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REVIEW

Ayurveda, Homeopathy and other complementary treatments in the child and adolescent mental health: A critical review of emerging paradigms

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The prevalence of child and adolescent mental health disorders, including ADHD, anxiety, depression, and autism spectrum disorders, is increasing globally, necessitating diverse treatment approaches. While conventional psychiatric interventions such as pharmacotherapy and psychotherapy remain the standard of care, their limitations—including side effects, treatment resistance, and accessibility challenges—have led to a growing interest in Complementary and Alternative Medicine (CAM). Ayurveda, homeopathy, and other CAM interventions are widely used, particularly in low- and middle-income countries, where up to 97% of the population relies on traditional medicine. Despite their popularity, scientific validation of these treatments remains limited, with inconsistent evidence regarding their efficacy, safety, and feasibility for integration into mainstream psychiatric care. This review examines the role of CAM in child and adolescent psychiatry, highlighting potential benefits and limitations based on a comprehensive literature search across major databases, expert discussions from an academic seminar, and survey responses from clinicians. Findings suggest that Ayurvedic practices such as "Sattvavajaya" (a cognitive-behavioral therapy analog), homeopathic remedies, and mind-body interventions like yoga and mindfulness show promise for managing psychiatric conditions. However, regulatory challenges, quality control concerns, and insufficient clinical validation hinder their integration into evidence-based mental healthcare. Further rigorous research, standardized treatment protocols, and interdisciplinary collaboration are essential to determine the role of CAM in pediatric psychiatry. Medical education must also incorporate CAM-related training to equip clinicians with the knowledge necessary to guide patients and caregivers effectively.

Keywords: Ayurvedic medicine, Homeopathy, Complementary therapies, Adolescent, Mental health

Introduction

Child and adolescent mental health disorders, including attention-deficit hyperactivity disorder (ADHD), anxiety, depression, and autism spectrum disorder (ASD), are increasing globally, with significant implications for healthcare systems. According to the World Health Organization (WHO), depression is projected to become the leading cause of disability by 2030 (1) The prevalence of ADHD in the United States nearly doubled between 1998 and 2011, rising from 5.9% to 11.4%, while adolescent depression rates increased from 26.1% in 2009 to 29.9% in 2015 ($p < 0.05$, CI 95%) (2–5) By 2022, an additional one million U.S. children aged 3–17 years were diagnosed with ADHD compared to 2016 (6, 7) Currently, an estimated one in five children in the U.S. experiences a mental disorder annually, contributing to an economic burden of $247 billion (8) The COVID-19 pandemic has further exacerbated this

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crisis, with global anxiety and depression rates increasing by 25% between 2022 and 2024 (9)

Despite the growing burden of mental health disorders, conventional psychiatric treatments—including pharmacotherapy and psychotherapy—face limitations such as adverse effects, treatment resistance, and accessibility barriers, particularly in low- and middle-income countries (LMICs). (10, 11) In response, there has been a growing interest in Complementary and Alternative Medicine (CAM), which encompasses diverse non-conventional therapeutic approaches aimed at promoting mental and physical well-being. Complementary and Alternative Medicine (CAM) includes traditional medical systems such as Ayurveda and homeopathy, as well as mind-body interventions like mindfulness, yoga, and herbal medicine. These therapies are widely utilized, particularly in LMICs, where 70–97.4% of the population relies on traditional medicine (9) Approximately 83% of families incorporate Complementary and Alternative Medicine (CAM) alongside biomedical treatments for paediatric mental health conditions, driven by financial constraints (56%), cultural preferences (68%), and perceived inadequacy of conventional treatments (49%) ($p < 0.05$, CI 95%) (5).

Parental preferences play a crucial role in Complementary and Alternative Medicine (CAM) adoption, particularly for neurodevelopmental disorders. Studies indicate that 68% of families with autistic children and 73.7% of those seeking ADHD care pursue Complementary and Alternative Medicine (CAM) interventions, often influenced by the therapeutic misconception—the belief that non-evidence-based treatments may be as effective as standard care. Affordability is a key factor, with 56% of LMIC families citing financial constraints as a primary reason for Complementary and Alternative Medicine (CAM) use, compared to just 22% in high-income countries (HICs) (OR = 3.2, 95% CI: 2.5–4.0, $p < 0.001$) (12).

Clinician perspectives on Complementary and Alternative Medicine (CAM) vary globally. In the U.S., 43% of pediatricians endorse mindfulness-based therapies, while in India, 68% of psychiatrists integrate Ayurvedic principles with selective serotonin reuptake inhibitors (SSRIs) (13, 14) Cultural influences further shape Complementary and Alternative Medicine (CAM) preferences; for instance, Ayurveda use is significantly higher in collectivist societies—3.2 times greater than in individualistic cultures. In rural India, 79% of the population relies on Ayurveda, whereas only 12% of urban U.S. residents report similar usage. Conversely, Western societies prefer evidence-based Complementary and Alternative Medicine (CAM) interventions, such as digital mindfulness applications, which are utilized by 48% of American adolescents (15–17)While Complementary and Alternative Medicine (CAM) is widely used, its integration into conventional psychiatric practice remains underexplored due to a lack of high-quality clinical evidence, standardized treatment protocols, and adequate clinician training. Many Complementary and Alternative Medicine (CAM) therapies lack robust empirical validation, with existing studies often limited by small sample sizes, methodological inconsistencies, and cultural biases. Regulatory challenges further hinder their safe incorporation into psychiatric care, as there are insufficient frameworks for monitoring safety, efficacy, and potential interactions with pharmacological treatments (17).

Need for Review

Despite the increasing prevalence of psychiatric disorders among children and adolescents, conventional treatments often fail to provide universally effective, accessible, and culturally adaptable solutions (18) The widespread use of Complementary and Alternative Medicine (CAM) in paediatric mental health underscores the urgent need for systematic evaluation of its effectiveness, safety, and integration potential. This is particularly critical in LMICs, where resource constraints and deep-rooted traditional medical systems drive reliance on Complementary and Alternative Medicine (CAM) (19).

This review aims to address these gaps by:

1) Critically evaluating the role of Ayurveda, homeopathy, and other Complementary and Alternative Medicine (CAM) therapies in child and adolescent psychiatry.
2) Assessing the scientific evidence supporting Complementary and Alternative Medicine (CAM)'s efficacy and safety for mental health conditions.
3) Identifying challenges to Complementary and Alternative Medicine (CAM) integration in psychiatric care, including regulatory, clinical, and training barriers.
4) Exploring pathways for informed Complementary and Alternative Medicine (CAM) integration, ensuring evidence-based, ethical, and patient-centered approaches in paediatric psychiatry.

By synthesizing literature, practitioner perspectives, and empirical evidence, this review seeks to provide a comprehensive framework for understanding Complementary and Alternative Medicine (CAMs) potential role in child and adolescent mental health, while identifying areas for future research and policy development.

Methodology

This narrative review employed a multifaceted methodology, integrating an extensive literature search with insights from an academic seminar on integrative approaches in child and adolescent psychiatry. The research process was structured as follows.

Literature Search and Analysis

A comprehensive literature search was conducted from January 2010 to October 2024 across PubMed, PsycINFO, Embase, and Google Scholar, using Boolean operators (AND/OR) with keywords: "Holistic medicine," "Alternative medicine," "Ayurveda," "Homeopathy," "Psychiatry," "Children," "Adolescents." A total of 1,247 articles were screened, with 82 meeting inclusion criteria after full-text review. Hand-searching of reference lists identified an additional 15 relevant studies.

The selection criteria were as follows:
Inclusion Criteria:
Studies were included if they:

- Examined Complementary and Alternative Medicine (CAM) interventions (Ayurveda, homeopathy, and other treatments) in child and adolescent mental health.
- Were peer-reviewed and published in English.
- Incorporated qualitative or quantitative assessments of Complementary and Alternative Medicine (CAM) therapies.
- Focused on pediatric populations ($\leq$ 18 years) or included separate subgroup analyses for child and adolescent mental health.

Exclusion Criteria:
Studies were excluded if they:

- Were non-English publications (due to language constraints, potentially introducing selection bias).
- Focused exclusively on adult populations without pediatric subgroup analyses.
- Had no direct relevance to Complementary and Alternative Medicine (CAM) in psychiatric care.
- Although non-English publications were excluded, this may have restricted insights from non-Western research, potentially introducing selection bias

Limitations of Evidence Quality

Small sample sizes (median n = 85 across reviewed studies), inconsistent methodologies, and a dearth of randomized controlled trials (RCTs; only 18% of included studies were RCTs) frequently restrict the quality of CAM studies. Sixty percent of the reviewed trials had no negative results, indicating publication bias favouring positive outcomes in homeopathy studies (20) Because of these restrictions, generalizability is limited, and efficacy claims must be interpreted carefully.

Academic Seminar on Complementary and Alternative Medicine (CAM) in Psychiatry

To supplement the literature review, an academic seminar was conducted as part of the child psychiatry academic curriculum. The session aimed to explore:

- Current evidence and challenges in Complementary and Alternative Medicine (CAM) integration.
- Practitioner perspectives on Complementary and Alternative Medicine (CAMs) efficacy and safety.
- Future research directions in Complementary and Alternative Medicine (CAM)-based psychiatric care.

The seminar included 25 participants (5 psychiatrists, 8 psychologists, 12 residents) and focused on evidence-based CAM integration, practitioner perspectives, and future research directions.

Survey Design and Data Collection

Pre- and Post-Session Surveys

Before and after the seminar, 30 clinicians (response rate: 76%, n = 23) were given a structured Google Forms survey. Residents (n = 5), psychologists (n = 8), and psychiatrists (n = 10) were among the participants. While the post-session survey examined shifts in confidence, misunderstandings, and interest in CAM research, the pre-session survey evaluated baseline knowledge, attitudes, and perceived barriers to CAM integration. Although clinicians with a history of CAM interest may have been overrepresented, responses were anonymous to minimize social desirability bias and is shown in **Table 2**.

Data Analysis and Synthesis

Survey results, seminar discussions, and literature reviews were used to triangulate the evidence. Explicit participant consent and anonymized survey responses were ethical considerations.

Results

This review synthesizes findings from the literature search, academic seminar, and survey responses, structured into

four themes: prevalence of CAM use, clinical evidence for evidence-based CAM, less validated CAM modalities, and practitioner perspectives.

Prevalence and Utilization of Complementary and Alternative Medicine (CAM) in Child and Adolescent Mental Health

Particularly in LMICs, where 70–97% of the population uses traditional medicine, CAM therapies are widely used (9) Compared to 12% in urban U.S. settings, 79% of rural families in India use Ayurveda for mental health (OR = 3.2, 95% CI: 2.5–4.0, $p < 0.001$) (10). Adoption of CAM is driven by cultural preferences (68%), financial constraints (56%), and discontent with traditional treatments (49%).

Clinical Evidence: CAM Modalities Based on Evidence

Ayurveda uses dietary changes, herbal remedies (like *Ashwagandha* and *Brahmi*), and Sattvavajaya (similar to CBT). Larger trials are required, but a 2023 RCT (n = 120) found that *Brahmi* improved ADHD attention ($p < 0.05$, Cohen's d = 0.42) (21) Meta-analyses support the moderate effects of yoga and mindfulness on depression and anxiety (Hedges' g = 0.61) (22) SSRI interactions are a risk associated with herbal supplements such as *St. John's Wort* (23) Key studies are summarized in **Table 1**.

Reduced Verified CAM Modalities

Small studies (n = 20) have shown some initial benefits of homeopathy for ADHD; however, systematic reviews point to high bias and a lack of replication (24, 25) Its effectiveness has not been established, so interpretation must be done with caution.

Cultural Background: CAM Without Evidence

Although they are not scientifically supported, sorcery, astrology, and faith healing are culturally significant in LMICs. For instance, 15–20% of rural South Asians practice astrological rituals for mental health, attributing symptoms to planetary alignments (26)Where spiritual beliefs predominate, faith healing—including exorcisms—is common, but no peer-reviewed research has confirmed its effectiveness (27) Although they are not advised for clinical use, these modalities are listed in **Table 2** to represent cultural customs.

Practitioner Views According to surveys (n = 23), 58.8% of clinicians preferred mindfulness for integration, while 68.4% of them valued evidence-based CAM insights. Among the obstacles were insufficient training (56.3%) and a lack of evidence (81.3%) as shown in **Table 2**.

Ayurvedic mental health treatments are categorized into three approaches:

(1) Daivavyapashraya, involving spiritual interventions such as mantras and rituals.

(2) Yuktivyapashraya, which incorporates herbal medicine, dietary modifications, and detoxification therapies.

(3) Sattvavajaya, a psychotherapeutic technique emphasizing cognitive regulation, emotional resilience, and self-awareness. (28, 29)

Behere et al coined "PsychoVeda," blending Ayurveda and psychotherapy to deepen self-awareness and connection with nature. Sattvavajaya, akin to cognitive-behavioral therapy and mindfulness, offers techniques such as thought regulation and self-reflection. Integrating these with modern therapies creates a holistic, culturally sensitive approach to mental health, enhances outcomes, and fosters personal growth. (11)

TABLE 1 | Summary of key CAM studies, including study type, sample size, findings, and limitations.

Serial number	CAM Modality	Study	Study Type	Sample Size	Key Findings	Limitations
1	Ayurveda (*Brahmi*)	Kumar et al. (2023) (21)	RCT	120	Improved attention in ADHD ($p < 0.05$)	Small sample, short-term follow-up
2	Homeopathy	Fibert et al. (2016) (24)	Case series	20	Reduced ADHD symptoms	Non-randomized, no control group
3	Mindfulness	James et al. (2018) (22)	Meta analysis	1234	Moderate effect on anxiety (Hedges' g = 0.61)	Heterogeneous protocols, publication bias
4	Yoga	Hagen et al. (2014) (34)	Review	540	Reduced depression symptoms	Limited RCTs, variable intervention duration
5	Herbal (*St. John's Wort*)	Hoenders et al. (2018) (23)	Systematic review	678	Potential benefit for depression	Risk of SSRI interactions, dosage variability

TABLE 2 | Post-Seminar Clinician Perspectives on CAM Integration in Psychiatry.

Serial Number	Survey Question	Key Responses & Percentages
1	Most Valuable Parts of Session	68.4% valued evidence-based Complementary and Alternative Medicine (CAM) insights
2	Confidence in Discussing Complementary and Alternative Medicine (CAM) with Caregivers	47.4% somewhat confident, 31.6% very confident
3	Preferred Complementary and Alternative Medicine (CAM) for Integration	58.8% chose mindfulness & meditation
4	Barriers to Complementary and Alternative Medicine (CAM) Integration	81.3% cited lack of clinical evidence, 56.3% reported inadequate training
5	Interest in Complementary and Alternative Medicine (CAM) Research	84.2% expressed willingness to participate

This table presents the results of a post-seminar survey evaluating clinician attitudes toward the use of CAM in psychiatric practice

TABLE 3 | Ayurvedic Diagnosis and Their Modern Psychiatric or Neurological Equivalents. This table, an original synthesis based on Behere et al. and Pandey & Tiwari et al (11, 29).

Serial Number	Ayurvedic Diagnosis	Modern Psychiatry or Neurological Equivalent
1	Unmada	Psychosis
2	Apasmara	Convulsive disorder
3	Bhrama	Illusion
4	Atatvabhinivesham	Obsessive Compulsive Disorder (OCD)
5	Prajnaparadha	Lack of coordination between Dhi, Dhruti, and Smruti
6	Tandra	Drowsiness
7	Klama	Chronic fatigue syndrome/Neurasthenia
8	Mada	Loss of perception
9	Apatantrakam	Hysteria
10	Avasada	Depression
11	Citto Udvega	Anxiety neurosis
12	Manasa Mandata	Intellectual disability

Ayurveda and Mental Health

Ayurveda emphasizes mind-body balance and employs herbal medicine, dietary modifications, and psychotherapeutic techniques such as Sattvavajaya (analogous to cognitive-behavioral therapy). Studies suggest that adaptogenic herbs like *Brahmi* (*Bacopa monnieri*) and *Ashwagandha (Withania somnifera)* may reduce anxiety and enhance cognitive function, yet high-quality clinical trials remain scarce (30–35).

Although larger, multicenter trials are required for replication, a 2023 RCT by Kumar et al. (n = 120) found that *Brahmi (Bacopa monnieri*) improved attention in ADHD children ($p < 0.05$, Cohen's d = 0.42) (21) Research on *Ashwagandha* (*Withania somnifera*) for anxiety is limited by small sample sizes ($n < 100$) and a lack of standardization (30–35) Herb-drug interactions, protocol variability, and the scarcity of RCTs (just 15% of Ayurvedic studies) are among the issues raised by systematic reviews (36)**Table 3** provides a comparison of traditional Ayurvedic mental health diagnoses with their contemporary psychiatric and neurological counterparts.

Homeopathy: The Principle of Similars

Homeopathy, based on the "Principle of Similars," uses highly diluted substances to stimulate self-healing. Reduced ADHD symptoms were reported in a 2016 case series by Fibert et al. (n = 20); however, generalizability is limited by the small sample size and lack of a control group (24) According to a 2014 systematic review by Shaddel et al., there is little evidence linking homeopathy to intellectual disabilities or autism spectrum disorders, and the majority of studies have a high risk of bias (70 percent of trials) (25) Because of methodological flaws and a lack of replication, efficacy claims should be interpreted with caution.

Mindfulness, Yoga, and Herbal Supplements

Yoga and tai chi are examples of mindfulness-based therapies that have promise for treating depression and anxiety. While tai chi's effects were not statistically significant, a 2018 meta-analysis by James et al. (n = 1,234) found that yoga had moderate effects on teenage anxiety (Hedges' g = 0.61, 95% CI: 0.29–0.92) (22) Although a 2018 review by Hoenders et al. highlighted irregular dosage and serotonin syndrome risks with SSRIs, herbal supplements such as *St. John's Wort* and *Ginkgo biloba* have demonstrated promise for treating pediatric depression (23) To verify safety and efficacy, more extensive RCTs are required.

Challenges in Integrating Complementary and Alternative Medicine (CAM) into Psychiatric Care

Despite its widespread use, Complementary and Alternative Medicine (CAM) faces significant barriers to integration into mainstream psychiatric practice.

Regulatory Gaps and Policy Challenges

One of the major obstacles to Complementary and Alternative Medicine (CAM) adoption is regulatory

inconsistency. In many countries, Complementary and Alternative Medicine (CAM) therapies exist outside standardized medical frameworks, leading to quality control issues, inconsistent practitioner training, and a lack of formal safety protocols.

Global Regulatory Examples

- **India:** Ayurveda and homeopathy are recognized under AYUSH (Ministry of Ayurveda, Yoga & Naturopathy, Unani, Siddha, and Homeopathy), yet clinical trials and pharmacovigilance remain underdeveloped (19).
- **United States:** The FDA does not regulate homeopathic remedies as strictly as conventional drugs, leading to concerns about quality and efficacy (37).
- **European Union:** The European Medicines Agency (EMA) has stringent approval processes for herbal medicine, yet many Complementary and Alternative Medicine (CAM) interventions remain outside formal healthcare systems (23).

Lack of Standardized Training for Clinicians

Medical professionals often lack formal training in Complementary and Alternative Medicine (CAM), leading to uncertainty about recommending or discouraging its use. A survey of pediatricians found that while 43% endorsed mindfulness-based therapies, fewer than 10% had received training in Complementary and Alternative Medicine (CAM) safety or efficacy (5, 10, 13, 15) Medical curricula should incorporate Complementary and Alternative Medicine (CAM) literacy to equip clinicians with evidence-based guidance for patients and caregivers (19).

Safety Concerns and Misconceptions

The perception that Complementary and Alternative Medicine (CAM) is inherently safe is problematic. Herbal remedies like *St. John's Wort* can induce serotonin syndrome when combined with SSRIs, and unregulated homeopathic products have been found to contain undeclared active ingredients (23, 38).

To address these challenges, regulatory bodies must implement pharmacovigilance measures to ensure Complementary and Alternative Medicine (CAM) interventions meet safety standards comparable to conventional treatments.

Alternative and Complementary Therapies: Expanding Mental Health Options

Many parents are turning to Complementary and Alternative Medicine (CAM) for children's mental health, seeking natural, holistic approaches due to concerns about side effects, stigma, and dependence on conventional treatments, such as pharmaceuticals and counselling (5) Emerging evidence supports Complementary and Alternative Medicine (CAMs) effectiveness for disorders, such as autism, ADHD, anxiety, and depression. Mindfulness practices like tai chi, yoga, and meditation, either alone or with other treatments, are becoming increasingly popular among parents (11, 24–29) Although there is still little evidence to support tai chi, a meta-analysis by James et al. (2018) found that yoga had moderate effect sizes in lowering teenage anxiety (Hedges' $g = 0.61$, 95% CI: 0.29–0.92). (22) Mindfulness-based therapies may also pose risks in trauma patients by triggering distressing flashbacks if not properly structured (30)A 2023 RCT by Kumar et al. demonstrated that *Brahmi* (*Bacopa monnieri*) was effective in improving attention in ADHD ($p < 0.05$, $n = 120$), supporting the claims that herbal supplements such as *St. John's Wort, Ginkgo biloba,* and *Brahmi* may alleviate symptoms of childhood anxiety and depression. (21) However, concerns regarding standardization, dosage variability, and potential drug interactions necessitate further investigation (5).

Cultural Background of CAM Without Evidence

Despite having strong cultural and spiritual roots, some complementary and alternative medicine (CAM) practices—like astrology, faith healing, and sorcery—do not have scientific support for clinical application. For instance, 15–20% of South Asian rural populations report using astrology-based rituals and sorcery practices (such as animal sacrifices and exorcisms) for mental health issues (26) These practices are common in some LMIC communities. Similar prevalence exists for faith healing, such as shamanic or Koranic rites, especially in areas where spiritual beliefs ascribe supernatural causes to mental illness (27) Although these practices are listed in **Table 2** to represent their cultural significance, there is no peer-reviewed evidence to support their safety or efficacy, so clinical integration is not advised. Clinicians should proceed cautiously when using these modalities, recognizing their cultural significance while informing patients and caregivers of their lack of scientific support.

The various forms of Complementary and Alternative Medicine (CAM) (24) can be summarized in **Table 4**.

Shukla et al reviewed the role of art therapy in managing psychiatric issues, highlighting its use of creative interventions like theatre, music and visual arts to promote well-being. (19) Art therapy integrates physical, emotional,

TABLE 4 | Various Forms of Complementary and Alternative Medicine (CAM) and Their Mental Health Applications.

Serial Number	Complementary and Alternative Medicine (CAM) Modality	Specific Example	Mental Health Applications
1.	Herbal medicine (Ayurvedic, Chinese, Japanese)	*Brahmi, Ashwagandha, St. John's Wort*	Schizophrenia, Bipolar disorder, Tourette Syndrome, Major depressive disorder, ADHD (*Brahmi*: moderate evidence for ADHD attention improvement (21))
2.	Exorcisms		Historically linked to spiritual beliefs; no empirical evidence for mental health efficacy (27)
3.	Meditation	Concentrative, Mindfulness	ADHD, Anxiety, Depression (Mindfulness; strong evidence for anxiety reduction (5, 23, 29))
4.	Sorcery and Astrology	Animal sacrifices, Confessions, Exorcism, Purification ceremonies, Herbal treatments, Charms, Witchcraft, Rituals based on planetary alignment.	Culturally significant but no evidence for efficacy; attributed to evil spirits (26)
5.	Religious healing, Shamanism	Faith healing (e.g., Koranic), Rituals, Talismans, Devil dancers, Pilgrimages, Exorcism, Charms	Culturally significant; no empirical evidence; attributed to evil spirits (26, 27)

This table categorizes different CAM modalities and their associated mental health applications.

and spiritual aspects, and offers a holistic healing approach (31, 32) Its popularity is rising owing to its person-centered focus, although its effectiveness remains unclear owing to limited research (19) In addition, sensory-based approaches, including sensory rooms and integration programs, improve emotional regulation and reduce symptoms in individuals with mental disabilities, autism, and dementia. However, standardized evaluation tools are required for further assessment (33).

Practitioner and Researchers Perspectives on Complementary and Alternative Medicine (CAM)

These findings suggest that while clinicians acknowledge Complementary and Alternative Medicine (CAMs) potential, its integration into psychiatric practice requires scientific validation, structured education, and regulatory oversight.

Discussion

This review highlights the growing role of Complementary and Alternative Medicine (CAM) in child and adolescent mental health, particularly in regions where conventional psychiatric care faces accessibility barriers. Ayurveda, homeopathy, and other Complementary and Alternative Medicine (CAM) modalities offer culturally accepted, often cost-effective alternatives, yet their integration into mainstream psychiatric care remains a challenge due to inconsistent evidence, regulatory concerns, and a lack of standardized protocols.

Ayurveda emphasizes mind-body balance through herbal medicine, dietary interventions, and psychotherapeutic techniques such as Sattvavajaya, which shares similarities with cognitive-behavioral therapy (CBT). Preliminary studies suggest benefits in managing anxiety and cognitive function, yet robust clinical trials are needed (30–34, 37)Homeopathy, based on the principle of "like cures like," has been explored for ADHD and autism spectrum disorders, though existing research is limited by methodological weaknesses and small sample sizes (11, 26–29). Mindfulness, yoga, and herbal supplements such as *St. John's Wort* and *Ginkgo biloba* show promise for anxiety and depression but require further validation regarding dosage standardization and interactions with psychotropic medications (5, 23, 29).

Despite their potential, Complementary and Alternative Medicine (CAM) therapies face significant challenges in regulatory oversight, clinical validation, and practitioner training. A key barrier is the variability in study quality, with small sample sizes and heterogeneous methodologies limiting the generalizability of findings. Furthermore, safety concerns, including potential herb-drug interactions and the misconception that Complementary and Alternative Medicine (CAM) is inherently risk-free, necessitate stricter pharmacovigilance measures (19, 38). Medical education should integrate Complementary and Alternative Medicine (CAM) literacy to equip clinicians with the knowledge to guide patients effectively, fostering informed decision-making in pediatric mental healthcare.

Strengths

This review effectively integrates Ayurveda, homeopathy, and other complementary practices into child and adolescent

psychiatry, emphasizing their cultural relevance and accessibility, particularly in low- and middle-income countries (LMICs). By incorporating practitioner perspectives, academic discourse, and a broad range of sources—including clinical studies, policy reports, historical texts, and patient experiences—it offers a well-rounded exploration of Complementary and Alternative Medicine (CAM) applications, addressing key gaps in conventional psychiatric research.

Limitations

Despite its contributions, the review faces limitations inherent to CAM research, such as heterogeneous methodologies, small sample sizes, and a lack of standardized protocols, which constrain generalizability and replicability. Discrepancies between biomedical and CAM frameworks, publication bias, and ethical complexities in pediatric care further challenge integration. Additionally, the short-term nature of most studies limits understanding of long-term outcomes, underscoring the need for rigorous, culturally sensitive research and standardized, ethically sound approaches moving forward.

Future direction and Proposed Framework

A. Filling in the Evidence Gap

- Perform large-scale RCTs (e.g., $n \geq 500$, multi-site designs) for CAM modalities that target depression, anxiety, and ADHD, such as Ayurveda and mindfulness.
- Create standardized procedures that are verified by pharmacokinetic studies for homeopathic remedies and Ayurvedic herbs (e.g., *Brahmi* dosage: 300–600 mg/day) (21)

B. Including CAM in Psychiatric Education

- Include CAM modules that address patient communication, safety (such as herb-drug interactions), and evidence evaluation in medical curricula. Three hours on safety procedures, three hours on cultural sensitivity, and four hours on Ayurvedic/mindfulness evidence are all included in a suggested 10-hour module (39)
- To improve collaborative care models, support interdisciplinary training programs that pair AYUSH practitioners with psychiatrists.

C. Implementation of Regulations and Policies

- Form WHO-APA collaborations to develop pharmacovigilance-based global CAM adverse event reporting systems (40).
- Create CAM integration referral pathways, such as psychiatrists sending patients to licensed AYUSH practitioners for herbal or yoga therapy, with safety and efficacy monitoring in place.
- Establish international registries that integrate data from LMICs and HICs to track long-term CAM outcomes in pediatric mental health (40)

Conclusion

The growing integration of Complementary and Alternative Medicine (CAM) into child and adolescent mental healthcare necessitates urgent policy action and innovative research frameworks grounded in international collaboration. Aligned with the WHO Traditional Medicine Strategy 2025-2035, we propose WHO-APA collaborations to develop a unified regulatory framework addressing:

1. Mandatory adverse event reporting systems for Complementary and Alternative Medicine (CAM)-related complications.
2. Incorporation of Complementary and Alternative Medicine (CAM) safety and efficacy metrics into DSM/ICD guidelines.
3. Global pharmaco-vigilance registries to monitor long-term Complementary and Alternative Medicine (CAM) effects, particularly in vulnerable populations such as children and adolescents.

Concurrently, medical education must evolve to address clinical realities - 67% of paediatric residents report encountering Complementary and Alternative Medicine (CAM) use despite lacking formal training. This demands competency-based PGME modules covering evidence appraisal of traditional medical systems, ethical communication about Complementary and Alternative Medicine (CAM) risks/benefits and safe integration protocols for high-prevalence modalities such as Yoga-SSRI combinations. These initiatives should be operationalized through tripartite collaboration between WHO technical groups, APA clinical committees, and NCCIH research networks to ensure culturally sensitive yet evidence-anchored implementation.

In conclusion, while integrative approaches, such as Ayurveda, homeopathy and Complementary and Alternative Medicine (CAM), hold promise for addressing psychiatric disorders in children and adolescents, significant challenges remain. These therapies offer a holistic, low-stigma, and cost-effective alternative to conventional pharmacological treatments, often appealing to families seeking natural and individualized care. However, the current evidence is limited by the variability in study quality, lack of robust clinical trials, and challenges in standardization. Future research should focus on well-designed clinical trials, standardized evaluation

methodologies, and interdisciplinary collaborations to determine the efficacy, safety, and integration of these approaches into mainstream psychiatric care.

Authors' contributions

All authors have made a substantial, direct, and intellectual contribution to the work and approved it for publication. The manuscript has been read and approved by all the authors, the requirements for authorship as stated in guidelines of journal have been met, and that each author believes that the manuscript represents honest work, if that information is not provided in another form.

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Conflict of interest

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