

REVIEWS

Impact of mindfulness-based interventions on anxiety and depression among adolescents with a neurological disorder: A systematic narrative review

Albany LaGore*^{1,2}, Nadine Kridli^{2,3}, Ron Piscotty¹, Suha Kridli¹

¹School of Nursing, Oakland University, Rochester, Michigan, United States

²C.S. Mott Children's Hospital, Ann Arbor, Michigan, United States

³T.H. Chan School of Medicine, University of Massachusetts, Worcester, Massachusetts, United States

Received: January 3, 2026

Accepted: April 30, 2026

Online Published: May 25, 2026

DOI: 10.63564/jnep.v16n6p35

URL: <https://doi.org/10.63564/jnep.v16n6p35>

ABSTRACT

Background: Adolescents with neurological disorders (NDs) experience significantly higher rates of depression, anxiety, or both relative to adolescents in the general population. The purpose of this systematic narrative review was to examine the existing literature evaluating the effects of mindfulness-based interventions (MBIs) on anxiety, depression, or both among adolescents with a known ND.

Methods: Articles published in the English language within the last 10 years were screened. Studies included in this review must have implemented an MBI.

Results: Ten articles met the inclusion criteria for final analysis. Across the included studies, MBI-based physical and behavioral interventions demonstrated improvements in psychological, emotional, and behavioral outcomes, including reductions in pain, emotional dysregulation, and attentional difficulties. However, findings related to improvements in anxiety and depression were mixed, as several studies did not report statistically significant changes in either outcome.

Conclusions: Future research is needed to clarify the effects of MBIs on adolescents with NDs and comorbid anxiety and/or depression. Future studies should specifically target this population to gain deeper insights into the impact of MBIs on mental health outcomes and overall well-being, with particular attention to anxiety and depression.

Key Words: Anxiety, Depression, Mindfulness, Neurological disease, Psychology, Therapy

1. INTRODUCTION

Adolescents with neurological disorders (NDs) are at a higher risk of developing depression and anxiety.^[1] This heightened vulnerability can be attributed to various physical and social factors directly related to NDs—conditions caused by dysfunction in the brain or nervous system^[2]—such as physical impairments, or indirectly associated factors, such as the inability to participate in certain activities. The preva-

lence of depression and anxiety among adolescents with NDs is significantly higher than among their peers without NDs. Specifically, those with NDs report a prevalence of 15.7% and 17.7% for depression and anxiety, respectively, compared to 3.4% and 7.3% among those without NDs.^[1] Recognizing this disparity is crucial for pediatric advanced practicing registered nurses (APRNs) and registered nurses (RNs), as many adolescent patients in their care may have

*Correspondence: Albany LaGore; Email: albanylagore@oakland.edu; Address: School of Nursing, Oakland University, Rochester, Michigan, United States.

an underlying ND. To provide effective, compassionate care, nurse clinicians must consider the distinct experiences of adolescents with NDs and thoughtfully tailor their approach to address the unique challenges these patients encounter.

According to the American Psychiatric Association,^[3] anxiety refers to the apprehension or unease relating to a future matter. Anxiety is often associated with physical tension and maladaptive coping mechanisms, including avoidance behaviors. However, for an individual to be diagnosed with an anxiety disorder, the anxiety must: 1) Be inflated or disproportionate to the situation or be developmentally inappropriate, and 2) Interfere with one's ability to function normally.^[3] Whereas depression—or major depressive disorder—is a common but serious mental health disorder that specifically targets and threatens how one thinks, feels, acts, and perceives the world.^[4] Mindfulness-based interventions (MBIs) can be implemented in various settings among diverse populations, including psychiatric nursing, to promote and optimize the health and abilities of individuals and their families. In fact, MBIs have been linked to improved well-being in certain youth outcomes including increased resilience, attention and mindfulness, and decreased anxiety and attention problems.^[5] Therefore, the purpose of this narrative review is to examine the extant literature on the impact of MBIs on anxiety and depression among adolescents with an ND.

2. METHODS

2.1 Review question

The review is guided by the following research question: What evidence exists regarding the impact of MBIs on anxiety or depression among adolescents with a ND?

2.2 Defined concepts

- a. The term 'ND' is defined in this review as a dysfunction in the brain or nervous system, potentially resulting in physical and psychological symptoms.^[2]
- b. The term 'mindfulness' is defined in this review as a "moment-to-moment, non-judgmental awareness, cultivated by paying attention in a specific way, that is, in the present moment, and as non-reactively, as non-judgmentally, and as open heartedly as possible" (p. 1481).^[6] Mindfulness and MBI are used interchangeably in this review. Examples of MBIs explored in this review include yoga, mindfulness martial arts, and meditation.
- c. The term 'adolescent' refers to a person in the unique phase of life between childhood and adulthood.^[7] While the World Health Organization defines adolescents as individuals between the ages of 10 and 19, this review specifically

defines adolescents as those between the ages of 10 and 17. This distinction is made because many adult-based MBI studies involving participants with NDs often use 18 years of age as the lower age limit for inclusion criteria.

2.3 Design

This systematic narrative review was conducted using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement.^[8] Relevant studies were discovered through searching the Cumulated Index to Nursing and Allied Health Literature (CINAHL) database and PubMed (MEDLINE) database. Studies published in English within the past 10 years (2013–2023) were included, given that the search was conducted in December 2023. The following search terms were applied within CINAHL: i) 'mindfulness-based stress reduction' OR 'mindfulness' OR 'mbsr' OR 'mindfulness intervention' AND ii) 'adolescent' OR 'teenager' OR 'young adults' OR 'teen' OR 'youth' AND iii) 'NDs' OR 'neurological disease' OR 'disability'. An advanced search was conducted in PubMed (MEDLINE) and included the following search terms: 'mindfulness' AND 'adolescent' AND 'ND' (see Appendix 1 for full search strings). The initial screening and retrieval of articles was conducted by one reviewer; however, when the primary reviewer was undecided about the inclusion of an article, a second reviewer assisted in the decision. Figure 1 illustrates the screening process using a PRISMA flow diagram.^[8]

2.4 Inclusion and exclusion criteria

The inclusion criteria consisted of qualitative, quantitative, and mixed methods studies, as well as reviews and meta-analyses. The studies must have examined adolescents (aged 10-17) with an ND, though they were not excluded if they also included children or adult participants with NDs. The studies must have evaluated or qualitatively described depression or anxiety, and incorporated a mindfulness-based aspect. Expert opinions, clinical discussion papers, and theoretical papers were excluded from this review. Additionally, studies involving adolescents with a disorder deemed mainly psychiatric in origin, such as schizophrenia or borderline personality disorder, were excluded from this study.

During the search process, it became evident that a dearth of literature existed addressing this topic within the population of interest. Consequently, the inclusion of relevant systematic reviews and meta-analyses within this systematic narrative review was necessary to comprehensively capture the available evidence and was consistent with the established inclusion criteria.

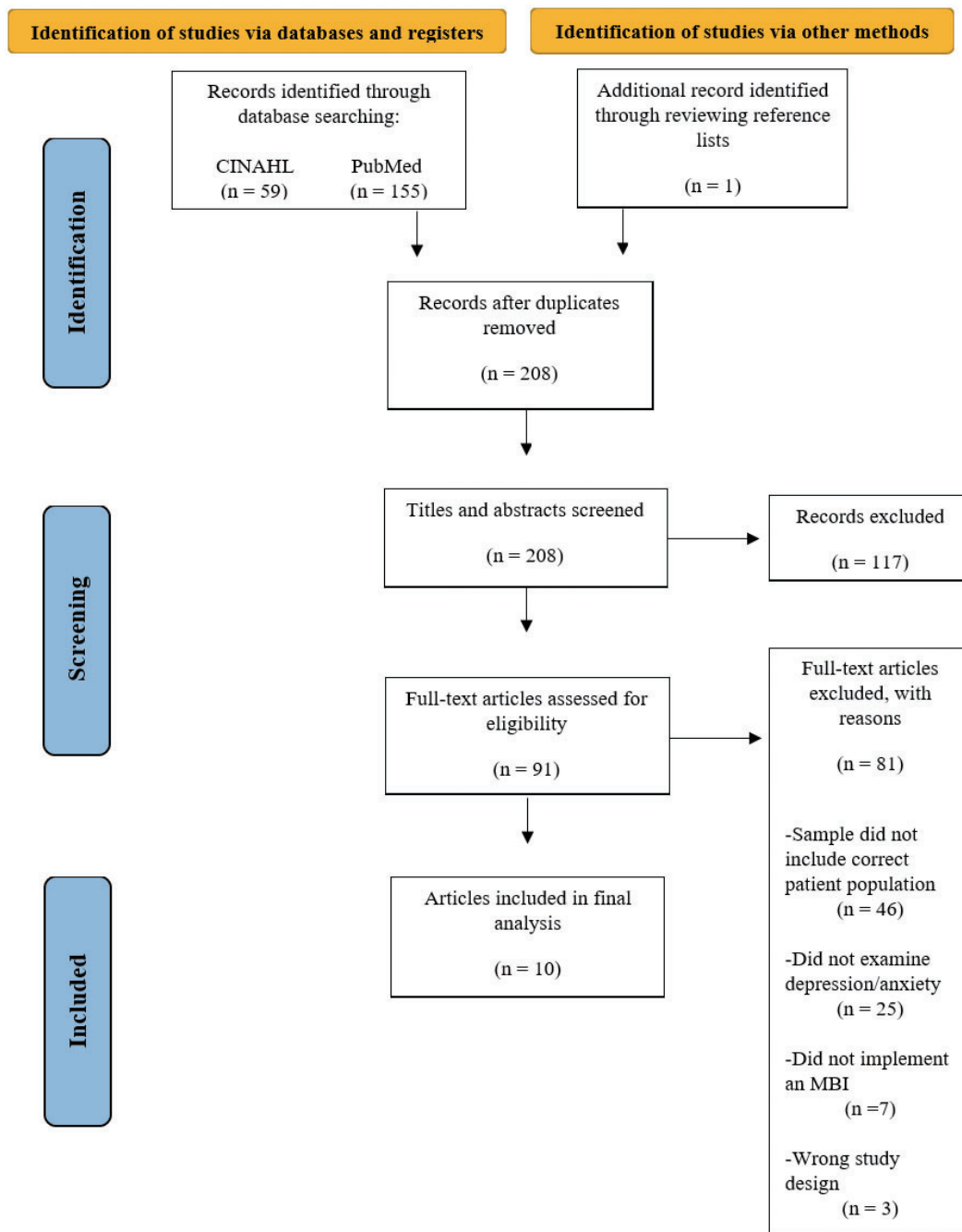


Figure 1. PRISMA flow diagram

2.5 Screening process

In December 2023, a total of 214 articles were retrieved from database searches, and one article was obtained through reviewing reference lists. After importing the articles into Covidence and removing duplicates, 208 unique articles remained. The titles and abstracts were initially screened for relevance and eligibility, resulting in the elimination of 117 articles. This left 91 articles for the full-text examination. The final screening led to the removal of 81 articles, leaving 10 eligible articles for inclusion in the review.

3. RESULTS

3.1 Summary of articles

The results of this review were analyzed and developed by two reviewers through communication via telephone and Zoom at several time points. Because of the broad inclusion of NDs, both reviewers agreed to thematically synthesize the articles based on the type of MBI employed, whether physical or behavioral in nature. When disagreements occurred, a third reviewer assisted in resolving decisions. Although the literature search spanned over 10 years (2013-2023), eight

of the ten reviewed articles included in this review were published within the last five years (between 2018-2023). A majority of the articles ($n = 8$) employed a quantitative design, while two articles employed a qualitative design and case study respectively.^[9,10] Of the eight quantitative studies; two were systematic reviews and meta-analyses,^[11,12] two were randomized controlled trials (RCTs),^[13,14] three were quasi-experimental in design,^[15-17] and one was mixed-methods.^[18] An overview of each study can be viewed in Appendix 2.

Utilizing the Joanna Briggs Institute (JBI) level of evidence for effectiveness grade,^[19] we determined three of the articles had a level I grade,^[11,13,14] five had a level II grade,^[12,15-18] one had a level III grade,^[9] and one had a level IV grade.^[10] Most of the studies reviewed utilized convenience sampling to recruit participants. In contrast, Stephens employed purposive sampling for the case presentation study.^[10] Among the systematic review/meta-analysis articles, one included a variety of studies with different designs,^[12] while the other focused solely on RCTs related to the author's specific research topic.^[11] Each included article was critically analyzed and interpreted using a matrix table (see Appendix 2), which enabled the researchers to systematically examine study quality and methodological limitations. Identified limitations were discussed between two reviewers, and consensus was reached regarding final article inclusion.

The studies reviewed included a diverse range of participants with NDs due to the literature examining MBI's among adolescents with NDs, particularly in relation to anxiety and depression. Most articles included in this review focused on adolescents with migraines or chronic tension headaches.^[10,15,16] One study examined adolescents with neurofibromatosis.^[17] Another study focused on children and adolescents with cerebral palsy,^[13] and a separate study examined adolescents and youth adults with autism spectrum disorder and intellectual disability.^[18] The remaining studies included adolescents with learning disorders and self-regulation challenges (e.g., anxiety, behavior problems)^[9] and adolescents and children with attention deficit hyperactivity disorder (ADHD).^[14] Of the ten articles included in this review, six incorporated parents and/or caregivers within the study design.^[9,10,13,14,17,18]

3.2 Physical mindfulness interventional studies

An eight-week yoga intervention program involving children with cerebral palsy was associated with improvements in consistency and attentiveness reported by both parents and children; however, no significant changes were observed in post-intervention psychological measures, including depression and anxiety.^[13] A separate study implemented a

multifaceted approach combining yoga, pharmacological, and nonpharmacological interventions to improve the quality of life for a 14-year-old girl with migraines and neurological comorbidities, leading to notable improvements in her psychological well-being, specifically anxiety.^[10] A third study evaluated a mindfulness martial arts program for youth with learning disabilities, finding significant enhancements in emotional and behavioral well-being. A parent of a participant detailed how his son wanted to participate in the MBI, verbalizing that he was feeling sad and anxious, but wanted to feel less sad and anxious.^[9]

3.3 Behavioral mindfulness interventional studies

Behavioral interventions have demonstrated promising results across various studies as well. One article found behavioral group sessions for adolescents with chronic migraine and high-frequency episodic headaches significantly reduced headache days, medication intake, disability, anxiety, depression, and catastrophizing.^[15] A second study discovered individualized therapy with mindfulness meditation significantly improved reactivity, dysphoria, irritability, anxiety, and depression for children with autism spectrum disorder.^[18]

Researchers from an additional study integrated an education component into their mindfulness-based behavioral group sessions, focusing on medication use and lifestyle modifications to manage chronic migraine and high-frequency episodic headaches through mindfulness meditation practices.^[16] This combined approach significantly reduced headache frequency, depression, catastrophizing, and headache-associated disability, although it did not significantly impact anxiety.

Martin and colleagues examined the effects of a mindfulness-based behavioral intervention, implementing a workshop program incorporating acceptance and commitment therapy for adolescents and young adults with neurofibromatosis type 1 and chronic pain.^[17] Participants received education about the psychological aspects of pain and were subsequently provided with mindfulness-based techniques to practice independently. A three-month follow-up revealed significant improvement in patient-reported pain; however, no significant changes were noted in functional ability, anxiety, depression, or quality of life as reported by the patients or their parents. The final mindfulness-based behavioral study compared mindfulness-oriented meditation with an emotion education program for children with ADHD. The findings revealed significant improvements in impulsivity, attentiveness, emotional lability, hyperactivity, social functioning, and perfectionism in the meditation group—outcomes not observed in the control group.^[14] However, anxiety and depression outcomes did not significantly improve.^[14]

Six of the reviewed studies included parents or caregivers.^[9, 10, 13, 14, 17, 18] While some studies reported improvements in caregiver stress and acceptance of their child's condition, these changes were generally not statistically significant. These findings, however, were not thoroughly explored in this review as they did not align with its primary purpose.

Among the behavioral and physical mindfulness interventional studies, four of the eight specifically addressed feasibility.^[15–18] All four of these interventions were noted to be feasible in their respective populations. These studies provided evidence that their interventions were not only practical but also well-received by participants, suggesting that such approaches can be successfully integrated into real-world settings. In contrast, the remaining four studies did not include a discussion on the feasibility of their interventions, leaving the practicality and broader applicability of these approaches unaddressed.^[9, 10, 13, 14]

3.4 Literature review studies

Wei and colleagues conducted a systematic review and meta-analysis on MBIs for patients with neurofibromatosis types 1 and 2 and schwannomatosis.^[12] They found that MBIs improved overall quality of life and demonstrated a positive correlation between relaxation response practice and quality of life indicators. One included study demonstrated significant improvements in depression and anxiety symptoms following an MBI. A similar article performed a review analysis for patients with autism spectrum disorder, revealing significant anxiety reduction in children whose parents received psychoeducation.^[11] However, the relationship between behavioral interventions and their effects on depression in children with autism spectrum disorder was unclear.

4. DISCUSSION

Two of the studies within this review that employed a physical mindfulness intervention resulted in improved psychological outcomes, including increased emotional well-being as an identified theme in children with learning disabilities^[9] and a decreased report of anxiety in a child with chronic headache.^[10] Improved mental health outcomes observed in these adolescents following MBI interventions highlight the potential for pediatric APRNs to incorporate such holistic practices into care plans and treatment regimens for adolescents with NDs requiring mental health support and treatment. The improvements seen in Milligan et al. and Stephens may be attributed to the combined effect of physical activity and mind-body practices on mental health regulators.^[9, 10] Belcher and colleagues found that physical activity, exercise, and aerobic fitness may promote resilience by positively

influencing brain regions such as the prefrontal cortex and large-scale neural circuits like the frontoparietal network.^[20] MRI imaging provides insight into these effects, suggesting these neural structures play a role in improved emotional and behavioral management. Additionally, incorporating mind-body connectedness may address the impacts of lifestyle choices, environmental factors, and individuals' spiritual dimensions on their mental health.^[21] By integrating physical activities like yoga with mind-body connectedness interventions, this holistic approach addresses both the neurochemical imbalances associated with mental health disorders and the effects of lifestyle choices, environmental factors, and spiritual dimensions on mental health. Embracing a holistic paradigm may facilitate more significant and long-lasting improvements in mental health.^[21] Despite both studies showing improved psychological function following a mindfulness intervention, one of the studies did not observe significant changes in psychological measures from pre to post intervention.^[13] This could be attributed to what is known as the ceiling effect, where baseline scores for participants fell within the normal range for psychological measurements. Additionally, Mak and colleagues primarily examined attention and impulsivity as primary outcomes and psychological measures as secondary outcomes.^[13] Therefore, the MiYoga intervention implemented within their study may have been more geared towards addressing attention and impulsivity rather than anxiety and depression.

Similar to the physical mindfulness interventional studies, most of the studies incorporating a behavioral mindfulness intervention demonstrated improvements in either depression, anxiety, or both.^[15, 16, 18] However, a separate study reported no significant changes in participant anxiety and depression scores.^[17] This lack of significant findings in anxiety and depression among participants could be attributed to a ceiling effect—similarly observed by Mak et al.,^[13] as participant baseline anxiety and depression scores were within normal ranges.^[17] Participants reported only mild pain anxiety scores according to Zhou and colleagues,^[22] and therefore did not meet the cutoff for probable depression on the Center for Epidemiological Studies-Depression Scale (CES-D-20).^[22, 23] Although Martin and colleagues^[17] utilized the CES-D-20 scale, it may not have appropriately examined depression scores for their respective study participants (adolescents with neurofibromatosis). The CES-D-20, while validated for the general population,^[24] may not have accurately assessed depression in adolescents with neurofibromatosis, who might express depression differently. Cognitive challenges and learning disabilities are common in this population^[17] and can contribute to the expression of depression unconventionally through behavioral outbursts or

increased irritability^[25]—symptoms that the CES-D-20 does not capture, particularly as they may be more observable than self-reported.

The study that implemented a combined behavioral education/MBI intervention yielded significant outcomes in improving symptoms of depression.^[16] Combining education with a behavioral MBI likely incorporated hands-on, practical approaches, enhancing participant understanding and information retention. Additionally, patient motivation may have been significantly influenced by the perceived relevance and applicability of the education provided. It is essential for pediatric APRNs to implement MBI interventions and educate patients and their families, ensuring they understand and can apply these practices at home to improve their mental health outcomes.

Mixed findings were observed regarding the impact of MBIs on caregivers. While these findings are important, they are not directly related to the primary focus of this review. However, it is crucial to acknowledge that caregivers' well-being can influence child outcomes. Variability in caregiver results may stem from factors such as differing care requirements for various patient populations; for example, caregiving for a child with cerebral palsy differs significantly from caring for a child with chronic pain. More complex disabilities correlate with a lower health-related quality of life for caregivers.^[26] Additionally, coping strategies significantly affect caregiver well-being, with avoidant coping linked to poorer mental health compared to more adaptive strategies like optimism and acceptance. Mak et al. observed decreased mindfulness scores among caregivers post-intervention, which they attributed to more accurate self-reporting after gaining insight into their own mindfulness.^[13] This decline might also reflect increased caregiver burden due to the substantial demands of the intervention, potentially leading to caregiver burnout. To better understand the feasibility of MBIs in children with NDs, it is essential to consider their effects on caregivers. Caregiver burnout has been well-documented in the literature^[27–29] and may decrease the feasibility of implementing new interventions. Thus, APRNs must consider this when determining the most appropriate care for both the patient and their family. Although these insights are not the main focus of this review, they underscore the interconnectedness between caregiver well-being and child outcomes.

4.1 Limitations

The limitations of this systematic narrative review relate to the limited number of databases included in the search. Although searching two databases is often deemed sufficient,^[30] higher-quality systematic reviews typically include searches across multiple databases. While many systematic reviews

are conducted with only two databases, this approach introduces a risk of bias, as relevant studies may have been missed due to the restricted scope of the literature search. In an attempt to mitigate this risk, grey literature was thoroughly explored by reviewing the reference lists of included articles, as well as other articles with relevant context, in an effort to capture all pertinent studies for this review.

Furthermore, due to reviewer availability, only one individual screened for article inclusion, with a second reviewer providing input when the primary reviewer was conflicted. Two of the authors, however, analyzed the final ten articles individually and discussed together how best to organize the results section of the review (i.e., type of MBI implemented). The authors jointly wrote the results and discussion section of the review, strengthening the validity and reliability of the work by reducing interpretive bias.

4.2 Implications

Most studies in this review assessed psychological well-being indicators such as anxiety or depression as a secondary outcome and predominantly relied on single measurement tools. To strengthen the internal validity of future research, it is crucial to employ multiple measurement tools when evaluating variables^[31] and to assess the reliability of each instrument among the study population to ensure it adequately measures the variables (e.g., anxiety or depression) under examination. Additionally, future research should focus on adolescents with NDs who have pre-existing anxiety and depression diagnoses to assess the efficacy of MBIs in reducing these symptoms, thereby avoiding a potential 'ceiling effect' as observed in some studies. Including participants with diagnosed anxiety or depression or identifying these conditions through thorough screening during study inclusion will be key. Advanced care providers or practitioners must conduct comprehensive assessments to identify or diagnose mental health disorders^[32] in this population, likely requiring tailored assessments to address their challenges. Moreover, ensuring the delivery of the intervention is consistent from one person to the next is imperative to the fidelity of the intervention. A standard of delivery in conducting MBI studies among this population should be employed to confirm the findings are directly related to the intervention and not an inconsistent delivery of the intervention.

Furthermore, future studies may consider implementing MBI programs among adolescents and children with various NDs to evaluate the generalizability of such programs across varying ND populations. This will assist pediatric APRNs in providing effective case management services to adolescents with NDs and mental health disorders, ensuring they receive the best plan of care and services for their individual needs.

Given the diversity of NDs, findings from this review should be interpreted with caution, as results from one condition may not be applicable to adolescents with other NDs. As future research in this area expands, a replication of this review may allow for thematic categorization of results by neurological condition, offering an alternative and more direct interpretation of the findings.

The unexpected findings related to caregiver involvement and outcomes in these studies highlight the need for future research to evaluate the impact of introducing new interventions on the care regimen of children with complex needs. This should include a particular focus on caregiver well-being and compliance rates over time, as the introduction of new interventions may contribute to caregiver burnout. Further studies are needed to investigate the potential correlation between the feasibility of interventions and their impact on caregiver well-being.

5. CONCLUSION

MBIs are increasingly recognized for their potential in reducing anxiety and depression. This narrative review found generally equivocal results regarding the impact of MBIs on anxiety and depression among adolescents with NDs. Given heightened vulnerability of this population to mental health issues, further research is needed to evaluate MBIs with specific focus on anxiety and depression as primary outcomes. It is also essential to tailor MBIs to the unique experiences of adolescents with NDs, which differ from those of their peers. Additionally, assessing the impact of MBIs on caregivers is crucial, as their well-being can significantly influence the overall effectiveness of these interventions. By addressing both the needs of adolescents with NDs and their caregivers, MBIs can be better adapted to ultimately enhance the mental health and well-being of both groups.

ACKNOWLEDGEMENTS

We offer gratitude to Oakland University's School of Nursing for supporting the collaboration between faculty and students in the development of this systematic narrative review.

AUTHORS CONTRIBUTIONS

Mrs. Albany Breitenwischer was responsible for collecting the data. Mrs. Breitenwischer and Mrs. Nadine Kridli were

responsible for drafting the results, discussion, and implications section of the manuscript. Dr. Suha Kridli and Dr. Ron Piscotty were responsible for designing the manuscript and significantly contributing to its revision. All authors read and approved the final manuscript.

FUNDING

Not applicable.

CONFLICTS OF INTEREST DISCLOSURE

The authors declare they have no known competing financial interests of personal relationships that could have appeared to influence the work reported in this paper.

INFORMED CONSENT

Obtained.

ETHICS APPROVAL

The Publication Ethics Committee of the Association for Health Sciences and Education. The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

PROVENANCE AND PEER REVIEW

Not commissioned; externally double-blind peer reviewed.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

DATA SHARING STATEMENT

No additional data are available.

OPEN ACCESS

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

COPYRIGHTS

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

REFERENCES

- [1] Whitney DG, Shapiro DN, Warschausky SA, et al. The contribution of neurologic disorders to the national prevalence of depression and anxiety problems among children and adolescents. *Annals of Epidemiology*. 2019; 29: 81-84. PMID:30545763 <https://doi.org/10.1016/j.annepidem.2018.11.003>
- [2] Child Neurology Foundation. [Internet]. What is a neurological disorder? [cited 2025 June 20]. Available from: <https://www.childneurologyfoundation.org/what-is-a-neurologic-disorder/>

- [3] American Psychiatric Association. What are anxiety disorders? [published 2023; cited 2025 June]. Available from: <https://www.psychiatry.org/Patients-Families/Anxiety-Disorders/What-are-Anxiety-Disorders>
- [4] American Psychiatric Association. [Internet]. What is depression? [published 2024; cited 2025 June]. Available from: <https://www.psychiatry.org/Patients-Families/Depression/What-Is-Depression>
- [5] Phan ML, Renshaw TL, Caramanico J, et al. Mindfulness-based school interventions: A systematic review of outcome evidence quality by study design. *Mindfulness*. 2022; 13(7): 1591–1613. PMID:36186722 <https://doi.org/10.1007/s12671-022-01885-9>
- [6] Kabat-Zinn J. *Mindfulness*. 2015; 6: 1481–1483. <https://doi.org/10.1007/s12671-015-0456-x>
- [7] World Health Organization. Adolescent health. 2024. Available from: https://www.who.int/health-topics/adolescent-health#tab=tab_1
- [8] Moher D, Liberati A, Tetzlaff J, et al. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med*. 2009; 6(7): Article e1000097. PMID:19621072 <https://doi.org/10.1371/journal.pmed.1000097>
- [9] Milligan K, Badali P, Spiroiu F. Using integrative mindfulness martial arts to address self-regulation challenges in youth with learning disabilities: A qualitative exploration. *Journal of Child and Family Studies*. 2015; 24: 562–575. <https://doi.org/10.1007/s10826-013-9868-1>
- [10] Stephens I. Case report: The use of medical yoga for adolescent mental health. *Complementary Therapies in Medicine*. 2019; 43: 60–65. PMID:30935556 <https://doi.org/10.1016/j.ctim.2019.01.006>
- [11] Linden A, Best L, Elise F, et al. Benefits and harms of interventions to improve anxiety, depression, and other mental health outcomes for autistic people: A systematic review and network meta-analysis of randomised controlled trials. *Autism: The International Journal of Research and Practice*. 2023; 27(1): 7–30. PMID:35957523 <https://doi.org/10.1177/13623613221117931>
- [12] Wei G, Farooq J, Kumar A. Impact of mind-body treatment interventions on quality of life in neurofibromatosis patients: A systematic review and meta-analysis. *Dermatologic Therapy*. 2021; 34(1): Article e14613. <https://doi.org/10.1111/dth.14613>
- [13] Mak C, Whittingham K, Cunningham R, et al. Effect of mindfulness yoga programme MiYoga on attention, behaviour, and physical outcomes in cerebral palsy: a randomized controlled trial. *Developmental Medicine and Child Neurology*. 2018; 60(9): 922–932. PMID:29869333 <https://doi.org/10.1111/dmcn.13923>
- [14] Santonastaso O, Zaccari V, Crescentini C, et al. Clinical application of mindfulness-oriented meditation: A preliminary study in children with ADHD. *International Journal of Environmental Research and Public Health*. 2020; 17(18): 6916. PMID:32971803 <https://doi.org/10.3390/ijerph17186916>
- [15] Grazzi L, Grignani E, Raggi A, et al. Effect of a mindfulness-based intervention for chronic migraine and high frequency episodic migraine in adolescents: A pilot single-arm open-label study. *International Journal of Environmental Research and Public Health*. 2021; 18(22): 11739. PMID:34831494 <https://doi.org/10.3390/ijerph182211739>
- [16] Grazzi L, Montisano DA, Raggi A, et al. Feasibility and effect of mindfulness approach by web for chronic migraine and high-frequency episodic migraine without aura at in adolescents during and after COVID emergency: preliminary findings. *Neurological Sciences*. 2022; 43(9): 5741–5744. PMID:35788839 <https://doi.org/10.1007/s10072-022-06225-2>
- [17] Martin S, Wolters PL, Toledo-Tamula MA, et al. Acceptance and commitment therapy in youth with neurofibromatosis type 1 (NF1) and chronic pain and their parents: A pilot study of feasibility and preliminary efficacy. *American Journal of Medical Genetics*. 2016; 170(6): 1462–1470. PMID:27021207 <https://doi.org/10.1002/ajmg.a.37623>
- [18] Beck KB, Northrup JB, Breitenfeldt KE, et al. Stakeholder informed development of the Emotion Awareness and Skills Enhancement team-based program (EASE-Teams). *Autism: The International Journal of Research and Practice*. 2022; 26(3): 586–600. PMID:34903083 <https://doi.org/10.1177/13623613211061936>
- [19] Joanna Briggs Institute Levels of Evidence and Grades of Recommendation Working Party. [Internet]. JBI levels of evidence. [published 2013 October; cited 2026 April]. Available from: https://jbi.global/sites/default/files/2019-05/JBI-Levels-of-evidence_2014_0.pdf
- [20] Belcher BR, Zink J, Azad A, et al. The roles of physical activity, exercise, and fitness in promoting resilience during adolescence: Effects on mental well-being and brain development. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*. 2021; 6(2): 225–237. PMID:33067166 <https://doi.org/10.1016/j.bpsc.2020.08.005>
- [21] Kaushik D, Garg M, Dixit G. Holistic approaches to mental health: Integrating mind, body, and spirit for comprehensive well-being. *International Journal of Advanced Biochemistry Research*. 2024; 8: 295–299. <https://doi.org/10.33545/26174693.2024.v8.i3Sd.783>
- [22] Zhou XY, Xu XM, Wang F, et al. Validations and psychological properties of a simplified Chinese version of pain anxiety symptoms scale (SC-PASS). *Medicine*. 2017; 96(10): Article e5626. PMID:28272194 <https://doi.org/10.1097/MD.0000000000005626>
- [23] Lewinsohn PM, Seeley JR, Roberts RE, et al. Center for Epidemiological Studies-Depression Scale (CES-D) as a screening instrument for depression among community-residing older adults. *Psychology and Aging*. 1997; 12: 277–287. PMID:9189988 <https://doi.org/10.1037/0882-7974.12.2.277>
- [24] Radloff LS. The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*. 1977; 1(3): 385–401. <https://doi.org/10.1177/014662167700100306>
- [25] Chesterfield Royal NHS Foundation Trust. [Internet]. Depression in young people with a learning disability. <https://www.camhsnor.thderbyshire.nhs.uk/depression-1>
- [26] Isa SN, Ishak I, Ab Rahman A, et al. Health and quality of life among the caregivers of children with disabilities: A review of literature. *Asian Journal of Psychiatry*. 2016; 23: 71–77. PMID:27969083 <https://doi.org/10.1016/j.ajp.2016.07.007>
- [27] Caicedo C. Families with special needs children: Family health, functioning, and care burden. *Journal of the American Psychiatric Nurses Association*. 2014; 20(6): 398–407. PMID:25428686 <https://doi.org/10.1177/1078390314561326>
- [28] Kuo DZ, Cohen E, Agrawal R, et al. A national profile of caregiver challenges among more medically complex children with special health care needs. *Archives of Pediatrics & Adolescent Medicine*. 2011; 165(11): 1020–1026. PMID:22065182 <https://doi.org/10.1001/archpediatrics.2011.172>
- [29] Vicentic S, Sapic R, Damjanovic A, et al. Burnout of formal caregivers of children with cerebral palsy. *The Israel Journal of Psychiatry and Related Sciences*. 2016; 53(2): 10–15. <https://pubmed.ncbi.nlm.nih.gov/28079032/>

- [30] Mathew MJ. Literature search in systematic reviews: How much is good enough? *Clinical Epidemiology and Global Health*. 2024; 25: Article 101485. <https://doi.org/10.1016/j.cegh.2023.101485>
- [31] Tufanaru C, Munn Z, Aromataris E, et al. Chapter 3: systematic reviews of effectiveness. In E. Aromataris & Z. Munn (Eds.), *JBIManual for Evidence Synthesis*. The Joanna Briggs Institute. 2020. <https://doi.org/10.46658/JBIMES-20-04>
- [32] American Psychiatric Nurses Association. APNA position: Psychiatric-mental health advanced practice nurses. 2025. <https://www.apna.org/pmh-aprns-position-statement/#:~:text=APNA%20Position:%20Psychiatric%2DMental%20Health,increasing%20population's%20mental%20health%20needs>