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# BMJ Open

## Complementary therapies and pain management in paediatric intensive care units (PICU): protocol for scoping review

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3 **Complementary therapies and pain management in paediatric intensive care units**

4 **(PICU): protocol for scoping review**

5 **ABSTRACT**

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8 **Introduction** The World Health Organization (WHO) issued new guidelines for pain

9 management in children and adolescents in 2021, emphasising the integrative approach to

10 controlling this symptom. Painful procedures are common in the PICU, and it is necessary

11 to map evidence of complementary therapies in pain management in this setting.

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13 **Methods and analysis** A systematic literature search will be performed in the following

14 databases: CINAHL (EBSCO), MEDLINE (PubMed), Cochrane Library (Wiley), Embase

15 (Elsevier), LILACS (VHL), Scopus (Elsevier), Web of Science Core Collection (Clarivate

16 Analytics) and gray literature Theses Capes, Dart Europe (DART-E), and Open Access

17 Theses and Dissertations (OATD). The research will consider quantitative and qualitative

18 studies, mixed-methods studies, systematic reviews, text articles, and opinion articles in any

19 language and database. The following will be eligible for inclusion: (i) child preschool,

20 children and adolescents in whom (ii) complementary therapies were used to manage (iii)

21 acute or chronic pain in (iii) PICUs.

22

23 **Ethics and dissemination** The data used in this technique will be taken from the literature.

24 This study does not require ethical approval. This protocol has been registered with Open

25 Science Framework (DOI 10.17605/OSF.IO/DZHKT) and is accordance with Creative

26 Commons Attribution Non Commercial (CC BY-NC 4.0) licence's.

27

28 **Acknowledgments** We would like to thank Editage (www.editage.com) for English

29 language editing.

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31 **Article Summary**

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33 Strengths and limitations of this study

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- 35 • This scoping review will provide a guide to intensive care professionals as
  - 36 complementary therapies represent a field of knowledge in which pain management is
  - 37 possible, especially in the paediatric population.
  - 38 • This study is required to learn about alternatives to prescribing benzodiazepines for
  - 39 pain management in paediatric intensive care units.
  - 40 • The scoping review methodology has limitations because it does not recommend
  - 41 which complementary therapy is most effective for pain relief in children and adolescents
  - 42 in the PICU.
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- The variability of characteristics in the paediatric population may limit our understanding of variables related to pain management with complementary therapies in this population.

## INTRODUCTION

Pain is a complex condition. Biological, psychological, and social interactions help to understand the effects of pain on the individual, family, caregivers, diagnosis, and treatment. Therefore, pain management requires an interdisciplinary and integrated multimodal approach.<sup>1</sup>

In this sense, complementary therapies can help health professionals not only focus on pain as a symptom, but also understand and elucidate the processes experienced by the individual that culminate in the symptoms. Changes in the treatment paradigm have contributed to the deprescription of opioids and adoption of the approach proposed by the WHO.<sup>2</sup>

Pain relief as a human right has been discussed by international institutions since 2004, as per the International Association for the Study of Pain.<sup>3</sup> However, topics considered challenging to treat, such as the treatment of pain in children, still have critical gaps in the knowledge base. This is especially true for chronic pain management in children.<sup>1</sup>

One of the obstacles to advancing paediatric pain control in this age group is the heterogeneity of pain perception and response in children. That is, pain in children is quantitatively and qualitatively different from adult pain, requiring individual measures. The first approach is age-based symptom evaluation, wherein the collaboration of parents, caregivers, and the child itself is essential. Complete medical and pain history should be collected. Paediatric pain assessment scales help with this process. The second approach is distinguishing between acute and chronic pain. While acute pain occurs in tissue damage, such as needle sting, chronic pain refers to pain lasting more than three months.<sup>2-3</sup>

The above-mentioned points indicate that paediatric pain management requires multifactorial assessment, requiring the provision of technical training to the health team, especially nurses. In a qualitative study carried out in a paediatric inpatient unit of a hospital in Brazil, the need for training the health team to relieve pain in paediatric patients was evaluated. Participants reported that the frequency of training on the subject is scarce<sup>4</sup>, revealing the need for continuing education for nurses, as highlighted by the WHO, as nurses are usually the first to encounter and recognize pain in paediatric patients.<sup>1</sup>

Another relevant point in paediatric pain management is the consequence of not reducing it. Despite scientific and technological developments in recent decades, many paediatric patients do not experience pain relief. In the long term, this generates consequences such as exacerbation of fear and pain during future painful situations, weakening of the effect of medications, and an increased risk of developing chronic pain.<sup>5</sup> Such problems highlight the importance of the WHO guidelines regarding the use of supportive therapies and non-pharmacological treatment modalities. Non-pharmacological treatments include massage, acupuncture, relaxation, and physical therapy.<sup>1</sup>

The effects of complementary therapies have increased the supply of these services in hospital settings. Mind-body practices, such as chiropractic, osteopathy, yoga, and massage therapy, are among the most practiced by adults and children in the US. In acute care settings, pain management using complementary therapies provides biological evidence. These demonstrations result in the incorporation of complementary therapies into nurses' critical care to support holistic patient care.<sup>6</sup>

This aspect is fundamental for intensive care, as children under intensive care usually submit to invasive and painful procedures, such as punctures (venous, arterial, lumbar), catheterisation (central venous catheter, peripherally inserted central catheter), intubation, and endotracheal aspiration. Thus, insufficient or inadequate pain management has been associated with a reduction in the patient's ability to rehabilitate; ventilatory and haemodynamic compromise; and the development of chronic pain or post-traumatic stress.<sup>7</sup>

Therefore, it is essential to develop appropriate complementary techniques for pain management in PICUs. In addition to acute pain, the treatment of children with chronic pain can be optimised using these techniques. Among the therapies indicated by the Andrew Weil Center for Integrative Medicine for pain control in paediatric patients are gate control theory, techniques of vagus nerve stimulation, breathing control, aromatherapy with essential oils, nutrition and supplementation, use of plants, acupuncture (auriculotherapy, acupuncture, acupressure, distraction), mind-body therapies (guided imagery, hypnotherapy, hypnotic language, biofeedback, music therapy, progressive muscle relaxation), and sleep promotion.<sup>2-3</sup>

Based on the above, considering paediatric patients in PICUs may experience acute or chronic pain, the potential use of complementary therapies to manage this symptom is envisaged. Thus, paediatric intensive care professionals need access to the best and most up-to-date scientific evidence on complementary therapies for pain management in PICUs, as such practices are foreseen within their professional areas.<sup>6,8-9</sup> The development of a quality

scope review can provide data that explores the phenomenon of complementary therapies in pain management and help interpret the various factors involved in the paediatric spectrum. This review aims to map evidence related to complementary therapies in pain management in the PICU context.

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## METHODS AND ANALYSIS

Scoping reviews seek to synthesise evidence for researchers, clinicians, and policymakers, gather and describe evidence, and present an easily illustrative summary.<sup>10</sup> In this sense, as complementary therapies exhibit a multiplicity of techniques, with varied health impacts and use by different ages, the scoping review was deemed the most appropriate review to illustrate different nuances of this topic in the paediatric spectrum, which is also heterogeneous.

This scoping review will be conducted according to the chapter on scoping reviews in the JBI Manual for Evidence Synthesis<sup>11</sup> and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews<sup>12</sup> (PRISMA-ScR). This protocol is registered in Open Science Framework (<https://doi.org/10.17605/OSF.IO/GKETX>). This review will be conducted in five phases: 1) identification of the research question; 2) identification of studies; 3) selection of studies; 4) mapping and comparison of the data; and 5) collecting, summarising, and reporting the results.<sup>13</sup>

### Identifying the research question

The general research question for this scoping review is: "What complementary therapies have been used for pain management in patients admitted to paediatric intensive care units?" To construct the research question, we used the PCC strategy recommended by the JBI<sup>11</sup> and the table proposed by Ahmad et al<sup>14</sup>, provide in the table 1.

**Table 1** Inclusion and exclusion criteria are based on the PCC framework.<sup>11</sup>

	Inclusion criteria	Exclusion criteria
<b>Population</b>	Child, Preschool <sup>15</sup> ( 2 to 5 years old), Children <sup>16</sup> (6 to 12 years old) and Adolescents <sup>17</sup> (13 to 18 years old)	Newborns (infants during the first 28 days after birth) <sup>17</sup>
<b>Concept</b>	Complementary Therapies Alternative Therapies Integrative Therapies Acute pain Chronic pain	Conservative treatment
<b>Context</b>	Pediatric Intensive Care Units	Home Assistance Services Outpatient Care

		Inpatient Units
<b>Types of evidence</b>	Quantitative studies	Letters to the editor Editorials
	Qualitative studies	
	Mixed methods studies	
	Systematic reviews	
	Text articles	
	Opinion articles	
	Gray literature	
	Any language and database	

- PCC, Population, Concept, Context.

This population did not include new-borns<sup>18</sup> because, physiologically, inhibitory pathways for pain are in the developmental stage in new-born babies.<sup>2</sup> Regarding the concept, the review will consider studies that explore complementary therapies in pain management (acute and chronic). In the context of health treatments, "complementary" means combining an unconventional approach with traditional medicine; "alternative" if the unconventional approach is used instead of traditional medicine. It is "integrative" through the coordinated action of traditional medicine and an unconventional approach.<sup>19</sup> As in Brazil, the health descriptor is "Complementary Therapies" it was decided to include this terminology in the research title.

Pain is another concept that should be discussed. Pain can be acute or chronic. In acute pain, a sensation of intense, distressing, or painful discomfort is associated with trauma or disease, with a well-defined location, time, and characteristics.<sup>20</sup> In contrast, chronic pain persists for more than a few months. It can coexist with or without trauma or illness, and may persist after the initial injury has healed. Their location, characteristics, and periodicity are more imprecise than those of acute pain.<sup>21</sup>

### Identifying relevant studies

The search strategy was developed in collaboration with a librarian of a leading university in Brazil. The strategy was designed with the aim to locate primary published studies, reviews, and text articles. First, a limited initial search was performed on CINAHL (EBSCO) and MEDLINE (PubMed) to identify relevant terms and keywords to develop the consolidated search strategy. As transparency and replication of the review, a chart was created based on the protocol by Ahmad et al.<sup>14</sup>, which details the strategy with Medical Subject Headings (MeSH) and Text Word (TW). See the table 2 below.

**Table 2** MeSH (Medical Subject Headings) terms/Text words. <sup>14</sup>



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<b>Pain Management</b>
1. "pain management"[MeSH Terms] OR "pain management"[Text Word] OR "pain relief"[Text Word] OR "pain control"[Text Word] OR "pain reduction"[Text Word] OR "managing pain"[Text Word] OR "analgesia"[MeSH Terms] OR "analgesia"[Text Word]
2. "pain measurement"[MeSH Terms] OR "pain assessment"[Text Word] OR "pain measurement"[MeSH Terms] OR "pain scale"[Text Word] OR "pain tool"[Text Word] OR "pain assessment tool"[Text Word] OR "pain instrument"[Text Word] OR "pain intervention"[Text Word] OR "pain measurement"[MeSH Terms] OR "pain measurement"[Text Word]
3. 1 OR 2
<b>Complementary Therapies</b>
4. "integrative medicine"[MeSH Terms] OR "integrative medicine"[Text Word] OR "complementary therapies"[MeSH Terms] OR "complementary medicine"[Text Word] OR "complementary therapies"[MeSH Terms] OR "alternative medicine"[Text Word] OR "integrative therapy"[Text Word] OR "integrative therapies"[Text Word] OR "complementary therapy"[Text Word] OR "complementary therapies"[MeSH Terms] OR "complementary therapies"[Text Word] OR "alternative therapy"[Text Word] OR "complementary therapies"[MeSH Terms] OR "alternative therapies"[Text Word] OR "alternative treatment"[Text Word]
5. "nonpharmacological intervention"[Text Word] OR "nonpharmacological interventions"[Text Word] OR "nonpharmacological therapy"[Text Word] OR "nonpharmacological therapies"[Text Word] OR "nonpharmacological treatment"[Text Word]
6. "aromatherapy"[MeSH Terms] OR "aromatherapy"[Text Word] OR "oils, volatile"[MeSH Terms] OR "essential oils"[Text Word] OR "aromatherapy"[MeSH Terms] OR "aroma therapy"[Text Word]
7. "acupuncture"[MeSH Terms] OR "acupuncture therapy"[MeSH Terms] OR "acupuncture"[Text Word] OR "acupuncture therapy"[MeSH Terms] OR "acupuncture therapy"[Text Word] OR "acupuncture treatment"[Text Word] OR "acupuncture, ear"[MeSH Terms] OR "acupuncture ear"[Text Word]
8. "mind body techniques"[Text Word] OR "mind body therapies"[MeSH Terms] OR "mind body therapies"[Text Word]
9. "breathing techniques"[Text Word] OR "breathing exercises"[MeSH Terms] OR "breathing exercise"[Text Word]
10. "guided imagery intervention"[Text Word] OR "guided imagery interventions"[Text Word] OR "imagery, psychotherapy"[MeSH Terms] OR "guided imagery"[Text Word] OR "guided relaxation"[Text Word]

11. "hypnosis"[MeSH Terms] OR "hypnosis"[Text Word] OR "hypnotherapy"[Text Word]
12. "biofeedback, psychology"[MeSH Terms] OR "biofeedback"[Text Word] OR "biofeedback therapy"[Text Word]
13. "music therapy"[MeSH Terms] OR "music therapy"[Text Word] OR "music intervention"[Text Word] OR "musical therapy"[Text Word] OR "music based intervention"[Text Word] OR "therapeutic music"[Text Word]
14. "progressive muscle relaxation"[Text Word] OR "muscle relaxation"[MeSH Terms] OR "muscle relaxation"[Text Word]
15. "sleep therapy"[Text Word] OR "sleep"[MeSH Terms] OR "sleep"[Text Word]
16. "massage therapy"[Text Word] OR "massage"[Text Word] OR "massage therapies"[Text Word]
17. "physical therapy modalities"[MeSH Terms] OR "physical therapy"[Text Word] OR "physical therapy modalities"[MeSH Terms] OR "physiotherapy"[Text Word]
18. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17
19. PICU
20. "pediatric intensive care unit"[Text Word] OR "picu"[Text Word] OR "pediatric critical care unit"[Text Word] OR "paediatric critical care"[Text Word] OR "intensive care units, pediatric"[MeSH Terms]
21. 3 AND 18 AND 19

Text words describes in the titles and abstracts of articles and the indexing the terms used in the articles will be used to guide a complete search strategy for CINAHL (EBSCO) and relevant platforms: Cochrane Library (Wiley), Embase (Elsevier), LILACS (VHL), MEDLINE (PubMed), Scopus (Elsevier), Web of Science Core Collection (Clarivate Analytics), to be disclosed with the result of the scoping review.

The search strategy will consider the particularity of each information source, including all the identified keywords and indexing terms. The strategy will consider articles published in any language and with any database on the start or date of insertion.

In addition to the electronic databases, contact will be made with the study authors, when necessary, to clarify doubts. This protocol will consider sources of unpublished studies and gray literature, Theses Capes, Dart Europe (DART-E), and Open Access Theses and Dissertations (OATD). Online supplemental appendix A provides a list of possible search queries.

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### Study selection

The information search process will be carried out in two stages: 1) Reading the title and abstract (first set of records), and 2) Read in full (second set of records). Screening, which will result in the first set of records, will be performed by two pairs of reviewers who will divide the search as follows: 1) Pair A will perform the search using the following sources. 2) Pair B will search in the following sources. A fifth reviewer will verify this process. The first data record will be grouped and loaded in EndNote20 (Clarivate Analytics, PA, USA), and duplicates will be removed.

A pilot test will be carried out on two sources of information, CINAHL and PubMed, for evaluation according to the inclusion criteria for the review. Potentially relevant articles will be retrieved in full of composing the second set of records and their citation details, imported into Rayyan (Rayyan Systems Inc., MA, Cambridge).

At this stage, if necessary, adjustments will be made to the search strategy to meet the review's inclusion criteria. After completing the pilot test, four reviewers will evaluate the full text of the other selected citations to check whether they meet the inclusion criteria. The reasons for excluding full-text articles that do not meet the inclusion criteria will be recorded and reported in the scoping review. Disagreements between reviewers at any stage of this process will be resolved through consensus.

The research results will be reported in full in the final scoping review and presented in a PRISMA<sup>22</sup> flow diagram (figure 1).

### Extracting and charting the results

Data will be extracted from the articles by three reviewers using a data extraction tool developed by the authors based on a model proposed by the JBI (table 3). Data extraction will occur independently, with cross-checking of the extracted evidence. Differences will be resolved by consensus. The outline of extraction tool can be provided in table 3.

**Table 3** Outline of the extraction tool. <sup>10</sup>

<ul style="list-style-type: none"><li>• AUTHOR</li><li>• YEAR</li><li>• OBJECTIVE</li><li>• TYPE OF STUDY/SOURCE</li><li>• POPULATION</li><li>• SAMPLE SIZE</li><li>• AGE</li><li>• GENRE</li></ul>
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- OTHER DEMOGRAPHICS
- CONCEPT- ALTERNATIVE/COMPLEMENTARY/INTEGRATIVE THERAPY
- TECHNIQUE USED
- PROFESSIONALS WHO USED THE TECHNIQUE
- CONCEPT- ACUTE/CHRONIC PAIN
- INSTRUMENT USED FOR PAIN IDENTIFICATION
- RESULTS

Relevant information will be extracted that answers the guiding, objective, and sub-questions of the review. The feasibility of the extraction tool will be tested on a subset of the second set of records. This will be modified and revised for each article included in the data extraction process. Any modifications will be detailed in the full scoping review.

### **Collating, summarizing, and reporting the results**

The total number of jobs will be presented in a summarised table format, using the extraction tool as a guide. Then, the data will be grouped according to the PAGER strategy (Patterns, Advances, Gaps, Evidence for practice, and Research recommendations) proposed by Bradbury-Jones and Aveyard.<sup>23</sup> Each component represents a domain. The starting point is to produce the "Chart of Patterns." It displays the articles included in the review on one axis and the themes on the other to report the themes expressed in the articles. After the patterns are identified, advances, and gaps can be identified and reported, resulting in the last domain of the framework, which is to recommend future research. In addition, the strategy also makes it possible to identify topics that do not require further research; that is, the scientific community has explored them well.

### **Ethics and dissemination**

Because scoping reviews use secondary data from other primary sources, approval of the protocol and review by the Research Ethics Committee will not be necessary. The results will be disseminated through publications in journals of high quality whose scope aligns with the theme. If appropriate, there will also be the dissemination of health services with local PICUs and at conferences in the field of study.

**Patient and public involvement** There was no patient involvement.

**Authors' contributions** IGMA, JKSD, SCMA, JT and PLOA contributed to the development of this manuscript. IGMA conceptualised the research question, designed the study and prepared the first draft of the manuscript. JS provided methodological expertise and manuscript edits. TELF helped refine the research question. All authors have contributed to study design and revising the protocol. All authors have approved the final manuscript.

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**Competing interests statement** None declared.

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PRISMA 2020 flow diagram for new systematic reviews which included searches of databases and registers only

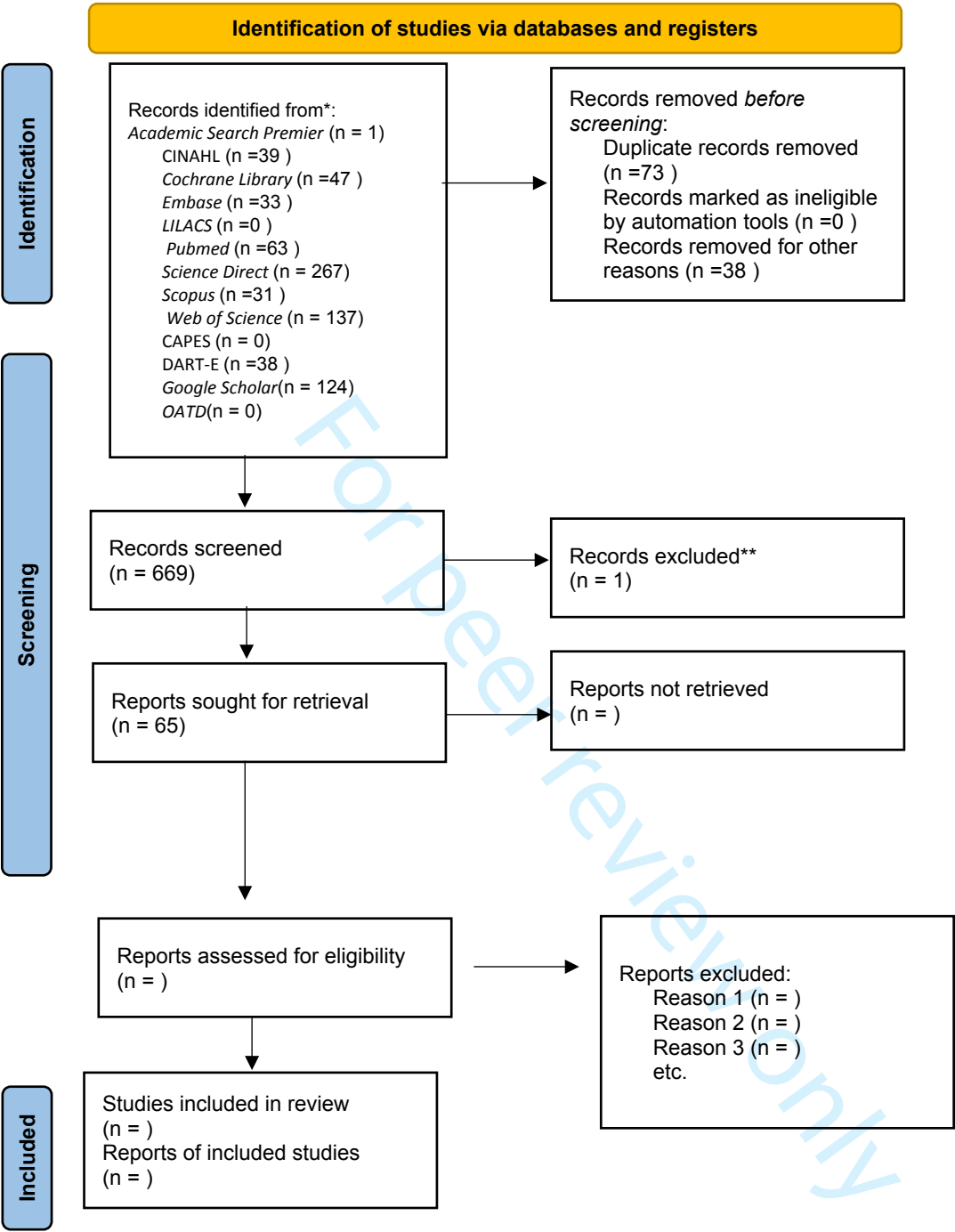


Figure 1. Research results until April 2023. From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

## Appendix A: Draft Search Strategy

Dates of coverage and database	Query	Retrieved records
09/21/22  CINAHL	1. MH (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR TI (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR AB (pain management or pain relief or pain control or pain reduction or managing pain or analgesia)	84,304
	2. MH (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain intervention or pain measurement) OR TI (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain intervention or pain measurement) OR AB (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain intervention or pain measurement)	75,339
	3. 1 OR 2	133,679
	4. MH (integrative medicine or complementary medicine or alternative medicine) OR TI (integrative medicine or complementary medicine or alternative medicine) OR AB (integrative medicine or complementary medicine or alternative medicine)	16,007
	5. MH ( integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment) OR TI (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment) OR AB (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment)	60,250
	6. MH (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment) OR TI (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment)	3,068

	pharmacological treatment) OR AB (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment)	
7.	MH (aromatherapy or essential oils or aroma therapy) OR TI (aromatherapy or essential oils or aroma therapy) OR AB (aromatherapy or essential oils or aroma therapy)	7,565
8.	MH (acupuncture or acupuncture therapy or acupuncture treatment) OR TI (acupuncture or acupuncture therapy or acupuncture treatment) OR AB (acupuncture or acupuncture therapy or acupuncture treatment)	20,538
9.	MH acupuncture, ear OR TI acupuncture, ear OR AB acupuncture, ear	590
10.	MH (mind body techniques or mind-body therapies) OR TI (mind body techniques or mind-body therapies) OR AB (mind body techniques or mind-body therapies)	3,952
11.	MH (breathing techniques or breathing or breathing exercise) OR TI (breathing techniques or breathing or breathing exercise) OR AB (breathing techniques or breathing or breathing exercise)	20,189
12.	MH (guided imagery for pain management or guided image therapy or guided images therapies) OR TI (guided imagery for pain management or guided image therapy or guided images therapies) OR AB (guided imagery for pain management or guided image therapy or guided images therapies)	646
13.	MH (guided imagery or guided relaxation or visualization techniques) OR TI (guided imagery or guided relaxation or visualization techniques) OR AB (guided imagery or guided relaxation or visualization techniques)	4,120
14.	MH (hypnosis or hypnotherapy) OR TI (hypnosis or hypnotherapy) OR AB (hypnosis or hypnotherapy)	4,011

15. MH (biofeedback or biofeedback therapy) OR TI (biofeedback or biofeedback therapy) OR AB (biofeedback or biofeedback therapy)	4,994
16. MH (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music) OR TI (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music ) OR AB (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music )	7,558
17. MH (progressive muscle relaxation or muscle relaxation) OR TI (progressive muscle relaxation or muscle relaxation) OR AB (progressive muscle relaxation or muscle relaxation)	2,299
18. MH (sleep therapy or sleep) OR TI (sleep therapy or sleep) OR AB (sleep therapy or sleep)	77,183
19. MH (massage therapy or massage or massage therapies) OR TI (massage therapy or massage or massage therapies) OR AB (massage therapy or massage or massage therapies)	21,418
20. MH (physical therapy or physiotherapy) OR TI (physical therapy or physiotherapy) OR AB (physical therapy or physiotherapy)	61,296
21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	277,529
22. MH (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR TI (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR AB (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care)	9,239
23. MH intensive care units, pediatric OR TI intensive care units, pediatric OR AB intensive care units, pediatric	8,949

	24. 22 OR 23	11,491
	25. 3 AND 21 AND 24	38

Dates of coverage and database	Query	Retrieved records
09/21/22  MEDLINE  (PubMed)	1. "pain management"[MeSH Terms] OR "pain management"[Text Word] OR "pain relief"[Text Word] OR "pain control"[Text Word] OR "pain reduction"[Text Word] OR "managing pain"[Text Word] OR "analgesia"[MeSH Terms] OR "analgesia"[Text Word]	177,128
	2. "pain measurement"[MeSH Terms] OR "pain assessment"[Text Word] OR "pain measurement"[MeSH Terms] OR "pain scale"[Text Word] OR "pain tool"[Text Word] OR "pain assessment tool"[Text Word] OR "pain instrument"[Text Word] OR "pain intervention"[Text Word] OR "pain measurement"[MeSH Terms] OR "pain measurement"[Text Word]	101,025
	3. 1 OR 2	246,193
	4. "integrative medicine"[MeSH Terms] OR "integrative medicine"[Text Word] OR "complementary therapies"[MeSH Terms] OR "complementary medicine"[Text Word] OR "complementary therapies"[MeSH Terms] OR "alternative medicine"[Text Word] OR "integrative therapy"[Text Word] OR "integrative therapies"[Text Word] OR "complementary therapy"[Text Word] OR "complementary therapies"[MeSH Terms] OR "complementary therapies"[Text Word] OR "alternative therapy"[Text Word] OR "complementary therapies"[MeSH Terms] OR "alternative therapies"[Text Word] OR "alternative treatment"[Text Word]	274,042
	5. "nonpharmacological intervention"[Text Word] OR "nonpharmacological interventions"[Text Word] OR "nonpharmacological therapy"[Text Word] OR "nonpharmacological therapies"[Text Word] OR "nonpharmacological treatment"[Text Word]	5,292

6.	"aromatherapy"[MeSH Terms] OR "aromatherapy"[Text Word] OR "oils, volatile"[MeSH Terms] OR "essential oils"[Text Word] OR "aromatherapy"[MeSH Terms] OR "aroma therapy"[Text Word]	23,007
7.	"acupuncture"[MeSH Terms] OR "acupuncture therapy"[MeSH Terms] OR "acupuncture"[Text Word] OR "acupuncture therapy"[MeSH Terms] OR "acupuncture therapy"[Text Word] OR "acupuncture treatment"[Text Word] OR "acupuncture, ear"[MeSH Terms] OR "acupuncture ear"[Text Word]	35,397
8.	"mind body techniques"[Text Word] OR "mind body therapies"[MeSH Terms] OR "mind body therapies"[Text Word]	<u>46,477</u>
9.	"breathing techniques"[Text Word] OR "breathing exercises"[MeSH Terms] OR "breathing exercises"[Text Word]	<u>4,632</u>
10.	"guided imagery intervention"[Text Word] OR "guided imagery interventions"[Text Word] OR "imagery, psychotherapy"[MeSH Terms] OR "guided imagery"[Text Word] OR "guided relaxation"[Text Word]	2,746
11.	"hypnosis"[MeSH Terms] OR "hypnosis"[Text Word] OR "hypnotherapy"[Text Word]	15,942
12.	"biofeedback, psychology"[MeSH Terms] OR "biofeedback"[Text Word] OR "biofeedback therapy"[Text Word]	<u>16,054</u>
13.	"music therapy"[MeSH Terms] OR "music therapy"[Text Word] OR "music intervention"[Text Word] OR "musical therapy"[Text Word] OR "music based intervention"[Text Word] OR "therapeutic music"[Text Word]	5,367
14.	"progressive muscle relaxation"[Text Word] OR "muscle relaxation"[MeSH Terms] OR "muscle relaxation"[Text Word]	<u>35,626</u>
15.	"sleep therapy"[Text Word] OR "sleep"[MeSH Terms] OR "sleep"[Text Word]	<u>232,994</u>

	16. "massage therapy"[Text Word] OR "massage"[Text Word] OR "massage therapies"[Text Word]	16,186
	17. "physical therapy modalities"[MeSH Terms] OR "physical therapy"[Text Word] OR "physical therapy modalities"[MeSH Terms] OR "physiotherapy"[Text Word]	200,591
	18. 4 OR 5 OR 6 OR 7 OR 8OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17	746,903
	19. "pediatric intensive care unit"[Text Word] OR "picu"[Text Word] OR "pediatric critical care unit"[Text Word] OR "paediatric critical care"[Text Word] OR "intensive care units, pediatric"[MeSH Terms]	31,624
	20. 3 AND 18 AND 19	63

Dates of coverage and database	Query	Retrieved records
09/14/22 ACADEMIC SEARCH PREMIER	1. (pain management) OR (DE "PAIN management" OR DE "DRY needling" OR DE "PAIN measurement" OR DE "BRIEF Pain Inventory" OR DE "MCGILL Pain Questionnaire")	81,825

	2. DE "ALTERNATIVE medicine" OR DE "ACUPUNCTURE" OR DE "ALTERNATIVE treatment" OR DE "BOTANIC medicine" OR DE "CHIROPRACTIC" OR DE "CHRONOTHERMAL medicine" OR DE "DRY needling" OR DE "ENERGY medicine" OR DE "HOLISTIC medicine" OR DE "HOMEOPATHY" OR DE "MENTAL healing" OR DE "NATUROPATHY"	38,185
	3. DE "PEDIATRIC intensive care" OR ""PEDIATRIC intensive care units" OR PICU	10,655
	4. 1 AND 2 AND 3	1

Dates of coverage and database	Query	Retrieved records
10/03/22  COCHRANE	1. ("pain"):ti,ab,kw OR ("pain assessment"):ti,ab,kw	215514
	2. ("integrative medicine"):ti,ab,kw OR ("complementary medicine"):ti,ab,kw OR ("alternative medicine"):ti,ab,kw	4013
	3. ("non-pharmacological"):ti,ab,kw AND ("therapies"):ti,ab,kw OR ("treatment"):ti,ab,kw OR ("intervention"):ti,ab,kw	1147812
	4. ("aromatherapies"):ti,ab,kw OR ("essential oil"):ti,ab,kw	2174



5.	("acupuncture"):ti,ab,kw OR ("acupuncture analgesia"):ti,ab,kw	17333
6.	("mind body"):ti,ab,kw OR ("mind body medicine"):ti,ab,kw OR ("mind body therapies"):ti,ab,kw	1248
7.	("breathing"):ti,ab,kw	34728
8.	("guided imagery"):ti,ab,kw	806
9.	("hypnotherapy"):ti,ab,kw	380
10.	("biofeedback"):ti,ab,kw OR ("biofeedback training"):ti,ab,kw	3897
11.	("music therapy"):ti,ab,kw	2613
12.	("progressive muscle relaxation"):ti,ab,kw OR ("progressive muscle relaxation training"):ti,ab,kw	820
13.	("sleep"):ti,ab,kw	46268
14.	("massage therapy"):ti,ab,kw	875
15.	("physical therapy"):ti,ab,kw OR ("physical therapy	11504
16.	("pediatric intensive care unit"):ti,ab,kw OR ("paediatric intensive care"):ti,ab,kw OR ("paediatric intensive care unit"):ti,ab,kw OR ("paediatric intensive care units"):ti,ab,kw	1095

17. 1 AND 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 AND 16	0
18. 1 AND 3 AND 16	46
19. 1 AND 7 AND 16	10
20. 1 AND 11 AND 16	2
21. 1 AND 13 AND 16	5
22. 1 AND 15 AND 16	1
23. 1 AND 3 AND 16 OR 1 AND 7 AND 16 OR 1 AND 11 AND 16 OR 1 AND 13 AND 16 OR 1 AND 15 AND 16	47

Dates of coverage and database	Query	Retrieved records
10/23/22 EMBASE	1. pain'/exp OR 'pain' OR 'analgesia'/exp OR 'analgesia'	2062548
	2. 'integrative medicine'/exp OR 'integrative medicine' OR 'alternative medicine'/exp OR 'alternative medicine' OR 'aromatherapy'/exp OR 'aromatherapy' OR 'essential oil'/exp OR 'essential oil' OR 'acupuncture'/exp OR 'acupuncture' OR 'auricular acupuncture'/exp OR 'auricular acupuncture' OR 'breathing exercise'/exp OR 'breathing exercise' OR 'guided imagery'/exp OR 'guided imagery' OR 'hypnosis'/exp OR 'hypnosis' OR 'biofeedback'/exp OR 'biofeedback' OR 'music therapy'/exp OR 'music therapy' OR 'muscle relaxation'/exp OR 'muscle relaxation' OR 'sleep quality'/exp OR 'sleep quality' OR 'massage'/exp OR 'massage'	255690

	OR 'physiotherapy'/exp OR 'physiotherapy' OR	
	3. 'pediatric intensive care unit'/exp OR 'pediatric intensive care unit'	22687
	4. 1 AND 2 AND 3	33

Dates of coverage and database	Query	Retrieved records
10/23/22 LILACS	1. "DOR" or "avaliacao da DOR" or "escala analogica da DOR" or "escala analogica visual de DOR" or "intensidade da DOR" or "limiar da DOR" or "manejo da DOR" or "medicao da DOR" or "percepcao da DOR" or "unidades de alivio da DOR" or "DOR aguda" or "DOR cronica" [Descritor de assunto]	5862
	2. "TERAPIAS COMPLEMENTARES" or "TERAPIAS COMPLEMENTARES e integrativas" [Descritor de assunto]	1429
	3. "unidade de terapia intensiva pediatrica" [Descritor de assunto]	767
	4. 1 and 2 and 3	0

Dates of coverage and database	Query	Retrieved records
SCIENCE DIRECT	1. Title, abstract, keyword: pain	232,587

	2. Title, abstract, keyword: complementary and alternative medicine	3342
	3. Title, abstract, keyword: integrative medicine	6951
	4. pediatric intensive care unit	3787
	1 AND 2 OR 3 AND 4	267

Dates of coverage and database	Query	Retrieved records
09/23/22 SCOPUS	1. TITLE("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia) OR ABS("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia) OR TITLE-ABS-KEY(Pain Management OR Pain Relief OR Pain Control OR "Pain Reduction" OR "Managing Pain" OR Analgesia)	(344,701)
	2. TITLE("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement") OR ABS("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement") OR TITLE-ABS-KEY("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement")	(145,947)

3.	1 OR 2	(423,690)
4.	TITLE(“Integrative Medicine” OR “Complementary Medicine” OR “Alternative Medicine”) OR ABS(“Integrative Medicine” OR “Complementary Medicine” OR “Alternative Medicine”) OR TITLE-ABS-KEY(“Integrative Medicine” OR “Complementary Medicine” OR “Alternative Medicine”)	(58,538)
5.	TITLE(“Integrative Therapy” OR “Integrative Therapies” OR “Complementary Therapy” OR “Complementary Therapies” OR “Alternative Therapy” OR “Alternative Therapies” OR “Alternative Treatment” OR “Alternative Treatments”) OR ABS(“Integrative Therapy” OR “Integrative Therapies” OR “Complementary Therapy” OR “Complementary Therapies” OR “Alternative Therapy” OR “Alternative Therapies” OR “Alternative Treatment” OR “Alternative Treatments”) OR TITLE-ABS-KEY(“Integrative Therapy” OR “Integrative Therapies” OR “Complementary Therapy” OR “Complementary Therapies” OR “Alternative Therapy” OR “Alternative Therapies” OR “Alternative Treatment” OR “Alternative Treatments”)	(59,454)
6.	TITLE(“Non-pharmacological Intervention” OR “Non-pharmacological Interventions” OR “Non-pharmacological Therapy” OR “Non-pharmacological Therapies” OR “Non-pharmacological Treatment” OR “Non-pharmacological Treatments”) OR ABS(“Non-pharmacological Intervention” OR “Non-pharmacological Interventions” OR “Non-pharmacological Therapy” OR “Non-pharmacological Therapies” OR “Non-pharmacological Treatment” OR “Non-pharmacological Treatments”) OR TITLE-ABS-KEY(“Non-pharmacological Intervention” OR “Non-pharmacological Interventions” OR “Non-pharmacological Therapy” OR “Non-pharmacological Therapies” OR “Non-pharmacological Treatment” OR “Non-pharmacological Treatments”)	(7,752)
7.	TITLE(Aromatherapy OR “Essential Oils” OR Aroma therapy) OR ABS(Aromatherapy OR “Essential Oils” OR Aroma therapy) OR TITLE-ABS-KEY(Aromatherapy OR “Essential Oils” OR Aroma therapy)	(3,885)
8.	TITLE(“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”) OR ABS (“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”) OR TITLE-ABS-KEY(“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”)	(52,587)
9.	TITLE(“Acupuncture, Ear”) OR ABS(“Acupuncture, Ear”) OR TITLE-ABS-KEY(“Acupuncture, Ear”)	(452)
10.	TITLE(“Mind Body Techniques” OR “Mind-body Therapies”) OR ABS(“Mind Body Techniques” OR “Mind-body Therapies”) OR TITLE-ABS-KEY(“Mind Body Techniques” OR “Mind-body Therapies”)	(1,625)

11. TITLE("Breathing Techniques"OR Breathing OR "Breathing Exercise") OR ABS("Breathing Techniques"OR Breathing OR "Breathing Exercise") OR TITLE-ABS-KEY("Breathing Techniques"OR Breathing OR "Breathing Exercise")	(279,806)
12. TITLE("Guided Imagery for Pain Management" OR "Guided Image Therapy" OR "Guided Imagery Therapies") OR ABS("Guided Imagery for Pain Management" OR "Guided Image Therapy" OR "Guided Imagery Therapies") OR TITLE-ABS-KEY("Guided Imagery for Pain Management" OR "Guided Image Therapy" OR "Guided Imagery Therapies")	4
13. TITLE("Guided Imagery" OR "Guided Relaxation" OR "Visualization Techniques") OR ABS("Guided Imagery" OR "Guided Relaxation" OR "Visualization Techniques") OR TITLE-ABS-KEY("Guided Imagery" OR "Guided Relaxation" OR "Visualization Techniques")	17,176
14. TITLE(Hypnosis OR Hypnotherapy) OR ABS(Hypnosis OR Hypnotherapy) OR TITLE-ABS-KEY(Hypnosis OR Hypnotherapy)	22,266
15. TITLE(Biofeedback OR "Biofeedback Therapy") OR ABS(Biofeedback OR "Biofeedback Therapy") OR TITLE-ABS-KEY(Biofeedback OR "Biofeedback Therapy")	17,108
16. TITLE("Music Therapy" OR "Music Intervention" OR "Musical Therapy" OR "Music-based Intervention" OR "Therapeutic Music") OR ABS("Music Therapy" OR "Music Intervention" OR "Musical Therapy" OR "Music-based Intervention" OR "Therapeutic Music") OR TITLE-ABS-KEY("Music Therapy" OR "Music Intervention" OR "Musical Therapy" OR "Music-based Intervention" OR "Therapeutic Music")	11,454
17. TITLE("Progressive Muscle Relaxation" OR "Muscle Relaxation") OR ABS("Progressive Muscle Relaxation" OR "Muscle Relaxation") OR TITLE-ABS-KEY("Progressive Muscle Relaxation" OR "Muscle Relaxation")	34,970
18. TITLE("Sleep Therapy" OR Sleep) OR ABS("Sleep Therapy" OR Sleep) OR TITLE-ABS-KEY("Sleep Therapy" OR Sleep)	340,832

	19. TITLE(“Massage Therapy” OR Massage OR “Massage Therapies”) OR ABS(“Massage Therapy” OR Massage OR “Massage Therapies”) OR TITLE-ABS-KEY(“Massage Therapy” OR Massage OR “Massage Therapies”)	28,624
	20. TITLE(“Physical Therapy” OR Physiotherapy) OR ABS(“Physical Therapy” OR Physiotherapy) OR TITLE-ABS-KEY(“Physical Therapy” OR Physiotherapy)	129,632
	21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	937,453
	22. TITLE(“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”) OR ABS(“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”) OR TITLE-ABS-KEY(“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”)	20,379
	23. TITLE(“Intensive Care Units, Pediatric”) OR ABS(“Intensive Care Units, Pediatric”) OR TITLE-ABS-KEY(“Intensive Care Units, Pediatric”)	8,226
	24. 22 OR 23	22,008
	25. 3 AND 21 AND 24	31

Dates of coverage and database	Query	Retrieved records
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09/21/22 WEB OF SCIENCE	1. TS= (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR TI= (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR AB= (pain management or pain relief or pain control or pain reduction or managing pain or analgesia)	(376,576)
	2. TS= (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain measurement) OR TI= (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain measurement) OR AB= (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain measurement)	(241,031)
	3. 1 OR 2	(475,359)
	4. TS= (integrative medicine or complementary medicine or alternative medicine) OR TI= (integrative medicine or complementary medicine or alternative medicine) OR AB= (Integrative medicine or complementary medicine or alternative medicine)	(51,961)
	5. TS= (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment) OR TI= (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment ) OR AB= (Integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment)	(288,290)
	6. TS= (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment) OR TI= (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment) OR AB= (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment)	(12,420)
	7. TS= (aromatherapy or essential oils or aroma therapy) OR TI= (aromatherapy or essential oils or aroma therapy) OR AB= (aromatherapy or essential oils or aroma therapy)	(86,864)



8. TS= (acupuncture or acupuncture therapy or acupuncture treatment) OR TI= (acupuncture or acupuncture therapy or acupuncture treatment) OR AB= (acupuncture or acupuncture therapy or acupuncture treatment)	(25,368)
9. TS= (acupuncture, ear) OR TI= (acupuncture, ear) OR AB= (acupuncture, ear)	(547)
10. TS= (mind body techniques or mind-body therapies) OR TI= (mind body techniques or mind-body therapies) OR AB= (mind body techniques or mind-body therapies)	(2,430)
11. TS= (breathing techniques or breathing or breathing exercise) OR TI= (breathing techniques or breathing or breathing exercise) OR AB= (breathing techniques or breathing or breathing exercise)	(99,065)
12. TS= (guided imagery for pain management or guided image therapy or guided images therapies) OR TI= (guided imagery for pain management or guided image therapy or guided images therapies) OR AB= (guided imagery for pain management or guided image therapy or guided images therapies)	(22,227)
13. TS= (guided imagery or guided relaxation or visualization techniques) OR TI= (guided imagery or guided relaxation or visualization techniques) OR AB= (guided imagery or guided relaxation or visualization techniques)	(68,289)
14. TS= (hypnosis or hypnotherapy) OR TI= (hypnosis or hypnotherapy) OR AB= (hypnosis or hypnotherapy)	(10,831)
15. TS= (biofeedback or biofeedback therapy) OR TI= (biofeedback or biofeedback therapy) OR AB= (biofeedback or biofeedback therapy)	(12,661)
16. TS= (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music) OR TI= (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music) OR AB= (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music)	(11,018)
17. TS= (progressive muscle relaxation or muscle relaxation) OR TI= (progressive muscle relaxation or muscle relaxation) OR AB= (progressive muscle relaxation or muscle relaxation)	(33,638)

18. TS= (sleep therapy or sleep) OR TI= (sleep therapy or sleep) OR AB= (sleep therapy or sleep)	(293,420)
19. TS= (massage therapy or massage or massage therapies) OR TI= (massage therapy or massage or massage therapies) OR AB= (massage therapy or massage or massage therapies)	(11,659)
20. TS= (physical therapy or physiotherapy) OR TI= (physical therapy or physiotherapy) OR AB= (physical therapy or physiotherapy)	(121,548)
21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	(1,058,477)
22. TS= (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR TI= (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR AB= (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care)	(21,834)
23. TS= (intensive care units, pediatric) OR TI= (intensive care units, pediatric) OR AB= (intensive care units, pediatric)	(14,677)
24. 22 OR 23	(21,834)
25. 3 AND 21 AND 24	(137)

Dates of coverage and database	Query	Retrieved records
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09/26/22 Catálogo de Teses e Dissertações (CA PES)	1. ("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia) OR ("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia) OR ("Pain Management OR Pain Relief OR Pain Control OR "Pain Reduction" OR "Managing Pain" OR Analgesia)	47.919
	2. ("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement") OR ("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement") OR ("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement")	17.688
	3. 1 OR 2	60.914
	4. ("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine") OR ("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine") OR ("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine")	5.309
	5. ("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment") OR ("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment") OR ("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment")	14.345
	6. ("Non-pharmacological Intervention" OR "Non-pharmacological Interventions" OR "Non-pharmacological Therapy" OR "Non-pharmacological Therapies" OR "Non-pharmacological Treatment") OR ("Non-pharmacological Intervention" OR "Non-pharmacological Interventions" OR "Non-pharmacological Therapy" OR "Non-pharmacological Therapies" OR "Non-pharmacological Treatment") OR ("Non-pharmacological Intervention" OR "Non-pharmacological Interventions" OR "Non-pharmacological Therapy" OR "Non-pharmacological Therapies" OR "Non-pharmacological Treatment")	20.398

7. (Aromatherapy OR “Essential Oils” OR Aroma therapy) OR (Aromatherapy OR “Essential Oils” OR Aroma therapy) OR (Aromatherapy OR “Essential Oils” OR Aroma therapy)	8.734
8. (“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”) OR (“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”)	11.097
9. (“Acupuncture, Ear”) OR (“Acupuncture, Ear”) OR (“Acupuncture, Ear”)	468
10. (“Mind Body Techniques” OR “Mind-body Therapies”) OR (“Mind Body Techniques” OR “Mind-body Therapies”) OR (“Mind Body Techniques” OR “Mind-body Therapies”)	8.897
11. (“Breathing Techniques” OR Breathing OR “Breathing Exercise”) OR (“Breathing Techniques” OR Breathing OR “Breathing Exercise”) OR (“Breathing Techniques” OR Breathing OR “Breathing Exercise”)	12.400
12. (“Guided Imagery for Pain Management” OR “Guided Image Therapy” OR “Guided Images Therapies”) OR (“Guided Imagery for Pain Management” OR “Guided Image Therapy” OR “Guided Images Therapies”) OR (“Guided Imagery for Pain Management” OR “Guided Image Therapy” OR “Guided Images Therapies”)	63.039
13. (“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”) OR (“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”) OR (“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”)	3.632
14. (Hypnosis OR Hypnotherapy) OR (Hypnosis OR Hypnotherapy) OR (Hypnosis OR Hypnotherapy)	19
15. (Biofeedback OR “Biofeedback Therapy”) OR (Biofeedback OR “Biofeedback Therapy”) OR (Biofeedback OR “Biofeedback Therapy”)	5.433

16. (“Music Therapy” OR “Music Intervention” OR “Musical Therapy” OR “Music-based Intervention” OR “Therapeutic Music”) OR (“Music Therapy” OR “Music Intervention” OR “Musical Therapy” OR “Music-based Intervention” OR “Therapeutic Music”) OR (“Music Therapy” OR “Music Intervention” OR “Musical Therapy” OR “Music-based Intervention” OR “Therapeutic Music”)	25.370
17. (“Progressive Muscle Relaxation” OR “Muscle Relaxation”) OR (“Progressive Muscle Relaxation” OR “Muscle Relaxation”) OR (“Progressive Muscle Relaxation” OR “Muscle Relaxation”)	2.847
18. (“Sleep Therapy” OR Sleep) OR (“Sleep Therapy” OR Sleep) OR (“Sleep Therapy” OR Sleep)	13.033
19. (“Massage Therapy” OR Massage OR “Massage Therapies”) OR (“Massage Therapy” OR Massage OR “Massage Therapies”) OR (“Massage Therapy” OR Massage OR “Massage Therapies”)	5.587
20. (“Physical Therapy” OR Physiotherapy) OR (“Physical Therapy” OR Physiotherapy) OR (“Physical Therapy” OR Physiotherapy)	13.679
21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	120.654
22. (“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”) OR (“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”) OR (“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”)	21.859
23. (“Intensive Care Units, Pediatric”) OR (“Intensive Care Units, Pediatric”) OR (“Intensive Care Units, Pediatric”)	16.055
24. 22 OR 23	22.946

Dates of coverage and database	Query	Retrieved records
11/05/22  DART-E	1. pain	547
	2. "'complementary therapies" OR "alternative medicine" OR "integrative medicine" OR "pharmacological	168
	3. "pediatric intensive care unit" or "paediatric intensive care unit"	51
	4. 1 AND 2 AND 3	38

Dates of coverage and database	Query	Retrieved records
11/05/22  Google Scholar	1. "complementary therapies" OR "integrative medicine" OR "complementary and alternative medicine" OR "complementary and alternative therapies"	17900
	2. nonpharmacologic	77700
	3. "pediatric intensive care" OR "paediatric intensive care"	17600

	4. 1 OR 2 AND 3 AND doc OR .txt OR .rtf OR .PDF OR .html	124
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Dates of coverage and database	Query	Retrieved records
11/05/22  OATD	1. pain	38650
	2. "complementary therapies" OR "alternative medicine" OR "integrative medicine" OR nonpharmacological	1819
	3. "pediatric intensive care unit" or "paediatric intensive care unit"	382
	4. 1 AND 2 AND 3	0

# BMJ Open

## Nonpharmacological therapies for pain management in paediatric intensive care units: protocol for a scoping review

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**Nonpharmacological therapies for pain management in paediatric intensive care  
units: protocol for a scoping review**

**ABSTRACT**

**Introduction:** The World Health Organization (WHO) issued new guidelines for pain management in children and adolescents in 2021, emphasizing the integrative approach to controlling this symptom. Pain is common in paediatric intensive care units (PICUs), and it is necessary to map evidence of nonpharmacological therapies in this setting.

**Methods and analysis:** A systematic literature search will be performed in the following databases: Academic Search Premier, The Cumulative Index of Nursing and Allied Health Literature (CINAHL), Cochrane Library, Excerpta Medica dataBASE (Embase, Latin American and Caribbean Health Sciences Literature (LILACS) (VHL), Medical Literature Analysis and Retrieval System Online (MEDLINE), Science Direct, Scopus, Web of Science Core Collection, Theses Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), Dart Europe (DART-E), Open Access Theses and Dissertations (OATD) and grey literature from Google Scholar. The research will consider quantitative and qualitative studies, mixed-methods studies, systematic reviews, text articles, opinion articles, grey literature, letters to editors and editorials in any language and database. The following will be eligible for inclusion: (i) newborns, infants, children and adolescents (ii) nonpharmacological therapies were used for pain (iii) in (iii) PICUs.

**Ethics and dissemination** The data used in this technique will be taken from the literature. This study does not require ethical approval. This protocol has been registered with Open Science Framework (DOI 10.17605/OSF.IO/DZHKT). The results of this research will be published in a relevant journal on pain or paediatric critical care and presented at international scientific events.

**Strengths and limitations of this study**

- Reviewing articles with qualitative and mixed studies designs besides quantitative may show aspects of this treatment that need to be addressed in other revisions.
- Studies in other languages besides English may contribute to mapping nonpharmacological and complementary therapies in other languages.
- The variability of characteristics in the pediatric population can make research difficult with this population.

## INTRODUCTION

International Association for the Study of Pain (IASP) has updated the concept of pain as "an unpleasant sensory and emotional experience associated with or resembling that associated with actual or potential tissue damage." This definition should be valid for acute and chronic pain and applied to all pain conditions, regardless of its pathophysiology (nociceptive, neuropathic and neoplastic). Another relevant aspect in updating the concept of pain was the addition of emotional issues, which is significant for diagnosing the signal.<sup>(1)</sup> This aspect was appropriate because the cumulative effect of pain and its physiological and emotional stress causes long-term damage in children.<sup>(2)</sup>

Despite recent scientific and technological developments, paediatric patients often do not experience pain relief. A study on pain epidemiology in hospitalised children revealed that of the 570 children involved in the study, 213 (37%) reported pain in the first 24 hours and that 43% would have preferred some intervention for control.<sup>(3)</sup>

Recently, other studies have presented data that collapsed to understand pain as a global public health problem.<sup>(4-9)</sup>

Pain is the most common reason to seek medical attention in all acute care settings in Canada.<sup>(10)</sup> In acute pain, a sensation of intense, distressing, or painful discomfort is associated with trauma or disease, with a well-defined location, time and characteristics.<sup>(11)</sup> In the long term, this generates consequences such as exacerbating fear and pain during future painful situations, weakening the effect of medications and increasing the risk of developing chronic pain.<sup>(12)</sup>

Chronic pain is defined as persistent or recurrent pain lasting 3 months.<sup>(10)</sup> It can coexist with or without trauma, or illness may persist after the initial injury has healed <sup>(13)</sup> and can be secondary to underlying chronic conditions such as sickle cell disease or inflammatory bowel disease or part of a primary pain disorder, as with irritable bowel syndrome or complex regional pain syndrome.<sup>(10)</sup> Their location, characteristics and periodicity are more imprecise than those of acute pain.<sup>(13)</sup>

Pain relief as a human right has been discussed by international institutions since 2004, as per the IASP.<sup>(14)</sup> However, topics considered challenging to treat, such as the treatment of pain in children, still have critical gaps in the knowledge base. This is especially true for chronic pain management in children.<sup>(15)</sup> This problem motivated the WHO to

publish 2020 the "Guidelines on the Management of Chronic Pain in Children" to help countries ensure access to appropriate pain relief therapies, considering the damage from improper use of medicines and other adverse effects.(16) One of the obstacles to advancing paediatric pain control in this age group is the heterogeneity of pain perception and response in children.(14,17)

Pain diagnosis is often performed using self-refined scales. Although they are the gold standard for identifying pain signs, neonates and young children do not have the level of development for appropriate verbal communication. Therefore, the scales use behavioural observation and physiological measures, with parents and professionals being more accurate than health professionals. There are other obstacles, such as the perception of pain in the child.(18)

Pain management in infants is complex because babies cannot express what they are feeling. In children over the age of one year and adolescents, pain management must be appropriate for the child's age, developmental stage, maturity, prior pain exposure and experience, and the type/intensity/frequency of pain the child is currently experiencing.(19) Furthermore, racial bias and social and cultural differences can affect how patients experience and exhibit pain. Other obstacles include professionals' access to validated tools to assess and treat pain, deficient practitioner training, a lack of pain experts, a lack of time to consider pain properly and interruptions in the supply of pain medications.(18)

Admission to PICU exposes the child to various experiences of pain. 45% -72% of them experience pain daily, either of their critical illness or procedures, therapies, or surgeries to approach the disease that motivated hospitalisation in the unit.(18) In the PICU context, pain can be caused by the underlying illness or injury, complications of the primary disease, frequent medical procedures that result in pain (e.g., incisions, wound care and injections) and supporting and monitoring systems (e.g., suctioning an endotracheal tube, manipulation or stripping of drains, removal of catheters or drains). Tissue hypoxia that develops because of low oxygen saturation, low cardiac output, or anaemia can result in pain. Many other causes of pain are present in the PICU, such as painful joints, pressure point pain and pain resulting from changing positions.(20, 21)

Pharmacological and nonpharmacological therapies can conduct pain management in critical children. As the use of pain medications is related to side effects and improper use of opioids, nonpharmacological interventions have reused the interest of health professionals and researchers. Although combining the two approaches is more effective, there is limited information on nonpharmacological treatment in PICU.(2)

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Nonpharmacological interventions can be categorised as behavioural, cognitive, restorative and complementary therapies.(22) Psychological interventions (positioning/repositioning, guided imagery, hypnosis, detailed inquiry, parent's presence and distraction), physical interventions (acupuncture, stroking and soothing, holding and rocking), and other (quiet environment, dim lights, limiting visitors, music) are some nonpharmacological treatments already described for pain relief in PICUs.(21) Positioning/repositioning was also the most used therapy in other studies.(2, 20, 23, 24)

In acute care settings, pain management using complementary therapies provides biological evidence. These demonstrations result in the incorporation of complementary therapies into nurses' critical care to support holistic patient care.(25) Nonpharmacological therapies for managing PICU pain have been the subject of study by the scientific community. However, there is a need to strengthen the evidence of their benefits and safety. This fact was even justified for the subject not to have been included in organizational documents such as Guidelines on the Management of Chronic Pain in Children.(16)

There is a problem associated with the nature of studies with nonpharmacological therapies in children in PICU, which begins with different experiences and pain perceptions. Thus, it is acceptable that the theme needs more scope, contemplating aspects of revisions that were not previously explored. In a scoping review, Ismail(26) mapped interventions for pain management in PICU, contributing evidence about design, condition and intervention category; pain management intervention (medication, psychological, physical and others) and pain assessment tools used across the studies. As a limitation, the authors cited that all the articles identified from the literature search were published in English and that the study focused only on quantitative designs.

The present scoping review protocol adds other study designs and other languages to contribute to knowledge. In addition, it foresees to address aspects related to the different ages of children in PICU who are receiving nonpharmacological treatment for pain.

Furthermore, paediatric intensive care professionals need access to the best and most up-to-date scientific evidence on nonpharmacological therapies for pain management in PICUs, as such practices are foreseen within their professional areas.(6,8-9) The development of a quality scope review can provide data that explores the phenomenon of nonpharmacological therapies in pain management and help interpret the various factors involved in paediatric critical care. Thus, this review aims to map research that used nonpharmacological therapies for pain management in paediatric intensive care units and to scope evidence from the literature to investigate the characteristics of these techniques.

METHODS AND ANALYSIS

Scoping reviews seek to synthesise evidence for researchers, clinicians and policymakers, gather and describe evidence and present an easily illustrative summary.(27) In this sense, as nonpharmacological therapies exhibit a multiplicity of techniques with varied health impacts and use according to different patient ages, the scoping review was deemed the most appropriate review to illustrate different nuances of this topic in the paediatric spectrum, which is also heterogeneous.

This scoping review will be conducted according to the chapter on scoping reviews in the JBI Manual for Evidence Synthesis(28) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Extension for Scoping Reviews (Appendix 1).(29) This protocol is registered in Open Science Framework (<https://doi.org/10.17605/OSF.IO/GKETX>). This review will be conducted in six phases: 1) identification of the research question; 2) identification of studies; 3) selection of studies; 4) mapping and comparison of the data; and 5) collecting, summarising and reporting the results(30) and 6) to consult with stakeholders about the results.(31)

Patient and Public Involvement

There was no patient or public involvement.

Identifying the research question

The research question for this scoping review is "What nonpharmacological therapies have been used for pain management in paediatric intensive care units?" To support the research question, four sub-questions were developed:

- 1. Which techniques are for different paediatric age groups?
- 2. When and how to use nonpharmacologic therapies in intensive care?
- 3. What is nonpharmacological therapies' impact on pain?
- 4. What assesses their effectiveness?

To construct the research question, we used the PCC strategy recommended by the JBI<sup>28</sup> and the table proposed by Ahmad *et al.* (Table 1).(32)

Table 1

Inclusion and exclusion criteria are based on the Population, Concept, Context (PCC) framework.(28,32)

Inclusion criteria	Exclusion criteria
Population Newborns	-

	Infants	
	Children	
	Adolescents	
<b>Concept</b>	Pain Management Analgesia Pain Measurement Complementary Therapies Alternative Therapies Integrative Therapies Integrative Medicine Aromatherapy Oils, Volatile Acupuncture Acupuncture Therapy Acupuncture, Ear Mind Body Therapies Breathing Exercises Imagery, Psychotherapy Hypnosis Biofeedback, Psychology Music Therapy Muscle Relaxation Sleep Physical Therapy Modalities	Pharmacologic Therapies
<b>Context</b>	Paediatric Intensive Care Units (PICU) Paediatric Intensive Ward Units	Home Assistance Services Outpatient Care Inpatient Units
<b>Types of evidence</b>	Quantitative studies Qualitative studies Mixed methods studies Systematic reviews Text articles Opinion articles Gray literature Letters to the editor Editorials	-

Regarding the concept, the review will consider studies exploring complementary pain management therapies. In the context of health treatments, "complementary" means combining an unconventional approach with traditional medicine; "alternative" if the unconventional approach is used instead of traditional medicine. It is "integrative" through the coordinated action of traditional medicine and an unconventional approach.(33)



However, identifying what therapies constitute complementary, alternative and integrative medicine is complex.(34) One Operational definition of "Complementary and Alternative Medicine" was proposed by Cochrane Researchers in 2011. There is also a discussion between integrative health and integrative medicine that influenced NIH's National Center for Complementary and Alternative Medicine in the U.S. and changed its National Center for Complementary and Integrative Health.(33,35)

This review will adopt the term "non-pharmacological therapies," understanding that although it is not described in the Medical Subject Headings (MeSH) terms, it incorporates "Complementary Therapies, Alternative Therapies, Integrative Therapies and Integrative Medicine."

Identifying relevant studies

The search strategy was developed in collaboration with a librarian at a leading university in Brazil. The strategy was to locate primary published studies, reviews and text articles. First, a limited initial search was performed on CINAHL and MEDLINE to identify relevant terms and keywords to develop the final search strategy. As transparency and replication of the review, a chart was created based on the protocol by Ahmad *et al.*(32), which details the strategy with Medical Subject Headings (MeSH) and Text Word (Table 2).

Table 2

MeSH (Medical Subject Headings) terms/Text words.(32, 36)

Population
newborns, infants, children and adolescents
Concept
1. "pain management"[MeSH Terms] OR "pain management"[Text Word] OR "pain relief"[Text Word] OR "pain control"[Text Word] OR "pain reduction"[Text Word] OR "managing pain"[Text Word] OR "analgesia"[MeSH Terms] OR "analgesia"[Text Word]
2. "pain measurement"[MeSH Terms] OR "pain assessment"[Text Word] OR "pain measurement"[MeSH Terms] OR "pain scale"[Text Word] OR "pain tool"[Text Word] OR "pain assessment tool"[Text Word] OR "pain instrument"[Text Word] OR "pain intervention"[Text Word] OR "pain measurement"[MeSH Terms] OR "pain measurement"[Text Word]
3. 1 OR 2

4. "integrative medicine"[MeSH Terms] OR "integrative medicine"[Text Word] OR "complementary therapies"[MeSH Terms] OR "complementary medicine"[Text Word] OR "complementary therapies"[MeSH Terms] OR "alternative medicine"[Text Word] OR "integrative therapy"[Text Word] OR "integrative therapies"[Text Word] OR "complementary therapy"[Text Word] OR "complementary therapies"[MeSH Terms] OR "complementary therapies"[Text Word] OR "alternative therapy"[Text Word] OR "complementary therapies"[MeSH Terms] OR "alternative therapies"[Text Word] OR "alternative treatment"[Text Word]
5. "nonpharmacological intervention"[Text Word] OR "nonpharmacological interventions"[Text Word] OR "nonpharmacological therapy"[Text Word] OR "nonpharmacological therapies"[Text Word] OR "nonpharmacological treatment"[Text Word]
6. "aromatherapy"[MeSH Terms] OR "aromatherapy"[Text Word] OR "oils, volatile"[MeSH Terms] OR "essential oils"[Text Word] OR "aromatherapy"[MeSH Terms] OR "aroma therapy"[Text Word]
7. "acupuncture"[MeSH Terms] OR "acupuncture therapy"[MeSH Terms] OR "acupuncture"[Text Word] OR "acupuncture therapy"[MeSH Terms] OR "acupuncture therapy"[Text Word] OR "acupuncture treatment"[Text Word] OR "acupuncture, ear"[MeSH Terms] OR "acupuncture ear"[Text Word]
8. "mind body techniques"[Text Word] OR "mind body therapies"[MeSH Terms] OR "mind body therapies"[Text Word]
9. "breathing techniques"[Text Word] OR "breathing exercises"[MeSH Terms] OR "breathing exercise"[Text Word]
10. "guided imagery intervention"[Text Word] OR "guided imagery interventions"[Text Word] OR "imagery, psychotherapy"[MeSH Terms] OR "guided imagery"[Text Word] OR "guided relaxation"[Text Word]
11. "hypnosis"[MeSH Terms] OR "hypnosis"[Text Word] OR "hypnotherapy"[Text Word]
12. "biofeedback, psychology"[MeSH Terms] OR "biofeedback"[Text Word] OR "biofeedback therapy"[Text Word]
13. "music therapy"[MeSH Terms] OR "music therapy"[Text Word] OR "music intervention"[Text Word] OR "musical therapy"[Text Word] OR "music based intervention"[Text Word] OR "therapeutic music"[Text Word]
14. "progressive muscle relaxation"[Text Word] OR "muscle relaxation"[MeSH Terms] OR "muscle relaxation"[Text Word]
15. "sleep therapy"[Text Word] OR "sleep"[MeSH Terms] OR "sleep"[Text Word]
16. "massage therapy"[Text Word] OR "massage"[Text Word] OR "massage therapies"[Text Word]



17. "physical therapy modalities"[MeSH Terms] OR "physical therapy"[Text Word] OR "physical therapy modalities"[MeSH Terms] OR "physiotherapy"[Text Word]
18. 4 OR 5 OR 6 OR 7 OR 8OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17
<b>Context</b>
19. "pediatric intensive care unit"[Text Word] OR "picu"[Text Word] OR "pediatric critical care unit"[Text Word] OR "paediatric critical care"[Text Word] OR "intensive care units, pediatric"[MeSH Terms]
20. 3 AND 18 AND 19

Text in the titles and abstracts of articles and the indexing terms used in the articles will be used to guide a complete search strategy for Academic Search Premier, CINAHL, Cochrane Library, Embase, LILACS, MEDLINE, Science Direct, Scopus and Web of Science Core Collection to be disclosed with the result of the scoping review.

The search strategy will consider the particularity of each information source, including all the identified keywords and indexing terms. The strategy will consider articles published in any language and with any database on the start or date of insertion. We use an independent professional translation for the authors' translation of articles in non-native languages.

In addition to the electronic databases, contact will be made with the study authors, when necessary, to clarify doubts. This protocol will consider sources of unpublished studies: CAPES, DART-E, OATD and grey literature in Google Scholar. Online supplemental Appendix 2 provides a list of possible search queries.

**Study selection**

The information search process will be carried out in two stages: 1) reading the title and abstract (first set of records) and 2) reading the full article (second set of records). Screening, which will result in the first set of records, will be performed by two pairs of reviewers who will divide the search as follows: 1) Pair A (IGMA and JKSD) will perform the search using the following sources: Academic Search Premier, CINAHL, LILACS, Embase, Science Direct, Dart Europe, Open Access Theses and Dissertations and Google Scholar. 2) Pair B (SCMA and JT) will search in the following sources: Cochrane Library, MEDLINE, Scopus, Web of Science and CAPES.

The first data record will be grouped and loaded in EndNote2.0 (Clarivate Analytics, PA, USA), and duplicates will be removed. A pilot test will be carried out on two sources of information, CINAHL and PubMed, for evaluation according to the inclusion

criteria for the review. Potentially relevant articles will be retrieved in full, comprising the second set of records and their citation details, imported into Rayyan (Rayyan Systems Inc., MA, Cambridge).

At this stage, if necessary, adjustments will be made to the search strategy to meet the review's inclusion criteria. After completing the pilot test, two reviewers will evaluate the full text of the other selected citations to check whether they meet the inclusion criteria. The reasons for excluding full-text articles that do not meet the inclusion criteria will be recorded and reported in the scoping review. A third independent reviewer will resolve disagreements at any stage of this process. The research results will be fully reported in the final scoping review and presented in a PRISMA(37-39) flow diagram (Figure 1).

### Extracting and charting the results

Data will be extracted using a data extraction tool developed by the authors based on a model proposed by the JBI (Table 3).(27)

**Table 3**

Outline of the extraction tool.(27)

Source of evidence (citation)	Year	Country	Participants		Nonpharmacological therapies techniques	Moment and mode of use	Impact on pain	Assesses their effectiveness
			Sex	Age				

This can then be refined further to address the research question for the scoping review as required. The feasibility of the extraction tool will be tested on a subset of the second set of records. This will be modified and revised for each article included in the data extraction process. Any modifications will be detailed in the full scoping review.

Two authors will be involved in data extraction (IGMA and AC). Data extraction will occur independently, with cross-checking of the extracted evidence. A third author (JT) will resolve disagreements between authors regarding dissimilarities in terms of data extraction.

### Collating, summarizing and reporting the results

The total studies included will be presented in a summarised table format, using the extraction tool as a guide. Then, the data will be grouped according to the Patterns, Advances, Gaps, Evidence for Practice and Research Recommendations strategy proposed by Bradbury-Jones and Aveyard.(31) Each component represents a domain. The starting

point is to produce the "Chart of Patterns." It displays the articles included in the review on one axis and the themes on the other to report the themes expressed in the articles. After the patterns are identified, advances and gaps can be identified and reported, resulting in the last domain of the framework, which is to recommend future research. In addition, the strategy also makes it possible to identify topics that do not require further research; that is, the scientific community has explored them well.

**Contributorship statement**

IGMA, JKSD, SCMA, JT contributed to the development of this manuscript. IGMA conceptualized the research question, designed the study and prepared the first draft of the manuscript. JS provided methodological expertise and manuscript edits. TELF, PLOA, AC and JS helped refine the research question. All authors have contributed to study design and revising the protocol. All authors have approved the final manuscript.

**Competing interests' statement**

None declared.

**Funding statement**

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

**Ethics**

Because scoping reviews use secondary data from other primary sources, approval of the protocol and review by the Research Ethics Committee will not be necessary.

**Data sharing statement**

This protocol has been registered with Open Science Framework (DOI 10.17605/OSF.IO/DZHKT). The results will be disseminated through publications in journals of high quality whose scope aligns with the theme.

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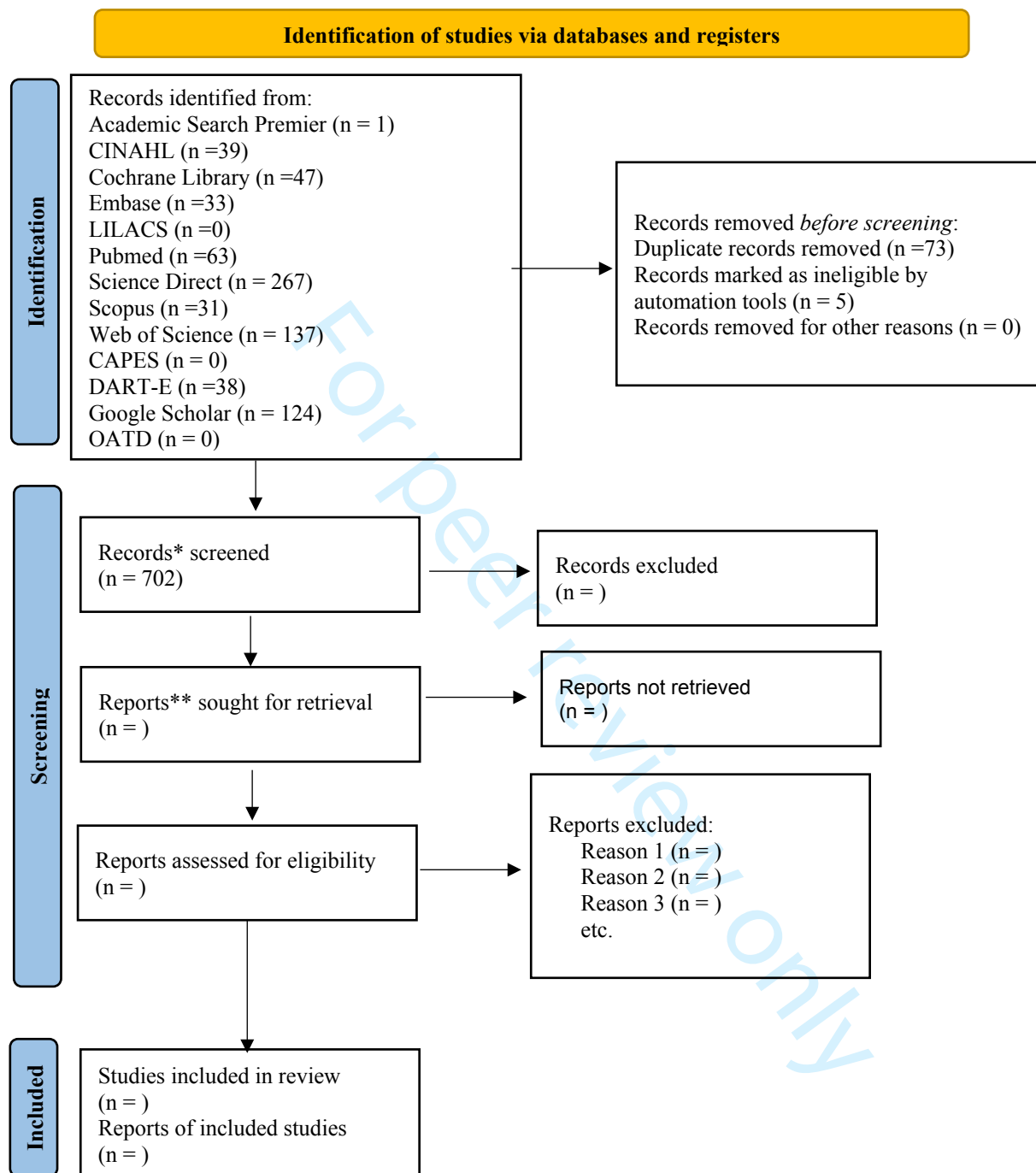
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Figure 1  
Legend

\* Works on authentic evidence, of something having legal importance. The concept includes certificates of birth, death, etc., as well as hospital, medical, and other institutional records.<sup>38</sup>  
\*\* Detailed account or statement or formal record of data resulting from empirical inquiry.<sup>39</sup>

Figure 1

PRISMA 2020 flow diagram for new systematic reviews which included searches of databases and registers only.<sup>37</sup> Research results until July 2023.





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Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist<sup>29</sup>

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	2, 3 and 4
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	4 and 5
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	5
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	5
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	6
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	6
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	6 and 7
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	7
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	7
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	Not available
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	7 and 8

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
<b>RESULTS</b>			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Not started
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Not started
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Not started
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Not started
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Not started
<b>DISCUSSION</b>			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	Not started
Limitations	20	Discuss the limitations of the scoping review process.	Not started
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	Not started
<b>FUNDING</b>			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	Not one

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

\* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

Appendix 2  
Draft Search Strategy

Dates of coverage and database	Query	Retrieved records
09/21/22  CINAHL	1. MH (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR TI (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR AB (pain management or pain relief or pain control or pain reduction or managing pain or analgesia)	84,304
	2. MH (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain measurement) OR TI (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain measurement) OR AB (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain measurement)	75,339
	3. 1 OR 2	133,679
	4. MH (integrative medicine or complementary medicine or alternative medicine) OR TI (integrative medicine or complementary medicine or alternative medicine) OR AB (integrative medicine or complementary medicine or alternative medicine)	16,007
	5. MH ( integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment) OR TI (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment) OR AB (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment)	60,250
	6. MH (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment) OR TI (non- pharmacological intervention or	3,068

	non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment) OR AB (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment)	
	7. MH (aromatherapy or essential oils or aroma therapy) OR TI (aromatherapy or essential oils or aroma therapy) OR AB (aromatherapy or essential oils or aroma therapy)	7,565
	8. MH (acupuncture or acupuncture therapy or acupuncture treatment) OR TI (acupuncture or acupuncture therapy or acupuncture treatment) OR AB (acupuncture or acupuncture therapy or acupuncture treatment)	20,538
	9. MH acupuncture, ear OR TI acupuncture, ear OR AB acupuncture, ear	590
	10. MH (mind body techniques or mind-body therapies) OR TI (mind body techniques or mind-body therapies) OR AB (mind body techniques or mind-body therapies)	3,952
	11. MH (breathing techniques or breathing or breathing exercise) OR TI (breathing techniques or breathing or breathing exercise) OR AB (breathing techniques or breathing or breathing exercise)	20,189
	12. MH (guided imagery for pain management or guided image therapy or guided images therapies) OR TI (guided imagery for pain management or guided image therapy or guided images therapies) OR AB (guided imagery for pain management or guided image therapy or guided images therapies)	646
	13. MH (guided imagery or guided relaxation or visualization techniques) OR TI (guided imagery or guided relaxation or visualization techniques) OR AB (guided imagery or guided relaxation or visualization techniques)	4,120
	14. MH (hypnosis or hypnotherapy) OR TI (hypnosis or hypnotherapy) OR AB (hypnosis or hypnotherapy)	4,011

15. MH (biofeedback or biofeedback therapy) OR TI (biofeedback or biofeedback therapy) OR AB (biofeedback or biofeedback therapy)	4,994
16. MH (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music) OR TI (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music ) OR AB (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music )	7,558
17. MH (progressive muscle relaxation or muscle relaxation) OR TI (progressive muscle relaxation or muscle relaxation) OR AB (progressive muscle relaxation or muscle relaxation)	2,299
18. MH (sleep therapy or sleep) OR TI (sleep therapy or sleep) OR AB (sleep therapy or sleep)	77,183
19. MH (massage therapy or massage or massage therapies) OR TI (massage therapy or massage or massage therapies) OR AB (massage therapy or massage or massage therapies)	21,418
20. MH (physical therapy or physiotherapy) OR TI (physical therapy or physiotherapy) OR AB (physical therapy or physiotherapy)	61,296
21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	277,529
22. MH (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR TI (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR AB (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care)	9,239
23. MH intensive care units, pediatric OR TI intensive care units, pediatric OR AB intensive care units, pediatric	8,949

	24. 22 OR 23	11,491
	25. 3 AND 21 AND 24	38

Dates of coverage and database	Query	Retrieved records
09/21/22  MEDLINE  (PubMed)	1. "pain management"[MeSH Terms] OR "pain management"[Text Word] OR "pain relief"[Text Word] OR "pain control"[Text Word] OR "pain reduction"[Text Word] OR "managing pain"[Text Word] OR "analgesia"[MeSH Terms] OR "analgesia"[Text Word]	177,128
	2. "pain measurement"[MeSH Terms] OR "pain assessment"[Text Word] OR "pain measurement"[MeSH Terms] OR "pain scale"[Text Word] OR "pain tool"[Text Word] OR "pain assessment tool"[Text Word] OR "pain instrument"[Text Word] OR "pain intervention"[Text Word] OR "pain measurement"[MeSH Terms] OR "pain measurement"[Text Word]	101,025
	3. 1 OR 2	246,193
	4. "integrative medicine"[MeSH Terms] OR "integrative medicine"[Text Word] OR "complementary therapies"[MeSH Terms] OR "complementary medicine"[Text Word] OR "complementary therapies"[MeSH Terms] OR "alternative medicine"[Text Word] OR "integrative therapy"[Text Word] OR "integrative therapies"[Text Word] OR "complementary therapy"[Text Word] OR "complementary therapies"[MeSH Terms] OR "complementary therapies"[Text Word] OR "alternative therapy"[Text Word] OR "complementary therapies"[MeSH Terms] OR "alternative therapies"[Text Word] OR "alternative treatment"[Text Word]	274,042
	5. "nonpharmacological intervention"[Text Word] OR "nonpharmacological interventions"[Text Word] OR "nonpharmacological therapy"[Text Word] OR "nonpharmacological therapies"[Text Word] OR "nonpharmacological treatment"[Text Word]	5,292

6.	"aromatherapy"[MeSH Terms] OR "aromatherapy"[Text Word] OR "oils, volatile"[MeSH Terms] OR "essential oils"[Text Word] OR "aromatherapy"[MeSH Terms] OR "aroma therapy"[Text Word]	23,007
7.	"acupuncture"[MeSH Terms] OR "acupuncture therapy"[MeSH Terms] OR "acupuncture"[Text Word] OR "acupuncture therapy"[MeSH Terms] OR "acupuncture therapy"[Text Word] OR "acupuncture treatment"[Text Word] OR "acupuncture, ear"[MeSH Terms] OR "acupuncture ear"[Text Word]	35,397
8.	"mind body techniques"[Text Word] OR "mind body therapies"[MeSH Terms] OR "mind body therapies"[Text Word]	<u>46,477</u>
9.	"breathing techniques"[Text Word] OR "breathing exercises"[MeSH Terms] OR "breathing exercises"[Text Word]	<u>4,632</u>
10.	"guided imagery intervention"[Text Word] OR "guided imagery interventions"[Text Word] OR "imagery, psychotherapy"[MeSH Terms] OR "guided imagery"[Text Word] OR "guided relaxation"[Text Word]	2,746
11.	"hypnosis"[MeSH Terms] OR "hypnosis"[Text Word] OR "hypnotherapy"[Text Word]	15,942
12.	"biofeedback, psychology"[MeSH Terms] OR "biofeedback"[Text Word] OR "biofeedback therapy"[Text Word]	<u>16,054</u>
13.	"music therapy"[MeSH Terms] OR "music therapy"[Text Word] OR "music intervention"[Text Word] OR "musical therapy"[Text Word] OR "music based intervention"[Text Word] OR "therapeutic music"[Text Word]	5,367
14.	"progressive muscle relaxation"[Text Word] OR "muscle relaxation"[MeSH Terms] OR "muscle relaxation"[Text Word]	<u>35,626</u>
15.	"sleep therapy"[Text Word] OR "sleep"[MeSH Terms] OR "sleep"[Text Word]	<u>232,994</u>

	16. "massage therapy"[Text Word] OR "massage"[Text Word] OR "massage therapies"[Text Word]	16,186
	17. "physical therapy modalities"[MeSH Terms] OR "physical therapy"[Text Word] OR "physical therapy modalities"[MeSH Terms] OR "physiotherapy"[Text Word]	200,591
	18. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17	746,903
	19. "pediatric intensive care unit"[Text Word] OR "picu"[Text Word] OR "pediatric critical care unit"[Text Word] OR "paediatric critical care"[Text Word] OR "intensive care units, pediatric"[MeSH Terms]	31,624
	20. 3 AND 18 AND 19	63

Dates of coverage and database	Query	Retrieved records
09/14/22 ACADEMIC SEARCH PREMIER	1. (pain management) OR (DE "PAIN management" OR DE "DRY needling" OR DE "PAIN measurement" OR DE "BRIEF Pain Inventory" OR DE "MCGILL Pain Questionnaire")	81,825
	2. DE "ALTERNATIVE medicine" OR DE "ACUPUNCTURE" OR DE "ALTERNATIVE treatment" OR DE "BOTANIC medicine" OR DE "CHIROPRACTIC" OR DE "CHRONOTHERMAL medicine" OR DE	38,185



	"DRY needling" OR DE "ENERGY medicine" OR DE "HOLISTIC medicine" OR DE "HOMEOPATHY" OR DE "MENTAL healing" OR DE "NATUROPATHY"	
	3. DE "PEDIATRIC intensive care" OR ""PEDIATRIC intensive care units" OR PICU	10,655
	4. 1 AND 2 AND 3	1

Dates of coverage and database	Query	Retrieved records
10/03/22  COCHRANE	1. ("pain"):ti,ab,kw OR ("pain assessment"):ti,ab,kw	215514
	2. ("integrative medicine"):ti,ab,kw OR ("complementary medicine"):ti,ab,kw OR ("alternative medicine"):ti,ab,kw	4013
	3. ("non-pharmacological"):ti,ab,kw AND ("therapies"):ti,ab,kw OR ("treatment"):ti,ab,kw OR ("intervention"):ti,ab,kw	1147812
	4. ("aromatherapies"):ti,ab,kw OR ("essential oil"):ti,ab,kw	2174
	5. ("acupuncture"):ti,ab,kw OR ("acupuncture analgesia"):ti,ab,kw	17333
	6. ("mind body"):ti,ab,kw OR ("mind body medicine"):ti,ab,kw OR ("mind body therapies"):ti,ab,kw	1248
	7. ("breathing"):ti,ab,kw	34728
	8. ("guided imagery"):ti,ab,kw	806

9.	("hypnotherapy"):ti,ab,kw	380
10.	("biofeedback"):ti,ab,kw OR ("biofeedback training"):ti,ab,kw	3897
11.	("music therapy"):ti,ab,kw	2613
12.	("progressive muscle relaxation"):ti,ab,kw OR ("progressive muscle relaxation training"):ti,ab,kw	820
13.	("sleep"):ti,ab,kw	46268
14.	("massage therapy"):ti,ab,kw	875
15.	("physical therapy"):ti,ab,kw OR ("physical therapy	11504
16.	("pediatric intensive care unit"):ti,ab,kw OR ("paediatric intensive care"):ti,ab,kw OR ("paediatric intensive care unit"):ti,ab,kw OR ("paediatric intensive care units"):ti,ab,kw	1095
17.	1 AND 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 AND 16	0
18.	1 AND 3 AND 16	46
19.	1 AND 7 AND 16	10
20.	1 AND 11 AND 16	2
21.	1 AND 13 AND 16	5
22.	1 AND 15 AND 16	1

	23. 1 AND 3 AND 16 OR 1 AND 7 AND 16 OR 1 AND 11 AND 16 OR 1 AND 13 AND 16 OR 1 AND 15 AND 16	47
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Dates of coverage and database	Query	Retrieved records
10/23/22 EMBASE	1. pain'/exp OR 'pain' OR 'analgesia'/exp OR 'analgesia'	2062548
	2. 'integrative medicine'/exp OR 'integrative medicine' OR 'alternative medicine'/exp OR 'alternative medicine' OR 'aromatherapy'/exp OR 'aromatherapy' OR 'essential oil'/exp OR 'essential oil' OR 'acupuncture'/exp OR 'acupuncture' OR 'auricular acupuncture'/exp OR 'auricular acupuncture' OR 'breathing exercise'/exp OR 'breathing exercise' OR 'guided imagery'/exp OR 'guided imagery' OR 'hypnosis'/exp OR 'hypnosis' OR 'biofeedback'/exp OR 'biofeedback' OR 'music therapy'/exp OR 'music therapy' OR 'muscle relaxation'/exp OR 'muscle relaxation' OR 'sleep quality'/exp OR 'sleep quality' OR 'massage'/exp OR 'massage' OR 'physiotherapy'/exp OR 'physiotherapy' OR	255690
	3. 'pediatric intensive care unit'/exp OR 'pediatric intensive care unit'	22687
	4. 1 AND 2 AND 3	33

Dates of coverage and database	Query	Retrieved records
10/23/22 LILACS	1. "DOR" or "avaliacao da DOR" or "escala analogica da DOR" or "escala analogica visual de DOR" or "intensidade da DOR" or "limiar da DOR" or "manejo da DOR" or "medicao da DOR" or "percepcao da DOR" or "unidades de alivio da DOR" or "DOR aguda" or "DOR cronica" [Descritor de assunto]	5862

	2. "TERAPIAS COMPLEMENTARES" or "TERAPIAS COMPLEMENTARES e integrativas" [Descritor de assunto]	1429
	3. "unidade de terapia intensiva pediátrica" [Descritor de assunto]	767
	4. 1 and 2 and 3	0
Dates of coverage and database	Query	Retrieved records
SCIENCE DIRECT	1. Title, abstract, keyword: pain	232,587
	2. Title, abstract, keyword: complementary and alternative medicine	3342
	3. Title, abstract, keyword: integrative medicine	6951
	4. pediatric intensive care unit	3787
	1 AND 2 OR 3 AND 4	267

Dates of coverage and database	Query	Retrieved records
09/23/22  SCOPUS	1. TITLE("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia) OR ABS("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia) OR TITLE-ABS-KEY(Pain Management OR Pain Relief OR Pain Control OR Pain Reduction OR "Managing Pain" OR Analgesia)	(344,701)
	2. TITLE("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement") OR ABS("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement") OR TITLE-ABS-KEY("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement")	(145,947)
	3. 1 OR 2	(423,690)
	4. TITLE("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine") OR ABS("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine") OR TITLE-ABS-KEY("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine")	(58,538)
	5. TITLE("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment") OR ABS("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment") OR TITLE-ABS-KEY("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment")	(59,454)

6. TITLE("Non-pharmacological Intervention" OR "Non-pharmacological Interventions" OR "Non-pharmacological Therapy" OR "Non-pharmacological Therapies" OR "Non-pharmacological Treatment") OR ABS("Non-pharmacological Intervention" OR "Non-pharmacological Interventions" OR "Non-pharmacological Therapy" OR "Non-pharmacological Therapies" OR "Non-pharmacological Treatment") OR TITLE-ABS-KEY("Non-pharmacological Intervention" OR "Non-pharmacological Interventions" OR "Non-pharmacological Therapy" OR "Non-pharmacological Therapies" OR "Non-pharmacological Treatment")	(7,752)
7. TITLE(Aromatherapy OR "Essential Oils" OR Aroma therapy) OR ABS(Aromatherapy OR "Essential Oils" OR Aroma therapy) OR TITLE-ABS-KEY(Aromatherapy OR "Essential Oils" OR Aroma therapy)	(3,885)
8. TITLE("Acupuncture" OR "Acupuncture Therapy" OR "Acupuncture Treatment") OR ABS("Acupuncture" OR "Acupuncture Therapy" OR "Acupuncture Treatment") OR TITLE-ABS-KEY("Acupuncture" OR "Acupuncture Therapy" OR "Acupuncture Treatment")	(52,587)
9. TITLE("Acupuncture, Ear") OR ABS("Acupuncture, Ear") OR TITLE-ABS-KEY("Acupuncture, Ear")	(452)
10. TITLE("Mind Body Techniques" OR "Mind-body Therapies") OR ABS("Mind Body Techniques" OR "Mind-body Therapies") OR TITLE-ABS-KEY("Mind Body Techniques" OR "Mind-body Therapies")	(1,625)
11. TITLE("Breathing Techniques" OR Breathing OR "Breathing Exercise") OR ABS("Breathing Techniques" OR Breathing OR "Breathing Exercise") OR TITLE-ABS-KEY("Breathing Techniques" OR Breathing OR "Breathing Exercise")	(279,806)
12. TITLE("Guided Imagery for Pain Management" OR "Guided Image Therapy" OR "Guided Images Therapies") OR ABS("Guided Imagery for Pain Management" OR "Guided Image Therapy" OR "Guided Images Therapies") OR TITLE-ABS-KEY("Guided Imagery for Pain Management" OR "Guided Image Therapy" OR "Guided Images Therapies")	4
13. TITLE("Guided Imagery" OR "Guided Relaxation" OR "Visualization Techniques") OR ABS("Guided Imagery" OR "Guided Relaxation" OR "Visualization Techniques") OR TITLE-ABS-KEY("Guided Imagery" OR "Guided Relaxation" OR "Visualization Techniques")	17,176

14. TITLE(Hypnosis OR Hypnotherapy) OR ABS(Hypnosis OR Hypnotherapy) OR TITLE-ABS-KEY(Hypnosis OR Hypnotherapy)	22,266
15. TITLE(Biofeedback OR “Biofeedback Therapy”) OR ABS(Biofeedback OR “Biofeedback Therapy”) OR TITLE-ABS-KEY(Biofeedback OR “Biofeedback Therapy”)	17,108
16. TITLE(“Music Therapy” OR “Music Intervention” OR “Musical Therapy” OR “Music-based Intervention” OR “Therapeutic Music”) OR ABS(“Music Therapy” OR “Music Intervention” OR “Musical Therapy” OR “Music-based Intervention” OR “Therapeutic Music”) OR TITLE-ABS-KEY(“Music Therapy” OR “Music Intervention” OR “Musical Therapy” OR “Music-based Intervention” OR “Therapeutic Music”)	11,454
17. TITLE(“Progressive Muscle Relaxation” OR “Muscle Relaxation”) OR ABS(“Progressive Muscle Relaxation” OR “Muscle Relaxation”) OR TITLE-ABS-KEY(“Progressive Muscle Relaxation” OR “Muscle Relaxation”)	34,970
18. TITLE(“Sleep Therapy” OR Sleep) OR ABS(“Sleep Therapy” OR Sleep) OR TITLE-ABS-KEY(“Sleep Therapy” OR Sleep)	340,832
19. TITLE(“Massage Therapy” OR Massage OR “Massage Therapies”) OR ABS(“Massage Therapy” OR Massage OR “Massage Therapies”) OR TITLE-ABS-KEY(“Massage Therapy” OR Massage OR “Massage Therapies”)	28,624
20. TITLE(“Physical Therapy” OR Physiotherapy) OR ABS(“Physical Therapy” OR Physiotherapy) OR TITLE-ABS-KEY(“Physical Therapy” OR Physiotherapy)	129,632
21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	937,453
22. TITLE(“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”) OR ABS(“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”) OR TITLE-ABS-KEY(“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”)	20,379

	23. TITLE("Intensive Care Units, Pediatric") OR ABS("Intensive Care Units, Pediatric") OR TITLE-ABS-KEY("Intensive Care Units, Pediatric")	8,226
	24. 22 OR 23	22,008
	25. 3 AND 21 AND 24	31

Dates of coverage and database	Query	Retrieved records
09/21/22  WEB OF SCIENCE	1. TS= (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR TI= (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR AB= (pain management or pain relief or pain control or pain reduction or managing pain or analgesia)	(376,576)
	2. TS= (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain intervention or pain measurement) OR TI= (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain intervention or pain measurement) OR AB= (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain intervention or pain measurement)	(241,031)
	3. 1 OR 2	(475,359)
	4. TS= (integrative medicine or complementary medicine or alternative medicine) OR TI= (integrative medicine or complementary medicine or alternative medicine) OR AB= (Integrative medicine or complementary medicine or alternative medicine)	(51,961)



5. TS= (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment) OR TI= (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment ) OR AB= (Integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment)	(288,290)
6. TS= (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment) OR TI= (non- pharmacological intervention or non-pharmacological therapies or non-pharmacological treatment) OR AB= (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment)	(12,420)
7. TS= (aromatherapy or essential oils or aroma therapy) OR TI= (aromatherapy or essential oils or aroma therapy) OR AB= (aromatherapy or essential oils or aroma therapy)	(86,864)
8. TS= (acupuncture or acupuncture therapy or acupuncture treatment) OR TI= (acupuncture or acupuncture therapy or acupuncture treatment) OR AB= (acupuncture or acupuncture therapy or acupuncture treatment)	(25,368)
9. TS= (acupuncture, ear) OR TI= (acupuncture, ear) OR AB= (acupuncture, ear)	(547)
10. TS= (mind body techniques or mind-body therapies) OR TI= (mind body techniques or mind-body therapies) OR AB= (mind body techniques or mind-body therapies)	(2,430)
11. TS= (breathing techniques or breathing or breathing exercise) OR TI= (breathing techniques or breathing or breathing exercise) OR AB= (breathing techniques or breathing or breathing exercise)	(99,065)
12. TS= (guided imagery for pain management or guided image therapy or guided images therapies) OR TI= (guided imagery for pain management or guided image therapy or guided images therapies) OR AB= (guided imagery for pain management or guided image therapy or guided images therapies)	(22,227)

13. TS= (guided imagery or guided relaxation or visualization techniques) OR TI= (guided imagery or guided relaxation or visualization techniques) OR AB= (guided imagery or guided relaxation or visualization techniques)	(68,289)
14. TS= (hypnosis or hypnotherapy) OR TI= (hypnosis or hypnotherapy) OR AB= (hypnosis or hypnotherapy)	(10,831)
15. TS= (biofeedback or biofeedback therapy) OR TI= (biofeedback or biofeedback therapy) OR AB= (biofeedback or biofeedback therapy)	(12,661)
16. TS= (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music) OR TI= (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music) OR AB= (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music)	(11,018)
17. TS= (progressive muscle relaxation or muscle relaxation) OR TI= (progressive muscle relaxation or muscle relaxation) OR AB= (progressive muscle relaxation or muscle relaxation)	(33,638)
18. TS= (sleep therapy or sleep) OR TI= (sleep therapy or sleep) OR AB= (sleep therapy or sleep)	(293,420)
19. TS= (massage therapy or massage or massage therapies) OR TI= (massage therapy or massage or massage therapies) OR AB= (massage therapy or massage or massage therapies)	(11,659)
20. TS= (physical therapy or physiotherapy) OR TI= (physical therapy or physiotherapy) OR AB= (physical therapy or physiotherapy)	(121,548)
21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	(1,058,477)
22. TS= (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR TI= (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR AB= (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care)	(21,834)

	23. TS= (intensive care units, pediatric) OR TI= (intensive care units, pediatric) OR AB= (intensive care units, pediatric)	(14,677)
	24. 22 OR 23	(21,834)
	25. 3 AND 21 AND 24	(137)

Dates of coverage and database	Query	Retrieved records
09/26/22  Catálogo de Teses e Dissertações (CAPES)	1. (“Pain Management” OR “Pain Relief” OR “Pain Control” OR “Pain Reduction” OR “Managing Pain” OR Analgesia) OR (“Pain Management” OR “Pain Relief” OR “Pain Control” OR “Pain Reduction” OR “Managing Pain” OR Analgesia) OR (“Pain Management” OR “Pain Relief” OR “Pain Control” OR “Pain Reduction” OR “Managing Pain” OR Analgesia)	47.919
	2. (“Pain Assessment” OR “Pain Scale” OR “Pain Tool” OR “Pain Assessment Tool” OR “Pain Instrument” OR “Pain Intervention” OR “Pain Measurement”) OR (“Pain Assessment” OR “Pain Scale” OR “Pain Tool” OR “Pain Assessment Tool” OR “Pain Instrument” OR “Pain Intervention” OR “Pain Measurement”) OR (“Pain Assessment” OR “Pain Scale” OR “Pain Tool” OR “Pain Assessment Tool” OR “Pain Instrument” OR “Pain Intervention” OR “Pain Measurement”)	17.688
	3. 1 OR 2	60.914
	4. (“Integrative Medicine” OR “Complementary Medicine” OR “Alternative Medicine”) OR (“Integrative Medicine” OR “Complementary Medicine” OR “Alternative Medicine”) OR (“Integrative Medicine” OR “Complementary Medicine” OR “Alternative Medicine”)	5.309

5. ("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment") OR ("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment") OR ("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment")	14.345
6. ("Non-pharmacological Intervention" OR "Non-pharmacological Interventions" OR "Non-pharmacological Therapy" OR "Non-pharmacological Therapies" OR "Non-pharmacological Treatment") OR ("Non-pharmacological Intervention" OR "Non-pharmacological Interventions" OR "Non-pharmacological Therapy" OR "Non-pharmacological Therapies" OR "Non-pharmacological Treatment") OR ("Non-pharmacological Intervention" OR "Non-pharmacological Interventions" OR "Non-pharmacological Therapy" OR "Non-pharmacological Therapies" OR "Non-pharmacological Treatment")	20.398
7. (Aromatherapy OR "Essential Oils" OR Aroma therapy) OR (Aromatherapy OR "Essential Oils" OR Aroma therapy) OR (Aromatherapy OR "Essential Oils" OR Aroma therapy)	8.734
8. ("Acupuncture" OR "Acupuncture Therapy" OR "Acupuncture Treatment") OR ("Acupuncture" OR "Acupuncture Therapy" OR "Acupuncture Treatment") OR ("Acupuncture" OR "Acupuncture Therapy" OR "Acupuncture Treatment")	11.097
9. ("Acupuncture, Ear") OR ("Acupuncture, Ear") OR ("Acupuncture, Ear")	468
10. ("Mind Body Techniques" OR "Mind-body Therapies") OR ("Mind Body Techniques" OR "Mind-body Therapies") OR ("Mind Body Techniques" OR "Mind-body Therapies")	8.897
11. ("Breathing Techniques" OR Breathing OR "Breathing Exercise") OR ("Breathing Techniques" OR Breathing OR "Breathing Exercise") OR ("Breathing Techniques" OR Breathing OR "Breathing Exercise")	12.400
12. ("Guided Imagery for Pain Management" OR "Guided Image Therapy" OR "Guided Images Therapies") OR ("Guided Imagery for Pain Management" OR "Guided Image Therapy" OR "Guided Images Therapies") OR ("Guided Imagery for Pain Management" OR "Guided Image Therapy" OR "Guided Images Therapies")	63.039

13. (“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”) OR (“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”) OR (“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”)	3.632
14. (Hypnosis OR Hypnotherapy) OR (Hypnosis OR Hypnotherapy) OR (Hypnosis OR Hypnotherapy)	19
15. (Biofeedback OR “Biofeedback Therapy”) OR (Biofeedback OR “Biofeedback Therapy”) OR (Biofeedback OR “Biofeedback Therapy”)	5.433
16. (“Music Therapy” OR “Music Intervention” OR “Musical Therapy” OR “Music-based Intervention” OR “Therapeutic Music”) OR (“Music Therapy” OR “Music Intervention” OR “Musical Therapy” OR “Music-based Intervention” OR “Therapeutic Music”) OR (“Music Therapy” OR “Music Intervention” OR “Musical Therapy” OR “Music-based Intervention” OR “Therapeutic Music”)	25.370
17. (“Progressive Muscle Relaxation” OR “Muscle Relaxation”) OR (“Progressive Muscle Relaxation” OR “Muscle Relaxation”) OR (“Progressive Muscle Relaxation” OR “Muscle Relaxation”)	2.847
18. (“Sleep Therapy” OR Sleep) OR (“Sleep Therapy” OR Sleep) OR (“Sleep Therapy” OR Sleep)	13.033
19. (“Massage Therapy” OR Massage OR “Massage Therapies”) OR (“Massage Therapy” OR Massage OR “Massage Therapies”) OR (“Massage Therapy” OR Massage OR “Massage Therapies”)	5.587
20. (“Physical Therapy” OR Physiotherapy) OR (“Physical Therapy” OR Physiotherapy) OR (“Physical Therapy” OR Physiotherapy)	13.679
21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	120.654

	22. (“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”) OR (“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”) OR (“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”)	21.859
	23. (“Intensive Care Units, Pediatric”) OR (“Intensive Care Units, Pediatric”) OR (“Intensive Care Units, Pediatric”)	16.055
	24. 22 OR 23	22.946

Dates of coverage and database	Query	Retrieved records
11/05/22  DART-E	1. pain	547
	2. ""complementary therapies" OR "alternative medicine" OR "integrative medicine" OR "nonpharmacological	168
	3. "pediatric intensive care unit" or "paediatric intensive care unit"	51
	4. 1 AND 2 AND 3	38

Dates of coverage and database	Query	Retrieved records
11/05/22  Google Scholar	1. "complementary therapies" OR "integrative medicine" OR "complementary and alternative medicine" OR "complementary and alternative therapies"	17900
	2. nonpharmacologic	77700
	3. "pediatric intensive care" OR "paediatric intensive care"	17600
	4. 1 OR 2 AND 3 AND doc OR .txt OR .rtf OR .PDF OR .html	124

Dates of coverage and database	Query	Retrieved records
11/05/22  OATD	1. pain	38650
	2. "complementary therapies" OR "alternative medicine" OR "integrative medicine" OR nonpharmacological	1819
	3. "pediatric intensive care unit" or "paediatric intensive care unit"	382

	4. 1 AND 2 AND 3	0
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# BMJ Open

## Non-pharmacological therapies for pain management in paediatric intensive care units: a protocol for a scoping review

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**Non-pharmacological therapies for pain management in paediatric intensive care units: a protocol for a scoping review**

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**Word count:** 2908

## ABSTRACT

**Introduction:** Pain management in critically ill children is complex for specific cognitive development and hospitalisation in paediatric intensive therapy units. Although there are many protocols and guidelines for pain control with pharmacological interventions, non-pharmacological practices should be explored and disseminated for their beneficial potential.

**Methods and analysis:** A systematic literature search will be performed in the following databases: Academic Search Premier, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane Library, Excerpta Medica Database (Embase, Latin American and Caribbean Health Sciences Literature (LILACS) (VHL)), Medical Literature Analysis and Retrieval System Online (MEDLINE), Science Direct, Scopus, Web of Science Core Collection, Theses from *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* (CAPES), Dart Europe (DART-E), Open Access Theses and Dissertations (OATD), and grey literature from Google Scholar. The research will consider quantitative and qualitative studies, mixed-methods studies, systematic reviews, text articles, opinion articles, letters to editors, and editorials in any language and database. The following will be eligible for inclusion: (i) newborns, infants, children, and adolescents; (ii) non-pharmacological therapies used for pain in **paediatric intensive care (PICU)**.

**Ethics and dissemination:** This study does not require ethical approval. The results of this research will be disseminated through social media channels and podcasts about pain in children.

**Trail registration number:** This protocol has been registered with the Open Science Framework (DOI 10.17605/OSF.IO/DZHKT).

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**STRENGTHS AND LIMITATIONS OF THIS STUDY**

- Promote updates on what is known about non-pharmacological therapies.
- Present gaps in knowledge that still need to be filled.
- Enable the selection of studies in other languages.
- Division of results by paediatric age groups can make the findings difficult in this population.

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## INTRODUCTION

Admission to the PICU exposes the child to various experiences of pain, and approximately between 45–72% of them experience pain daily, either due to their critical illness, procedures, therapies, or surgeries to approach the disease that motivated hospitalisation in the unit [1]. As a result, critically ill children have more experience with intense pain. They are subjected to more painful procedures than children in other hospitalisation units, such as medical and surgical units [2]. In the PICU, pain can be caused by the underlying illness or injury, complications of the primary disease, frequent medical procedures that result in pain (e.g., incisions, wound care, and injections), and supporting and monitoring systems (e.g., suctioning an endotracheal tube, manipulation or stripping of drains, removal of catheters or drains) [2, 3]. Tissue hypoxia that develops due to low oxygen saturation, cardiac output, or anaemia can also cause pain. In the PICU, other types of pain include pain in the joints and pressure points and pain resulting from changing positions.

Despite recent scientific and technological developments, paediatric patients usually have no relief from pain [2-9]. It is essential to describe that no relief from pain is considered an adverse event, the most common type in the United States [2]. According to International Association for the Study of Pain (IASP), pain relief has been discussed as a human right by international institutions since 2004 [10]. However, it remains challenging to discuss topics such as treating pain in children. One of the obstacles to the management of pain control in this age group is the heterogeneity of pain perception and response [1, 10-11]. Although the diagnosis of pain is often performed using self-refined scales, this method has limitations. For example, neonates and young children do not have the level of development for appropriate verbal communication. In this group, the scales use behavioural observation and physiological measures. However, parents and non-professionals have more accurate observations than healthcare providers in identifying pain-related facial expressions and responses in children [1].

Smith *et al.* [12] in The Pain, Agitation, Neuromuscular Blockade, and Delirium in Critically Ill Paediatric Patients with Consideration of the PICU Environment and Early Mobility (PANDEM) Guidelines discussed that the pain assessment tools could be classified as self-report or observation scales. Self-report scales are considered the "gold standard" and were validated in children up to 3 years of age, although self-adherence from the age of 6 years was considered the most reliable. The most used paediatric self-report scales are the analogue visual scale, numerical classification scale, Ocher scale, and Wong-Baker pain

scale. The observation scales incorporate behavioural aspects associated with physiological variables to evaluate the pain in children who are unable to self-collaborate the pain. This way, Face, Legs, Activity, Cry, Consolability (FLACC), Comfort, and Comfort-B scales are the most commonly used observation tools in critically ill children [12].

Measuring and treating pain in critically ill children represents a significant obstacle for health professionals [1]. The risk factors for experiencing pain vary from specific factors in paediatric patients to PICU-related factors [12]. The perception of pain can be influenced by age, anxiety, fear, stigma, comorbidities, concern about family separation, strange environments, barriers to verbal communication, and racial bias. Another factor that can change the way children feel and demonstrate their pain is cultural and social differences [1]. The PICU-related factors involve mechanical ventilation, invasive procedures, invasive devices, the use of multiple medications, frequent sleep interruptions, and reduced mobility [12].

A proper administration of analgesia contributes to pain relief, improves psychomotor agitation, facilitates the maintenance of invasive devices, optimises synchronisation between the mechanical and child ventilators, and decreases oxygen consumption and stress response. The decrease in these events is related to proper pain management in PICUs [12]. Pain management in children requires pharmacological and non-pharmacological therapies [13]. The pharmacological interventions are usually lodged in protocols using opioids alone or associated with other non-opioid drugs [12]. As the use of pain medications is related to side effects and inadequate use of opioids, non-pharmacological interventions have been explored by professionals and researchers. Although there is a consensus that combining both approaches is more effective, the amount of information on non-pharmacological pain treatment in critically ill children is limited [13].

Non-pharmacological interventions can be categorised as behavioural, cognitive, restorative, and complementary therapies [14]. Psychological interventions (guided imagery, hypnosis, detailed inquiry, parent's presence, and distraction), physical interventions (acupuncture, stroking and soothing, holding, and rocking), and others (quiet environment, dim lights, limiting visitors, and music) are some of the non-pharmacological treatments already described for pain relief in PICUs [3]. They have the potential to alleviate stress generated by hospitalisation, improve quality of life, and prevent changes in the physiology and behaviour of neonates. Previous research raised concerns about the registration of this therapeutic modality by nursing professionals in the patient's medical

record. The interventions used were oral sweet solution, non-nutritive sucking, positioning, skin-to-skin contact, and modifying environmental stimuli [15, 16]. In one of these studies, skin-to-skin contact between father/mother and baby was the most commonly used method [15].

Non-pharmacological therapies may also help improve the effectiveness of pharmacological therapies or even contribute to reducing their use, thus improving the scores related to adverse events of drug use. Another medical record analysis enabled an observational cohort study in 15 PICUs. The most used measures were repositioning, decreasing environmental stimuli, carer presence, distraction, and music therapy [13, 17]. Yaz and Atay (2000) [18] conducted a transverse study to describe the nurses' use of non-pharmacological methods in paediatric intensive care clinics during the pandemic. Although the pandemic has changed the work process, the non-pharmacological pain relief methods commonly used by nurses in interventional procedures for children are positioning, using a pacifier, embracing, massage, environmental modification, touching the treated area/therapeutic touch, toy distraction, musical therapy and speaking, providing pre-process information, heat/cold application, parent involvement, kangaroo care, giving sucrose, video distraction, post-application rewarding, breathing exercise, and dreaming.

Other forms of non-pharmacological therapies include their association with pharmacological therapies to decrease environmental stressors and facilitate relaxation, distraction, and sleep [12]. A scoping review held in 2019 mapped pain management in PICUs. The interventions involved guided image, hypnosis, detailed inquiry, the parent's presence, distraction, a combination of psychological, physical, and pharmacological interventions (such as positioning, guided imagery, hypnosis, and parental education), acupuncture, the use of positioning, stroking and soothing, touching, holding, and rocking, musical therapy, and environmental modifications (such as a quiet environment, dim lights, limiting visitors, and music) [19].

Despite the advancements in pain management protocols in PICUs, various methodologies and guidelines suggest the development of further research on this topic. Ismail *et al.* (2019) [19] cited that all the articles identified from the literature search were published in English and that the study focused only on quantitative designs. Recently, the PANDEM guidelines [12] suggested that research must be conducted to certify the information on the impact of acupuncture on postoperative or procedural pain. As a contribution, this scoping review protocol adds to the study other designs, languages, and some techniques of acupuncture to explore new evidence of pain management in critically



ill paediatric patients. In addition, it addresses aspects related to the different ages of children in PICUs who are receiving non-pharmacological treatment for pain.

Furthermore, paediatric intensive care professionals need access to the best and most up-to-date scientific evidence on non-pharmacological therapies for pain management in PICUs [6, 8-9]. The development of a quality scoping review protocol can provide data that explores the phenomenon of non-pharmacological therapies in critically ill children and helps interpret the various factors involved in paediatric critical care. Thus, this review aimed to map the research that used non-pharmacological therapies for pain management in PICUs and provide evidence from the literature to investigate the characteristics of these techniques.

**METHODS AND ANALYSIS**

Scoping reviews seek to synthesise evidence for researchers, clinicians, and policymakers, gather and describe the evidence, and present an easily illustrative summary [20]. As non-pharmacological therapies exhibit a multiplicity of techniques with varied health impacts and use according to different patient ages, the scoping review was deemed the most appropriate review to illustrate the different nuances of this topic in the paediatric spectrum, which is also heterogeneous.

This scoping review will be conducted according to the chapter on scoping reviews in the Joanna Briggs Institute (JBI) Manual for Evidence Synthesis [21] and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Extension for Scoping Reviews (Appendix 1) [22]. This protocol is registered in the Open Science Framework (<https://doi.org/10.17605/OSF.IO/GKETX>). This review will be conducted in six phases: 1) identification of the research question; 2) identification of studies; 3) selection of studies; 4) mapping and comparison of the data; 5) collecting, summarising, and reporting the results [23]; 6) consultation with stakeholders about the results (optional) [24].

**Patient and public involvement**

This study does not involve patients or the public.

**Identifying the research question**

The research question for this scoping review is "What non-pharmacological therapies have been used for pain management in PICUs?" To support the research question, four sub-questions were developed:

1. What techniques were used in different age groups? What scores on the pain scales define the use of non-pharmacological therapy?
2. Were the techniques used for the management of pain? Are there differences between the moment (before or after pain/surgery/painful procedures) and the application time?
3. What therapies impacted decreased pain, mechanical ventilation duration, or reduction in length of stay in the PICU?
4. What factors assess their effectiveness?

To construct the research question, we used the Population, Concept, Context (PCC) strategy recommended by the JBI [20] and the table proposed by Ahmad *et al.* (2022) (Table 1) [25].

**Table 1.** The inclusion and exclusion criteria are based on the PCC framework.

	Inclusion criteria	Exclusion criteria
Population	Newborns Infants Children Adolescents	-
Concept	Pain management Analgesia Pain measurement Complementary therapies Alternative therapies Integrative therapies Integrative medicine Aromatherapy Oils, volatile Acupuncture Acupuncture therapy Acupuncture, ear Mind-Body therapies Breathing exercises Imagery, psychotherapy Hypnosis Biofeedback, psychology Music therapy Muscle relaxation Sleep Physical therapy modalities	Pharmacologic therapies
Context	Paediatric intensive care units (PICU)	Home assistance services outpatient care  Inpatient ward settings
Types of evidence	Quantitative studies Qualitative studies Mixed-methods studies Systematic reviews Text articles Opinion articles Grey literature Letters to the editor Editorials	-

This review will consider studies that exploit unconventional pain management therapies. In health treatments, "complementary" therapies mean associating an

unconventional approach with traditional medicine. If an unconventional health intervention is used instead of traditional medicine, we call it "alternative" therapy. If an intervention occurs through the coordinated action of traditional medicine and an unconventional approach, the term "integrative" therapy is used [26].

However, identifying what therapies constitute complementary, alternative, and integrative medicine is complex [27]. One operational definition of "complementary and alternative medicine" was proposed by Cochrane researchers in 2011. There was also a discussion on integrative health and integrative medicine that influenced the National Center for Complementary and Alternative Medicine in the U.S. and changed it to the National Center for Complementary and Integrative Health (NIH) [26, 28].

This review will adopt the term "non-pharmacological therapies." Even though it is not described in the Medical Subject Headings (MeSH) terms, it incorporates "complementary therapies, alternative therapies, integrative therapies, and integrative medicine."

### Identifying relevant studies

The search strategy was developed in collaboration with a librarian at a leading university in Brazil. The strategy was to locate primary published studies, reviews, and text articles. First, a limited initial search was performed on the Cumulative Index of Nursing and Allied Health Literature (CINAHL) and Medical Literature Analysis and Retrieval System Online (MEDLINE) to identify relevant terms and keywords to develop the final search strategy. For transparency and replication of the review, a chart was created based on the protocol by Ahmad *et al.* (2022) [25], which outlines the details of the strategy with MeSH terms and text words (Table 2).

**Table 2.** Medical Subject Headings (MeSH) terms/text words. [25, 29]

<b>Population</b>
Newborns, infants, children, and adolescents
<b>Concept</b>
1. "pain management" [MeSH Terms] OR "pain management" [Text Word] OR "pain relief" [Text Word] OR "pain control" [Text Word] OR "pain reduction" [Text Word] OR "managing pain" [Text Word] OR "analgesia" [MeSH Terms] OR "analgesia" [Text Word]
2. "pain measurement" [MeSH Terms] OR "pain assessment" [Text Word] OR "pain measurement" [MeSH Terms] OR "pain scale" [Text Word] OR "pain tool" [Text Word] OR "pain assessment tool" [Text Word] OR "pain instrument" [Text Word] OR "pain intervention" [Text Word] OR "pain measurement" [MeSH Terms] OR "pain measurement" [Text Word]
3. 1 OR 2
4. "integrative medicine" [MeSH Terms] OR "integrative medicine" [Text Word] OR "complementary therapies" [MeSH Terms] OR "complementary medicine" [Text Word] OR "complementary therapies" [MeSH Terms] OR "alternative medicine" [Text Word] OR "integrative therapy" [Text Word] OR "integrative therapies" [Text Word] OR "complementary therapy" [Text Word] OR "complementary therapies" [MeSH Terms] OR "complementary therapies" [Text Word] OR "alternative therapy" [Text Word] OR "complementary therapies" [MeSH Terms] OR "alternative therapies" [Text Word] OR "alternative treatment" [Text Word]
5. "non-pharmacological intervention" [Text Word] OR "non-pharmacological interventions" [Text Word] OR "non-pharmacological therapy" [Text Word] OR "non-pharmacological therapies" [Text Word] OR "non-pharmacological treatment" [Text Word]
6. "aromatherapy" [MeSH Terms] OR "aromatherapy" [Text Word] OR "oils, volatile" [MeSH Terms] OR "essential oils" [Text Word] OR "aromatherapy" [MeSH Terms] OR "aroma therapy" [Text Word]
7. "acupuncture" [MeSH Terms] OR "acupuncture therapy" [MeSH Terms] OR "acupuncture" [Text Word] OR "acupuncture therapy" [MeSH Terms] OR "acupuncture therapy" [Text Word] OR "acupuncture treatment" [Text Word] OR "acupuncture, ear" [MeSH Terms] OR "acupuncture ear" [Text Word]
8. "mind-body techniques" [Text Word] OR "mind-body therapies" [MeSH Terms] OR "mind-body therapies" [Text Word]
9. "breathing techniques" [Text Word] OR "breathing exercises" [MeSH Terms] OR "breathing exercise" [Text Word]

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10. "guided imagery intervention" [Text Word] OR "guided imagery interventions" [Text Word] OR "imagery, psychotherapy" [MeSH Terms] OR "guided imagery" [Text Word] OR "guided relaxation" [Text Word]
11. "hypnosis" [MeSH Terms] OR "hypnosis" [Text Word] OR "hypnotherapy" [Text Word]
12. "biofeedback, psychology" [MeSH Terms] OR "biofeedback" [Text Word] OR "biofeedback therapy" [Text Word]
13. "music therapy" [MeSH Terms] OR "music therapy" [Text Word] OR "music intervention" [Text Word] OR "musical therapy" [Text Word] OR "music-based intervention" [Text Word] OR "therapeutic music" [Text Word]
14. "progressive muscle relaxation" [Text Word] OR "muscle relaxation" [MeSH Terms] OR "muscle relaxation" [Text Word]
15. "sleep therapy" [Text Word] OR "sleep" [MeSH Terms] OR "sleep" [Text Word]
16. "massage therapy" [Text Word] OR "massage" [Text Word] OR "massage therapies" [Text Word]
17. "physical therapy modalities" [MeSH Terms] OR "physical therapy" [Text Word] OR "physical therapy modalities" [MeSH Terms] OR "physiotherapy" [Text Word]
18. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17
<b>Context</b>
19. "paediatric intensive care unit" [Text Word] OR "picu" [Text Word] OR "paediatric critical care unit" [Text Word] OR "paediatric critical care" [Text Word] OR "intensive care units, paediatric" [MeSH Terms]
20. 3 AND 18 AND 19

The keywords in the titles and abstracts of articles and the indexing terms used in the articles will be used to guide a complete search strategy for Academic Search Premier, CINAHL, Cochrane Library, Embase, LILACS, MEDLINE, Science Direct, Scopus, and Web of Science Core Collection to be disclosed with the results of the scoping review.

The search strategy will consider the particularity of each information source, including all the identified keywords and indexing terms. The strategy will consider articles published in any language and with any database at the start or date of insertion. We use independent professional translation services for the authors' translation of articles in non-native languages.

In addition to the electronic databases, contact will be made with the study authors, when necessary, to clarify any doubts. This protocol will consider sources of unpublished

studies: CAPES, DART-E, OATD, and grey literature in Google Scholar. The online supplemental Appendix 2 provides a list of possible search queries.

**Study selection**

The search process will be carried out in two stages: 1) reading the title and abstract (first set of records); and 2) reading the full article (second set of records). Screening, which will result in the first set of records, will be performed by two pairs of reviewers who will divide the search as follows: 1) Pair A (IGMA and JKSD) will perform the search using the following sources: Academic Search Premier, CINAHL, LILACS, Embase, Science Direct, Dart Europe, Open Access Theses and Dissertations, and Google Scholar; 2) Pair B (SCMA and JT) will perform the search using the following sources: Cochrane Library, MEDLINE, Scopus, Web of Science, and CAPES.

The first data record will be grouped and loaded in EndNote 2.0 (Clarivate Analytics, PA, USA), and duplicates will be removed. A pilot test will be carried out on two sources of information, CINAHL and PubMed, for an evaluation according to the inclusion criteria for the review. The potentially relevant articles will be retrieved in full, comprising the second set of records and their citation details, and will be imported into Rayyan (Rayyan Systems Inc., MA, Cambridge).

At this stage, if necessary, adjustments will be made to the search strategy to meet the inclusion criteria of the review. After completing the pilot test, two reviewers will evaluate the full text of the other selected citations to check whether they meet the inclusion criteria. The reasons for excluding full-text articles that do not meet the inclusion criteria will be recorded and reported in the scoping review. A third independent reviewer will resolve the disagreements at any stage of this process. The research results will be fully reported in the final scoping review and presented in a PRISMA [30] flow diagram (Figure 1).

**Mapping and comparison of the data**

Data will be extracted using a data extraction tool developed by the authors based on a model proposed by the JBI [20] in Table 3.

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**Table 3.** Outline of the extraction tool.

Source of evidence (citation)	Year	Country	Participants		Therapies techniques	Moment and mode of use	Impact on pain	Assesses their effectiveness
			Sex	Age				

This can then be refined further to address the research question for the scoping review, as required. The feasibility of the extraction tool will be tested on a subset of the second set of records. This will be modified and revised for each article included in the data extraction process. Any modifications will be detailed in the full scoping review.

Two authors will be involved in data extraction (IGMA and AC). Data extraction will occur independently, with cross-checking of the extracted evidence. A third author (JT) will resolve any disagreements between the authors regarding dissimilarities in terms of data extraction.

### **Collating, summarising, and reporting the results**

The total number of studies included will be presented in a summarised table format, using the extraction tool as a guide. Subsequently, the data will be grouped according to the Patterns, Advances, Gaps, Evidence for Practice, and Research Recommendations strategy proposed by Jones and Aveyard. [24] Each component represents a domain. The starting point is to produce the "Chart of Patterns." It displays the articles included in the review on one axis and the themes on the other to report the themes expressed in the articles. After the patterns are identified, advances and gaps can be identified and reported, resulting in the last domain of the framework, which is to recommend future research. In addition, the strategy also makes it possible to identify topics that do not require further research; that is, the scientific community has explored them well.

### **ETHICS AND DISSEMINATION**

As scoping reviews use secondary data from other primary sources, approval for the protocol and review by the Research Ethics Committee will not be necessary. The results of this review will be disseminated through publications in high-quality journals whose scope aligns with the theme.



**AUTHORS' CONTRIBUTIONS**

IGMA, and JT contributed to conception and design this protocol. IGMA, SCMA, JKD, PLOA, and TEF contributed to acquisition of data. IGMA conceptualised the research question, prepared the drafts and manuscript edits. JSAO provided methodological expertise. TEF, and ABC, helped refine the research question. All authors have contributed to the study design and revised the protocol. All authors have approved the final manuscript.

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**COMPETING INTERESTS STATEMENT**

None declared.

**DATA SHARING STATEMENT**

This protocol has been registered with the Open Science Framework (DOI 10.17605/OSF.IO/DZHKT).

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Enseignement Supérieur (ABES)

## FIGURE LEGEND

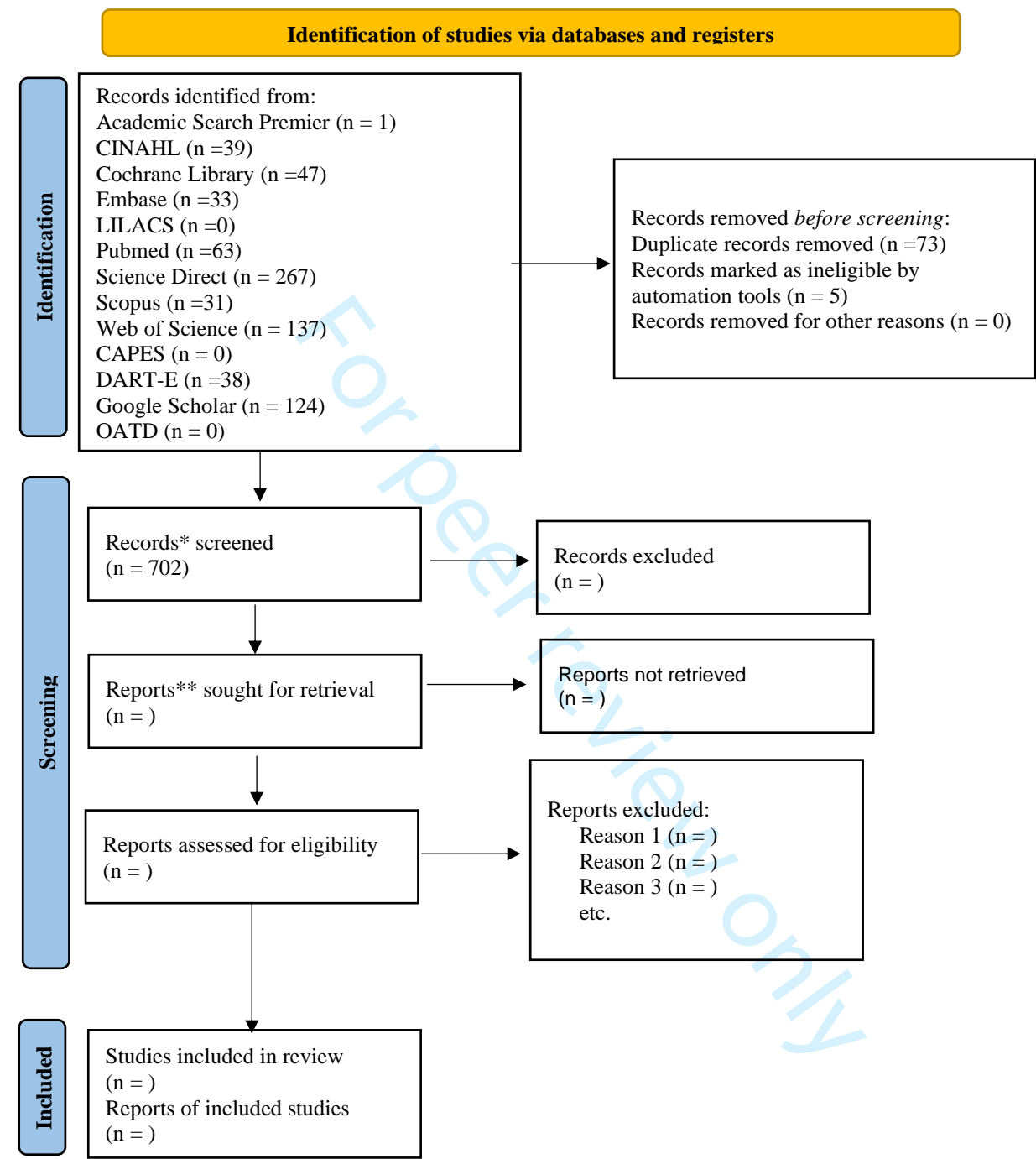
**Figure 1.**

\*Report: A document (paper or electronic) supplying information about a particular study. It could be a journal article, preprint, conference abstract, study register entry, clinical study report, dissertation, unpublished manuscript, government report, or any other document providing relevant information.

\*\*Record: The title or abstract (or both) of a report indexed in a database or website (such as the title or abstract for an article indexed in Medline). Records that refer to the same report (such as the same journal article) are “duplicates”; however, records that refer to reports that are merely similar (such as a similar abstract submitted to two different conferences) should be considered unique.

Figure 1

PRISMA 2020 flow diagram for new systematic reviews which included searches of databases and registers only.<sup>30</sup> Research results until July 2023.





## Appendix 1

### Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist<sup>29</sup>

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
<b>TITLE</b>			
Title	1	Identify the report as a scoping review.	1
<b>ABSTRACT</b>			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	2
<b>INTRODUCTION</b>			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	4, 5, 6 and 7
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	7
<b>METHODS</b>			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	7
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	8
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	10
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	10,11 and 12
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	13
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	13
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	14
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	Not available
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	14



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SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Not started
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Not started
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Not started
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Not started
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Not started
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	Not started
Limitations	20	Discuss the limitations of the scoping review process.	Not started
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	Not started
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	Not one

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

\* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

## Appendix 2

## Draft Search Strategy

Dates of coverage and database	Query	Retrieved records
09/21/22  CINAHL	1. MH (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR TI (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR AB (pain management or pain relief or pain control or pain reduction or managing pain or analgesia)	84,304
	2. MH (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain measurement) OR TI (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain measurement) OR AB (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain measurement)	75,339
	3. 1 OR 2	133,679
	4. MH (integrative medicine or complementary medicine or alternative medicine) OR TI (integrative medicine or complementary medicine or alternative medicine) OR AB (integrative medicine or complementary medicine or alternative medicine)	16,007
	5. MH ( integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment) OR TI (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment) OR AB (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment)	60,250
	6. MH (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment) OR TI (non- pharmacological intervention or	3,068

	non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment) OR AB (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment)	
7.	MH (aromatherapy or essential oils or aroma therapy) OR TI (aromatherapy or essential oils or aroma therapy) OR AB (aromatherapy or essential oils or aroma therapy)	7,565
8.	MH (acupuncture or acupuncture therapy or acupuncture treatment) OR TI (acupuncture or acupuncture therapy or acupuncture treatment) OR AB (acupuncture or acupuncture therapy or acupuncture treatment)	20,538
9.	MH acupuncture, ear OR TI acupuncture, ear OR AB acupuncture, ear	590
10.	MH (mind body techniques or mind-body therapies) OR TI (mind body techniques or mind-body therapies) OR AB (mind body techniques or mind-body therapies)	3,952
11.	MH (breathing techniques or breathing or breathing exercise) OR TI (breathing techniques or breathing or breathing exercise) OR AB (breathing techniques or breathing or breathing exercise)	20,189
12.	MH (guided imagery for pain management or guided image therapy or guided images therapies) OR TI (guided imagery for pain management or guided image therapy or guided images therapies) OR AB (guided imagery for pain management or guided image therapy or guided images therapies)	646
13.	MH (guided imagery or guided relaxation or visualization techniques) OR TI (guided imagery or guided relaxation or visualization techniques) OR AB (guided imagery or guided relaxation or visualization techniques)	4,120
14.	MH (hypnosis or hypnotherapy) OR TI (hypnosis or hypnotherapy) OR AB (hypnosis or hypnotherapy)	4,011

15. MH (biofeedback or biofeedback therapy) OR TI (biofeedback or biofeedback therapy) OR AB (biofeedback or biofeedback therapy)	4,994
16. MH (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music) OR TI (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music ) OR AB (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music )	7,558
17. MH (progressive muscle relaxation or muscle relaxation) OR TI (progressive muscle relaxation or muscle relaxation) OR AB (progressive muscle relaxation or muscle relaxation)	2,299
18. MH (sleep therapy or sleep) OR TI (sleep therapy or sleep) OR AB (sleep therapy or sleep)	77,183
19. MH (massage therapy or massage or massage therapies) OR TI (massage therapy or massage or massage therapies) OR AB (massage therapy or massage or massage therapies)	21,418
20. MH (physical therapy or physiotherapy) OR TI (physical therapy or physiotherapy) OR AB (physical therapy or physiotherapy)	61,296
21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	277,529
22. MH (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR TI (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR AB (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care)	9,239
23. MH intensive care units, pediatric OR TI intensive care units, pediatric OR AB intensive care units, pediatric	8,949

	24. 22 OR 23	11,491
	25. 3 AND 21 AND 24	38

Dates of coverage and database	Query	Retrieved records
09/21/22  MEDLINE  (PubMed)	1. "pain management"[MeSH Terms] OR "pain management"[Text Word] OR "pain relief"[Text Word] OR "pain control"[Text Word] OR "pain reduction"[Text Word] OR "managing pain"[Text Word] OR "analgesia"[MeSH Terms] OR "analgesia"[Text Word]	177,128
	2. "pain measurement"[MeSH Terms] OR "pain assessment"[Text Word] OR "pain measurement"[MeSH Terms] OR "pain scale"[Text Word] OR "pain tool"[Text Word] OR "pain assessment tool"[Text Word] OR "pain instrument"[Text Word] OR "pain intervention"[Text Word] OR "pain measurement"[MeSH Terms] OR "pain measurement"[Text Word]	101,025
	3. 1 OR 2	246,193
	4. "integrative medicine"[MeSH Terms] OR "integrative medicine"[Text Word] OR "complementary therapies"[MeSH Terms] OR "complementary medicine"[Text Word] OR "complementary therapies"[MeSH Terms] OR "alternative medicine"[Text Word] OR "integrative therapy"[Text Word] OR "integrative therapies"[Text Word] OR "complementary therapy"[Text Word] OR "complementary therapies"[MeSH Terms] OR "complementary therapies"[Text Word] OR "alternative therapy"[Text Word] OR "complementary therapies"[MeSH Terms] OR "alternative therapies"[Text Word] OR "alternative treatment"[Text Word]	274,042
	5. "nonpharmacological intervention"[Text Word] OR "nonpharmacological interventions"[Text Word] OR "nonpharmacological therapy"[Text Word] OR "nonpharmacological therapies"[Text Word] OR "nonpharmacological treatment"[Text Word]	5,292

6.	"aromatherapy"[MeSH Terms] OR "aromatherapy"[Text Word] OR "oils, volatile"[MeSH Terms] OR "essential oils"[Text Word] OR "aromatherapy"[MeSH Terms] OR "aroma therapy"[Text Word]	23,007
7.	"acupuncture"[MeSH Terms] OR "acupuncture therapy"[MeSH Terms] OR "acupuncture"[Text Word] OR "acupuncture therapy"[MeSH Terms] OR "acupuncture therapy"[Text Word] OR "acupuncture treatment"[Text Word] OR "acupuncture, ear"[MeSH Terms] OR "acupuncture ear"[Text Word]	35,397
8.	"mind body techniques"[Text Word] OR "mind body therapies"[MeSH Terms] OR "mind body therapies"[Text Word]	<u>46,477</u>
9.	"breathing techniques"[Text Word] OR "breathing exercises"[MeSH Terms] OR "breathing exercises"[Text Word]	<u>4,632</u>
10.	"guided imagery intervention"[Text Word] OR "guided imagery interventions"[Text Word] OR "imagery, psychotherapy"[MeSH Terms] OR "guided imagery"[Text Word] OR "guided relaxation"[Text Word]	2,746
11.	"hypnosis"[MeSH Terms] OR "hypnosis"[Text Word] OR "hypnotherapy"[Text Word]	15,942
12.	"biofeedback, psychology"[MeSH Terms] OR "biofeedback"[Text Word] OR "biofeedback therapy"[Text Word]	<u>16,054</u>
13.	"music therapy"[MeSH Terms] OR "music therapy"[Text Word] OR "music intervention"[Text Word] OR "musical therapy"[Text Word] OR "music based intervention"[Text Word] OR "therapeutic music"[Text Word]	5,367
14.	"progressive muscle relaxation"[Text Word] OR "muscle relaxation"[MeSH Terms] OR "muscle relaxation"[Text Word]	<u>35,626</u>
15.	"sleep therapy"[Text Word] OR "sleep"[MeSH Terms] OR "sleep"[Text Word]	<u>232,994</u>

	16. "massage therapy"[Text Word] OR "massage"[Text Word] OR "massage therapies"[Text Word]	16,186
	17. "physical therapy modalities"[MeSH Terms] OR "physical therapy"[Text Word] OR "physical therapy modalities"[MeSH Terms] OR "physiotherapy"[Text Word]	200,591
	18. 4 OR 5 OR 6 OR 7 OR 8OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17	746,903
	19. "pediatric intensive care unit"[Text Word] OR "picu"[Text Word] OR "pediatric critical care unit"[Text Word] OR "paediatric critical care"[Text Word] OR "intensive care units, pediatric"[MeSH Terms]	31,624
	20. 3 AND 18 AND 19	63

Dates of coverage and database	Query	Retrieved records
09/14/22 ACADEMIC SEARCH PREMIER	1. (pain management) OR (DE "PAIN management" OR DE "DRY needling" OR DE "PAIN measurement" OR DE "BRIEF Pain Inventory" OR DE "MCGILL Pain Questionnaire")	81,825
	2. DE "ALTERNATIVE medicine" OR DE "ACUPUNCTURE" OR DE "ALTERNATIVE treatment" OR DE "BOTANIC medicine" OR DE "CHIROPRACTIC" OR DE"CHRONOTHERMAL medicine" OR DE	38,185

	"DRY needling" OR DE "ENERGY medicine" OR DE "HOLISTIC medicine" OR DE "HOMEOPATHY" OR DE "MENTAL healing" OR DE "NATUROPATHY"	
	3. DE "PEDIATRIC intensive care" OR ""PEDIATRIC intensive care units" OR PICU	10,655
	4. 1 AND 2 AND 3	1

Dates of coverage and database	Query	Retrieved records
10/03/22  COCHRANE	1. ("pain"):ti,ab,kw OR ("pain assessment"):ti,ab,kw	215514
	2. ("integrative medicine"):ti,ab,kw OR ("complementary medicine"):ti,ab,kw OR ("alternative medicine"):ti,ab,kw	4013
	3. ("non-pharmacological"):ti,ab,kw AND ("therapies"):ti,ab,kw OR ("treatment"):ti,ab,kw OR ("intervention"):ti,ab,kw	1147812
	4. ("aromatherapies"):ti,ab,kw OR ("essential oil"):ti,ab,kw	2174
	5. ("acupuncture"):ti,ab,kw OR ("acupuncture analgesia"):ti,ab,kw	17333
	6. ("mind body"):ti,ab,kw OR ("mind body medicine"):ti,ab,kw OR ("mind body therapies"):ti,ab,kw	1248
	7. ("breathing"):ti,ab,kw	34728
	8. ("guided imagery"):ti,ab,kw	806



9.	("hypnotherapy"):ti,ab,kw	380
10.	("biofeedback"):ti,ab,kw OR ("biofeedback training"):ti,ab,kw	3897
11.	("music therapy"):ti,ab,kw	2613
12.	("progressive muscle relaxation"):ti,ab,kw OR ("progressive muscle relaxation training"):ti,ab,kw	820
13.	("sleep"):ti,ab,kw	46268
14.	("massage therapy"):ti,ab,kw	875
15.	("physical therapy"):ti,ab,kw OR ("physical therapy	11504
16.	("pediatric intensive care unit"):ti,ab,kw OR ("paediatric intensive care"):ti,ab,kw OR ("paediatric intensive care unit"):ti,ab,kw OR ("paediatric intensive care units"):ti,ab,kw	1095
17.	1 AND 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 AND 16	0
18.	1 AND 3 AND 16	46
19.	1 AND 7 AND 16	10
20.	1 AND 11 AND 16	2
21.	1 AND 13 AND 16	5
22.	1 AND 15 AND 16	1

	23. 1 AND 3 AND 16 OR 1 AND 7 AND 16 OR 1 AND 11 AND 16 OR 1 AND 13 AND 16 OR 1 AND 15 AND 16	47
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Dates of coverage and database	Query	Retrieved records
10/23/22 EMBASE	1. pain'/exp OR 'pain' OR 'analgesia'/exp OR 'analgesia'	2062548
	2. 'integrative medicine'/exp OR 'integrative medicine' OR 'alternative medicine'/exp OR 'alternative medicine' OR 'aromatherapy'/exp OR 'aromatherapy' OR 'essential oil'/exp OR 'essential oil' OR 'acupuncture'/exp OR 'acupuncture' OR 'auricular acupuncture'/exp OR 'auricular acupuncture' OR 'breathing exercise'/exp OR 'breathing exercise' OR 'guided imagery'/exp OR 'guided imagery' OR 'hypnosis'/exp OR 'hypnosis' OR 'biofeedback'/exp OR 'biofeedback' OR 'music therapy'/exp OR 'music therapy' OR 'muscle relaxation'/exp OR 'muscle relaxation' OR 'sleep quality'/exp OR 'sleep quality' OR 'massage'/exp OR 'massage' OR 'physiotherapy'/exp OR 'physiotherapy' OR	255690
	3. 'pediatric intensive care unit'/exp OR 'pediatric intensive care unit'	22687
	4. 1 AND 2 AND 3	33

Dates of coverage and database	Query	Retrieved records
10/23/22 LILACS	1. "DOR" or "avaliacao da DOR" or "escala analogica da DOR" or "escala analogica visual de DOR" or "intensidade da DOR" or "limiar da DOR" or "manejo da DOR" or "medicao da DOR" or "percepcao da DOR" or "unidades de alivio da DOR" or "DOR aguda" or "DOR cronica" [Descritor de assunto]	5862

	2. "TERAPIAS COMPLEMENTARES" or "TERAPIAS COMPLEMENTARES e integrativas" [Descritor de assunto]	1429
	3. "unidade de terapia intensiva pediatria" [Descritor de assunto]	767
	4. 1 and 2 and 3	0

Dates of coverage and database	Query	Retrieved records
SCIENCE DIRECT	1. Title, abstract, keyword: pain	232,587
	2. Title, abstract, keyword: complementary and alternative medicine	3342
	3. Title, abstract, keyword: integrative medicine	6951
	4. pediatric intensive care unit	3787
	1 AND 2 OR 3 AND 4	267

Dates of coverage and database	Query	Retrieved records
09/23/22  SCOPUS	1. TITLE("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia) OR ABS("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia) OR TITLE-ABS-KEY(Pain Management OR Pain Relief OR Pain Control OR Pain Reduction OR "Managing Pain" OR Analgesia)	(344,701)
	2. TITLE("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement") OR ABS("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement") OR TITLE-ABS-KEY("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement")	(145,947)
	3. 1 OR 2	(423,690)
	4. TITLE("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine") OR ABS("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine") OR TITLE-ABS-KEY("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine")	(58,538)
	5. TITLE("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment") OR ABS("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment") OR TITLE-ABS-KEY("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment")	(59,454)

6. TITLE(“Non-pharmacological Intervention” OR “Non-pharmacological Interventions” OR “Non-pharmacological Therapy” OR “Non-pharmacological Therapies” OR “Non-pharmacological Treatment”) OR ABS(“Non-pharmacological Intervention” OR “Non-pharmacological Interventions” OR “Non-pharmacological Therapy” OR “Non-pharmacological Therapies” OR “Non-pharmacological Treatment”) OR TITLE-ABS-KEY(“Non-pharmacological Intervention” OR “Non-pharmacological Interventions” OR “Non-pharmacological Therapy” OR “Non-pharmacological Therapies” OR “Non-pharmacological Treatment”)	(7,752)
7. TITLE(Aromatherapy OR “Essential Oils” OR Aroma therapy) OR ABS(Aromatherapy OR “Essential Oils” OR Aroma therapy) OR TITLE-ABS-KEY(Aromatherapy OR “Essential Oils” OR Aroma therapy)	(3.885)
8. TITLE(“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”) OR ABS (“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”) OR TITLE-ABS-KEY(“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”)	(52,587)
9. TITLE(“Acupuncture, Ear”) OR ABS(“Acupuncture, Ear”) OR TITLE-ABS-KEY(“Acupuncture, Ear”)	(452)
10. TITLE(“Mind Body Techniques” OR “Mind-body Therapies”) OR ABS(“Mind Body Techniques” OR “Mind-body Therapies”) OR TITLE-ABS-KEY(“Mind Body Techniques” OR “Mind-body Therapies”)	(1.625)
11. TITLE(“Breathing Techniques”OR Breathing OR “Breathing Exercise”) OR ABS(“Breathing Techniques”OR Breathing OR “Breathing Exercise”) OR TITLE-ABS-KEY(“Breathing Techniques”OR Breathing OR “Breathing Exercise”)	(279.806)
12. TITLE(“Guided Imagery for Pain Management” OR “Guided Image Therapy” OR “Guided Images Therapies”) OR ABS(“Guided Imagery for Pain Management” OR “Guided Image Therapy” OR “Guided Images Therapies”) OR TITLE-ABS-KEY(“Guided Imagery for Pain Management” OR “Guided Image Therapy” OR “Guided Images Therapies”)	4
13. TITLE(“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”) OR ABS(“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”) OR TITLE-ABS-KEY(“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”)	17,176

14. TITLE(Hypnosis OR Hypnotherapy) OR ABS(Hypnosis OR Hypnotherapy) OR TITLE-ABS-KEY(Hypnosis OR Hypnotherapy)	22,266
15. TITLE(Biofeedback OR "Biofeedback Therapy") OR ABS(Biofeedback OR "Biofeedback Therapy") OR TITLE-ABS-KEY(Biofeedback OR "Biofeedback Therapy")	17,108
16. TITLE("Music Therapy" OR "Music Intervention" OR "Musical Therapy" OR "Music-based Intervention" OR "Therapeutic Music") OR ABS("Music Therapy" OR "Music Intervention" OR "Musical Therapy" OR "Music-based Intervention" OR "Therapeutic Music") OR TITLE-ABS-KEY("Music Therapy" OR "Music Intervention" OR "Musical Therapy" OR "Music-based Intervention" OR "Therapeutic Music")	11,454
17. TITLE("Progressive Muscle Relaxation" OR "Muscle Relaxation") OR ABS("Progressive Muscle Relaxation" OR "Muscle Relaxation") OR TITLE-ABS-KEY("Progressive Muscle Relaxation" OR "Muscle Relaxation")	34,970
18. TITLE("Sleep Therapy" OR Sleep) OR ABS("Sleep Therapy" OR Sleep) OR TITLE-ABS-KEY("Sleep Therapy" OR Sleep)	340,832
19. TITLE("Massage Therapy" OR Massage OR "Massage Therapies") OR ABS("Massage Therapy" OR Massage OR "Massage Therapies") OR TITLE-ABS-KEY("Massage Therapy" OR Massage OR "Massage Therapies")	28,624
20. TITLE("Physical Therapy" OR Physiotherapy) OR ABS("Physical Therapy" OR Physiotherapy) OR TITLE-ABS-KEY("Physical Therapy" OR Physiotherapy)	129,632
21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	937,453
22. TITLE("Pediatric Intensive Care Unit" OR PICU OR "Pediatric Critical Care Unit" OR "Paediatric Intensive Care" OR "Paediatric Critical Care") OR ABS("Pediatric Intensive Care Unit" OR PICU OR "Pediatric Critical Care Unit" OR "Paediatric Intensive Care" OR "Paediatric Critical Care") OR TITLE-ABS-KEY("Pediatric Intensive Care Unit" OR PICU OR "Pediatric Critical Care Unit" OR "Paediatric Intensive Care" OR "Paediatric Critical Care")	20,379

	23. TITLE(“Intensive Care Units, Pediatric”) OR ABS(“Intensive Care Units, Pediatric”) OR TITLE-ABS-KEY(“Intensive Care Units, Pediatric”)	8,226
	24. 22 OR 23	22,008
	25. 3 AND 21 AND 24	31

Dates of coverage and database	Query	Retrieved records
09/21/22  WEB OF SCIENCE	1. TS= (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR TI= (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR AB= (pain management or pain relief or pain control or pain reduction or managing pain or analgesia)	(376,576)
	2. TS= (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain intervention or pain measurement) OR TI= (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain intervention or pain measurement) OR AB= (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain intervention or pain measurement)	(241,031)
	3. 1 OR 2	(475,359)
	4. TS= (integrative medicine or complementary medicine or alternative medicine) OR TI= (integrative medicine or complementary medicine or alternative medicine) OR AB= (Integrative medicine or complementary medicine or alternative medicine)	(51,961)

5. TS= (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment) OR TI= (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment ) OR AB= (Integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment)	(288,290)
6. TS= (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment) OR TI= (non- pharmacological intervention or non-pharmacological therapies or non-pharmacological treatment) OR AB= (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment)	(12,420)
7. TS= (aromatherapy or essential oils or aroma therapy) OR TI= (aromatherapy or essential oils or aroma therapy) OR AB= (aromatherapy or essential oils or aroma therapy)	(86,864)
8. TS= (acupuncture or acupuncture therapy or acupuncture treatment) OR TI= (acupuncture or acupuncture therapy or acupuncture treatment) OR AB= (acupuncture or acupuncture therapy or acupuncture treatment)	(25,368)
9. TS= (acupuncture, ear) OR TI= (acupuncture, ear) OR AB= (acupuncture, ear)	(547)
10. TS= (mind body techniques or mind-body therapies) OR TI= (mind body techniques or mind-body therapies) OR AB= (mind body techniques or mind-body therapies)	(2,430)
11. TS= (breathing techniques or breathing or breathing exercise) OR TI= (breathing techniques or breathing or breathing exercise) OR AB= (breathing techniques or breathing or breathing exercise)	(99,065)
12. TS= (guided imagery for pain management or guided image therapy or guided images therapies) OR TI= (guided imagery for pain management or guided image therapy or guided images therapies) OR AB= (guided imagery for pain management or guided image therapy or guided images therapies)	(22,227)



13. TS= (guided imagery or guided relaxation or visualization techniques) OR TI= (guided imagery or guided relaxation or visualization techniques) OR AB= (guided imagery or guided relaxation or visualization techniques)	(68,289)
14. TS= (hypnosis or hypnotherapy) OR TI= (hypnosis or hypnotherapy) OR AB= (hypnosis or hypnotherapy)	(10,831)
15. TS= (biofeedback or biofeedback therapy) OR TI= (biofeedback or biofeedback therapy) OR AB= (biofeedback or biofeedback therapy)	(12,661)
16. TS= (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music) OR TI= (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music) OR AB= (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music)	(11,018)
17. TS= (progressive muscle relaxation or muscle relaxation) OR TI= (progressive muscle relaxation or muscle relaxation) OR AB= (progressive muscle relaxation or muscle relaxation)	(33,638)
18. TS= (sleep therapy or sleep) OR TI= (sleep therapy or sleep) OR AB= (sleep therapy or sleep)	(293,420)
19. TS= (massage therapy or massage or massage therapies) OR TI= (massage therapy or massage or massage therapies) OR AB= (massage therapy or massage or massage therapies)	(11,659)
20. TS= (physical therapy or physiotherapy) OR TI= (physical therapy or physiotherapy) OR AB= (physical therapy or physiotherapy)	(121,548)
21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	(1,058,477)
22. TS= (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR TI= (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR AB= (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care)	(21,834)

	23. TS= (intensive care units, pediatric) OR TI= (intensive care units, pediatric) OR AB= (intensive care units, pediatric)	(14,677)
	24. 22 OR 23	(21,834)
	25. 3 AND 21 AND 24	(137)

Dates of coverage and database	Query	Retrieved records
09/26/22  Catálogo de Teses e Dissertações (CAPES)	1. ("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia) OR ("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia) OR ("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia)	47.919
	2. ("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement") OR ("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement") OR ("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement")	17.688
	3. 1 OR 2	60.914
	4. ("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine") OR ("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine") OR ("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine")	5.309

5. (“Integrative Therapy” OR “Integrative Therapies” OR “Complementary Therapy” OR “Complementary Therapies” OR “Alternative Therapy” OR “Alternative Therapies” OR “Alternative Treatment”) OR (“Integrative Therapy” OR “Integrative Therapies” OR “Complementary Therapy” OR “Complementary Therapies” OR “Alternative Therapy” OR “Alternative Therapies” OR “Alternative Treatment”) OR (“Integrative Therapy” OR “Integrative Therapies” OR “Complementary Therapy” OR “Complementary Therapies” OR “Alternative Therapy” OR “Alternative Therapies” OR “Alternative Treatment”)	14.345
6. (“Non-pharmacological Intervention” OR “Non-pharmacological Interventions” OR “Non-pharmacological Therapy” OR “Non-pharmacological Therapies” OR “Non-pharmacological Treatment”) OR (“Non-pharmacological Intervention” OR “Non-pharmacological Interventions” OR “Non-pharmacological Therapy” OR “Non-pharmacological Therapies” OR “Non-pharmacological Treatment”) OR (“Non-pharmacological Intervention” OR “Non-pharmacological Interventions” OR “Non-pharmacological Therapy” OR “Non-pharmacological Therapies” OR “Non-pharmacological Treatment”)	20.398
7. (Aromatherapy OR “Essential Oils” OR Aroma therapy) OR (Aromatherapy OR “Essential Oils” OR Aroma therapy) OR (Aromatherapy OR “Essential Oils” OR Aroma therapy)	8.734
8. (“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”) OR (“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”) OR (“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”)	11.097
9. (“Acupuncture, Ear”) OR (“Acupuncture, Ear”) OR (“Acupuncture, Ear”)	468
10. (“Mind Body Techniques” OR “Mind-body Therapies”) OR (“Mind Body Techniques” OR “Mind-body Therapies”) OR (“Mind Body Techniques” OR “Mind-body Therapies”)	8.897
11. (“Breathing Techniques”OR Breathing OR “Breathing Exercise”) OR (“Breathing Techniques”OR Breathing OR “Breathing Exercise”) OR (“Breathing Techniques”OR Breathing OR “Breathing Exercise”)	12.400
12. (“Guided Imagery for Pain Management” OR “Guided Image Therapy” OR “Guided Images Therapies”) OR (“Guided Imagery for Pain Management” OR “Guided Image Therapy” OR “Guided Images Therapies”) OR (“Guided Imagery for Pain Management” OR “Guided Image Therapy” OR “Guided Images Therapies”)	63.039

13. (“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”) OR (“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”) OR (“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”)	3.632
14. (Hypnosis OR Hypnotherapy) OR (Hypnosis OR Hypnotherapy) OR (Hypnosis OR Hypnotherapy)	19
15. (Biofeedback OR “Biofeedback Therapy”) OR (Biofeedback OR “Biofeedback Therapy”) OR (Biofeedback OR “Biofeedback Therapy”)	5.433
16. (“Music Therapy” OR “Music Intervention” OR “Musical Therapy” OR “Music-based Intervention” OR “Therapeutic Music”) OR (“Music Therapy” OR “Music Intervention” OR “Musical Therapy” OR “Music-based Intervention” OR “Therapeutic Music”) OR (“Music Therapy” OR “Music Intervention” OR “Musical Therapy” OR “Music-based Intervention” OR “Therapeutic Music”)	25.370
17. (“Progressive Muscle Relaxation” OR “Muscle Relaxation”) OR (“Progressive Muscle Relaxation” OR “Muscle Relaxation”) OR (“Progressive Muscle Relaxation” OR “Muscle Relaxation”)	2.847
18. (“Sleep Therapy” OR Sleep) OR (“Sleep Therapy” OR Sleep) OR (“Sleep Therapy” OR Sleep)	13.033
19. (“Massage Therapy” OR Massage OR “Massage Therapies”) OR (“Massage Therapy” OR Massage OR “Massage Therapies”) OR (“Massage Therapy” OR Massage OR “Massage Therapies”)	5.587
20. (“Physical Therapy” OR Physiotherapy) OR (“Physical Therapy” OR Physiotherapy) OR (“Physical Therapy” OR Physiotherapy)	13.679
21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	120.654

	22. (“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”) OR (“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”) OR (“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”)	21.859
	23. (“Intensive Care Units, Pediatric”) OR (“Intensive Care Units, Pediatric”) OR (“Intensive Care Units, Pediatric”)	16.055
	24. 22 OR 23	22.946

Dates of coverage and database	Query	Retrieved records
11/05/22  DART-E	1. pain	547
	2. “"complementary therapies" OR "alternative medicine" OR "integrative medicine" OR "nonpharmacological	168
	3. "pediatric intensive care unit" or "paediatric intensive care unit"	51
	4. 1 AND 2 AND 3	38

Dates of coverage and database	Query	Retrieved records
11/05/22 Google Scholar	1. "complementary therapies" OR "integrative medicine" OR "complementary and alternative medicine" OR "complementary and alternative therapies"	17900
	2. nonpharmacologic	77700
	3. "pediatric intensive care" OR "paediatric intensive care"	17600
	4. 1 OR 2 AND 3 AND doc OR .txt OR .rtf OR .PDF OR .html	124

Dates of coverage and database	Query	Retrieved records
11/05/22 OATD	1. pain	38650
	2. "complementary therapies" OR "alternative medicine" OR "integrative medicine" OR nonpharmacological	1819
	3. "pediatric intensive care unit" or "paediatric intensive care unit"	382

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# BMJ Open

## Non-pharmacological therapies for pain management in paediatric intensive care units: a protocol for a scoping review

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**Non-pharmacological therapies for pain management in paediatric intensive care units: a protocol for a scoping review**

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**Word count:** 2568

## ABSTRACT

**Introduction:** In critically ill children, pain management is complex owing to cognitive development and the nature of hospitalisation in paediatric intensive therapy units. Although there are many protocols and guidelines for pain control via pharmacological interventions, non-pharmacological practices should be also explored and disseminated for their potential benefit.

**Methods and analysis:** A systematic literature search will be performed using the following databases: Academic Search Premier, Cumulative Index to Nursing and Allied Health Literature, Cochrane Library, Excerpta Medica Database, Virtual Health Library, Medical Literature Analysis and Retrieval System Online, ScienceDirect, Scopus, Web of Science Core Collection, Theses from *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior*, Dart Europe, Open Access Theses and Dissertations, and grey literature from Google Scholar. The research will consider quantitative and qualitative studies, mixed-methods studies, systematic reviews, text articles, opinion articles, letters to editors, and editorials in any language and from any database. The following will be eligible for inclusion: (i) newborns, infants, children, and adolescents; and (ii) non-pharmacological therapies used for pain in paediatric intensive care.

**Ethics and dissemination:** This study does not require ethical approval. The results of this research will be disseminated through social media channels and podcasts about pain in children.

**Trail registration number:** This protocol has been registered with the Open Science Framework (DOI 10.17605/OSF.IO/DZHKT).

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**STRENGTHS AND LIMITATIONS OF THIS STUDY**

- Promotes updates on what is known about non-pharmacological therapies.
- Presents gaps in knowledge that still need to be filled.
- Enables the selection of studies in other languages.
- There was a change and reduction of the initial reviewer's team, which may bias the evidence.

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## INTRODUCTION

Admission to the paediatric intensive care unit (PICU) exposes paediatric patients to various pain experiences, and approximately 45–72% of these patients experience pain daily either due to their critical illness, procedures, therapies, or surgeries [1]. As a result, critically ill children have more experience with intense pain. They are subjected to more painful procedures than children in other hospital divisions such as medical and surgical units [2]. In the PICU, pain can be caused by the underlying illness or injury, complications of the primary disease, frequent medical procedures that result in pain (e.g., incisions, wound care, and injections), and supporting and monitoring systems (e.g., suctioning an endotracheal tube, manipulation or stripping of drains, removal of catheters or drains) [2, 3]. Tissue hypoxia that develops due to low oxygen saturation, cardiac output, or anaemia can also cause pain[2,3]; prolonged immobilization can result in pain in the joints and pressure points and from changing positions [2,3].

Despite recent scientific and technological developments, paediatric patients frequently have no adequate pain relief [2-9]. Moreover, lack of pain relief is considered an adverse event and is the most common type in the United States [2]. According to the International Association for the Study of Pain, pain relief has been discussed as a human right by international institutions since 2004 [10]. However, treating pain in children remains challenging. One of the obstacles to the management of pain control in paediatrics is the heterogeneity of pain perception and response among different paediatric age groups [1, 10-11]. Although the diagnosis of pain is often performed using self-refined scales, this method has limitations in paediatrics. For example, neonates and young children have not yet achieved the developmental level necessary for the required verbal communication. In this group, the scales use behavioural observation and physiological measures; moreover, parents and caregivers have more accurate observations than healthcare providers in identifying pain-related facial expressions and responses in children [1].

In The Pain, Agitation, Neuromuscular Blockade, and Delirium in Critically Ill Paediatric Patients with Consideration of the PICU Environment and Early Mobility (PANDEM) Guidelines, Smith *et al.* discussed that the pain assessment tools could be classified as self-report or observation scales [12]. Self-report scales are considered the gold standard and have been validated in children down to 3 years of age, although self-adherence from the age of 6 years was considered the most reliable. The most used paediatric self-report scales are the Analogue Visual Scale, Numerical Classification Scale, Ocher Scale, and Wong-Baker Pain Scale. Alternatively, observation scales incorporate behavioural

aspects associated with physiological variables to evaluate the pain in children who are unable to self-report the pain. This way, Face, Legs, Activity, Cry, Consolability, Comfort, and Comfort-B scales are the most commonly used observation tools in critically ill children [12].

Measuring and treating pain in critically ill children represents a significant endeavour for health professionals [1], and the risk factors for experiencing pain vary from specific factors in paediatric patients to PICU-related factors [12]. The perception of pain may be influenced by age, anxiety, fear, comorbidities, concern about family separation, strange environments, barriers to verbal communication, and racial bias. Another factor that can change the way children feel and show their pain is cultural and social differences [1]. The PICU-related factors involve mechanical ventilation, invasive procedures, invasive devices, the use of multiple medications, frequent sleep interruptions, and reduced mobility [12].

The proper administration of analgesia contributes to pain relief, improves psychomotor agitation, facilitates the maintenance of invasive devices, optimises synchronisation between the mechanical ventilator and child, and decreases oxygen consumption and stress response. The decrease in these events is related to proper pain management in PICUs [12]. Pain management in children requires pharmacological and non-pharmacological therapies [13], with pharmacological interventions typically involving protocols of opioids alone or with other non-opioid drugs [12]. As the use of pain medications is related to side effects and misuse of opioids, non-pharmacological interventions have been explored by professionals and researchers. Although there is a consensus that combining both approaches is more effective, the amount of information on non-pharmacological pain treatment in critically ill children is limited [13].

Non-pharmacological interventions can be categorised as behavioural, cognitive, restorative, and complementary therapies [14]. Interventions as oral sweet solution, non-nutritive sucking, positioning, skin-to-skin contact, and modifying environmental stimuli [15, 16] have the potential to alleviate stress generated by hospitalisation, improve quality of life, and prevent changes in the physiology and behaviour of neonates [15].

Non-pharmacological therapies may also help improve the effectiveness of medications or even contribute to reducing their use, thus improving the scores related to adverse events of drug use. A previous medical record analysis enabled an observational cohort study in 15 PICUs [17]; the most used measures were repositioning, decreasing environmental stimuli, carer presence, distraction, and music therapy [13, 17]. Additionally,

Yaz and Atay (2022) conducted a transverse study to describe the nurses' use of non-pharmacological methods in paediatric intensive care clinics during the COVID-19 pandemic [18]. While the pandemic changed the time and training available for healthcare staff interested in this area, the alternatives to pharmacotherapy commonly used by nurses in paediatric interventions remain the same and include embracing, massage, pacifier use, therapeutic touch, toy distraction, musical therapy and speaking, providing pre-process information, heat/cold application, parent involvement, kangaroo care, giving sucrose, video distraction, post-application rewarding, breathing exercise, and dreaming [18].

Other forms of non-pharmacological therapies involve integration with medication to decrease environmental stressors and facilitate relaxation, distraction, and sleep [12]. A scoping review held in 2019 mapped pain management in PICUs. These interventions involved guided imagery; hypnosis; detailed inquiry (interview technique that rescues information on thoughts and feelings related to pain); parental presence; distraction; a combination of psychological, physical, and pharmacological interventions (such as positioning, guided imagery, hypnosis, and parental education); acupuncture; stroking and soothing, holding, and rocking; and environmental modifications (such as a quiet environment, dim lights, limiting visitors to decrease noise, and music) [19].

Despite the advancements in pain management protocols in PICUs, various methodologies and guidelines suggest the development of further research on this topic. Ismail *et al.* (2019) reported that all the articles identified from the literature search were published in English and that the study focused only on quantitative designs [19]. Recently, the PANDEM guidelines [12] suggested that research must be conducted to certify the information on the impact of acupuncture on postoperative or procedural pain. As a contribution to the knowledge of nonpharmacological therapies, this scoping review protocol aims to add data collected from other study designs, languages, and acupuncture techniques to explore new evidence on pain management in critically ill patients. In addition, it addresses aspects related to the different ages of children in PICUs who are receiving non-pharmacological treatment for pain.

Furthermore, paediatric intensive care professionals need access to the best and most up-to-date scientific evidence on non-pharmacological therapies for pain management in PICUs [6, 8-9]. The development of a quality scoping review protocol can provide data that explores the phenomenon of non-pharmacological therapies in critically ill children and helps interpret the various factors involved in paediatric critical care. Thus, this review aims to map the research that used non-pharmacological therapies for pain management in PICUs

and provide evidence from the literature to investigate the characteristics of these techniques.

**METHODS AND ANALYSIS**

Scoping reviews seek to synthesise evidence for researchers, clinicians, and policymakers, gather and describe the evidence, and present an easily illustrative summary [20]. As non-pharmacological therapies exhibit a multiplicity of techniques with varied health impacts and use according to different patient ages, the scoping review was deemed the most appropriate review to illustrate the different nuances of this topic in the paediatric spectrum, which is also heterogeneous.

This scoping review will be conducted according to the chapter on scoping reviews in the Joanna Briggs Institute (JBI) Manual for Evidence Synthesis [21] and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Extension for Scoping Reviews (Appendix 1) [22]. This protocol is registered in the Open Science Framework (<https://doi.org/10.17605/OSF.IO/GKETX>). This review will be conducted in five phases: 1) identification of the research question; 2) identification of studies; 3) selection of studies; 4) mapping and comparison of the data; 5) collecting, summarising, and reporting the results [23]; 6) consultation with stakeholders about the results (optional) [24].

**Patient and public involvement**

This study does not involve patients or the public.

**Identifying the research question**

The research question for this scoping review is "What non-pharmacological therapies have been used for pain management in PICUs?" To support this query, four sub-questions were developed:

1. What techniques were used among different age groups?
2. What scores on the pain scales define the use of non-pharmacological therapy?
3. How the techniques used for the management of pain?
4. What therapies impacted decreased pain, mechanical ventilation duration, or reduction in length of stay in the PICU?
5. What factors assess their effectiveness?

To construct the research question, we used the Population, Concept, Context (PCC) strategy recommended by the JBI [20] and the table proposed by Ahmad *et al.* (2022) (Table 1) [25].

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**Table 1.** The inclusion and exclusion criteria are based on the PCC framework

	Inclusion criteria	Exclusion criteria
Population	Newborns Infants Children Adolescents	-
Concept	Pain management Analgesia Pain measurement Complementary therapies Alternative therapies Integrative therapies Integrative medicine Aromatherapy Oils, volatile Acupuncture Acupuncture therapy Acupuncture, ear Mind-Body therapies Breathing exercises Imagery, psychotherapy Hypnosis Biofeedback, psychology Music therapy Muscle relaxation Sleep Physical therapy modalities	Pharmacologic therapies
Context	Paediatric intensive care units (PICU)	Home assistance services outpatient care  Inpatient ward settings
Types of evidence	Quantitative studies Qualitative studies Mixed-methods studies Systematic reviews Opinion articles Grey literature Letters to the editor Editorials Others	-

This review will consider studies that explore unconventional pain management therapies. In healthcare, complementary therapies indicate the integration of an alternative

approach with conventional medicine. If an unconventional health intervention is used instead of traditional medicine, we call it "alternative" therapy. If an intervention occurs through the coordinated action of traditional medicine and an unconventional approach, the term "integrative" therapy is used [26].

However, identifying what therapies constitute complementary, alternative, and integrative medicine is complex [27]. One operational definition of "complementary and alternative medicine" was proposed by Cochrane researchers in 2011. There was also a discussion on integrative health and integrative medicine that influenced the National Center for Complementary and Alternative Medicine in the U.S. and changed it to the National Center for Complementary and Integrative Health (NIH) [26, 28].

This review will adopt the term non-pharmacological therapies, even though it is not described in the US National Library of Medicine Medical Subject Headings (MeSH) terms, it incorporates complementary therapies, alternative therapies, integrative therapies, and integrative medicine.

### Identifying relevant studies

Our search strategy was developed in collaboration with a librarian at a leading university in Brazil and aims to locate primary published studies, reviews, and text articles. First, a limited initial search will be performed on the Cumulative Index of Nursing and Allied Health Literature (CINAHL) and Medical Literature Analysis and Retrieval System Online (MEDLINE) to identify relevant terms and keywords to develop the final search strategy. For transparency and replication of the review, a chart was created based on the protocol by Ahmad *et al.* (2022) [25], which outlines the details of the strategy with MeSH terms and text words (Table 2).

**Table 2.** Medical Subject Headings (MeSH) terms/text words. [25, 29]

<b>Population</b>
Newborns, infants, children, and adolescents
<b>Concept</b>
1. "pain management" [MeSH Terms] OR "pain management" [Text Word] OR "pain relief" [Text Word] OR "pain control" [Text Word] OR "pain reduction" [Text Word] OR "managing pain" [Text Word] OR "analgesia" [MeSH Terms] OR "analgesia" [Text Word]
2. "pain measurement" [MeSH Terms] OR "pain assessment" [Text Word] OR "pain measurement" [MeSH Terms] OR "pain scale" [Text Word] OR "pain tool" [Text Word] OR "pain assessment tool" [Text Word] OR "pain instrument" [Text Word] OR "pain intervention" [Text Word] OR "pain measurement" [MeSH Terms] OR "pain measurement" [Text Word]
3. 1 OR 2
4. "integrative medicine" [MeSH Terms] OR "integrative medicine" [Text Word] OR "complementary therapies" [MeSH Terms] OR "complementary medicine" [Text Word] OR "complementary therapies" [MeSH Terms] OR "alternative medicine" [Text Word] OR "integrative therapy" [Text Word] OR "integrative therapies" [Text Word] OR "complementary therapy" [Text Word] OR "complementary therapies" [MeSH Terms] OR "complementary therapies" [Text Word] OR "alternative therapy" [Text Word] OR "complementary therapies" [MeSH Terms] OR "alternative therapies" [Text Word] OR "alternative treatment" [Text Word]
5. "non-pharmacological intervention" [Text Word] OR "non-pharmacological interventions" [Text Word] OR "non-pharmacological therapy" [Text Word] OR "non-pharmacological therapies" [Text Word] OR "non-pharmacological treatment" [Text Word]
6. "aromatherapy" [MeSH Terms] OR "aromatherapy" [Text Word] OR "oils, volatile" [MeSH Terms] OR "essential oils" [Text Word] OR "aromatherapy" [MeSH Terms] OR "aroma therapy" [Text Word]
7. "acupuncture" [MeSH Terms] OR "acupuncture therapy" [MeSH Terms] OR "acupuncture" [Text Word] OR "acupuncture therapy" [MeSH Terms] OR "acupuncture therapy" [Text Word] OR "acupuncture treatment" [Text Word] OR "acupuncture, ear" [MeSH Terms] OR "acupuncture ear" [Text Word]
8. "mind-body techniques" [Text Word] OR "mind-body therapies" [MeSH Terms] OR "mind-body therapies" [Text Word]
9. "breathing techniques" [Text Word] OR "breathing exercises" [MeSH Terms] OR "breathing exercise" [Text Word]

10. "guided imagery intervention" [Text Word] OR "guided imagery interventions" [Text Word] OR "imagery, psychotherapy" [MeSH Terms] OR "guided imagery" [Text Word] OR "guided relaxation" [Text Word]
11. "hypnosis" [MeSH Terms] OR "hypnosis" [Text Word] OR "hypnotherapy" [Text Word]
12. "biofeedback, psychology" [MeSH Terms] OR "biofeedback" [Text Word] OR "biofeedback therapy" [Text Word]
13. "music therapy" [MeSH Terms] OR "music therapy" [Text Word] OR "music intervention" [Text Word] OR "musical therapy" [Text Word] OR "music-based intervention" [Text Word] OR "therapeutic music" [Text Word]
14. "progressive muscle relaxation" [Text Word] OR "muscle relaxation" [MeSH Terms] OR "muscle relaxation" [Text Word]
15. "sleep therapy" [Text Word] OR "sleep" [MeSH Terms] OR "sleep" [Text Word]
16. "massage therapy" [Text Word] OR "massage" [Text Word] OR "massage therapies" [Text Word]
17. "physical therapy modalities" [MeSH Terms] OR "physical therapy" [Text Word] OR "physical therapy modalities" [MeSH Terms] OR "physiotherapy" [Text Word]
18. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17
<b>Context</b>
19. "paediatric intensive care unit" [Text Word] OR "picu" [Text Word] OR "paediatric critical care unit" [Text Word] OR "paediatric critical care" [Text Word] OR "intensive care units, paediatric" [MeSH Terms]
20. 3 AND 18 AND 19

The keywords in the titles and abstracts of articles and the indexing terms used in the articles will be used to guide a complete search strategy for Academic Search Premier, CINAHL, Cochrane Library, Excerpta Medica Database (Embase), Virtual Health Library (VHL), MEDLINE, Science-Direct, Scopus, and Web of Science Core Collection to be disclosed with the results of the scoping review.

The search strategy will consider the particularity of each information source, including all the identified keywords and indexing terms. The strategy will consider articles published in any language and with any database at the start or date of insertion. We use independent professional translation services for the authors' translation of articles in non-native languages.

In addition to the electronic databases, contact will be made with the study authors, when necessary, to clarify any doubts. This protocol will consider sources of unpublished studies: Theses from *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* (CAPES), Dart Europe (DART-E), Open Access Theses and Dissertations (OATD), and grey literature in Google Scholar. The online supplemental Appendix 2 provides a list of possible search queries.

**Study selection**

The search process will be carried out in two stages: 1) reading the title and abstract (first set of records); and 2) reading the full article (second set of records). Screening, which will result in the first set of records, will be performed by two pairs of reviewers who will divide the search as follows: 1) Pair A (IGMA and JKSD) will perform the search using the following sources: Academic Search Premier, CINAHL, VHL, Embase, Science-Direct, DART-E, OATD, and grey literature from Google Scholar; 2) Pair B (SCMA and JT) will perform the search using the following sources: Cochrane Library, MEDLINE, Scopus, Web of Science, and CAPES.

The first data record will be grouped and loaded in EndNote 2.0 (Clarivate Analytics, PA, USA), and duplicates will be removed. A pilot test will be carried out on two sources of information, CINAHL and MEDLINE, for evaluation according to the inclusion criteria for the review. The potentially relevant articles will be retrieved in full, comprising the second set of records and their citation details, and will be imported into Rayyan (Rayyan Systems Inc., MA, Cambridge).

At this stage, any necessary adjustments will be made to the search strategy to meet the inclusion criteria of the review. After completing the pilot test, two reviewers (IGMA and ABC) will evaluate the full text of the other selected citations to check whether they meet the inclusion criteria. The reasons for excluding full-text articles that do not meet the inclusion criteria will be recorded and reported in the scoping review. A third reviewer (JT) will resolve the disagreements at any stage of this process. The research results will be fully reported in the final scoping review and presented in a [30] flow diagram (Figure 1) [30].

**Mapping and comparison of the data**

Data will be extracted using a data extraction tool developed by the authors based on a model proposed by the JBI in Table 3 [20].

**Table 3.** Outline of the extraction tool

Source of evidence (citation)	Year	Country	Participants		Therapies techniques	Moment and mode of use	Impact on pain	Assesses their effectiveness
			Sex	Age				

This can then be refined further to address the research question for the scoping review, as required. The feasibility of the extraction tool will be tested on a subset of the second set of records, and this will then be modified and revised for each article included in the data extraction process. Any modifications will be detailed in the full scoping review.

Two reviewers will be involved in data extraction (IGMA and ABC). Data extraction will occur independently, with cross-checking of the extracted evidence. A third reviewer (JT) will resolve any disagreements between the authors regarding dissimilarities in terms of data extraction.

### **Collating, summarising, and reporting the results**

The total number of studies included will be presented in a summarised table format, using the extraction tool as a guide. Subsequently, the data will be grouped according to the Patterns, Advances, Gaps, Evidence for Practice, and Research Recommendations strategy proposed by Jones and Aveyard. [24] Each component represents a domain. The starting point is to produce the "Chart of Patterns." It displays the articles included in the review on one axis and the themes on the other to report the themes expressed in the articles. After the patterns are identified, advances and gaps can be identified and reported, resulting in the last domain of the framework, which is to recommend future research. In addition, the strategy also makes it possible to identify topics that do not require further research; that is, the scientific community has explored them well.

### **ETHICS AND DISSEMINATION**

As scoping reviews use secondary data from other primary sources, approval for the protocol and review by the Research Ethics Committee will not be necessary. The results of this research will be disseminated through social media channels and podcasts about pain in children.

**AUTHORS' CONTRIBUTIONS**

IGMA and JT contributed to conception and design of this protocol. IGMA, SCMA, JKD, PLOA, and TEF contributed to acquisition of data. IGMA conceptualised the research question, and prepared the drafts and manuscript edits. JSAO provided methodological expertise. TEF, and ABC, helped refine the research question. All authors have contributed to the study design and revised the protocol. All authors have approved the final manuscript.

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**COMPETING INTERESTS STATEMENT**

None declared.

**DATA SHARING STATEMENT**

This protocol has been registered with the Open Science Framework (DOI 10.17605/OSF.IO/DZHKT).

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## FIGURE LEGEND

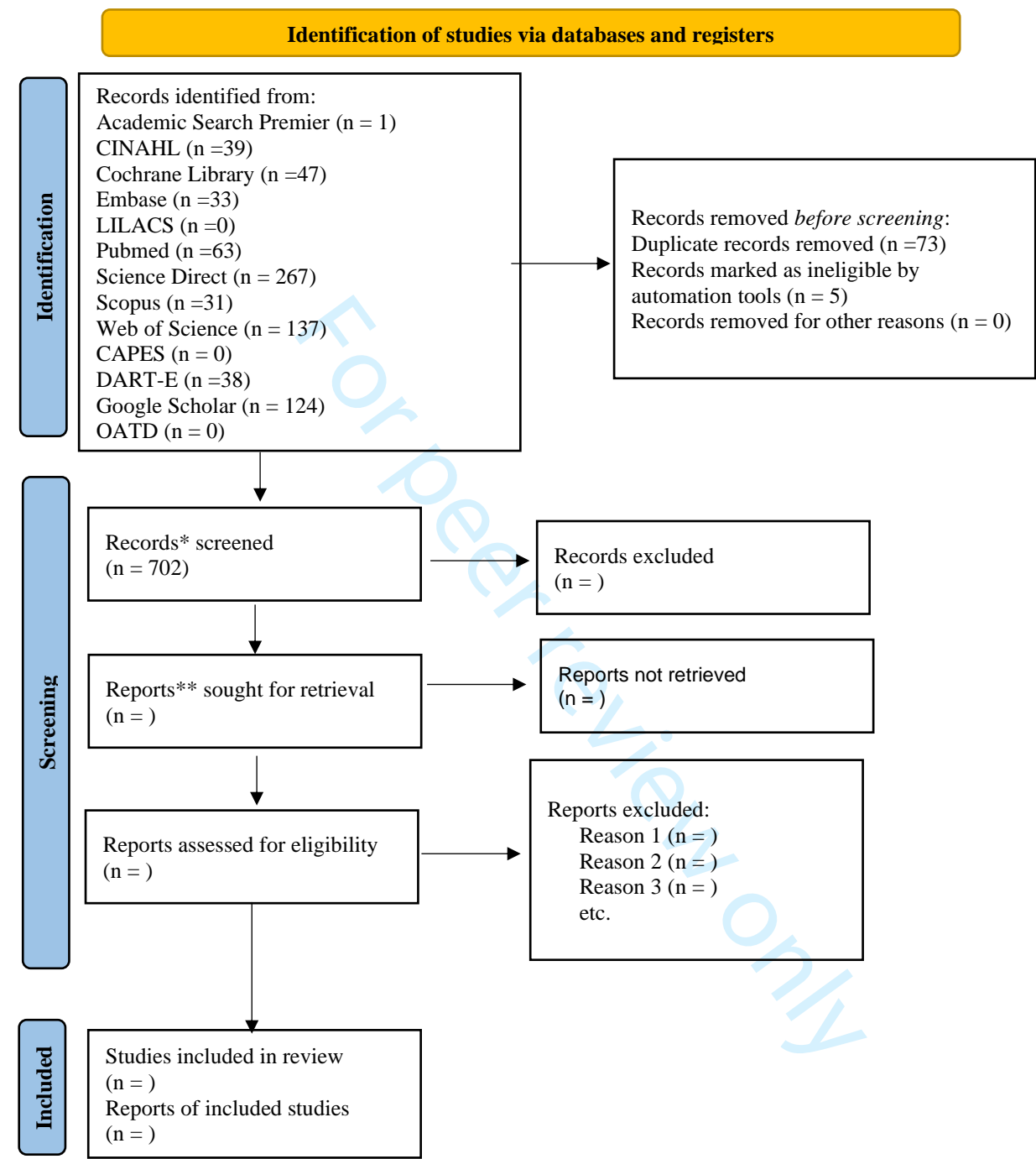
### Figure 1.

\*Report: A document (paper or electronic) supplying information about a particular study. It could be a journal article, preprint, conference abstract, study register entry, clinical study report, dissertation, unpublished manuscript, government report, or any other document providing relevant information.

\*\*Record: The title or abstract (or both) of a report indexed in a database or website (such as the title or abstract for an article indexed in Medline). Records that refer to the same report (such as the same journal article) are “duplicates”; however, records that refer to reports that are merely similar (such as a similar abstract submitted to two different conferences) should be considered unique.

Figure 1

PRISMA 2020 flow diagram for new systematic reviews which included searches of databases and registers only.<sup>30</sup> Research results until July 2023.



## Appendix 1

### Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist<sup>22</sup>

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
<b>TITLE</b>			
Title	1	Identify the report as a scoping review.	1
<b>ABSTRACT</b>			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	2
<b>INTRODUCTION</b>			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	4-7
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	6 and 7
<b>METHODS</b>			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	7
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	9
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	10-13
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	11 and 12
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	13
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	13 and 14
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	14
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	Not available
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	14

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SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Not started
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Not started
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Not started
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Not started
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Not started
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	Not started
Limitations	20	Discuss the limitations of the scoping review process.	Not started
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	Not started
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	Not one

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

\* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).



## Appendix 2

## Draft Search Strategy

Dates of coverage and database	Query	Retrieved records
09/21/22  CINAHL	1. MH (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR TI (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR AB (pain management or pain relief or pain control or pain reduction or managing pain or analgesia)	84,304
	2. MH (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain measurement) OR TI (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain measurement) OR AB (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain measurement)	75,339
	3. 1 OR 2	133,679
	4. MH (integrative medicine or complementary medicine or alternative medicine) OR TI (integrative medicine or complementary medicine or alternative medicine) OR AB (integrative medicine or complementary medicine or alternative medicine)	16,007
	5. MH ( integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment) OR TI (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment) OR AB (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment)	60,250
	6. MH (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment) OR TI (non- pharmacological intervention or	3,068



	non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment) OR AB (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment)	
7.	MH (aromatherapy or essential oils or aroma therapy) OR TI (aromatherapy or essential oils or aroma therapy) OR AB (aromatherapy or essential oils or aroma therapy)	7,565
8.	MH (acupuncture or acupuncture therapy or acupuncture treatment) OR TI (acupuncture or acupuncture therapy or acupuncture treatment) OR AB (acupuncture or acupuncture therapy or acupuncture treatment)	20,538
9.	MH acupuncture, ear OR TI acupuncture, ear OR AB acupuncture, ear	590
10.	MH (mind body techniques or mind-body therapies) OR TI (mind body techniques or mind-body therapies) OR AB (mind body techniques or mind-body therapies)	3,952
11.	MH (breathing techniques or breathing or breathing exercise) OR TI (breathing techniques or breathing or breathing exercise) OR AB (breathing techniques or breathing or breathing exercise)	20,189
12.	MH (guided imagery for pain management or guided image therapy or guided images therapies) OR TI (guided imagery for pain management or guided image therapy or guided images therapies) OR AB (guided imagery for pain management or guided image therapy or guided images therapies)	646
13.	MH (guided imagery or guided relaxation or visualization techniques) OR TI (guided imagery or guided relaxation or visualization techniques) OR AB (guided imagery or guided relaxation or visualization techniques)	4,120
14.	MH (hypnosis or hypnotherapy) OR TI (hypnosis or hypnotherapy) OR AB (hypnosis or hypnotherapy)	4,011

15. MH (biofeedback or biofeedback therapy) OR TI (biofeedback or biofeedback therapy) OR AB (biofeedback or biofeedback therapy)	4,994
16. MH (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music) OR TI (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music ) OR AB (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music )	7,558
17. MH (progressive muscle relaxation or muscle relaxation) OR TI (progressive muscle relaxation or muscle relaxation) OR AB (progressive muscle relaxation or muscle relaxation)	2,299
18. MH (sleep therapy or sleep) OR TI (sleep therapy or sleep) OR AB (sleep therapy or sleep)	77,183
19. MH (massage therapy or massage or massage therapies) OR TI (massage therapy or massage or massage therapies) OR AB (massage therapy or massage or massage therapies)	21,418
20. MH (physical therapy or physiotherapy) OR TI (physical therapy or physiotherapy) OR AB (physical therapy or physiotherapy)	61,296
21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	277,529
22. MH (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR TI (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR AB (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care)	9,239
23. MH intensive care units, pediatric OR TI intensive care units, pediatric OR AB intensive care units, pediatric	8,949

	24. 22 OR 23	11,491
	25. 3 AND 21 AND 24	38

Dates of coverage and database	Query	Retrieved records
09/21/22  MEDLINE  (PubMed)	1. "pain management"[MeSH Terms] OR "pain management"[Text Word] OR "pain relief"[Text Word] OR "pain control"[Text Word] OR "pain reduction"[Text Word] OR "managing pain"[Text Word] OR "analgesia"[MeSH Terms] OR "analgesia"[Text Word]	177,128
	2. "pain measurement"[MeSH Terms] OR "pain assessment"[Text Word] OR "pain measurement"[MeSH Terms] OR "pain scale"[Text Word] OR "pain tool"[Text Word] OR "pain assessment tool"[Text Word] OR "pain instrument"[Text Word] OR "pain intervention"[Text Word] OR "pain measurement"[MeSH Terms] OR "pain measurement"[Text Word]	101,025
	3. 1 OR 2	246,193
	4. "integrative medicine"[MeSH Terms] OR "integrative medicine"[Text Word] OR "complementary therapies"[MeSH Terms] OR "complementary medicine"[Text Word] OR "complementary therapies"[MeSH Terms] OR "alternative medicine"[Text Word] OR "integrative therapy"[Text Word] OR "integrative therapies"[Text Word] OR "complementary therapy"[Text Word] OR "complementary therapies"[MeSH Terms] OR "complementary therapies"[Text Word] OR "alternative therapy"[Text Word] OR "complementary therapies"[MeSH Terms] OR "alternative therapies"[Text Word] OR "alternative treatment"[Text Word]	274,042
	5. "nonpharmacological intervention"[Text Word] OR "nonpharmacological interventions"[Text Word] OR "nonpharmacological therapy"[Text Word] OR "nonpharmacological therapies"[Text Word] OR "nonpharmacological treatment"[Text Word]	5,292

6.	"aromatherapy"[MeSH Terms] OR "aromatherapy"[Text Word] OR "oils, volatile"[MeSH Terms] OR "essential oils"[Text Word] OR "aromatherapy"[MeSH Terms] OR "aroma therapy"[Text Word]	23,007
7.	"acupuncture"[MeSH Terms] OR "acupuncture therapy"[MeSH Terms] OR "acupuncture"[Text Word] OR "acupuncture therapy"[MeSH Terms] OR "acupuncture therapy"[Text Word] OR "acupuncture treatment"[Text Word] OR "acupuncture, ear"[MeSH Terms] OR "acupuncture ear"[Text Word]	35,397
8.	"mind body techniques"[Text Word] OR "mind body therapies"[MeSH Terms] OR "mind body therapies"[Text Word]	<u>46,477</u>
9.	"breathing techniques"[Text Word] OR "breathing exercises"[MeSH Terms] OR "breathing exercises"[Text Word]	<u>4,632</u>
10.	"guided imagery intervention"[Text Word] OR "guided imagery interventions"[Text Word] OR "imagery, psychotherapy"[MeSH Terms] OR "guided imagery"[Text Word] OR "guided relaxation"[Text Word]	2,746
11.	"hypnosis"[MeSH Terms] OR "hypnosis"[Text Word] OR "hypnotherapy"[Text Word]	15,942
12.	"biofeedback, psychology"[MeSH Terms] OR "biofeedback"[Text Word] OR "biofeedback therapy"[Text Word]	<u>16,054</u>
13.	"music therapy"[MeSH Terms] OR "music therapy"[Text Word] OR "music intervention"[Text Word] OR "musical therapy"[Text Word] OR "music based intervention"[Text Word] OR "therapeutic music"[Text Word]	5,367
14.	"progressive muscle relaxation"[Text Word] OR "muscle relaxation"[MeSH Terms] OR "muscle relaxation"[Text Word]	<u>35,626</u>
15.	"sleep therapy"[Text Word] OR "sleep"[MeSH Terms] OR "sleep"[Text Word]	<u>232,994</u>

	16. "massage therapy"[Text Word] OR "massage"[Text Word] OR "massage therapies"[Text Word]	16,186
	17. "physical therapy modalities"[MeSH Terms] OR "physical therapy"[Text Word] OR "physical therapy modalities"[MeSH Terms] OR "physiotherapy"[Text Word]	200,591
	18. 4 OR 5 OR 6 OR 7 OR 8OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17	746,903
	19. "pediatric intensive care unit"[Text Word] OR "picu"[Text Word] OR "pediatric critical care unit"[Text Word] OR "paediatric critical care"[Text Word] OR "intensive care units, pediatric"[MeSH Terms]	31,624
	20. 3 AND 18 AND 19	63

Dates of coverage and database	Query	Retrieved records
09/14/22 ACADEMIC SEARCH PREMIER	1. (pain management) OR (DE "PAIN management" OR DE "DRY needling" OR DE "PAIN measurement" OR DE "BRIEF Pain Inventory" OR DE "MCGILL Pain Questionnaire")	81,825
	2. DE "ALTERNATIVE medicine" OR DE "ACUPUNCTURE" OR DE "ALTERNATIVE treatment" OR DE "BOTANIC medicine" OR DE "CHIROPRACTIC" OR DE"CHRONOTHERMAL medicine" OR DE	38,185

	"DRY needling" OR DE "ENERGY medicine" OR DE "HOLISTIC medicine" OR DE "HOMEOPATHY" OR DE "MENTAL healing" OR DE "NATUROPATHY"	
	3. DE "PEDIATRIC intensive care" OR ""PEDIATRIC intensive care units" OR PICU	10,655
	4. 1 AND 2 AND 3	1

Dates of coverage and database	Query	Retrieved records
10/03/22  COCHRANE	1. ("pain"):ti,ab,kw OR ("pain assessment"):ti,ab,kw	215514
	2. ("integrative medicine"):ti,ab,kw OR ("complementary medicine"):ti,ab,kw OR ("alternative medicine"):ti,ab,kw	4013
	3. ("non-pharmacological"):ti,ab,kw AND ("therapies"):ti,ab,kw OR ("treatment"):ti,ab,kw OR ("intervention"):ti,ab,kw	1147812
	4. ("aromatherapies"):ti,ab,kw OR ("essential oil"):ti,ab,kw	2174
	5. ("acupuncture"):ti,ab,kw OR ("acupuncture analgesia"):ti,ab,kw	17333
	6. ("mind body"):ti,ab,kw OR ("mind body medicine"):ti,ab,kw OR ("mind body therapies"):ti,ab,kw	1248
	7. ("breathing"):ti,ab,kw	34728
	8. ("guided imagery"):ti,ab,kw	806

9.	("hypnotherapy"):ti,ab,kw	380
10.	("biofeedback"):ti,ab,kw OR ("biofeedback training"):ti,ab,kw	3897
11.	("music therapy"):ti,ab,kw	2613
12.	("progressive muscle relaxation"):ti,ab,kw OR ("progressive muscle relaxation training"):ti,ab,kw	820
13.	("sleep"):ti,ab,kw	46268
14.	("massage therapy"):ti,ab,kw	875
15.	("physical therapy"):ti,ab,kw OR ("physical therapy	11504
16.	("pediatric intensive care unit"):ti,ab,kw OR ("paediatric intensive care"):ti,ab,kw OR ("paediatric intensive care unit"):ti,ab,kw OR ("paediatric intensive care units"):ti,ab,kw	1095
17.	1 AND 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 AND 16	0
18.	1 AND 3 AND 16	46
19.	1 AND 7 AND 16	10
20.	1 AND 11 AND 16	2
21.	1 AND 13 AND 16	5
22.	1 AND 15 AND 16	1

	23. 1 AND 3 AND 16 OR 1 AND 7 AND 16 OR 1 AND 11 AND 16 OR 1 AND 13 AND 16 OR 1 AND 15 AND 16	47
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Dates of coverage and database	Query	Retrieved records
10/23/22 EMBASE	1. pain'/exp OR 'pain' OR 'analgesia'/exp OR 'analgesia'	2062548
	2. 'integrative medicine'/exp OR 'integrative medicine' OR 'alternative medicine'/exp OR 'alternative medicine' OR 'aromatherapy'/exp OR 'aromatherapy' OR 'essential oil'/exp OR 'essential oil' OR 'acupuncture'/exp OR 'acupuncture' OR 'auricular acupuncture'/exp OR 'auricular acupuncture' OR 'breathing exercise'/exp OR 'breathing exercise' OR 'guided imagery'/exp OR 'guided imagery' OR 'hypnosis'/exp OR 'hypnosis' OR 'biofeedback'/exp OR 'biofeedback' OR 'music therapy'/exp OR 'music therapy' OR 'muscle relaxation'/exp OR 'muscle relaxation' OR 'sleep quality'/exp OR 'sleep quality' OR 'massage'/exp OR 'massage' OR 'physiotherapy'/exp OR 'physiotherapy' OR	255690
	3. 'pediatric intensive care unit'/exp OR 'pediatric intensive care unit'	22687
	4. 1 AND 2 AND 3	33

Dates of coverage and database	Query	Retrieved records
10/23/22 LILACS	1. "DOR" or "avaliacao da DOR" or "escala analogica da DOR" or "escala analogica visual de DOR" or "intensidade da DOR" or "limiar da DOR" or "manejo da DOR" or "medicao da DOR" or "percepcao da DOR" or "unidades de alivio da DOR" or "DOR aguda" or "DOR cronica" [Descritor de assunto]	5862



	2. "TERAPIAS COMPLEMENTARES" or "TERAPIAS COMPLEMENTARES e integrativas" [Descritor de assunto]	1429
	3. "unidade de terapia intensiva pediátrica" [Descritor de assunto]	767
	4. 1 and 2 and 3	0

Dates of coverage and database	Query	Retrieved records
SCIENCE DIRECT	1. Title, abstract, keyword: pain	232,587
	2. Title, abstract, keyword: complementary and alternative medicine	3342
	3. Title, abstract, keyword: integrative medicine	6951
	4. pediatric intensive care unit	3787
	1 AND 2 OR 3 AND 4	267

Dates of coverage and database	Query	Retrieved records
09/23/22  SCOPUS	1. TITLE("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia) OR ABS("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia) OR TITLE-ABS-KEY(Pain Management OR Pain Relief OR Pain Control OR Pain Reduction OR "Managing Pain" OR Analgesia)	(344,701)
	2. TITLE("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement") OR ABS("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement") OR TITLE-ABS-KEY("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement")	(145,947)
	3. 1 OR 2	(423,690)
	4. TITLE("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine") OR ABS("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine") OR TITLE-ABS-KEY("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine")	(58,538)
	5. TITLE("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment") OR ABS("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment") OR TITLE-ABS-KEY("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment")	(59,454)

6. TITLE(“Non-pharmacological Intervention” OR “Non-pharmacological Interventions” OR “Non-pharmacological Therapy” OR “Non-pharmacological Therapies” OR “Non-pharmacological Treatment”) OR ABS(“Non-pharmacological Intervention” OR “Non-pharmacological Interventions” OR “Non-pharmacological Therapy” OR “Non-pharmacological Therapies” OR “Non-pharmacological Treatment”) OR TITLE-ABS-KEY(“Non-pharmacological Intervention” OR “Non-pharmacological Interventions” OR “Non-pharmacological Therapy” OR “Non-pharmacological Therapies” OR “Non-pharmacological Treatment”)	(7,752)
7. TITLE(Aromatherapy OR “Essential Oils” OR Aroma therapy) OR ABS(Aromatherapy OR “Essential Oils” OR Aroma therapy) OR TITLE-ABS-KEY(Aromatherapy OR “Essential Oils” OR Aroma therapy)	(3.885)
8. TITLE(“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”) OR ABS (“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”) OR TITLE-ABS-KEY(“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”)	(52,587)
9. TITLE(“Acupuncture, Ear”) OR ABS(“Acupuncture, Ear”) OR TITLE-ABS-KEY(“Acupuncture, Ear”)	(452)
10. TITLE(“Mind Body Techniques” OR “Mind-body Therapies”) OR ABS(“Mind Body Techniques” OR “Mind-body Therapies”) OR TITLE-ABS-KEY(“Mind Body Techniques” OR “Mind-body Therapies”)	(1.625)
11. TITLE(“Breathing Techniques”OR Breathing OR “Breathing Exercise”) OR ABS(“Breathing Techniques”OR Breathing OR “Breathing Exercise”) OR TITLE-ABS-KEY(“Breathing Techniques”OR Breathing OR “Breathing Exercise”)	(279.806)
12. TITLE(“Guided Imagery for Pain Management” OR “Guided Image Therapy” OR “Guided Images Therapies”) OR ABS(“Guided Imagery for Pain Management” OR “Guided Image Therapy” OR “Guided Images Therapies”) OR TITLE-ABS-KEY(“Guided Imagery for Pain Management” OR “Guided Image Therapy” OR “Guided Images Therapies”)	4
13. TITLE(“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”) OR ABS(“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”) OR TITLE-ABS-KEY(“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”)	17,176

14. TITLE(Hypnosis OR Hypnotherapy) OR ABS(Hypnosis OR Hypnotherapy) OR TITLE-ABS-KEY(Hypnosis OR Hypnotherapy)	22,266
15. TITLE(Biofeedback OR "Biofeedback Therapy") OR ABS(Biofeedback OR "Biofeedback Therapy") OR TITLE-ABS-KEY(Biofeedback OR "Biofeedback Therapy")	17,108
16. TITLE("Music Therapy" OR "Music Intervention" OR "Musical Therapy" OR "Music-based Intervention" OR "Therapeutic Music") OR ABS("Music Therapy" OR "Music Intervention" OR "Musical Therapy" OR "Music-based Intervention" OR "Therapeutic Music") OR TITLE-ABS-KEY("Music Therapy" OR "Music Intervention" OR "Musical Therapy" OR "Music-based Intervention" OR "Therapeutic Music")	11,454
17. TITLE("Progressive Muscle Relaxation" OR "Muscle Relaxation") OR ABS("Progressive Muscle Relaxation" OR "Muscle Relaxation") OR TITLE-ABS-KEY("Progressive Muscle Relaxation" OR "Muscle Relaxation")	34,970
18. TITLE("Sleep Therapy" OR Sleep) OR ABS("Sleep Therapy" OR Sleep) OR TITLE-ABS-KEY("Sleep Therapy" OR Sleep)	340,832
19. TITLE("Massage Therapy" OR Massage OR "Massage Therapies") OR ABS("Massage Therapy" OR Massage OR "Massage Therapies") OR TITLE-ABS-KEY("Massage Therapy" OR Massage OR "Massage Therapies")	28,624
20. TITLE("Physical Therapy" OR Physiotherapy) OR ABS("Physical Therapy" OR Physiotherapy) OR TITLE-ABS-KEY("Physical Therapy" OR Physiotherapy)	129,632
21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	937,453
22. TITLE("Pediatric Intensive Care Unit" OR PICU OR "Pediatric Critical Care Unit" OR "Paediatric Intensive Care" OR "Paediatric Critical Care") OR ABS("Pediatric Intensive Care Unit" OR PICU OR "Pediatric Critical Care Unit" OR "Paediatric Intensive Care" OR "Paediatric Critical Care") OR TITLE-ABS-KEY("Pediatric Intensive Care Unit" OR PICU OR "Pediatric Critical Care Unit" OR "Paediatric Intensive Care" OR "Paediatric Critical Care")	20,379

	23. TITLE(“Intensive Care Units, Pediatric”) OR ABS(“Intensive Care Units, Pediatric”) OR TITLE-ABS-KEY(“Intensive Care Units, Pediatric”)	8,226
	24. 22 OR 23	22,008
	25. 3 AND 21 AND 24	31

Dates of coverage and database	Query	Retrieved records
09/21/22  WEB OF SCIENCE	1. TS= (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR TI= (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR AB= (pain management or pain relief or pain control or pain reduction or managing pain or analgesia)	(376,576)
	2. TS= (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain intervention or pain measurement) OR TI= (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain intervention or pain measurement) OR AB= (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain intervention or pain measurement)	(241,031)
	3. 1 OR 2	(475,359)
	4. TS= (integrative medicine or complementary medicine or alternative medicine) OR TI= (integrative medicine or complementary medicine or alternative medicine) OR AB= (Integrative medicine or complementary medicine or alternative medicine)	(51,961)

5. TS= (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment) OR TI= (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment ) OR AB= (Integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment)	(288,290)
6. TS= (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment) OR TI= (non- pharmacological intervention or non-pharmacological therapies or non-pharmacological treatment) OR AB= (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment)	(12,420)
7. TS= (aromatherapy or essential oils or aroma therapy) OR TI= (aromatherapy or essential oils or aroma therapy) OR AB= (aromatherapy or essential oils or aroma therapy)	(86,864)
8. TS= (acupuncture or acupuncture therapy or acupuncture treatment) OR TI= (acupuncture or acupuncture therapy or acupuncture treatment) OR AB= (acupuncture or acupuncture therapy or acupuncture treatment)	(25,368)
9. TS= (acupuncture, ear) OR TI= (acupuncture, ear) OR AB= (acupuncture, ear)	(547)
10. TS= (mind body techniques or mind-body therapies) OR TI= (mind body techniques or mind-body therapies) OR AB= (mind body techniques or mind-body therapies)	(2,430)
11. TS= (breathing techniques or breathing or breathing exercise) OR TI= (breathing techniques or breathing or breathing exercise) OR AB= (breathing techniques or breathing or breathing exercise)	(99,065)
12. TS= (guided imagery for pain management or guided image therapy or guided images therapies) OR TI= (guided imagery for pain management or guided image therapy or guided images therapies) OR AB= (guided imagery for pain management or guided image therapy or guided images therapies)	(22,227)

13. TS= (guided imagery or guided relaxation or visualization techniques) OR TI= (guided imagery or guided relaxation or visualization techniques) OR AB= (guided imagery or guided relaxation or visualization techniques)	(68,289)
14. TS= (hypnosis or hypnotherapy) OR TI= (hypnosis or hypnotherapy) OR AB= (hypnosis or hypnotherapy)	(10,831)
15. TS= (biofeedback or biofeedback therapy) OR TI= (biofeedback or biofeedback therapy) OR AB= (biofeedback or biofeedback therapy)	(12,661)
16. TS= (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music) OR TI= (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music) OR AB= (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music)	(11,018)
17. TS= (progressive muscle relaxation or muscle relaxation) OR TI= (progressive muscle relaxation or muscle relaxation) OR AB= (progressive muscle relaxation or muscle relaxation)	(33,638)
18. TS= (sleep therapy or sleep) OR TI= (sleep therapy or sleep) OR AB= (sleep therapy or sleep)	(293,420)
19. TS= (massage therapy or massage or massage therapies) OR TI= (massage therapy or massage or massage therapies) OR AB= (massage therapy or massage or massage therapies)	(11,659)
20. TS= (physical therapy or physiotherapy) OR TI= (physical therapy or physiotherapy) OR AB= (physical therapy or physiotherapy)	(121,548)
21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	(1,058,477)
22. TS= (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR TI= (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR AB= (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care)	(21,834)

	23. TS= (intensive care units, pediatric) OR TI= (intensive care units, pediatric) OR AB= (intensive care units, pediatric)	(14,677)
	24. 22 OR 23	(21,834)
	25. 3 AND 21 AND 24	(137)

Dates of coverage and database	Query	Retrieved records
09/26/22  Catálogo de Teses e Dissertações (CAPES)	1. ("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia) OR ("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia) OR ("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia)	47.919
	2. ("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement") OR ("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement") OR ("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement")	17.688
	3. 1 OR 2	60.914
	4. ("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine") OR ("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine") OR ("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine")	5.309



5. ("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment") OR ("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment") OR ("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment")	14.345
6. ("Non-pharmacological Intervention" OR "Non-pharmacological Interventions" OR "Non-pharmacological Therapy" OR "Non-pharmacological Therapies" OR "Non-pharmacological Treatment") OR ("Non-pharmacological Intervention" OR "Non-pharmacological Interventions" OR "Non-pharmacological Therapy" OR "Non-pharmacological Therapies" OR "Non-pharmacological Treatment") OR ("Non-pharmacological Intervention" OR "Non-pharmacological Interventions" OR "Non-pharmacological Therapy" OR "Non-pharmacological Therapies" OR "Non-pharmacological Treatment")	20.398
7. (Aromatherapy OR "Essential Oils" OR Aroma therapy) OR (Aromatherapy OR "Essential Oils" OR Aroma therapy) OR (Aromatherapy OR "Essential Oils" OR Aroma therapy)	8.734
8. ("Acupuncture" OR "Acupuncture Therapy" OR "Acupuncture Treatment") OR ("Acupuncture" OR "Acupuncture Therapy" OR "Acupuncture Treatment") OR ("Acupuncture" OR "Acupuncture Therapy" OR "Acupuncture Treatment")	11.097
9. ("Acupuncture, Ear") OR ("Acupuncture, Ear") OR ("Acupuncture, Ear")	468
10. ("Mind Body Techniques" OR "Mind-body Therapies") OR ("Mind Body Techniques" OR "Mind-body Therapies") OR ("Mind Body Techniques" OR "Mind-body Therapies")	8.897
11. ("Breathing Techniques"OR Breathing OR "Breathing Exercise") OR ("Breathing Techniques"OR Breathing OR "Breathing Exercise") OR ("Breathing Techniques"OR Breathing OR "Breathing Exercise")	12.400
12. ("Guided Imagery for Pain Management" OR "Guided Image Therapy" OR "Guided Images Therapies") OR ("Guided Imagery for Pain Management" OR "Guided Image Therapy" OR "Guided Images Therapies") OR ("Guided Imagery for Pain Management" OR "Guided Image Therapy" OR "Guided Images Therapies")	63.039

13. (“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”) OR (“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”) OR (“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”)	3.632
14. (Hypnosis OR Hypnotherapy) OR (Hypnosis OR Hypnotherapy) OR (Hypnosis OR Hypnotherapy)	19
15. (Biofeedback OR “Biofeedback Therapy”) OR (Biofeedback OR “Biofeedback Therapy”) OR (Biofeedback OR “Biofeedback Therapy”)	5.433
16. (“Music Therapy” OR “Music Intervention” OR “Musical Therapy” OR “Music-based Intervention” OR “Therapeutic Music”) OR (“Music Therapy” OR “Music Intervention” OR “Musical Therapy” OR “Music-based Intervention” OR “Therapeutic Music”) OR (“Music Therapy” OR “Music Intervention” OR “Musical Therapy” OR “Music-based Intervention” OR “Therapeutic Music”)	25.370
17. (“Progressive Muscle Relaxation” OR “Muscle Relaxation”) OR (“Progressive Muscle Relaxation” OR “Muscle Relaxation”) OR (“Progressive Muscle Relaxation” OR “Muscle Relaxation”)	2.847
18. (“Sleep Therapy” OR Sleep) OR (“Sleep Therapy” OR Sleep) OR (“Sleep Therapy” OR Sleep)	13.033
19. (“Massage Therapy” OR Massage OR “Massage Therapies”) OR (“Massage Therapy” OR Massage OR “Massage Therapies”) OR (“Massage Therapy” OR Massage OR “Massage Therapies”)	5.587
20. (“Physical Therapy” OR Physiotherapy) OR (“Physical Therapy” OR Physiotherapy) OR (“Physical Therapy” OR Physiotherapy)	13.679
21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	120.654

	22. (“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”) OR (“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”) OR (“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”)	21.859
	23. (“Intensive Care Units, Pediatric”) OR (“Intensive Care Units, Pediatric”) OR (“Intensive Care Units, Pediatric”)	16.055
	24. 22 OR 23	22.946

Dates of coverage and database	Query	Retrieved records
11/05/22  DART-E	1. pain	547
	2. “"complementary therapies" OR "alternative medicine" OR "integrative medicine" OR "nonpharmacological	168
	3. "pediatric intensive care unit" or "paediatric intensive care unit"	51
	4. 1 AND 2 AND 3	38

Dates of coverage and database	Query	Retrieved records
11/05/22 Google Scholar	1. "complementary therapies" OR "integrative medicine" OR "complementary and alternative medicine" OR "complementary and alternative therapies"	17900
	2. nonpharmacologic	77700
	3. "pediatric intensive care" OR "paediatric intensive care"	17600
	4. 1 OR 2 AND 3 AND doc OR .txt OR .rtf OR .PDF OR .html	124

Dates of coverage and database	Query	Retrieved records
11/05/22 OATD	1. pain	38650
	2. "complementary therapies" OR "alternative medicine" OR "integrative medicine" OR nonpharmacological	1819
	3. "pediatric intensive care unit" or "paediatric intensive care unit"	382

	4. 1 AND 2 AND 3	0
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## Non-pharmacological therapies for pain management in paediatric intensive care units: a protocol for a scoping review

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**Non-pharmacological therapies for pain management in paediatric intensive care units: a protocol for a scoping review**

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**Word count:** 2570

## ABSTRACT

**Introduction:** In critically ill children, pain management is complex owing to cognitive development and the nature of hospitalisation in paediatric intensive therapy units. Although there are many protocols and guidelines for pain control via pharmacological interventions, non-pharmacological practices should also be explored and disseminated for their potential benefit.

**Methods and analysis:** A systematic literature search will be performed using the following databases: Academic Search Premier, Cumulative Index to Nursing and Allied Health Literature, Cochrane Library, Excerpta Medica Database, Virtual Health Library, Medical Literature Analysis and Retrieval System Online, ScienceDirect, Scopus, Web of Science Core Collection, Theses from *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior*, Dart Europe, Open Access Theses and Dissertations, and grey literature from Google Scholar. The research will consider quantitative and qualitative studies, mixed-methods studies, systematic reviews, text articles, opinion articles, letters to editors, and editorials in any language and from any database. The following will be eligible for inclusion: (i) newborns, infants, children, and adolescents; and (ii) non-pharmacological therapies used for pain in paediatric intensive care.

**Ethics and dissemination:** This study does not require ethical approval. The results of this research will be disseminated through social media channels and podcasts about pain in children.

**Trial registration number:** This protocol has been registered with the Open Science Framework (DOI 10.17605/OSF.IO/DZHKT).

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- Promotes updates on what is known about non-pharmacological therapies.
- Presents gaps in knowledge that still need to be addressed.
- Enables the selection of studies in other languages.
- A modification and downsizing occurred within the initial reviewer's team, potentially introducing bias to the evidence.



INTRODUCTION

Admission to the paediatric intensive care unit (PICU) exposes paediatric patients to various pain experiences, and approximately 45–72% of these patients experience pain daily either due to their critical illness, procedures, therapies, or surgeries [1]. As a result, critically ill children have more experience with intense pain, as they are subjected to more painful procedures than children in other hospital divisions, such as medical and surgical units [2]. In the PICU, pain can be caused by the underlying illness or injury, complications of the primary disease, frequent medical procedures that result in pain (e.g., incisions, wound care, and injections), and supporting and monitoring systems (e.g., suctioning an endotracheal tube, manipulation or stripping of drains, removal of catheters or drains) [2, 3]. Tissue hypoxia that develops due to low oxygen saturation, cardiac output, or anaemia can also cause pain [2,3]; prolonged immobilisation can result in pain in the joints and pressure points and from changing positions [2,3].

Despite recent scientific and technological developments, paediatric patients frequently lack adequate pain relief [2-9].

Moreover, lack of pain relief is considered one of the most commonly reported adverse events in United States PICUs [2]. According to the International Association for the Study of Pain, pain relief has been discussed as a human right by international institutions since 2004 [10]. However, treating pain in children remains challenging. One of the obstacles to the management of pain control in paediatrics is the heterogeneity of pain perception and response among different paediatric age groups [1, 10-11].

Although pain diagnosis is often performed using self-reporting scales, this method has limitations in paediatrics. For example, neonates and young children may not have yet achieved the developmental level necessary for effective verbal communication. In this group, the scales use behavioural observation and physiological measures. Moreover, parents and caregivers have more accurate observations than healthcare providers in identifying pain-related facial expressions and responses in children [1]. In The Pain, Agitation, Neuromuscular Blockade, and Delirium in Critically Ill Paediatric Patients with Consideration of the PICU Environment and Early Mobility (PANDEM) Guidelines, Smith *et al.* discussed that the pain assessment tools could be classified as self-report or observation scales [12]. Self-report scales are considered the gold standard and have been validated in children over 3 years of age, although self-assessment from the age of 6 years was considered more reliable. The most used paediatric self-report scales are the Analogue Visual Scale, Numerical Classification Scale, OUCHER Scale, and Wong-Baker Pain Scale.

Alternatively, observation scales incorporate behavioural aspects associated with physiological variables to evaluate the pain in children who are unable to self-report the pain. Among these tools, the Face, Legs, Activity, Cry, Consolability, Comfort, and Comfort-B scales are the most commonly used observation tools in critically ill children [12].

Measuring and treating pain in critically ill children represents a significant endeavour for health professionals [1], and the risk factors for experiencing pain vary from specific factors in paediatric patients to PICU-related factors [12]. The perception of pain may be influenced by age, anxiety, fear, comorbidities, concern about family separation, strange environments, barriers to verbal communication, and racial bias. Indeed, another factor that can change the way children feel and show their pain is cultural and social differences [1]. The PICU-related factors involve mechanical ventilation, invasive procedures, invasive devices, the use of multiple medications, frequent sleep interruptions, and reduced mobility [12].

The proper administration of analgesia contributes to pain relief, improves psychomotor agitation, facilitates the maintenance of invasive devices, optimises synchronisation between the mechanical ventilator and child, and decreases oxygen consumption and stress response. The decrease in these events is related to proper pain management in PICUs [12]. Pain management in children requires pharmacological and non-pharmacological therapies [13], with pharmacological interventions typically involving protocols of opioids alone or with other non-opioid drugs [12]. As the use of pain medications is related to side effects and misuse of opioids, non-pharmacological interventions have been explored by professionals and researchers. Although there is a consensus that combining both approaches is more effective, the amount of information on non-pharmacological pain treatment in critically ill children is limited [13].

Non-pharmacological interventions can be categorised as behavioural, cognitive, restorative, and complementary therapies [14]. Interventions, such as oral sweet solution, non-nutritive sucking, positioning, skin-to-skin contact, and modifying environmental stimuli [15, 16], have the potential to alleviate stress generated by hospitalisation, improve quality of life, and prevent changes in the physiology and behaviour of neonates [15]. Non-pharmacological therapies may also help improve the effectiveness of medications or even contribute to reducing their use, thus improving the scores related to adverse events of drug use. A previous medical record analysis enabled an observational cohort study in 15 PICUs [17]; the most used measures were repositioning, decreasing environmental stimuli, carer

presence, distraction, and music therapy [13, 17]. Additionally, Yaz and Atay (2022) conducted a transverse study to describe the nurses' use of non-pharmacological methods in paediatric intensive care clinics during the COVID-19 pandemic [18]. While the pandemic changed the time and training available for healthcare staff interested in this area, the alternatives to pharmacotherapy commonly used by nurses in paediatric interventions remain the same and include embracing, massage, pacifier use, therapeutic touch, toy distraction, musical therapy and speaking, providing pre-process information, heat/cold application, parent involvement, kangaroo care, giving sucrose, video distraction, post-application rewarding, breathing exercise, and dreaming [18].

Other forms of non-pharmacological therapies involve integration with medication to decrease environmental stressors and facilitate relaxation, distraction, and sleep [12]. A scoping review held in 2019 mapped pain management in PICUs. These interventions involved guided imagery; hypnosis; detailed inquiry, including interview technique that rescues information on thoughts and feelings related to pain; parental presence; distraction; a combination of psychological, physical, and pharmacological interventions, such as positioning, guided imagery, hypnosis, and parental education; acupuncture; stroking and soothing, holding, and rocking; and environmental modifications, such as a quiet environment, dim lights, limiting visitors to decrease noise, and music [19].

Despite advancements in pain management in PICUs, various methodologies and guidelines advocate the development of further research on this topic. Ismail *et al.* (2019) reported that all the articles identified from the literature search were published in English and that the studies focused only on quantitative designs [19]. Recently, the PANDEM guidelines [12] suggested that research must be conducted to validate the information on the impact of acupuncture on postoperative or procedural pain. As a contribution to the knowledge of non-pharmacological therapies, this scoping review aims to add data collected from other study designs and languages to explore new evidence on pain management in critically ill children with a focus on acupuncture techniques. In addition, it addresses aspects related to the different ages of children in PICUs who are receiving non-pharmacological treatment for pain. Furthermore, paediatric intensive care professionals need access to the best and most up-to-date scientific evidence on non-pharmacological therapies for pain management in PICUs [6, 8-9]. The development of a quality scoping review can provide data that explores the phenomenon of non-pharmacological therapies in critically ill children and helps interpret the various factors involved in paediatric critical care. Thus, this review aims to map the research that used non-pharmacological therapies

for pain management in PICUs and provide information to investigate the characteristics of these techniques.

## METHODS AND ANALYSIS

Scoping reviews aim to synthesise evidence for researchers, clinicians, and policymakers, gather and describe the evidence, and present an easily illustrative summary [20]. As non-pharmacological therapies exhibit a multiplicity of techniques with varied health impacts and use according to different patient ages, the scoping review was deemed the most appropriate review to illustrate the different nuances of this topic in the paediatric spectrum, which is also heterogeneous.

This scoping review will be conducted according to the chapter on scoping reviews in the Joanna Briggs Institute (JBI) Manual for Evidence Synthesis [21] and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Extension for Scoping Reviews (Appendix 1) [22]. This protocol is registered in the Open Science Framework (<https://doi.org/10.17605/OSF.IO/GKETX>). This review will be conducted in five phases: 1) identification of the research question; 2) identification of studies; 3) selection of studies; 4) mapping and comparison of the data; 5) collecting, summarising, and reporting the results [23]; 6) consultation with stakeholders about the results (optional) [24].

### Patient and public involvement

This study does not involve patients or the public.

### Identifying the research question

The research question for this scoping review is "What non-pharmacological therapies have been used for pain management in PICUs?" To support this query, four sub-questions were developed:

1. What techniques were used among different age groups?
2. What scores on the pain scales define the use of non-pharmacological therapy?
3. How were non-pharmacological therapies used to reduce pain in the PICU?
4. What therapies impacted decreased pain, mechanical ventilation duration, or reduction in length of stay in the PICU?
5. What factors assess the effectiveness of non-pharmacological interventions?

To construct the research question, we used the Population, Concept, Context (PCC) strategy recommended by the JBI [20] and the table proposed by Ahmad *et al.* (2022) (Table 1) [25].

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**Table 1.** The inclusion and exclusion criteria are based on the PCC framework.

	Inclusion criteria	Exclusion criteria
<b>Population</b>	Newborns Infants Children Adolescents	-
<b>Concept</b>	Pain management Analgesia Pain measurement Complementary therapies Alternative therapies Integrative therapies Integrative medicine Aromatherapy Oils, volatile Acupuncture Acupuncture therapy Acupuncture, ear Mind-Body therapies Breathing exercises Imagery, psychotherapy Hypnosis Biofeedback, psychology Music therapy Muscle relaxation Sleep Physical therapy modalities	Pharmacologic therapies
<b>Context</b>	Paediatric intensive care units (PICU)	Home assistance services outpatient care  Inpatient ward settings
<b>Types of evidence</b>	Quantitative studies Qualitative studies Mixed-methods studies Systematic reviews Opinion articles Grey literature Letters to the editor Editorials Others	-

This review will consider studies that explore unconventional pain management therapies. In healthcare, complementary therapies indicate the integration of an alternative approach with conventional medicine. If an unconventional health intervention is used instead of traditional medicine, we call it "alternative" therapy. If an intervention occurs through the coordinated action of traditional medicine and an unconventional approach, the term "integrative" therapy is used [26].

However, identifying what therapies constitute complementary, alternative, and integrative medicine is complex [27]. One operational definition of "complementary and alternative medicine" was proposed by Cochrane researchers in 2011. There was also a discussion on integrative health and integrative medicine that influenced the National Center for Complementary and Alternative Medicine in the U.S. and changed it to the National Center for Complementary and Integrative Health (NIH) [26, 28].

This review will adopt the term non-pharmacological therapies; although it is not described in the U.S. National Library of Medicine Medical Subject Headings (MeSH) terms, it incorporates complementary therapies, alternative therapies, integrative therapies, and integrative medicine.

**Identifying relevant studies**

Our search strategy was developed in collaboration with a librarian at a leading university in Brazil and aims to locate primary published studies, reviews, and text articles. First, a limited initial search will be performed on the Cumulative Index of Nursing and Allied Health Literature (CINAHL) and Medical Literature Analysis and Retrieval System Online (MEDLINE) to identify relevant terms and keywords to develop the final search strategy. For transparency and replication of the review, a chart was created based on the protocol by Ahmad *et al.* (2022) [25] and Luberenga *et al.* (2023) [29] , which outlines the details of the strategy with MeSH terms and text words (Table 2).

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**Table 2.** Medical Subject Headings (MeSH) terms/text words.

Population
Newborns, infants, children, and adolescents
Concept
1. "pain management" [MeSH Terms] OR "pain management" [Text Word] OR "pain relief" [Text Word] OR "pain control" [Text Word] OR "pain reduction" [Text Word] OR "managing pain" [Text Word] OR "analgesia" [MeSH Terms] OR "analgesia" [Text Word]
2. "pain measurement" [MeSH Terms] OR "pain assessment" [Text Word] OR "pain measurement" [MeSH Terms] OR "pain scale" [Text Word] OR "pain tool" [Text Word] OR "pain assessment tool" [Text Word] OR "pain instrument" [Text Word] OR "pain intervention" [Text Word] OR "pain measurement" [MeSH Terms] OR "pain measurement" [Text Word]
3. 1 OR 2
4. "integrative medicine" [MeSH Terms] OR "integrative medicine" [Text Word] OR "complementary therapies" [MeSH Terms] OR "complementary medicine" [Text Word] OR "complementary therapies" [MeSH Terms] OR "alternative medicine" [Text Word] OR "integrative therapy" [Text Word] OR "integrative therapies" [Text Word] OR "complementary therapy" [Text Word] OR "complementary therapies" [MeSH Terms] OR "complementary therapies" [Text Word] OR "alternative therapy" [Text Word] OR "complementary therapies" [MeSH Terms] OR "alternative therapies" [Text Word] OR "alternative treatment" [Text Word]
5. "non-pharmacological intervention" [Text Word] OR "non-pharmacological interventions" [Text Word] OR "non-pharmacological therapy" [Text Word] OR "non-pharmacological therapies" [Text Word] OR "non-pharmacological treatment" [Text Word]
6. "aromatherapy" [MeSH Terms] OR "aromatherapy" [Text Word] OR "oils, volatile" [MeSH Terms] OR "essential oils" [Text Word] OR "aromatherapy" [MeSH Terms] OR "aroma therapy" [Text Word]
7. "acupuncture" [MeSH Terms] OR "acupuncture therapy" [MeSH Terms] OR "acupuncture" [Text Word] OR "acupuncture therapy" [MeSH Terms] OR "acupuncture therapy" [Text Word] OR "acupuncture treatment" [Text Word] OR "acupuncture, ear" [MeSH Terms] OR "acupuncture ear" [Text Word]
8. "mind-body techniques" [Text Word] OR "mind-body therapies" [MeSH Terms] OR "mind-body therapies" [Text Word]
9. "breathing techniques" [Text Word] OR "breathing exercises" [MeSH Terms] OR "breathing exercise" [Text Word]
10. "guided imagery intervention" [Text Word] OR "guided imagery interventions" [Text Word] OR "imagery, psychotherapy" [MeSH Terms] OR "guided imagery" [Text Word] OR "guided relaxation" [Text Word]
11. "hypnosis" [MeSH Terms] OR "hypnosis" [Text Word] OR "hypnotherapy" [Text Word]
12. "biofeedback, psychology" [MeSH Terms] OR "biofeedback" [Text Word] OR "biofeedback therapy" [Text Word]
13. "music therapy" [MeSH Terms] OR "music therapy" [Text Word] OR "music intervention" [Text Word] OR "musical therapy" [Text Word] OR "music-based intervention" [Text Word] OR "therapeutic music" [Text Word]



14. "progressive muscle relaxation" [Text Word] OR "muscle relaxation" [MeSH Terms] OR "muscle relaxation" [Text Word]
15. "sleep therapy" [Text Word] OR "sleep" [MeSH Terms] OR "sleep" [Text Word]
16. "massage therapy" [Text Word] OR "massage" [Text Word] OR "massage therapies" [Text Word]
17. "physical therapy modalities" [MeSH Terms] OR "physical therapy" [Text Word] OR "physical therapy modalities" [MeSH Terms] OR "physiotherapy" [Text Word]
18. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17
<b>Context</b>
19. "paediatric intensive care unit" [Text Word] OR "picu" [Text Word] OR "paediatric critical care unit" [Text Word] OR "paediatric critical care" [Text Word] OR "intensive care units, paediatric" [MeSH Terms]
20. 3 AND 18 AND 19

The keywords in the titles and abstracts of articles and the indexing terms used in the articles will be used to guide a complete search strategy for Academic Search Premier, CINAHL, Cochrane Library, Excerpta Medica Database (Embase), Virtual Health Library (VHL), MEDLINE, Science-Direct, Scopus, and Web of Science Core Collection to be disclosed with the results of the scoping review.

The search strategy will consider the particularity of each information source, including all the identified keywords and indexing terms. The strategy will consider articles published in any language and with any database at the start or date of insertion. We use independent professional translation services for the authors' translation of articles in non-native languages.

In addition to the electronic databases, contact will be made with the study authors, when necessary, to clarify any doubts. This protocol will consider sources of unpublished studies: Theses from *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* (CAPES), Dart Europe (DART-E), Open Access Theses and Dissertations (OATD), and grey literature in Google Scholar. The online supplemental Appendix 2 provides a list of possible search queries.

**Study selection**

The search process will be carried out in two stages: 1) reading the title and abstract (first set of records); and 2) reading the full article (second set of records). Screening, which will result in the first set of records, will be performed by two pairs of reviewers who will divide the search as follows: 1) Pair A (IGMA and JKSD) will perform the search using the

following sources: Academic Search Premier, CINAHL, VHL, Embase, Science-Direct, DART-E, OATD, and grey literature from Google Scholar; 2) Pair B (SCMA and JT) will perform the search using the following sources: Cochrane Library, MEDLINE, Scopus, Web of Science, and CAPES.

The first data record will be grouped and loaded in EndNote 2.0 (Clarivate Analytics, PA, USA), and duplicates will be removed. A pilot test will be carried out on two sources of information, CINAHL and MEDLINE, for evaluation according to the inclusion criteria for the review. The potentially relevant articles will be retrieved in full, comprising the second set of records and their citation details, and will be imported into Rayyan (Rayyan Systems Inc., MA, Cambridge).

At this stage, any necessary adjustments will be made to the search strategy to meet the inclusion criteria of the review. After completing the pilot test, two reviewers (IGMA and ABC) will evaluate the full text of the other selected citations to check whether they meet the inclusion criteria. The reasons for excluding full-text articles that do not meet the inclusion criteria will be recorded and reported in the scoping review. A third reviewer (JT) will resolve the disagreements at any stage of this process. The research results will be fully reported in the final scoping review and presented in a [30] flow diagram (Figure 1) [30].

### Mapping and comparison of the data

Data will be extracted using a data extraction tool developed by the authors based on a model proposed by the JBI in Table 3 [20].

**Table 3.** Outline of the extraction tool.

Source of evidence (citation)	Year	Country	Participants		Therapies techniques	Moment and mode of use	Impact on pain	Assesses their effectiveness
			Sex	Age				

This tool can then be refined further to address the research question for the scoping review, as required. The feasibility of the extraction tool will be tested on a subset of the second set of records, and this will then be modified and revised for each article included in the data extraction process. Any modifications will be detailed in the full scoping review.

Two reviewers will be involved in data extraction (IGMA and ABC). Data extraction will occur independently, with cross-checking of the extracted evidence. A third reviewer (JT) will resolve any disagreements between the authors regarding dissimilarities in terms of data extraction.

**Collating, summarising, and reporting the results**

The total number of studies included will be presented in a summarised table format, using the extraction tool as a guide. Subsequently, the data will be grouped according to the Patterns, Advances, Gaps, Evidence for Practice, and Research Recommendations strategy proposed by Jones and Aveyard. [24] Each component represents a domain. The starting point is to produce the "Chart of Patterns." It displays the articles included in the review on one axis and the themes on the other to report the themes expressed in the articles. After the patterns are identified, advances and gaps can be identified and reported, resulting in the last domain of the framework, which is to recommend future research. In addition, the strategy also enables the identification of topics that do not require further research; that is, the scientific community has explored them well.

**ETHICS AND DISSEMINATION**

As scoping reviews use secondary data from other primary sources, approval for the protocol and review by the Research Ethics Committee will not be necessary. The results of this research will be disseminated through social media channels and podcasts about pain in children.

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## **AUTHORS' CONTRIBUTIONS**

IGMA and JT contributed to the conception and design of this protocol. IGMA, SCMA, JKD, PLOA, and TEF contributed to data acquisition. IGMA conceptualised the research question and prepared the drafts and manuscript edits. JSAO provided methodological expertise. TEF, and ABC, helped refine the research question. All authors have contributed to the study design and revised the protocol. All authors have approved the final manuscript.

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## **COMPETING INTERESTS STATEMENT**

None declared.

## **DATA SHARING STATEMENT**

This protocol has been registered with the Open Science Framework (DOI 10.17605/OSF.IO/DZHKT).

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## FIGURE LEGEND

### Figure 1.

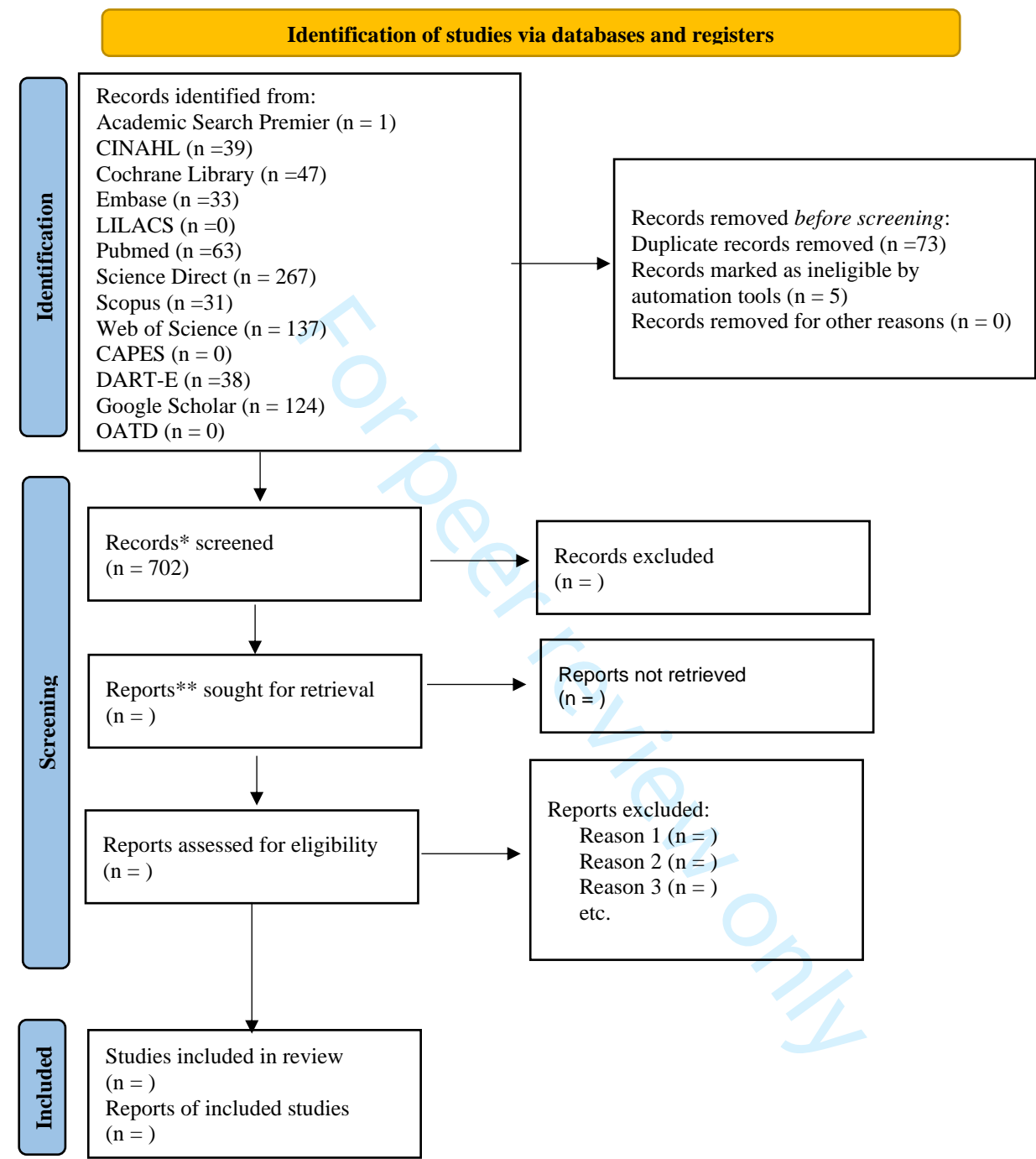
\*Report: A document (paper or electronic) supplying information about a particular study. It could be a journal article, preprint, conference abstract, study register entry, clinical study report, dissertation, unpublished manuscript, government report, or any other document providing relevant information.

\*\*Record: The title or abstract (or both) of a report indexed in a database or website (such as the title or abstract for an article indexed in MEDLINE). Records that refer to the same report (such as the same journal article) are “duplicates”; however, records that refer to reports that are merely similar (such as a similar abstract submitted to two different conferences) should be considered unique.



Figure 1

PRISMA 2020 flow diagram for new systematic reviews which included searches of databases and registers only.<sup>30</sup> Research results until July 2023.



## Appendix 1

### Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist<sup>22</sup>

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
<b>TITLE</b>			
Title	1	Identify the report as a scoping review.	1
<b>ABSTRACT</b>			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	2
<b>INTRODUCTION</b>			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	3-5
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	5-6
<b>METHODS</b>			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	6
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	8
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	8-9
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	10-11
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	11-12
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	12-13
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	13
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	Not available
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	13

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SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Not started
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Not started
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Not started
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Not started
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Not started
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	Not started
Limitations	20	Discuss the limitations of the scoping review process.	Not started
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	Not started
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	Not one

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

\* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

## Appendix 2

## Draft Search Strategy

Dates of coverage and database	Query	Retrieved records
09/21/22  CINAHL	1. MH (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR TI (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR AB (pain management or pain relief or pain control or pain reduction or managing pain or analgesia)	84,304
	2. MH (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain measurement) OR TI (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain measurement) OR AB (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain measurement)	75,339
	3. 1 OR 2	133,679
	4. MH (integrative medicine or complementary medicine or alternative medicine) OR TI (integrative medicine or complementary medicine or alternative medicine) OR AB (integrative medicine or complementary medicine or alternative medicine)	16,007
	5. MH ( integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment) OR TI (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment) OR AB (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment)	60,250
	6. MH (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment) OR TI (non- pharmacological intervention or	3,068

	non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment) OR AB (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment)	
7.	MH (aromatherapy or essential oils or aroma therapy) OR TI (aromatherapy or essential oils or aroma therapy) OR AB (aromatherapy or essential oils or aroma therapy)	7,565
8.	MH (acupuncture or acupuncture therapy or acupuncture treatment) OR TI (acupuncture or acupuncture therapy or acupuncture treatment) OR AB (acupuncture or acupuncture therapy or acupuncture treatment)	20,538
9.	MH acupuncture, ear OR TI acupuncture, ear OR AB acupuncture, ear	590
10.	MH (mind body techniques or mind-body therapies) OR TI (mind body techniques or mind-body therapies) OR AB (mind body techniques or mind-body therapies)	3,952
11.	MH (breathing techniques or breathing or breathing exercise) OR TI (breathing techniques or breathing or breathing exercise) OR AB (breathing techniques or breathing or breathing exercise)	20,189
12.	MH (guided imagery for pain management or guided image therapy or guided images therapies) OR TI (guided imagery for pain management or guided image therapy or guided images therapies) OR AB (guided imagery for pain management or guided image therapy or guided images therapies)	646
13.	MH (guided imagery or guided relaxation or visualization techniques) OR TI (guided imagery or guided relaxation or visualization techniques) OR AB (guided imagery or guided relaxation or visualization techniques)	4,120
14.	MH (hypnosis or hypnotherapy) OR TI (hypnosis or hypnotherapy) OR AB (hypnosis or hypnotherapy)	4,011

15. MH (biofeedback or biofeedback therapy) OR TI (biofeedback or biofeedback therapy) OR AB (biofeedback or biofeedback therapy)	4,994
16. MH (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music) OR TI (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music ) OR AB (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music )	7,558
17. MH (progressive muscle relaxation or muscle relaxation) OR TI (progressive muscle relaxation or muscle relaxation) OR AB (progressive muscle relaxation or muscle relaxation)	2,299
18. MH (sleep therapy or sleep) OR TI (sleep therapy or sleep) OR AB (sleep therapy or sleep)	77,183
19. MH (massage therapy or massage or massage therapies) OR TI (massage therapy or massage or massage therapies) OR AB (massage therapy or massage or massage therapies)	21,418
20. MH (physical therapy or physiotherapy) OR TI (physical therapy or physiotherapy) OR AB (physical therapy or physiotherapy)	61,296
21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	277,529
22. MH (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR TI (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR AB (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care)	9,239
23. MH intensive care units, pediatric OR TI intensive care units, pediatric OR AB intensive care units, pediatric	8,949

	24. 22 OR 23	11,491
	25. 3 AND 21 AND 24	38

Dates of coverage and database	Query	Retrieved records
09/21/22  MEDLINE  (PubMed)	1. "pain management"[MeSH Terms] OR "pain management"[Text Word] OR "pain relief"[Text Word] OR "pain control"[Text Word] OR "pain reduction"[Text Word] OR "managing pain"[Text Word] OR "analgesia"[MeSH Terms] OR "analgesia"[Text Word]	177,128
	2. "pain measurement"[MeSH Terms] OR "pain assessment"[Text Word] OR "pain measurement"[MeSH Terms] OR "pain scale"[Text Word] OR "pain tool"[Text Word] OR "pain assessment tool"[Text Word] OR "pain instrument"[Text Word] OR "pain intervention"[Text Word] OR "pain measurement"[MeSH Terms] OR "pain measurement"[Text Word]	101,025
	3. 1 OR 2	246,193
	4. "integrative medicine"[MeSH Terms] OR "integrative medicine"[Text Word] OR "complementary therapies"[MeSH Terms] OR "complementary medicine"[Text Word] OR "complementary therapies"[MeSH Terms] OR "alternative medicine"[Text Word] OR "integrative therapy"[Text Word] OR "integrative therapies"[Text Word] OR "complementary therapy"[Text Word] OR "complementary therapies"[MeSH Terms] OR "complementary therapies"[Text Word] OR "alternative therapy"[Text Word] OR "complementary therapies"[MeSH Terms] OR "alternative therapies"[Text Word] OR "alternative treatment"[Text Word]	274,042
	5. "nonpharmacological intervention"[Text Word] OR "nonpharmacological interventions"[Text Word] OR "nonpharmacological therapy"[Text Word] OR "nonpharmacological therapies"[Text Word] OR "nonpharmacological treatment"[Text Word]	5,292



6.	"aromatherapy"[MeSH Terms] OR "aromatherapy"[Text Word] OR "oils, volatile"[MeSH Terms] OR "essential oils"[Text Word] OR "aromatherapy"[MeSH Terms] OR "aroma therapy"[Text Word]	23,007
7.	"acupuncture"[MeSH Terms] OR "acupuncture therapy"[MeSH Terms] OR "acupuncture treatment"[Text Word] OR "acupuncture therapy"[MeSH Terms] OR "acupuncture therapy"[Text Word] OR "acupuncture treatment"[Text Word] OR "acupuncture, ear"[MeSH Terms] OR "acupuncture ear"[Text Word]	35,397
8.	"mind body techniques"[Text Word] OR "mind body therapies"[MeSH Terms] OR "mind body therapies"[Text Word]	<u>46,477</u>
9.	"breathing techniques"[Text Word] OR "breathing exercises"[MeSH Terms] OR "breathing exercises"[Text Word]	<u>4,632</u>
10.	"guided imagery intervention"[Text Word] OR "guided imagery interventions"[Text Word] OR "imagery, psychotherapy"[MeSH Terms] OR "guided imagery"[Text Word] OR "guided relaxation"[Text Word]	2,746
11.	"hypnosis"[MeSH Terms] OR "hypnosis"[Text Word] OR "hypnotherapy"[Text Word]	15,942
12.	"biofeedback, psychology"[MeSH Terms] OR "biofeedback"[Text Word] OR "biofeedback therapy"[Text Word]	<u>16,054</u>
13.	"music therapy"[MeSH Terms] OR "music therapy"[Text Word] OR "music intervention"[Text Word] OR "musical therapy"[Text Word] OR "music based intervention"[Text Word] OR "therapeutic music"[Text Word]	5,367
14.	"progressive muscle relaxation"[Text Word] OR "muscle relaxation"[MeSH Terms] OR "muscle relaxation"[Text Word]	<u>35,626</u>
15.	"sleep therapy"[Text Word] OR "sleep"[MeSH Terms] OR "sleep"[Text Word]	<u>232,994</u>



	16. "massage therapy"[Text Word] OR "massage"[Text Word] OR "massage therapies"[Text Word]	16,186
	17. "physical therapy modalities"[MeSH Terms] OR "physical therapy"[Text Word] OR "physical therapy modalities"[MeSH Terms] OR "physiotherapy"[Text Word]	200,591
	18. 4 OR 5 OR 6 OR 7 OR 8OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17	746,903
	19. "pediatric intensive care unit"[Text Word] OR "picu"[Text Word] OR "pediatric critical care unit"[Text Word] OR "paediatric critical care"[Text Word] OR "intensive care units, pediatric"[MeSH Terms]	31,624
	20. 3 AND 18 AND 19	63

Dates of coverage and database	Query	Retrieved records
09/14/22 ACADEMIC SEARCH PREMIER	1. (pain management) OR (DE "PAIN management" OR DE "DRY needling" OR DE "PAIN measurement" OR DE "BRIEF Pain Inventory" OR DE "MCGILL Pain Questionnaire")	81,825
	2. DE "ALTERNATIVE medicine" OR DE "ACUPUNCTURE" OR DE "ALTERNATIVE treatment" OR DE "BOTANIC medicine" OR DE "CHIROPRACTIC" OR DE"CHRONOTHERMAL medicine" OR DE	38,185

	"DRY needling" OR DE "ENERGY medicine" OR DE "HOLISTIC medicine" OR DE "HOMEOPATHY" OR DE "MENTAL healing" OR DE "NATUROPATHY"	
	3. DE "PEDIATRIC intensive care" OR ""PEDIATRIC intensive care units" OR PICU	10,655
	4. 1 AND 2 AND 3	1

Dates of coverage and database	Query	Retrieved records
10/03/22  COCHRANE	1. ("pain"):ti,ab,kw OR ("pain assessment"):ti,ab,kw	215514
	2. ("integrative medicine"):ti,ab,kw OR ("complementary medicine"):ti,ab,kw OR ("alternative medicine"):ti,ab,kw	4013
	3. ("non-pharmacological"):ti,ab,kw AND ("therapies"):ti,ab,kw OR ("treatment"):ti,ab,kw OR ("intervention"):ti,ab,kw	1147812
	4. ("aromatherapies"):ti,ab,kw OR ("essential oil"):ti,ab,kw	2174
	5. ("acupuncture"):ti,ab,kw OR ("acupuncture analgesia"):ti,ab,kw	17333
	6. ("mind body"):ti,ab,kw OR ("mind body medicine"):ti,ab,kw OR ("mind body therapies"):ti,ab,kw	1248
	7. ("breathing"):ti,ab,kw	34728
	8. ("guided imagery"):ti,ab,kw	806

9.	("hypnotherapy"):ti,ab,kw	380
10.	("biofeedback"):ti,ab,kw OR ("biofeedback training"):ti,ab,kw	3897
11.	("music therapy"):ti,ab,kw	2613
12.	("progressive muscle relaxation"):ti,ab,kw OR ("progressive muscle relaxation training"):ti,ab,kw	820
13.	("sleep"):ti,ab,kw	46268
14.	("massage therapy"):ti,ab,kw	875
15.	("physical therapy"):ti,ab,kw OR ("physical therapy	11504
16.	("pediatric intensive care unit"):ti,ab,kw OR ("paediatric intensive care"):ti,ab,kw OR ("paediatric intensive care unit"):ti,ab,kw OR ("paediatric intensive care units"):ti,ab,kw	1095
17.	1 AND 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 AND 16	0
18.	1 AND 3 AND 16	46
19.	1 AND 7 AND 16	10
20.	1 AND 11 AND 16	2
21.	1 AND 13 AND 16	5
22.	1 AND 15 AND 16	1

	23. 1 AND 3 AND 16 OR 1 AND 7 AND 16 OR 1 AND 11 AND 16 OR 1 AND 13 AND 16 OR 1 AND 15 AND 16	47
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Dates of coverage and database	Query	Retrieved records
10/23/22 EMBASE	1. pain'/exp OR 'pain' OR 'analgesia'/exp OR 'analgesia'	2062548
	2. 'integrative medicine'/exp OR 'integrative medicine' OR 'alternative medicine'/exp OR 'alternative medicine' OR 'aromatherapy'/exp OR 'aromatherapy' OR 'essential oil'/exp OR 'essential oil' OR 'acupuncture'/exp OR 'acupuncture' OR 'auricular acupuncture'/exp OR 'auricular acupuncture' OR 'breathing exercise'/exp OR 'breathing exercise' OR 'guided imagery'/exp OR 'guided imagery' OR 'hypnosis'/exp OR 'hypnosis' OR 'biofeedback'/exp OR 'biofeedback' OR 'music therapy'/exp OR 'music therapy' OR 'muscle relaxation'/exp OR 'muscle relaxation' OR 'sleep quality'/exp OR 'sleep quality' OR 'massage'/exp OR 'massage' OR 'physiotherapy'/exp OR 'physiotherapy' OR	255690
	3. 'pediatric intensive care unit'/exp OR 'pediatric intensive care unit'	22687
	4. 1 AND 2 AND 3	33

Dates of coverage and database	Query	Retrieved records
10/23/22 LILACS	1. "DOR" or "avaliacao da DOR" or "escala analogica da DOR" or "escala analogica visual de DOR" or "intensidade da DOR" or "limiar da DOR" or "manejo da DOR" or "medicao da DOR" or "percepcao da DOR" or "unidades de alivio da DOR" or "DOR aguda" or "DOR cronica" [Descritor de assunto]	5862

	2. "TERAPIAS COMPLEMENTARES" or "TERAPIAS COMPLEMENTARES e integrativas" [Descritor de assunto]	1429
	3. "unidade de terapia intensiva pediátrica" [Descritor de assunto]	767
	4. 1 and 2 and 3	0

Dates of coverage and database	Query	Retrieved records
SCIENCE DIRECT	1. Title, abstract, keyword: pain	232,587
	2. Title, abstract, keyword: complementary and alternative medicine	3342
	3. Title, abstract, keyword: integrative medicine	6951
	4. pediatric intensive care unit	3787
	1 AND 2 OR 3 AND 4	267

Dates of coverage and database	Query	Retrieved records
09/23/22  SCOPUS	1. TITLE("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia) OR ABS("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia) OR TITLE-ABS-KEY(Pain Management OR Pain Relief OR Pain Control OR Pain Reduction OR "Managing Pain" OR Analgesia)	(344,701)
	2. TITLE("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement") OR ABS("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement") OR TITLE-ABS-KEY("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement")	(145,947)
	3. 1 OR 2	(423,690)
	4. TITLE("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine") OR ABS("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine") OR TITLE-ABS-KEY("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine")	(58,538)
	5. TITLE("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment") OR ABS("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment") OR TITLE-ABS-KEY("Integrative Therapy" OR "Integrative Therapies" OR "Complementary Therapy" OR "Complementary Therapies" OR "Alternative Therapy" OR "Alternative Therapies" OR "Alternative Treatment")	(59,454)

6. TITLE(“Non-pharmacological Intervention” OR “Non-pharmacological Interventions” OR “Non-pharmacological Therapy” OR “Non-pharmacological Therapies” OR “Non-pharmacological Treatment”) OR ABS(“Non-pharmacological Intervention” OR “Non-pharmacological Interventions” OR “Non-pharmacological Therapy” OR “Non-pharmacological Therapies” OR “Non-pharmacological Treatment”) OR TITLE-ABS-KEY(“Non-pharmacological Intervention” OR “Non-pharmacological Interventions” OR “Non-pharmacological Therapy” OR “Non-pharmacological Therapies” OR “Non-pharmacological Treatment”)	(7,752)
7. TITLE(Aromatherapy OR “Essential Oils” OR Aroma therapy) OR ABS(Aromatherapy OR “Essential Oils” OR Aroma therapy) OR TITLE-ABS-KEY(Aromatherapy OR “Essential Oils” OR Aroma therapy)	(3.885)
8. TITLE(“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”) OR ABS (“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”) OR TITLE-ABS-KEY(“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”)	(52,587)
9. TITLE(“Acupuncture, Ear”) OR ABS(“Acupuncture, Ear”) OR TITLE-ABS-KEY(“Acupuncture, Ear”)	(452)
10. TITLE(“Mind Body Techniques” OR “Mind-body Therapies”) OR ABS(“Mind Body Techniques” OR “Mind-body Therapies”) OR TITLE-ABS-KEY(“Mind Body Techniques” OR “Mind-body Therapies”)	(1.625)
11. TITLE(“Breathing Techniques”OR Breathing OR “Breathing Exercise”) OR ABS(“Breathing Techniques”OR Breathing OR “Breathing Exercise”) OR TITLE-ABS-KEY(“Breathing Techniques”OR Breathing OR “Breathing Exercise”)	(279.806)
12. TITLE(“Guided Imagery for Pain Management” OR “Guided Image Therapy” OR “Guided Images Therapies”) OR ABS(“Guided Imagery for Pain Management” OR “Guided Image Therapy” OR “Guided Images Therapies”) OR TITLE-ABS-KEY(“Guided Imagery for Pain Management” OR “Guided Image Therapy” OR “Guided Images Therapies”)	4
13. TITLE(“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”) OR ABS(“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”) OR TITLE-ABS-KEY(“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”)	17,176

14. TITLE(Hypnosis OR Hypnotherapy) OR ABS(Hypnosis OR Hypnotherapy) OR TITLE-ABS-KEY(Hypnosis OR Hypnotherapy)	22,266
15. TITLE(Biofeedback OR "Biofeedback Therapy") OR ABS(Biofeedback OR "Biofeedback Therapy") OR TITLE-ABS-KEY(Biofeedback OR "Biofeedback Therapy")	17,108
16. TITLE("Music Therapy" OR "Music Intervention" OR "Musical Therapy" OR "Music-based Intervention" OR "Therapeutic Music") OR ABS("Music Therapy" OR "Music Intervention" OR "Musical Therapy" OR "Music-based Intervention" OR "Therapeutic Music") OR TITLE-ABS-KEY("Music Therapy" OR "Music Intervention" OR "Musical Therapy" OR "Music-based Intervention" OR "Therapeutic Music")	11,454
17. TITLE("Progressive Muscle Relaxation" OR "Muscle Relaxation") OR ABS("Progressive Muscle Relaxation" OR "Muscle Relaxation") OR TITLE-ABS-KEY("Progressive Muscle Relaxation" OR "Muscle Relaxation")	34,970
18. TITLE("Sleep Therapy" OR Sleep) OR ABS("Sleep Therapy" OR Sleep) OR TITLE-ABS-KEY("Sleep Therapy" OR Sleep)	340,832
19. TITLE("Massage Therapy" OR Massage OR "Massage Therapies") OR ABS("Massage Therapy" OR Massage OR "Massage Therapies") OR TITLE-ABS-KEY("Massage Therapy" OR Massage OR "Massage Therapies")	28,624
20. TITLE("Physical Therapy" OR Physiotherapy) OR ABS("Physical Therapy" OR Physiotherapy) OR TITLE-ABS-KEY("Physical Therapy" OR Physiotherapy)	129,632
21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	937,453
22. TITLE("Pediatric Intensive Care Unit" OR PICU OR "Pediatric Critical Care Unit" OR "Paediatric Intensive Care" OR "Paediatric Critical Care") OR ABS("Pediatric Intensive Care Unit" OR PICU OR "Pediatric Critical Care Unit" OR "Paediatric Intensive Care" OR "Paediatric Critical Care") OR TITLE-ABS-KEY("Pediatric Intensive Care Unit" OR PICU OR "Pediatric Critical Care Unit" OR "Paediatric Intensive Care" OR "Paediatric Critical Care")	20,379



	23. TITLE(“Intensive Care Units, Pediatric”) OR ABS(“Intensive Care Units, Pediatric”) OR TITLE-ABS-KEY(“Intensive Care Units, Pediatric”)	8,226
	24. 22 OR 23	22,008
	25. 3 AND 21 AND 24	31

Dates of coverage and database	Query	Retrieved records
09/21/22  WEB OF SCIENCE	1. TS= (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR TI= (pain management or pain relief or pain control or pain reduction or managing pain or analgesia) OR AB= (pain management or pain relief or pain control or pain reduction or managing pain or analgesia)	(376,576)
	2. TS= (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain intervention or pain measurement) OR TI= (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain intervention or pain measurement) OR AB= (pain assessment or pain scale or pain tool or pain assessment tool or pain instrument or pain intervention or pain measurement)	(241,031)
	3. 1 OR 2	(475,359)
	4. TS= (integrative medicine or complementary medicine or alternative medicine) OR TI= (integrative medicine or complementary medicine or alternative medicine) OR AB= (Integrative medicine or complementary medicine or alternative medicine)	(51,961)

5. TS= (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment) OR TI= (integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment ) OR AB= (Integrative therapy or integrative therapies or complementary therapy or complementary therapies or alternative therapy or alternative therapies or alternative treatment)	(288,290)
6. TS= (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment) OR TI= (non- pharmacological intervention or non-pharmacological therapies or non-pharmacological treatment) OR AB= (non- pharmacological intervention or non-pharmacological interventions or non-pharmacological therapy or non-pharmacological therapies or non-pharmacological treatment)	(12,420)
7. TS= (aromatherapy or essential oils or aroma therapy) OR TI= (aromatherapy or essential oils or aroma therapy) OR AB= (aromatherapy or essential oils or aroma therapy)	(86,864)
8. TS= (acupuncture or acupuncture therapy or acupuncture treatment) OR TI= (acupuncture or acupuncture therapy or acupuncture treatment) OR AB= (acupuncture or acupuncture therapy or acupuncture treatment)	(25,368)
9. TS= (acupuncture, ear) OR TI= (acupuncture, ear) OR AB= (acupuncture, ear)	(547)
10. TS= (mind body techniques or mind-body therapies) OR TI= (mind body techniques or mind-body therapies) OR AB= (mind body techniques or mind-body therapies)	(2,430)
11. TS= (breathing techniques or breathing or breathing exercise) OR TI= (breathing techniques or breathing or breathing exercise) OR AB= (breathing techniques or breathing or breathing exercise)	(99,065)
12. TS= (guided imagery for pain management or guided image therapy or guided images therapies) OR TI= (guided imagery for pain management or guided image therapy or guided images therapies) OR AB= (guided imagery for pain management or guided image therapy or guided images therapies)	(22,227)

13. TS= (guided imagery or guided relaxation or visualization techniques) OR TI= (guided imagery or guided relaxation or visualization techniques) OR AB= (guided imagery or guided relaxation or visualization techniques)	(68,289)
14. TS= (hypnosis or hypnotherapy) OR TI= (hypnosis or hypnotherapy) OR AB= (hypnosis or hypnotherapy)	(10,831)
15. TS= (biofeedback or biofeedback therapy) OR TI= (biofeedback or biofeedback therapy) OR AB= (biofeedback or biofeedback therapy)	(12,661)
16. TS= (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music) OR TI= (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music) OR AB= (music therapy or music intervention or musical therapy or music-based intervention or therapeutic music)	(11,018)
17. TS= (progressive muscle relaxation or muscle relaxation) OR TI= (progressive muscle relaxation or muscle relaxation) OR AB= (progressive muscle relaxation or muscle relaxation)	(33,638)
18. TS= (sleep therapy or sleep) OR TI= (sleep therapy or sleep) OR AB= (sleep therapy or sleep)	(293,420)
19. TS= (massage therapy or massage or massage therapies) OR TI= (massage therapy or massage or massage therapies) OR AB= (massage therapy or massage or massage therapies)	(11,659)
20. TS= (physical therapy or physiotherapy) OR TI= (physical therapy or physiotherapy) OR AB= (physical therapy or physiotherapy)	(121,548)
21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	(1,058,477)
22. TS= (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR TI= (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care) OR AB= (pediatric intensive care unit or picu or pediatric critical care unit or paediatric intensive care or paediatric critical care)	(21,834)

	23. TS= (intensive care units, pediatric) OR TI= (intensive care units, pediatric) OR AB= (intensive care units, pediatric)	(14,677)
	24. 22 OR 23	(21,834)
	25. 3 AND 21 AND 24	(137)

Dates of coverage and database	Query	Retrieved records
09/26/22  Catálogo de Teses e Dissertações (CAPES)	1. ("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia) OR ("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia) OR ("Pain Management" OR "Pain Relief" OR "Pain Control" OR "Pain Reduction" OR "Managing Pain" OR Analgesia)	47.919
	2. ("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement") OR ("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement") OR ("Pain Assessment" OR "Pain Scale" OR "Pain Tool" OR "Pain Assessment Tool" OR "Pain Instrument" OR "Pain Intervention" OR "Pain Measurement")	17.688
	3. 1 OR 2	60.914
	4. ("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine") OR ("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine") OR ("Integrative Medicine" OR "Complementary Medicine" OR "Alternative Medicine")	5.309

5. (“Integrative Therapy” OR “Integrative Therapies” OR “Complementary Therapy” OR “Complementary Therapies” OR “Alternative Therapy” OR “Alternative Therapies” OR “Alternative Treatment”) OR (“Integrative Therapy” OR “Integrative Therapies” OR “Complementary Therapy” OR “Complementary Therapies” OR “Alternative Therapy” OR “Alternative Therapies” OR “Alternative Treatment”) OR (“Integrative Therapy” OR “Integrative Therapies” OR “Complementary Therapy” OR “Complementary Therapies” OR “Alternative Therapy” OR “Alternative Therapies” OR “Alternative Treatment”)	14.345
6. (“Non-pharmacological Intervention” OR “Non-pharmacological Interventions” OR “Non-pharmacological Therapy” OR “Non-pharmacological Therapies” OR “Non-pharmacological Treatment”) OR (“Non-pharmacological Intervention” OR “Non-pharmacological Interventions” OR “Non-pharmacological Therapy” OR “Non-pharmacological Therapies” OR “Non-pharmacological Treatment”) OR (“Non-pharmacological Intervention” OR “Non-pharmacological Interventions” OR “Non-pharmacological Therapy” OR “Non-pharmacological Therapies” OR “Non-pharmacological Treatment”)	20.398
7. (Aromatherapy OR “Essential Oils” OR Aroma therapy) OR (Aromatherapy OR “Essential Oils” OR Aroma therapy) OR (Aromatherapy OR “Essential Oils” OR Aroma therapy)	8.734
8. (“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”) OR (“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”) OR (“Acupuncture” OR “Acupuncture Therapy” OR “Acupuncture Treatment”)	11.097
9. (“Acupuncture, Ear”) OR (“Acupuncture, Ear”) OR (“Acupuncture, Ear”)	468
10. (“Mind Body Techniques” OR “Mind-body Therapies”) OR (“Mind Body Techniques” OR “Mind-body Therapies”) OR (“Mind Body Techniques” OR “Mind-body Therapies”)	8.897
11. (“Breathing Techniques”OR Breathing OR “Breathing Exercise”) OR (“Breathing Techniques”OR Breathing OR “Breathing Exercise”) OR (“Breathing Techniques”OR Breathing OR “Breathing Exercise”)	12.400
12. (“Guided Imagery for Pain Management” OR “Guided Image Therapy” OR “Guided Images Therapies”) OR (“Guided Imagery for Pain Management” OR “Guided Image Therapy” OR “Guided Images Therapies”) OR (“Guided Imagery for Pain Management” OR “Guided Image Therapy” OR “Guided Images Therapies”)	63.039

13. (“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”) OR (“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”) OR (“Guided Imagery” OR “Guided Relaxation” OR “Visualization Techniques”)	3.632
14. (Hypnosis OR Hypnotherapy) OR (Hypnosis OR Hypnotherapy) OR (Hypnosis OR Hypnotherapy)	19
15. (Biofeedback OR “Biofeedback Therapy”) OR (Biofeedback OR “Biofeedback Therapy”) OR (Biofeedback OR “Biofeedback Therapy”)	5.433
16. (“Music Therapy” OR “Music Intervention” OR “Musical Therapy” OR “Music-based Intervention” OR “Therapeutic Music”) OR (“Music Therapy” OR “Music Intervention” OR “Musical Therapy” OR “Music-based Intervention” OR “Therapeutic Music”) OR (“Music Therapy” OR “Music Intervention” OR “Musical Therapy” OR “Music-based Intervention” OR “Therapeutic Music”)	25.370
17. (“Progressive Muscle Relaxation” OR “Muscle Relaxation”) OR (“Progressive Muscle Relaxation” OR “Muscle Relaxation”) OR (“Progressive Muscle Relaxation” OR “Muscle Relaxation”)	2.847
18. (“Sleep Therapy” OR Sleep) OR (“Sleep Therapy” OR Sleep) OR (“Sleep Therapy” OR Sleep)	13.033
19. (“Massage Therapy” OR Massage OR “Massage Therapies”) OR (“Massage Therapy” OR Massage OR “Massage Therapies”) OR (“Massage Therapy” OR Massage OR “Massage Therapies”)	5.587
20. (“Physical Therapy” OR Physiotherapy) OR (“Physical Therapy” OR Physiotherapy) OR (“Physical Therapy” OR Physiotherapy)	13.679
21. 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20	120.654

	22. (“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”) OR (“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”) OR (“Pediatric Intensive Care Unit” OR PICU OR “Pediatric Critical Care Unit” OR “Paediatric Intensive Care” OR “Paediatric Critical Care”)	21.859
	23. (“Intensive Care Units, Pediatric”) OR (“Intensive Care Units, Pediatric”) OR (“Intensive Care Units, Pediatric”)	16.055
	24. 22 OR 23	22.946

Dates of coverage and database	Query	Retrieved records
11/05/22  DART-E	1. pain	547
	2. “"complementary therapies" OR "alternative medicine" OR "integrative medicine" OR "nonpharmacological	168
	3. "pediatric intensive care unit" or "paediatric intensive care unit"	51
	4. 1 AND 2 AND 3	38

Dates of coverage and database	Query	Retrieved records
11/05/22 Google Scholar	1. "complementary therapies" OR "integrative medicine" OR "complementary and alternative medicine" OR "complementary and alternative therapies"	17900
	2. nonpharmacologic	77700
	3. "pediatric intensive care" OR "paediatric intensive care"	17600
	4. 1 OR 2 AND 3 AND doc OR .txt OR .rtf OR .PDF OR .html	124

Dates of coverage and database	Query	Retrieved records
11/05/22 OATD	1. pain	38650
	2. "complementary therapies" OR "alternative medicine" OR "integrative medicine" OR nonpharmacological	1819
	3. "pediatric intensive care unit" or "paediatric intensive care unit"	382



	4. 1 AND 2 AND 3	0
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For peer review only