Mindfulness-based interventions for children and adolescents: A scoping review protocol

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Abstract
Background and purpose: Although mindfulness-based interventions (MBIs) are becoming increasingly popular, the application of MBIs with children and adolescents is still in its infancy. Mapping the existing literature is necessary to help guide pediatric mindfulness interventions. Our purpose is to synthesize the evidence of reported MBIs for children and adolescents with and without physical, mental, and cognitive disorders. Accordingly, we aim to identify trends and gaps in the literature, so that we can provide direction to researchers who seek to advance the evidence base for using MBIs in pediatric populations.

Methods: Our search strategy will be conducted following Arksey and O’Malley’s methodological framework. It will include a comprehensive search of published studies in 7 databases, the grey literature, conference proceedings, and citations of selected articles. Two independent reviewers will evaluate all abstracts and full articles that: i) have a pediatric sample (children 2-18 years), ii) use MBIs to promote development or to remediate underlying disorders, and iii) are written in English or French. We will identify the definitions and concepts from MBIs, categorize accepted studies according to etiology and rehabilitation type, describe intervention methodology, and report outcomes of selected studies.

Discussion: Our review will provide a comprehensive overview of the pediatric mindfulness intervention literature to date, involving a range of mental, cognitive and physical outcomes for healthy children and adolescents and for those with a variety of disorders in clinical and institutional settings. We will disseminate results to mindfulness practitioners and provide guidance to future pediatric researchers in their development and application of mindfulness interventions, thereby contributing to the scientific understanding of mindfulness for the ultimate betterment of child and adolescent well-being and life-long functioning.

Systematic review registration: PROSPERO does not accept scoping review protocols.

Background
Rationale
The practice of mindfulness meditation has gained popularity in recent decades alongside a surge of academic journal publications. In fact, the notion of mindfulness has become mainstream and perhaps
even popularized in recent years. The American Mindfulness Research Association (AMRA) reports a steady yearly growth in the number of published papers involving the word “mindfulness” in the title (ranging from 10 in the year 2000 to 842 in 2018 in the Web of Science database) (1). The integration of mindfulness-based interventions (MBIs) with traditional therapies is also increasing in a variety of clinical and institutional settings (2, 3), but almost exclusively in adult populations. Only recently has the focus shifted towards the application of MBIs with children and adolescents (4).

Mindfulness is the practice of directing attention in a particular way. It involves “awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally” (3), which can be cultivated and developed through meditation practice. In medicine and psychology, MBIs have been associated with better maintenance of therapeutic gains relating to depression, anxiety, and pain (2). By extension, MBIs can arguably improve physical health conditions, cognitive, psychosocial and affective outcomes (2, 4-11). Because of the applicability of mindfulness to many areas of functioning, there is increasing interest in its application. To this end, MBIs could be desirable and advantageous starting in early childhood to promote healthy development or to forestall anticipated setbacks or mitigate the effects of existing illnesses or deficits.

In fact, the evidence base is growing with respect to demonstrating improved mental and physical health in adults (2, 7, 12-13). Similarly, emerging mindfulness research shows a preliminary parallel in pediatric mental health and cognitive outcomes as well as an upsurge of adapted MBIs for children (4-7, 14). Adapted MBIs are those that have been modified from adult interventions to ensure developmental appropriateness for children and adolescent populations. Examples of adaptations include using age-appropriate language and practices that fit the child’s developmental stage or needs (e.g. attention span or cognitive abilities), shortening intervention sessions and individual training, modifying or omitting home mindfulness practice in favour of stories, games and activities (e.g. drawing, listening to music, tasting and smelling foods), and incorporating more extended family involvement (5, 8, 10, 12, 14, 17).

Childhood and adolescence may in fact be an ideal developmental period to introduce mindfulness to enhance cognitive development, particular with respect to executive functions and self-regulation.
skills (15–16). Additionally, there are suspected improvements in cognitive and psychosocial outcomes following MBIs in child and adolescent populations, as well as an overall increase in well-being (2, 8–9, 14, 16–18).

There is a current need to corroborate the effects of MBIs in children and adolescents. A crucial first step involves summarizing and disseminating research patterns and identifying gaps in the evidence base. We anticipate that our scoping review will direct future pediatric researchers in their development of age-appropriate and sustainable mindfulness interventions.

Objective
The purpose of our scoping review is to identify the breadth of literature reporting MBIs for both healthy children and adolescents and those with physical, mental, and cognitive disorders.

Methods
A scoping review is the most suitable type of review for synthesizing a potentially broad and diverse literature base on MBI use in children and adolescents. Our review will provide an overview of existing evidence for MBI research, including its extent, range and nature in the realm of pediatric interventions (18).

We will conduct our scoping review according to the methodological framework proposed by Arksey and O’Malley (20). The steps involved are 1) identifying the research question, 2) identifying relevant studies, 3) selecting studies for inclusion, 4) charting the data, and 5) collating, summarising and reporting the results.

1. Research question and objective

The application of mindfulness is rapidly growing, yet mindfulness research primarily involves adult populations (7). We aim to map the existing literature to summarize the overall state of research activity involving MBIs for children and adolescents. This scoping review then aims to answer the following research question: What mindfulness-based interventions have been developed and used in childhood and adolescence?

Our overarching objective is to identify the breadth of literature reporting MBIs for both healthy children and adolescents and those with physical, mental, and cognitive disorders. Specifically, we intend to map emerging trends in pediatric research applying MBIs in both healthy populations and those with congenital or acquired disorders (2). Accordingly, we will i) identify and synthesize the various definitions and concepts that have been used in MBIs, ii) determine the etiology and/or rehabilitation type MBIs have been used with, iii) describe the methodology and characteristics of
MBIs, and iv) determine the outcomes of the selected studies. We recognize that revisions to our objective may be necessary as we engage in an iterative to gain a thorough understanding of the subject matter throughout the course of our review (19).

2. Identifying relevant studies

**Eligibility criteria**

We will include studies based on the Participants – Concept – Context (PCC) mnemonic recommended by the Joanna Briggs Institute for scoping reviews (23). Participants will include children and adolescents from 2 to 17 years of age. The lower end of the age range was determined by database age limits, which include 2-year-olds in the preschool range (2-5 years of age). The review will involve MBIs conducted in healthy children and adolescents and those with physical, mental, and cognitive disorders, whether congenital or acquired. There will be no restrictions to modes of delivery, intervention duration, or health care provider background. The context where the MBIs occurred will not be restricted to any geographical location or setting. Consequently, studies conducted in institutional, other clinical, or home settings from any location will be eligible.

**Search strategy**

We will include studies available in English or French language from a variety of electronic sources to ensure the comprehensiveness of our scoping review. Accordingly, we will search the following databases: CINAHL, Embase, ERIC, Medline, PsycInfo, AMED, and Scopus from the first date of their online availability. Search terms will include Medical Subject Headings (MeSH) and context-dependent terms (e.g., title, abstract and keywords) related to the concepts of this study. The search strategy for Medline is provided in Table 1. We will apply corresponding search terms to the other six databases.

**Table 1 Medline search strategy (1946 to present)**

| 1. | exp Child/ |
| 2. | adolescent/ |
| 3. | (pediatric* or paediatric* or child* or preschool* or pre-school* or kindergarten* or kindergarden* or elementary school* or nursery school* or schoolchild* or toddler* or boy or boys or girl* or middle school* or pubescen* or juvenile* or teen* or youth* or high school* or adolesc* or pre-pubesc* or prepubesc*)ti,ab,kf. |
| 4. | or/1-3 |
| 5. | mindfulness/ |
| 6. | meditation/ |
| 7. | mindful*.ti,ab,kf. |
| 8. | meditat*.ti,ab,kf. |
| 9. | (Mindfulness-based stress reduction).ti,ab,kf. |
| 10. | (Mindfulness-based cognitive).ti,ab,kf. |
| 11. | MBSR.ti,ab,kf. |
| 12. | MBCT.ti,ab,kf. |
| 13. | or/5-12 |
| 14. | and/4,13 |
In addition to databases, we will search proceedings of relevant international conferences, as well as the grey literature (see Table 2). For all accepted studies, we will review reference lists and citations through Google Scholar using a process of forward and backward chaining (21).

Table 2 List of search sources including databases, conference proceedings and grey literature

| Literature type          | Sources                                                                 |
|--------------------------|-------------------------------------------------------------------------|
| Databases                | CINHAL, Embase, ERIC, Medline, PsycInfo, AMED, Scopus                   |
| Conference Proceedings   | World Pediatrics, Society for Research in Child Development, International Symposium for Contemplative Research, Mindfulness Research Conference – Mindful Families Schools & Communities |
| Grey Literature          | Open Grey, Grey Matters, Networked Digital Library of Theses and Dissertations, Open Access Theses and Dissertations, Proquest Dissertations and Theses Global, Ontario Public Health Libraries Association |

3. Selecting studies for inclusion

We will use a three-step process to select the studies for this scoping review: 1) extracting search results and removing duplicates; 2) title and abstract review; and 3) full article review. We will use Microsoft Excel and Covidence software (22) throughout the process to support and streamline the production of this scoping review. After eliminating duplicates and citations without abstracts, two independent reviewers will review all titles and abstracts, coding them for acceptance or exclusion according to the inclusion criteria.

In the final step, we will retrieve all potentially relevant papers and conduct independent evaluation by two reviewers, again using pre-established coding criteria. To facilitate decisions for the full article review process, study authors will be contacted for further information if necessary. At both the title and abstract (step 2) and full article review (step 3) stages, discrepancies will be resolved by discussion and consensus between the two reviewers. If they fail to reach consensus, a third reviewer will then review the article and discuss further to permit a final decision. We will document reasons for the exclusion of full articles reported associated frequencies in our scoping review. We have designed our scoping review according to the PRISMA-P where applicable (see Additional file 1).

4. Charting the data

Based on the final set of accepted articles, we will collect the data using a charting approach followed by data verification. The data will be sorted according to areas of interest from the included studies.
such as publication specifics (date and location of study), population, setting, design, intervention type, and key findings relevant to the review objective.

5. Collating, summarizing, and reporting the results

After gathering and examining the evidence, we will summarize data in a tabular form (using data and charts) along with a narrative summary where relevant (for MBI concepts and definitions). Illustrations will include information such publication trends, study design and intervention type.

Given our specific objective of mapping research in pediatric MBIs, we will organize the literature thematically under main conceptual categories. Types of MBIs for children and adolescents will be categorized according to etiology and rehabilitation type where applicable, since we are interested in MBIs to promote development or to remediate underlying disorders.

Our scoping review will provide a comprehensive overview of the existing evidence of MBIs for children and adolescents. We intend to inform mindfulness practitioners and researchers of the scope of the literature, thereby improving our understanding of the potential for application, and knowledge development or gaps in mindfulness interventions.

Discussion

This scoping review will aim to present a synthesis of the available evidence on mindfulness interventions for children and adolescents. The proposed framework for mapping the existing literature relating to pediatric MBIs will provide a rigorous and transparent method, documented in such a way to promote ease of duplication and updates (20). Following the dissemination of research findings in a peer reviewed journal, identified gaps will enable the development of a more solid evidence base for children and adolescent MBIs. It is particularly important that efficacious interventions initially designed for adults are adequately extended and adapted for use with children and adolescents (2, 8).

We will present the results of this scoping review in an accessible format depending on the intended audience: the scientific community, practitioners, professional societies, policy-making organisations, and the lay public. Our study will enlighten practitioners and researchers working with MBIs by providing a comprehensive view of the existing evidence of mindfulness-based interventions used in children and adolescents.

Due to the growing interest in pediatric mindfulness interventions, experts urge further research
involving children to ensure the development of well-suited, justifiable and adapted mindfulness interventions (2). Emerging research conducted with children and adolescent populations demonstrates promise. Other reviews have reported on cognitive (such as executive functions, attention, self-regulation and behaviour) (2, 5, 7–8, 10) and psychosocial (such as prosocial attitudes, emotional regulation, stress, anxiety and depression symptom reduction) outcomes (2, 4–11, 14) following MBIs, which in turn may improve academic scores and improve cognitive performance in clinical and institutional settings (4–6, 8, 10, 16). Studies investigating physiological biomarkers (such as blood pressure and heart rate) (6, 8) and physical symptoms (such as reflux symptoms, body weight, pain acceptance, sleep quality) (5, 7, 11) also report promising outcomes of postintervention improvements. Still other reviews have reported on evidence of feasibility and acceptability of MBIs (5, 11, 14, 17).

We therefore expect to identify a number of studies involving children or adolescent MBIs reporting on a range of mental and physical health, cognitive, psychosocial and affective outcomes in institutional and non-institutional settings. We anticipate that MBIs will appear promising for children and adolescent populations, although methodologically sound and higher quality evidence (e.g. better study designs, study evaluation methods, more objective measures, and larger sample sizes) research may be needed (2, 4–11, 14).

Our hope is that this scoping review will not only inform future mindfulness research and applications of pediatric MBIs, but will also contribute to the evidence base and the improvement of age-appropriate mindfulness interventions, pediatric patient care and well-being, during this time of exponential growth in the field of mindfulness.

Abbreviations
AMRA: American Mindfulness Research Association; PROSPERO: International Prospective Register of Systematic Reviews; MBIs: Mindfulness-based interventions; PCC: Participants - Concept - Context; CINAHL: Cumulative Index of Nursing and Allied Health Literature; Embase: Excerpta Medica database; ERIC: Educational Resources Information Center; Medline: Medical Literature Analysis and Retrieval System Online; AMED: Allied and Complementary Medicine Database; MeSH: Medical
Subject Headings; PRISMA-P: Preferred Reporting Items for Systematic Reviews and Meta-Analyses

Protocols

Declarations

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Contributors

MFP formulated the topic, conceptualised the research question and wrote the bulk of the protocol. HF contributed critical and novel insight for the research question, theoretical framework and provided advice for scoping review methods. NCJ-G provided advice for scoping review methods and contributed to writing the methods. SJS contributed critical and novel insight for the research question and methods as well as provided critical review of the manuscript along with HF, NCJ-G and AM. All authors read and approved the final manuscript.

Ethics approval and consent to participate

Not applicable.

Consent for publication

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Competing interests

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