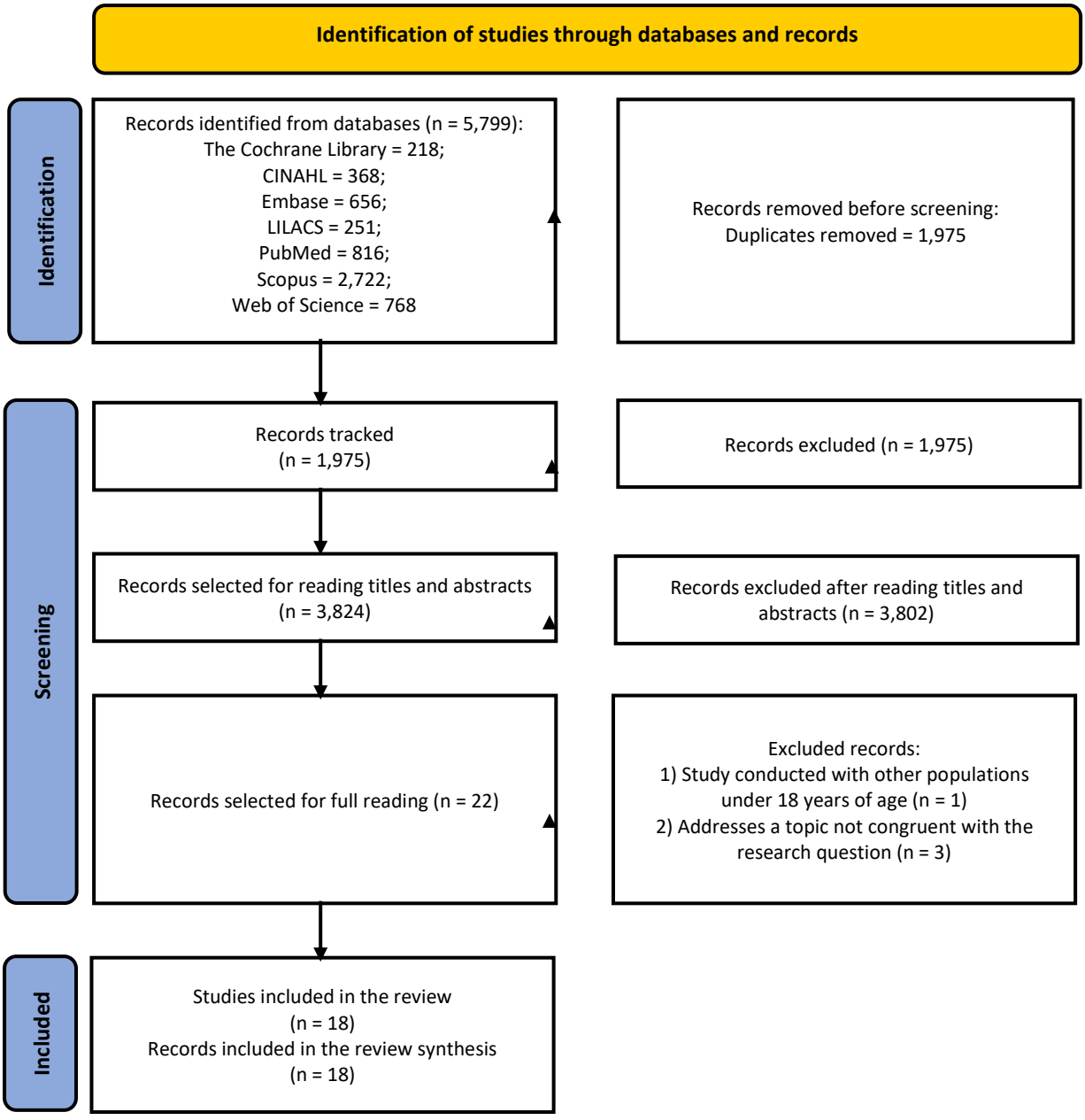

Figure 1: Flowchart of the study selection process. Ribeirão Preto, SP, Brazil, 2022.

DOI: https://doi.org/10.12957/reuerj.2025.89187

In turn, 1,975 duplicates were removed after the initial evaluation, leaving 3,824 publications analyzed by title and abstract reading. At the end of the process, 22 studies were selected for full-text reading. However, an additional four studies were excluded after full-text reading of the 22 publications. The characterization of the selected studies is presented in Figure 2.

Reference	Study design	Sample number	Risk of bias
Iwashyna *et al*. (2010)[14]	Prospective cohort study.	623 participantes.	Moderate
Sacanella *et al*. (2011)[15]	Prospective cohort study.	Inicial: 391 participantes; Final: 112 participantes.	High
Semmler *et al*. (2012)[16]	Cross-sectional, observational, and correlational study.	Initial: 44 participants; Final: 44 participants.	High
Davydow *et al*. (2013)[17]	Prospective cohort study.	471 participants.	High
Borges *et al*. (2015)[18]	Prospective cohort study.	Initial: 72 participants. Final: 51 participants.	High
Wintermann *et al*. (2015)[19]	Longitudinal observational study.	Initial: 195 participants; Final: 90 participants.	Moderate
Al Khalaf *et al*. (2015)[20]	The article did not specify the study type.	209 participants.	High
Götz *et al*. (2016)[21]	Prospective cohort study.	66 participants.	High
Solverson *et al*. (2016)[22]	Prospective longitudinal cohort study.	Initial: 61 participants; Final: 56 participants.	High
Hayhurst *et al*. (2018)[23]	Prospective cohort study.	Initial: 821 participants; Final: 253 participants.	High
Marra *et al*. (2018)[24]	Prospective cohort study.	Initial: 7,076 participants; Final: 334 participants.	High
Ehlenbach *et al*. (2018)[25]	Retrospective cohort study.	66,540 participants.	High
Brakenridge *et al*. (2019)[26]	Prospective longitudinal cohort study.	Initial: 1,908 participants; Final: 301 participants.	High
Biason *et al*. (2019)[27]	Prospective cohort study.	Initial: 1,219 participants; Final: 509 participants.	High
Riegel *et al*. (2019)[28]	Retrospective cohort study.	Initial: 3,464,601 participants; Final: 21,520 participants.	High
Shima *et al*. (2020)[29]	Prospective longitudinal cohort study.	Initial: 204 participants; 3 meses: 117 participants; 12 meses: 74 participants.	High
Dijkstra-Kersten *et al*. (2020)[30]	Prospective cohort study.	Initial: 2,572 participants; Final: 1,730 participants.	High
Calsavara *et al*. (2021)[31]	Prospective cohort study.	Initial: 33 participants; Final: 16 participants.	High

Figure 2: Characterization of the selected studies regarding design, sample size, and risk of bias. Ribeirão Preto, SP, Brazil, 2022.

The 18 studies included in the prevalence SR were characterized as observational studies (Figure 2). There was a prevalence of studies conducted in the North American Continent, namely in the United States (n=7) and Canada (n=1); in the South American Continent, only in Brazil (n=3); in the European Continent, namely: Germany (n=3), Spain (n=1), and the Netherlands (n=1); and finally in the Asian Continent, in Saudi Arabia (n=1) and Japan (n=1). All studies were published in medical journals.

The Axis tool was used to assess the risk of bias in the observational studies included in the SR. The studies were categorized as low risk (if all items were present and considered acceptable), moderate risk (if at least ½ of the items were present and considered acceptable), and high risk for bias (if less than ½ of the items were present and considered acceptable). As a result, only two among the 18 included studies presented a moderate risk of bias. The others were classified as high risk. Figure 3 presents a narrative summary of the main results of the selected studies.

DOI: https://doi.org/10.12957/reuerj.2025.89187

Reference	Main results
Iwashyna *et al*. (2010)[14]	Severe sepsis was associated with increased functional cognitive impairment among survivors.
Sacanella *et al*. (2011)[15]	Autonomy in IADLs decreased after discharge and was not recovered in the following 12 months. Anxiety, pain, and difficulty in usual activities were affected. Individuals with ≥ 2 geriatric syndromes experienced increased impairment after ICU admission and up to 95% post-discharge, then slowly decreased.
Semmler *et al*. (2012)[16]	Differentials in volume were observed for the left hippocampus and total hippocampus, as well as cognitive deficits in attention, verbal fluency, executive function, and verbal memory.
Davydow *et al*. (2013)[17]	Pre-sepsis and post-sepsis depressive symptoms were 28% for both. Depression symptoms before severe sepsis were associated with a 2.62 times risk of substantial depressive symptoms.
Borges *et al*. (2015)[18]	Septic patients presented below-predicted values in assessments of six-minute walk, quadriceps strength, handgrip strength, and maximum inspiratory pressure. These values increased three months after hospital discharge but remained below expected.
Wintermann *et al*. (2015)[19]	Of the patients interviewed, 64.4% did not present symptoms of stress disorder, 17.8% had late onset, 13.3% recovered, and 4.4% presented persistent symptoms. The PTSD rates at t3 were 20.7% and 23.0% for patients without and with sepsis. At the 3-month follow-up (t2), fear of death in the ICU, sepsis, and traumatic memories were significant predictors of PTSD symptoms.
Al Khalaf *et al*. (2015)[20]	On the Karnofsky Performance Status Scale, 63.3% had mild disability, 18.1% moderate, and 18.1% severe before acute critical illness with sepsis. One year after discharge, 35.9% had mild/no disability, 12.0% moderate or died, and 52.2% were severely disabled.
Götz *et al*. (2016)[21]	The peak resting heart rate in comparing the three time points in sepsis survivors was slowest at T0 (T0 < T1; T0 < T2; T1 < T2) and increased over time after ICU discharge.
Solverson *et al*. (2016)[22]	Median muscle strength measured by dynamometry was reduced, with more than 50% of patients not reaching 80% of their predicted strength for age and sex.
Hayhurst *et al*. (2018)[23]	It was observed that 77% of patients reported some pain at 3 months and 74% at 12 months after hospital discharge. The median pain intensity was 3 (1-5) out of 10 at 3 months and 3 (1-5) out of 10 at 12 months; 59% reported interference with daily life at 3 months; and 62% at 12 months.
Marra *et al*. (2018)[24]	At the 3-month follow-up, 88% of patients presented cognitive impairment, 99% disability, and 95% presented depression. Then at 12 months, 87%, 99%, and 94%, respectively.
Ehlenbach *et al*. (2018)[25]	Among survivors, 34% had severe or very severe cognitive impairment; mechanical ventilation use increased the risk of having very severe cognitive impairment and total dependence for ADLs. Among survivors, 72.5% had a score on the ADL Hierarchy Scale indicating Maximum Dependence, Dependence, or Partial Dependence.
Brakenridge *et al*. (2019)[26]	There were significant and persistent deficits among patients with sepsis compared to baseline, as measured by the Zubrod Performance Scale at three, six, and 12 months after the onset of sepsis.
Biason *et al*. (2019)[27]	Patients with sepsis reported more pain and a higher frequency of readmission during the two years of follow-up. In the assessment of the Karnofsky Performance Scale and IADLs, patients with sepsis were less functional at admission and two years after discharge.
Riegel *et al*. (2019)[28]	Older patients were more prone to decline. Septic shock increased decline in ambulation, transfers, toilet hygiene, toilet transfer, and personal hygiene. Patients with weight loss during hospitalization were 25 to 55% more likely to experience decline in all indicators, and depression and frailty increased depression by 30% at follow-up.
Shima *et al*. (2020)[29]	The prevalence of disability in ADLs, anxiety, depression, and post-traumatic stress symptoms at three months was 32%, 42%, 48%, and 20%, respectively. Then at 12 months, it was 22%, 33%, 39%, and 21%, respectively. Among 88 patients with ADL disability scores, 61% had one or more psychiatric symptoms at three months, while this figure was 52% at 12 months.
Dijkstra-Kersten *et al*. (2020)[30]	Of the 2,586 survivors, 34% reported anxiety, 33% depressive symptoms, and 19% symptoms of post-traumatic stress compared to survivors of acute respiratory distress syndrome, sepsis, multiple organ failure, or prolonged ICU stay.
Calsavara *et al*. (2021)[31]	A total of 46% of patients presented post-traumatic stress symptoms, 49% depressive symptoms, and 67% moderate to severe anxiety 24 hours after ICU discharge; 24.2% did not present significant psychiatric symptoms. These figures were 31%, 38%, and 50% one year after ICU discharge, respectively.

Note: Instrumental Activities of Daily Living (IADL); Activities of Daily Living (ADL); Electroencephalogram (EEG); Post-traumatic Symptom Scale (PTSS-10); Post-Traumatic Stress Disorder (PTSD); Intensive Care Unit (ICU).
Figure 3: Narrative summary of the main results of the selected studies, Ribeirão Preto, SP, Brazil, 2022.

The main results showed that different degrees of physical, psychological, and cognitive impairment were observed among sepsis survivors, including overlapping alterations.

DOI: https://doi.org/10.12957/reuerj.2025.89187

DISCUSSION

Sepsis, defined as life-threatening organ dysfunction caused by a dysregulated host response to infection (as detailed in the Introduction of this study), is a global health problem of alarming proportions. Although the first consensus definition of sepsis from the American College of Chest Physicians/Society of Critical Care Medicine was established in 1991, in-depth understanding and investigation of the long-term sequelae it can cause to survivors, particularly in the physical, psychological, and cognitive spheres, is a more recent field of study. Most relevant studies addressing these sequelae have emerged since 2010, indicating a time gap between the clinical recognition of sepsis and the systematic observation of its post-discharge consequences. This gap underscores the crucial relevance of this systematic review, whose objective was precisely to synthesize the available evidence on the physical, psychological, and cognitive changes presented by patients discharged from the Intensive Care Unit (ICU) after an episode of sepsis.

Regarding physical changes, the included studies used different assessment instruments such as the ADL Scale, IADL Scale[14,15,17,24,25,27-29], six-minute walk, muscle strength[18,22], Short Physical Performance Battery (SPPB)[26], Karnofsky Performance Scale[20] and Zubrod Performance Scale[26]. These instruments enable measuring the degree of functional limitation and the impact of sepsis on the physical capacity of individuals[18,22]. It was evidenced that survivors even presented a reduction in functional capacity, muscle strength and physical performance three months after discharge, which directly interferes with the execution of activities of daily living[18,22].

The decrease in the ability to perform physical activities and the loss of muscle strength can directly impact ADLs[16,27,29]. Sepsis survivors who were discharged to a specialized nursing center presented dependence in four or more ADLs or total dependence for feeding and/or locomotion[25], and the same could be observed in individuals participating in a large North American cohort study[14]. Pain can be a frequent symptom post-discharge and directly interfere with the survivor's physical capacity. Patients admitted to the ICU who were diagnosed with sepsis subjectively report more pain than those who were not (48.5% vs. 35.2%)[23]. Studies have also pointed to the presence of pain as a limiting factor, being more prevalent among patients who survived sepsis than among others admitted to the ICU, which may be associated with prolonged immobilization, invasive procedures and the inflammatory response itself[23].

Regarding psychological impacts, it was observed that ICU admission and the sepsis episode contribute to develop significant changes in the mental health of survivors. These impairments may be related to sedation, absence of time markers, little contact with reference persons, the occurrence of delirium[32], perceived helplessness and fear of death[19]. The main psychological alterations observed after hospital discharge are depression[15-17,24,29,31], anxiety[16,31] and PTSD[19,31]. The presence of PTSD symptoms may be low in the weeks following hospital discharge, but tends to increase over time[19].

When considering subsyndromal diagnoses, up to a quarter of patients may present clinically relevant PTSD symptoms 6 months after hospital discharge. PTSD symptoms over time are related to fear of death, perceived helplessness, and traumatic memories in the ICU, such as experiencing extreme pain. On the other hand, social support has been shown to be a protective factor for long-term PTSD, indicating that the family and social structure in which the survivor is embedded plays an important role in psychological recovery[19].

The percentage of sepsis survivors who present psychological impairments in the post-discharge period is variable, ranging from 30 to 50% for symptoms of anxiety and depression, respectively[16], and 20% for PTSD symptoms[16,29]. Despite the psychological impairment observed in post-discharge sepsis patients, education appears to be a protective factor; however, the exact mechanisms by which education can protect against these problems are unclear. Education is associated with occupational achievements, higher income, better cognitive and critical thinking skills, and larger social/support networks that can represent greater resources to facilitate recovery[24].

In addition to physical and psychological changes, the systematic review revealed that sepsis survivors often have significant impairments in cognitive functions, which reinforces the complexity and scope of post-sepsis syndrome. Studies have shown that up to 60% of survivors may have cognitive deficits, such as impaired attention, memory, verbal fluency, and executive function. These deficits were more pronounced among patients who used mechanical ventilation or who had more severe cases of sepsis[16]. Furthermore, cognitive impairment was associated with increased mortality, indicating that it is a relevant prognostic factor. Some evidence suggests that these changes may be related to structural lesions in the central nervous system caused by hypoxia, systemic inflammation, and neurotoxicity[16,24].

In turn, 34% of survivors had severe or very severe cognitive impairment upon admission to the specialized nursing center. Those who received mechanical ventilation during hospitalization were more likely to have very

DOI: https://doi.org/10.12957/reuerj.2025.89187

severe cognitive impairment. Notably, the risk of death was 40% higher for those with moderate cognitive impairment, twice as high for those with severe cognitive impairment at admission, and more than three times higher for those with very severe cognitive impairment compared to those with intact cognition[25]. Additionally, severe sepsis was independently associated with tripling the chance of moderate/severe cognitive impairment[14].

The study findings show that post-sepsis syndrome has a profound and lasting impact on survivors, reflected in multiple health spheres. Physical changes, such as chronic fatigue, muscle weakness, and functional limitations, are often associated with psychological disorders, including anxiety, depression, and symptoms of post-traumatic stress, as well as cognitive deficits that affect memory, attention, and decision-making. The coexistence of these sequelae significantly compromises the autonomy and quality of life of individuals, hindering the return to usual activities and social reintegration. These conditions are often neglected after discharge, and tend to persist for months or even years, requiring continuous attention and specific rehabilitation strategies. The severity and overlap of these impairments reinforce the need for early recognition and prolonged monitoring of the effects of sepsis in order to mitigate its impacts and promote a more complete recovery.

The data from this review reinforce the need to incorporate multidimensional monitoring of sepsis survivors into care routines, as well as to develop clinical protocols focused on physical, psychological, and cognitive rehabilitation.

CONCLUSION

Sepsis survivors may present varying degrees of impairment in the three areas analyzed. There may additionally be an overlap of physical, psychological, and cognitive changes, which compromises these individuals' ability to live independently and with adequate quality of life. In the context of intensive care, it is essential that the nursing team be prepared to recognize these changes early, even during hospitalization, promoting interventions which favor recovery and care continuity after hospital discharge.

Public and private institutions should invest in training multidisciplinary teams for discharge planning and adequate follow-up of patients at home and in outpatient services with the aim of reducing clinical complications, hospital readmissions, and mortality. Nursing plays an essential role in this process as a science based on care, directly and continuously acting in the prevention of complications and promoting rehabilitation. The findings reinforce the importance of incorporating this evidence into clinical nursing practice, especially in the context of intensive care, promoting actions which support improvement in care practices, strengthening care protocols, and formulating public policies aimed at the comprehensive and longitudinal follow-up of sepsis survivors.

REFERENCES

1. Martins H, Domingues TD, Caldeira S. Spiritual distress in cancer patients undergoing chemotherapy: a longitudinal study. Int. J. Nurs. Knowl. 2023 [cited 2024 July 20]; 35(3):272-80. DOI: https://doi.org/10.1111/2047-3095.12442.
2. Almeida Filho RF, Trezza MCSF, Comassetto I, Silva LKB, Lopes MP, Santana KGS, et al. Spirituality in the uncertainty of illness: the perspective of oncology patients. Rev. Bras. Enferm. 2023 [cited 2024 July 24]; 76(4):e20220712. DOI: https://doi.org/10.1590/0034-7167-2022-0712.
3. Pilger C, Caldeira S, Rodrigues RAP, Carvalho EC, Kusumota L. Spiritual well-being, religious/spiritual coping and quality of life among the elderly undergoing hemodialysis: a correlational study. J. Relig. Spiritual. Aging. 2021 [cited 2024 July 23]; 33(1):1824848. DOI: https://doi.org/10.1080/15528030.2020.1824848.
4. Banin VB, Silva DIC, Moreira LG, Padula NAMR, Mariotti LGL, Andrade LGM. Medicine and spirituality: the profile of students and physicians at a Brazilian medical school. Rev. Bras. Educ. Med. 2024 [cited 2024 July 23]; 48(1):e008. Available from: https://www.scielo.br/j/rbem/a/kGZSmk3CLkvDd9FtDRfN4xN/?lang=en.
5. Koenig HG, McCullough M, Larson DB. Handbook of religion and health: a century of research reviewed. 2nd ed. New York: Oxford University Press; 2001.
6. Santos LCF, Silva SM, Silva AE, Mendoza IYQ, Pereira FM, Queiroz RAS. Older adults in palliative care: experiencing spirituality in the face of terminality. Rev. Enferm. UERJ. 2020 [cited 2024 June 28]; 28:e49853. DOI: http://doi.org/10.12957/reuerj.2020.49853.
7. Barreto LV, Cruz MGS, Okuno MFP, Horta ALM. Association of spirituality, quality of life and depression in family members of older adults with dementia. Acta Paul. Enferm. 2023 [cited 2024 June 28]; 36:eAPE03061. DOI: https://doi.org/10.37689/acta-ape/2023AO03061.
8. Kano MM, Devezas AMLO. Nursing actions in the spirituality of adult cancer patients: bibliographic research. Arq. Med. Hosp. Fac. Ciênc. Med. Santa Casa São Paulo. 2020 [cited 2024 June 28]; 65:e036. DOI: https://doi.org/10.26432/1809-3019.2020.65.036.
9. North American Nursing Association - NANDA. Diagnóstico de enfermagem da NANDA: definições e classificações 2021-2023. Porto Alegre: Artmed; 2021.
10. Bulechek GM, Butcher HK, Dochterman JM. NIC Classificação das intervenções de enfermagem. 7th ed. Rio de Janeiro: Elsevier; 2020.

DOI: https://doi.org/10.12957/reuerj.2025.89187

11. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care. 2007 [cited 2024 July 13]; 19(6):349-57. DOI: https://doi.org/10.1093/intqhc/mzm042.
12. Faria-Schützer DB, Surita FG, Alves VLP, Bastos RA, Campos CJG, Turato ER. Seven steps for qualitative treatment in health research: the clinical-qualitative content analysis. Ciênc. Saúde Colet. 2021 [cited 28 June 2024]; 26(1):265-74. DOI: https://doi.org/10.1590/1413-81232020261.07622019.
13. Holloway l, Wheller S. Phenomenology. In: Holloway I, Wheller S., organizators. Qualitative research in nursing and healthcare. 3rd ed. Oxford: John Wiley & Sons; 2010. p. 213-31.
14. Henriques CMG, Botelho MAR, Catarino HCP. Phenomenology as a method applied to nursing science: research study. Ciênc. Saúde Colet. 2021 [cited 2024 May 05]; 26(2):511-9. DOI: https://doi.org/10.1590/1413-81232021262.41042020.
15. Schutz A. El problema de la realidade social. Buenos Aires: Amorrortu; 2008.
16. Moura CO, Silva ÍR, Silva TP, Santos KA, Crespo MCA, Silva MM. Methodological path to reach the degree of saturation in qualitative research: grounded theory. Rev. Bras. Enferm. 2022 [cited 2024 June 24]; 75(2):e20201379. DOI: https://doi.org/10.1590/0034-7167-2020-1379.
17. Martinez MC, Latorre MRDO, Fischer FM. Work ability and intending to leave the nursing profession in São Paulo. Rev. Enferm. UERJ. 2021 [cited 2024 June 29]; 29:e57941 DOI: http://doi.org/10.12957/reuerj.2021.57941.
18. Nogueira VPF, Gomes AMT, Mercês MC, Couto PLS, Yarid SD, Andrade PCST. Spirituality, religiosity, and their representations for people living with HIV: daily life and its experiences. Rev. Esc. Enferm. USP. 2023 [cited 2024 June 23]; 57:e20220394. DOI: https://doi.org/10.1590/1980-220X-REEUSP-2022-0394en.
19. Teixeira MZ. Interconnection between health, spirituality and religiosity: importance of teaching, research and assistance in medical education. Rev. Med. São Paulo. 2020 [cited 2024 May 12]; 99(2):134-47. DOI: https://doi.org/10.11606/issn.1679-9836.v99i2p134-147.
20. Santana VSFV, Santos FK, Neto M, Silva FVC, Castelo Branco AL. Nursing problems and interventions identified in the nursing consult for people living with HIV. Rev. Pesq. Cuid. Fundam. 2023 [cited 2024 June 28]; 15:e12074. DOI: http://doi.org/10.9789/2175-5361.rpcfo.v15.12074.
21. Costa JR, Marcon SS, Piexak DR, Oliveira SG, Santo FHE, Nitschke RG, Moncada MJ, Teston EF. Wheel of life and Reiki repercussions on health promotion for nursing professionals. Texto Contexto Enferm. 2022 [cited 2024 July 12]; 31:e20210294. DOI: https://doi.org/10.1590/1980-265X-TCE-2021-0294en.
22. Souza IN, Silva GB, Silva KTS, Scremin M, Dias CLO, Monteiro SC, et al. Scientific production on the National Policy of Integrative and Complementary Practices. REAS. 2020 [cited 2024 June 28]; 12(10):e4386. DOI: https://doi.org/10.25248/reas.e4386.2020.
23. Flach MRT, Ritt LEF, Santana Junior FG, Correia MF, Claro TC, Ladeia AM, et al. Spirituality, functional gain, and quality of life in cardiovascular rehabilitation. Arq. Bras. Cardiol. 2023 [cited 2024 June 23]; 120(3):e20220452. DOI: https://doi.org/10.36660/abc.20220452.
24. Nunes ECDA, Oliveira FA, Cunha JXP, Reis SO, Meira GG, Szylit R. Music as a transpersonal care tool - perceptions of hospitalized people assisted in the university extension. Esc. Anna Nery. 2020 [cited 2024 July 12]; 24(2):e20190165. DOI: https://doi.org/10.1590/2177-9465-EAN-2019-0165.
25. Marques DA, Alves MS, Carbogim FC, Vargas D, Paula GL, Almeida CPB. Multiprofessional team perception of a music therapeutic workshop developed by nurses. Rev. Bras. Enferm. 2020 [cited 2024 July 12]; 73(1):e20170853. DOI: http://doi.org/10.1590/0034-7167-2017-0853.

Authors contributions

Conceptualization, J.C.C.T. and A.M.S.; methodology, J.C.C.T. and A.M.S; software, J.C.C.T. and J.V.C.L.; validation, J.C.C.T. and A.M.S.; formal analysis, J.C.C.T. and A.M.S.; investigation, J.C.C.T. and A.M.S.; resources, A.M.S.; data curation, J.C.C.T. and J.V.C.L.; manuscript writing, J.C.C.T. and A.M.S.; review and editing, J.C.C.T. and A.M.S.; visualization, J.C.C.T. and A.M.S.; supervision, A.M.S.; project administration, J.C.C.T. and A.M.S.; financing acquisition, J.C.C.T. and A.M.S. All authors read and agreed with the published version of the manuscript.

Use of artificial intelligence tools

Authors declare that no artificial intelligence tools were used in the composition of the manuscript "*Physical, psychological, and cognitive changes among sepsis survivors after ICU discharge: A systematic review*".