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Non-pharmacological interventions to prevent and manage delirium in critically ill children in neonatal and paediatric intensive care units (NICU/PICU): a scoping review protocol

Max Zilezinski ,[1] Natascha-Elisabeth Denninger ,[2,3] Antje Tannen ,[1] Jan Kottner [1]

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For numbered affiliations see end of article.

Correspondence to
Max Zilezinski;
max.zilezinski@charite.de

ABSTRACT

Introduction Delirium is one of the most common forms of acute cerebral dysfunction in critically ill children leading to increased morbidity and mortality. Prevention, identification and management of delirium is an important part of paediatric and neonatological intensive care. This scoping review aims to identify and map evidence on non-pharmacological interventions for paediatric delirium prevention and management in paediatric and neonatal intensive care settings.

Methods and analysis This scoping review will be conducted according to the Joanna Briggs Institute methodology for scoping reviews and reported according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews. Searches will be performed in the databases Medline (via PubMed), CINAHL, Cochrane Library, Ovid (Journals), EMBASE and Web of Science (01/2000–current). Two reviewers will independently review retrieved studies, and relevant information will be extracted using data extraction forms. The results will be presented in tabular format and accompanied by a narrative summary.

Inclusion criteria The review will include references that describe or evaluate non-pharmacological interventions to prevent or manage paediatric delirium. Conference abstracts, editorials, opinion papers and grey literature will be excluded.

Ethics and dissemination Due to the nature of research involving humans or unpublished secondary data, approval of an ethics committee are not required. The dissemination of findings is planned via professional networks and publication in an open-access scientific journal.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Our scoping review will conform to the methodology guidance by the Joanna Briggs Institute.
⇒ The scoping review will be reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews guidelines.
⇒ There will be no language restrictions to include as much evidence as possible.
⇒ Evidence will be summarised and mapped descriptively.
⇒ The risk of bias will not be assessed.

INTRODUCTION

Delirium is a syndrome characterised by an acute change in attention, cognition and awareness caused by underlying medical conditions or treatments and associated with a worse course of therapy and unwanted outcomes.[1–3] Delirium usually develops in a short period (hours to days). It is classified into hypoactive, hyperactive and mixed forms. Signs and symptoms include agitation, restlessness, somnolence and psychomotor retardation that may vary during the day.[1 4] Hypoactive and mixed delirium is most common and usually lasts several days.[5–7] Delirium in children in paediatric and neonatal intensive care units (PICU/NICU) is common and represents a challenge in these settings.[8 9] The overall occurrence rates of paediatric delirium vary widely depending on the type ranging from 17% to 81%.[7 10–13] Delirium is associated with increased mortality,[1 12] and children are likely to experience adverse long-term consequences and poorer cognitive and functional development.[14] Therefore, preventing delirium in children is a treatment priority.

Studies showed that the risk of developing delirium increases with predisposing or existing risk factors, like underlying disease and precipitating factors like iatrogenic drugs.[1 9 12 15] Recent meta-analyses by Zhu *et al*[16] and Ista *et al*[17] conclude that developmental delay, mechanical ventilation, use of benzodiazepines, anticholinergics, age less than 2 years and length of stay in the PICU

increase the likelihood of developing delirium. Paediatric delirium may be identified using screening (e.g., Cornell Assessment of Paediatric Delirium) and/or assessments (e.g., Paediatric Confusion Assessment Method-Intensive Care Unit) tools.[18]

In addition to pharmacological approaches,[19 20] non-pharmacological interventions for preventing and managing delirium are also recommended because the interventions mainly address the impact of the precipitating factors. The interventions consist of various elements (e.g., identifying or managing risk factors, screening, increasing awareness, knowledge and skills). Like adults,[21 22] bundling non-pharmacological interventions of delirium prevention may reduce the rate of delirium development in the critically ill child in the PICU or NICU.[23–27] In addition, it seems reasonable to adopt the bundles of measures with different interventions to the stage of development and the age of the child.[28]

An integrative overview of 2020 provides a condensed overview of paediatric delirium[20]; however, no review of non-pharmacological interventions in the critically ill child is available. Also, no review protocols are registered in the Open Science Framework or PROSPERO databases, among others summarising available non-pharmacological interventions for intervention study planning.

Therefore, this scoping review (ScR) aims to map the current evidence on non-pharmacological interventions for delirium prevention and management in paediatrics.

REVIEW QUESTIONS

Which non-pharmacological interventions have been used to prevent and manage delirium in PICUs/NICUs, and what effects have been described?

METHODS

The ScR will be conducted following the methodological guidance of the Joanna Briggs Institute (JBI).[29 30] The manuscript will be reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for ScRs (PRISMA-ScR) guidelines.[31]

Eligibility criteria

Participants

Children (age: 0–18) with critical illness.

Concept

The focus of this review is to address the prevention, identification and management of paediatric delirium. This includes interventions aimed at enhancing awareness, knowledge, skills and resources, as well as implementing organisational changes and specific programmes.

Context

PICUs/NICUs.

Types of studies

All types of studies cover quantitative and qualitative designs, including experimental and quasi-experimental designs, descriptive studies, case studies and single-case reports. Reviews will be included, if they answer a clear review question using transparent methods and report interventions in general. In addition, reference lists of all included studies will be examined for further potential studies. No language restrictions will be applied, and the search period will be between January 2000 and the current. Articles written in languages other than German or English will be translated. Sources of unpublished studies and grey literature (e.g., dissertations and theses describing interventions) will not be included. Lay literature (e.g., 'how to' guides), opinion papers (e.g., areas for future research and interventions), conference abstracts, editorials, comments, viewpoints, letters to the editor, policy, recommendations and guidelines will be excluded.

Search strategy

The databases to be searched include Medline (via PubMed), CINAHL, Cochrane Library, Ovid (Journals), EMBASE and Web of Science. Two reviewers (MZ and ND) performed an initial orienting search strategy for MEDLINE (via PubMed) to identify relevant articles in the topic area. The search strategy in Medline (via PubMed) is provided in table 1. The search yielded 1060 results on 10 February 2023, without further restrictions. The text words contained in the titles and abstracts of relevant articles and the index terms were used to develop the final search strategy for the databases. The search strategy, including all identified keywords and index terms, will be translated for each database and reported in the final manuscript. One reviewer (MZ) will perform the search across all databases. The reference lists of all included articles will be screened for additional studies.

Table 1 Search MEDLINE via PubMed (conducted: 10 February 2023)

Queries	Keywords/search term	Results
1	"delirium"[MeSH Terms] OR "delirium"[All Fields] OR "delirium's"[All Fields] OR "deliriums"[All Fields]	23 079
2	"paediatrics"[All Fields] OR "paediatrics"[MeSH Terms] OR "paediatrics"[All Fields] OR "paediatric"[All Fields] OR "paediatric"[All Fields]	1 167 533
3	#1 AND #2	1060

Box 1 Data extraction form

- ⇒ Authors
- ⇒ Reference title
- ⇒ Publication type/source
- ⇒ Publication year
- ⇒ Origin/country of origin (where the source was published or conducted)
- ⇒ Study aim/purpose/objectives
- ⇒ Population and sample size within the source of evidence
- ⇒ Study design
- ⇒ Methodology/methods
- ⇒ Results (key findings that relate to the scoping review question/s / underpinning evidence/theory base)
- ⇒ Description of the intervention, measures or bundles (intervention type, comparator and details of these (e.g., provider of interventions) (if applicable)
- ⇒ Duration of the intervention (if applicable)
- ⇒ Outcomes and details of these (e.g., how measured, effect) (if applicable)
- ⇒ Other details (if applicable)

Study selection

All resources retrieved will be collected and uploaded into EndNote V.20.2.1/30 November 2021, for Windows (Clarivate Analytics, Pennsylvania, USA), and duplicates will be removed. Subsequently, based on titles and abstracts, two reviewers will independently screen and evaluate each article for assessment against the inclusion criteria (first step). The full texts which are potentially relevant will be imported into the web-based application called RAYYAN, supporting the selection process.[32] At least two reviewers will assess full texts against the inclusion criteria. Any reasons for the exclusion of full texts will be recorded. Any disagreements between the reviewers at each stage of the selection process will be resolved through discussion with a third reviewer.

Data extraction

Data will be extracted from articles included by two independent reviewers (MZ and ND) using a data extraction form developed by the reviewers. For the data extraction, we will use Microsoft Excel Version 2016. The data extracted will include specific details about the participants, concept, context, study methods and key findings relevant to the review questions, an initial piloting is planned. A draft of the extraction form is shown in box 1. The draft follows the recommendation of the JBI and is modified and will be revised as necessary while extracting data from each included evidence source. Modifications will be detailed in the final review article. Any reviewer disagreements will be resolved through discussion or with a third reviewer (JK or AT). If appropriate, authors of papers will be contacted twice via email at intervals of 1 week to request missing or additional data, where required.

Data analysis and presentation

Extracted data will be presented in tabular and graphical formats. Descriptive mapping of the types of included studies, and the methods used to evaluate the effectiveness of interventions, used diagnostic assessments/instruments and outcomes will be done. This will be followed by a summary of the different types of interventions, a discussion of limitations and recommendations for further research. Interventions will be mapped in detail, including a graphical representation and a narrative summary of characteristics.

Ethics and dissemination

Ethical approval is not mandatory as this is a review of existing evidence. The results of the review will be published in an open-access peer-reviewed journal and presented at national and international conferences.

Patient and public involvement

Patients and/or the public were not involved in this research's design, conduct, reporting or dissemination plans.

DISCUSSION

Due to the high rate of delirium in PICUs/NICUs[7 10–13] and the negative consequences,[1 12 14] as well as the current neglect of interventions to prevent or to reduce delirium,[23–28] there is a need to identify and subsequently develop non-pharmacological interventions.

This ScR adheres to the PRISMA-ScR,[31] ensuring that the review objectives are fulfilled, and the review steps are replicable. Even if rigorous reporting is done, it is possible that the search strategy needs to be more sensitive or that some keywords or MeSH terms might be missing. This would result in an incomplete evidence map. In addition, the risk of bias and the quality of evidence is not assessed.

To the best of our knowledge, this ScR will be the first to summarise and map available evidence on non-pharmacological interventions for preventing and managing paediatric delirium. Additionally, this review aims to contribute to the existing evidence base in this area. Currently, there is limited focus on managing and preventing delirium in PICU,[20] and the published literature on NICU delirium mostly consists of case reports.[33–35]

Author affiliations
[1]Institute of Clinical Nursing Science, Charité Universitätsmedizin Berlin, Berlin, Germany
[2]Department of Primary Care and Health Services Research, Nursing Science and Interprofessional Care, Medical Faculty Heidelberg, Heidelberg University, Heidelberg, Germany
[3]Institute for Health and Nursing Science, International Graduate Academy, Medical Faculty, Martin-Luther-University Halle-Wittenberg, Halle (Saale), Germany

Contributors MZ and ND designed the overall analysis and review questions. MZ and ND wrote the first draft of the protocol with contributions and methodological guidance from JK and AT. MZ conducted the preliminary search and used the results to refine search criteria. All authors have agreed on the final version and meet the criteria (recommended by the ICMJE (http://www. icmje.org/recommendations/)): Substantial contributions to conception and design, acquisition

of data or analysis and interpretation of data; drafting the article or revising it critically for important intellectual content.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

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ORCID iDs
Max Zilezinski http://orcid.org/0000-0001-9225-1672
Natascha-Elisabeth Denninger http://orcid.org/0000-0003-4085-0993
Antje Tannen http://orcid.org/0000-0003-0970-1818
Jan Kottner http://orcid.org/0000-0003-0750-3818

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