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Memory assessment instruments for post-intensive care unit patients: a scoping review protocol

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ABSTRACT

Introduction: Cognitive impairment is a frequent and disabling consequence among survivors of critical illness, with memory dysfunction being one of the most prevalent and impactful sequelae after discharge from intensive care units. Memory disturbances can significantly affect recovery, autonomy, and overall quality of life. Although various instruments exist to assess memory in clinical practice, the extent to which these tools have been specifically applied, validated, and characterized in patients after intensive care remains unclear.
Objectives: To map and describe the available literature on instruments used to assess memory in adult patients after discharge from intensive care, focusing on their types, measurement properties, and contexts of use.
Methodology: This scoping review will follow the Joanna Briggs Institute methodological guidance and aims to answer the question: What memory assessment instruments are used in adult patients after discharge from intensive care units? The search strategy will include multiple international databases and sources of grey literature, with no restrictions on language or publication date. Article selection will follow the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews. Studies eligible for inclusion will involve adult survivors of intensive care in any clinical or community context, reporting on instruments used to assess memory function or memories related to the intensive care experience.
Conclusion: This scoping review will systematically map and synthesize evidence on instruments for memory assessment after intensive care, identifying existing tools and gaps to inform clinical practice and future research focused on cognitive recovery

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RESUMO

Introdução: A rápida incorporação de tecnologias digitais e sistemas de inteligência artificial na educação tem transformado profundamente os processos de ensino-aprendizagem, promovendo uma aprendizagem personalizada, interativa e autónoma. Na formação em enfermagem, ferramentas como os *chatbots* educativos baseados em inteligência artificial podem simular situações clínicas, apoiar o raciocínio crítico e fornecer feedback individualizado, contudo, a evidência não é clara quanto às áreas de aplicação, estratégias pedagógicas e desafios envolvidos.
Objetivos: Mapear e sintetizar a evidência existente sobre o uso de *chatbots* baseados em inteligência artificial na educação e no desenvolvimento profissional em enfermagem, identificando aplicações, potencialidades, limitações e lacunas na evidência científica.
Metodologia: Trata-se de um protocolo para uma revisão de escopo seguindo a metodologia do Joanna Briggs Institute que será reportada conforme as diretrizes PRISMA-ScR. Serão realizadas pesquisas abrangentes em bases de dados e literatura cinzenta, sem restrição de idioma ou ano de publicação, incluindo estudos que abordem o desenvolvimento, implementação, e/ou avaliação da utilização de chatbots em contextos formais e não formais de ensino em enfermagem. A seleção e a extração dos dados serão realizadas por dois revisores de forma independente.
Conclusões: Espera-se que esta revisão forneça uma compreensão abrangente sobre o uso de chatbots educativos no ensino de enfermagem, contribuindo para orientar inovações pedagógicas, apoiar o desenvolvimento de tecnologias educacionais mais eficazes e direcionar futuras investigações com vista à melhoria do ensino de enfermagem e da prática profissional mediadas por inteligência artificial.

Introduction

Survivors of critical illness frequently experience a complex set of physical, cognitive, and psychological sequelae following discharge from the intensive care unit (ICU), a condition collectively known as Post-Intensive Care Syndrome (PICS).[1] Among these, cognitive impairments — particularly memory dysfunction — are highly prevalent and impactful, with far-reaching consequences on recovery, autonomy, and quality of life.[2,3] Memory impairments can persist for months or even years and are frequently associated with anxiety, depression, and post-traumatic stress disorder (PTSD).[4]

The prevalence of cognitive deficits in post-ICU patients is substantial. It is estimated that up to 49.8% of ICU survivors experience some degree of cognitive impairment within the first month post-discharge, with approximately 30.4% continuing to exhibit deficits after one year.[5] Among the cognitive domains affected, memory is one of the most frequently and severely impacted, and its evaluation is crucial to understanding the patient's subjective experience of critical illness and supporting effective recovery strategies.[6-8]

Conceptually, memory refers to the processes of encoding, storing, and retrieving information.[9] In the clinical context of ICU survivors, memory assessment typically involves the evaluation of different domains such as short-term memory, long-term memory, and episodic memory — particularly related to the ICU stay. These may include factual memories (e.g., staff, environment), delusional memories (e.g., hallucinations, nightmares), and emotional recollections (e.g., fear, pain, helplessness), each of which can have distinct psychological consequences.[10,11]

Despite this, routine cognitive assessment in ICU follow-up care remains inconsistent, and there is no consensus regarding the most appropriate instruments to evaluate memory in this specific population. The evaluation of ICU-related memories is particularly relevant because negative or delusional memories from ICU stays have been strongly associated with the later development of psychological distress and PTSD.[12,13] These memories can include sensations

of panic, hallucinations, pain, thirst, or helplessness — often exacerbated by sedation, mechanical ventilation, and communication barriers.[14,15]

Furthermore, the evaluation of memory function after intensive care discharge is not only relevant for understanding individual cognitive recovery but also has significant implications for health system planning and policy development. Identifying reliable and validated instruments can support the standardization of follow-up protocols, facilitate early detection of patients at risk for long-term cognitive impairment, and guide the implementation of individualized rehabilitation strategies. Additionally, comprehensive memory assessments may strengthen patient-provider communication, enhance shared decision-making, and promote person-centred care by incorporating patients' subjective cognitive experiences into their ongoing care plans.[16]

Several instruments have been developed to assess cognitive function and ICU-related memories. Among the most cited are the ICU Memory Tool (ICUM),[10] the ICU Stressful Experiences Questionnaire (ICU-SEQ),[11] and the Intensive Care Experience Questionnaire (ICE-Q).[3] However, many of these tools are either extensive and time-consuming or not specifically tailored to the evaluation of memory in post-ICU patients.[17] Moreover, most focus on general ICU experiences or stressors, with limited emphasis on memory-specific constructs or psychometric robustness.

To address this gap, Samuelson recently developed and validated the Stressful Memory Assessment Checklist for the ICU (SMAC-ICU), a short, self-administered tool designed to identify distressing ICU memories and their intensity.[18] This instrument is particularly relevant as it provides a quick assessment (3 minutes on average), includes a distress intensity rating, and was tested with a large sample of ICU survivors in Sweden. Although the SMAC-ICU shows promising validity and reliability, it represents just one of several tools available, and there is currently no comprehensive synthesis of existing instruments specifically designed to assess memory in post-ICU populations.

In this context, a scoping review is the most appropriate methodological approach, as it allows for the mapping of existing evidence, identification of key concepts, and gaps in knowledge regarding memory assessment in post-ICU patients. Unlike systematic reviews, which are focused on answering specific questions and assessing quality and effectiveness, scoping reviews are suited to exploratory objectives and provide a broader overview of available literature, especially in emerging or heterogeneous fields.[19,20]

The decision to include a wide range of study designs, languages, and publication types (including grey literature such as theses and conference abstracts) stems from the recognition that tools for memory assessment may be described in diverse contexts and not always published in high-impact journals. This inclusive strategy ensures a comprehensive identification of instruments, including those under development or locally validated.

Preliminary searches in databases such as MEDLINE (via EBSCOhost), CINAHL (via EBSCOhost), and Scopus have confirmed the existence of various tools, including brief checklists and extensive neuropsychological batteries, used across a range of studies and settings. However, these tools differ significantly in purpose, structure, mode of administration, target memory domains, and psychometric properties. This diversity underscores the need for a structured synthesis that can assist clinicians and researchers in choosing appropriate tools for follow-up and rehabilitation planning.

A preliminary search of PROSPERO, Open Science Framework, MEDLINE (via EBSCOhost), CINAHL (via EBSCOhost), the Cochrane Database of Systematic Reviews and JBI Evidence Synthesis was conducted, and no ongoing or published systematic or scoping reviews on the topic were found.

Therefore, the objective of this scoping review is to map and synthesise the existing literature on memory assessment instruments used in adult patients following discharge from ICU. Specifically, the review aims to identify the types of instruments used, their characteristics, and psychometric properties, as well as the contexts in which they are applied. This will provide a comprehensive overview of the tools available to assess memory in post-ICU patients, highlighting current practices and gaps in the literature to inform future research and clinical follow-up strategies.

Ultimately, the findings of this review are expected to support evidence-based selection of instruments, foster consistency in cognitive follow-up practices, and promote the integration of memory assessment into post-ICU care pathways—a key step toward improving outcomes for ICU survivors.

Methodology

The proposed scoping review will be conducted in accordance with the latest JBI methodology for scoping reviews.[20-23] This review has been registered on the Open Science Framework (OSF) (DOI: 10.17605/OSF.IO/468J3).

Review Question

Aligned with the review's objectives and the PCC framework, the following research questions have been formulated:

- What memory assessment instruments are used in adult patients after discharge from intensive care units?
- What are the main characteristics of these instruments (e.g., type, administration method, target domains)?

- What psychometric properties (e.g., validity, reliability, sensitivity) are reported for these instruments in the context of post-ICU patients?
- In which clinical or community contexts are these instruments applied following ICU discharge?

Inclusion Criteria

The Participants, Concept, and Context (PCC) mnemonic was used to define the key criteria to determine the eligibility of studies for inclusion in this scoping review.[19]

Participants

Studies involving adult patients (≥18 years) who have been admitted to an ICU and are in the post-ICU phase, regardless of the setting (e.g., hospital ward, rehabilitation, outpatient follow-up, or home care).

Concept

Studies that report on instruments used to assess memory, including validated instruments, cognitive tests, structured questionnaires, or other formal tools applied to the target population. Memory in this review refers to both retrospective recall of ICU events (factual, emotional, or delusional) and measures of memory function (e.g., short-term, long-term, working memory) as evaluated by structured instruments

Context

Any clinical or community setting in which memory assessment is conducted after ICU discharge (e.g., outpatient clinics, follow-up programs, rehabilitation centers, long-term care, or home settings). No geographical or cultural restrictions will be applied.

Types of Sources

This scoping review will consider all types of study designs, both quantitative and qualitative. This includes experimental and quasi-experimental studies (such as randomized and non-randomized controlled trials, before-and-after studies, and interrupted time-series), analytical and descriptive observational studies (including cohort, case-control, cross-sectional studies, case series, and case reports), as well as qualitative research (e.g., phenomenology, grounded theory, ethnography, qualitative description, action research, and feminist research).

Systematic reviews that meet the inclusion criteria will also be considered, alongside relevant text and opinion papers.

In addition, grey literature, such as thesis, dissertations, conference abstracts, and reports, will be included where relevant to the research question.

Search Strategy

The search strategy will aim to identify both published and unpublished (grey) literature. A three-step approach will be used in this review. First, an initial limited search of MEDLINE (via EBSCOhost) and CINAHL (via EBSCOhost) was conducted to identify relevant articles on the topic. The text words contained in the titles and abstracts of these articles, as well as the index terms used to describe them, were analysed to inform the development of a comprehensive search strategy.

This strategy will then be adapted for each selected database or information source. The databases to be searched include MEDLINE Complete (via EBSCOhost), CINAHL Complete (via EBSCOhost), Cochrane Library, Scopus, Web of Science. Sources of unpublished studies and grey literature to be searched include Repositório Científico de Acesso Aberto de Portugal (RCAAP) and ProQuest. The full search strategy for MEDLINE Complete (via EBSCOhost) is presented in Appendix 1. Where appropriate, validated search filters for study design (e.g., qualitative studies) will be used to support the identification of relevant evidence.

In addition, the reference lists of all included studies, as well as relevant systematic reviews on similar topics, will be screened manually to identify any additional studies not retrieved through the database searches.

Articles published in English, Portuguese, and Spanish will be included, as the review team is fluent in these languages. Articles published in other languages will also be considered when a translation can be obtained. During the screening phase, automated translation tools (e.g., DeepL or Google Translate) will be used to translate titles and abstracts to determine potential eligibility. Full texts will be translated as needed using the same approach. To ensure accuracy, translations of full texts will be validated by a translator or a native speaker of the original language whenever possible, thereby minimising the risk of misinterpretation and ensuring that potentially relevant evidence is not excluded based on language. Studies for which a reliable translation cannot be obtained may be excluded and this will be documented transparently.

No publication date limits will be applied, to ensure a comprehensive mapping of all available evidence related to memory assessment instruments in post-intensive care patients.

Study/Source of evidence selection

Following the search, all identified citations will be collated and uploaded into Rayyan Online Software[24] for the initial screening process, and duplicates will be identified and removed. Following a pilot screening, titles and abstracts will be independently assessed by two or more reviewers against the predefined inclusion criteria. Inter-rater agreement will

be calculated during this phase to evaluate the level of consistency between reviewers.

Potentially relevant sources will then be retrieved in full, and their citation details will be exported and imported into Zotero Software for reference management and data extraction.[25] The full texts will be independently reviewed by at least two reviewers to determine final eligibility. Reasons for exclusion at the full-text screening stage will be documented and reported in the final review. Any disagreements that arise at any stage of the selection process will be resolved through discussion or, if needed, with the involvement of a third reviewer.

The results of the search and selection process will be fully documented and presented using a PRISMA-ScR flow diagram, in accordance with the PRISMA Extension for Scoping Reviews guidelines.[26]

Data extraction

Data will be extracted from the included sources by two or more independent reviewers using the standard JBI Data Extraction Tool for Scoping Reviews.[22] No modifications will be made to the original tool. The extracted data will include information related to the study population (e.g., characteristics of post-ICU patients), the concept (e.g., type and properties of memory assessment instruments), the context (e.g., clinical or community-based follow-up settings), study design and methods, and key findings relevant to the review questions. The extraction tool will be piloted by at least two reviewers on a small sample of included studies to ensure clarity, completeness, and consistency in data collection. Based on the pilot testing, the tool may be refined and revised. All modifications made during the data extraction process will be documented and reported in the final scoping review.

Any disagreements between reviewers during the extraction process will be resolved through discussion. If consensus cannot be reached, a third reviewer will be consulted. Where necessary, authors of primary studies may be contacted to obtain missing or additional data.

Critical appraisal of individual sources of evidence will not be conducted, in accordance with JBI methodology for scoping reviews, as the objective of this review is to map the existing evidence rather than to assess the quality or risk of bias of individual studies.

Data analysis and presentation

The evidence presented in the review will directly address the stated objective and research questions. Data will be presented using appropriate tabular, graphical, and/or diagrammatic formats to facilitate a clear and structured overview of the findings. Where applicable, data mapping techniques such as thematic categorisation or classification by instrument type, target population, and psychometric properties may be employed to enhance interpretability.

A narrative summary will accompany all tabulated and/or charted data, providing contextual interpretation and explicitly linking the results to the review's objectives and questions.

Conclusion

This scoping review will systematically map and synthesize the available evidence on memory assessment instruments used in adult patients after discharge from intensive care units. By identifying the types of instruments, their reported psychometric properties, and contexts of application, this review aims to clarify how memory has been evaluated in this population and highlight existing gaps in the literature. The findings may support the selection of appropriate tools in clinical practice, inform follow-up and rehabilitation planning, and guide future research. By providing a comprehensive and up-to-date overview, this review will contribute to improving person-centred care and reinforce the importance of cognitive assessment as an essential component of recovery after critical illness.

Data supporting the results will be provided on request.

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