Non-Pharmaceutical Psychological Interventions for Adult ADHD: A Comparative Literature Review

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Abstract. Adult attention-deficit/hyperactivity disorder (ADHD) is estimated to affect 2.5–5% of adults globally. Although medication remains a first-line treatment, many individuals experience only partial benefit, unwanted side effects or discontinue use over time. This review examines current evidence on four major non-pharmacological interventions—cognitive-behavioural therapy (CBT), mindfulness-based approaches, psychoeducation, and cognitive training—and discusses their effectiveness and clinical relevance. Findings from randomized controlled trials and meta-analyses show consistent clinician-rated improvements across all four interventions. CBT shows the most consistent effects, leading to reductions in symptoms and improvements in daily functioning. Mindfulness-based interventions are particularly effective in enhancing attention and emotional regulation, while psychoeducation improves participants' understanding of ADHD and their self-management skills. Cognitive training yields modest gains in cognitive performance, though its transfer to real-world functioning appeared limited. Top-down approaches such as CBT and psychoeducation, and bottom-up methods like mindfulness and cognitive training, represent complementary therapeutic pathways. Combining these evidence-based strategies within individualized, multimodal treatment plans may improve outcomes for adults with ADHD beyond what medication alone can achieve.

Keywords: Adult ADHD, Psychological interventions, CBT, Psychoeducation, Mindfulness-based interventions, Comparative effectiveness.

1. Introduction

Attention-deficit/hyperactivity disorder (ADHD) affects approximately 2.5-5% of adults worldwide, influencing over 139 million individuals [1]. This prevalence poses a meaningful public health concern varying across regions, from about 3.6% in high-income countries to 1.4% in low- and middle-income nations [2]. While pharmacological treatments, particularly stimulant medications, have demonstrated efficacy in symptom reduction, they still present several limitations that emphasizes the need for effective non-pharmaceutical alternatives.

The reliance on medication alone for adult ADHD treatment raises several concerns. These include limited response rates, high discontinuation rates and insufficient addressing of functional impairments beyond core symptoms. First, approximately 30-50% of adults with ADHD respond poorly to medication. They also experience intolerable side effects, including sleep disturbances, appetite suppression, and cardiovascular effects [3]. Besides, discontinuation rates remain problematically high, with 50–80% of adults primarily ceasing medication within 1–2 years [4]. Furthermore, while medication primarily alleviates core symptoms, it often fails to address the functional impairments and skill deficits that adults with ADHD experience in areas such as organization, time management and emotion regulation [5]. Thus, Psychological interventions may help fill these treatment gaps by strengthening behavioral skills and emotion regulation capacities. These interventions are based on various theoretical frameworks. For example, cognitive-behavioural models target maladaptive thought patterns and problematic behaviours. Mindfulness-Based interventions utilize contemplative approaches that enhance attention regulation, self-awareness, and emotional control through present-moment awareness training. Psychoeducational models focus on skill development and environmental modifications. The diversity of available psychological interventions demands a comprehensive examination of their relative effectiveness and appropriate clinical applications.

This review will examine and compare non-pharmacological psychological interventions for adults with ADHD. Specifically, it aims to: (1) evaluate the empirical evidence supporting major psychological intervention approaches, (2) compare the relative effectiveness of these interventions across various outcome domains, (3) provide practical guidance for treatment selection. This review focuses on interventions developed for adult ADHD populations, including CBT, mindfulness-based interventions, psychoeducation, cognitive training and remediation.

2. Main Psychological Interventions

2.1. Cognitive Behavioural Therapy (CBT)

Cognitive-behavioural therapy (CBT) for adult ADHD is grounded in the premise that cognitive, behavioural and emotional processes interact reciprocally to maintain functional impairments [6]. ADHD-specific CBT builds on the understanding that these impairments arise not only from neurobiological factors but also from maladaptive thought patterns and behavioural responses. These patterns often emerge over years of struggling with inattention, impulsive and executive functioning difficulties, leading to ineffective coping strategies and a sense of self-doubt [7]. ADHD-specific adaptations of CBT involve several key modifications from traditional approaches. Firstly, the treatment focus shifts from emotional symptoms to executive function skills training, including time management, organizational planning, task breakdown and priority setting [8]. In addition, cognitive restructuring techniques specifically target common dysfunctional beliefs in adults with ADHD, such as “I always mess things up” or “I can’t focus on anything’’ [7]. Lastly, behavioural activation strategies are adjusted to include concrete compensatory techniques, such as external reminder systems, structured environmental modifications and reward mechanisms to enhance motivation [9]. ADHD-specific CBT also incorporates metacognitive strategy training, helping patients recognize early warning signs of attentional drift and implement corresponding refocusing techniques [10].

The empirical support for CBT in adult ADHD has strengthened through rigorous randomized controlled trials. Safren and colleagues’ landmark study [9] randomized 86 adults with ADHD already on medication to CBT or continued medication alone. Results showed that the CBT group not only had greater improvements in clinician-rated and self-reported ADHD symptoms but also maintained those improvements in 6- and 12-month follow-ups. An earlier investigation by the same group showed similar results: over 50% of individuals in the CBT group were considered treatment responders, compared to just 13% in the medication-only group [11]. These findings are supported by a comprehensive meta-analysis of 32 studies involving up to 896 adults with ADHD, which found that CBT yielded large pre-to-post treatment effects on self-reported ADHD symptoms ($g = 1.00$) and medium-to-large effects on functioning ($g = 0.73$), with small-to-medium advantages over control groups ($g = 0.65$ for symptoms and $g = 0.51$ for functioning) [7].

2.2. Mindfulness-Based Therapies

Mindfulness-based interventions for adult ADHD primarily include Mindfulness-Based Cognitive Therapy (MBCT) and Mindfulness-Based Stress Reduction (MBSR). While MBCT integrates cognitive restructuring with mindfulness practices to address negative thought patterns, MBSR focuses on stress reduction through body awareness and meditation techniques. MBCT typically runs for 8 weeks with 2-hour weekly sessions. MBSR follows a similar structure but focuses more on stress reduction through body awareness and meditation. Mitchell et al. [12] further developed MAPs (Mindful Awareness Practices), an ADHD-specific program that shortens meditation periods and includes more movement-based practices. These adaptations recognize that adults with ADHD may struggle with traditional lengthy meditation sessions.

The mechanisms underlying mindfulness effects in ADHD involve both attention regulation and emotional dysregulation pathways. Along the attention-regulation pathway, mindfulness practice may improve the coordination of attentional networks [13]. During practice, participants consciously attend to present-moment experiences (e.g. breathing, bodily sensations, the flow of thought), and

train to notice when their attention drifts and gently bring it back to the present experience. Some studies have shown that mindfulness meditation can improve sustained attention and inhibitory control, which may benefit ADHD patients' performance on attention tasks [14]. Besides, mindfulness can also help to regulate emotion. By non-judgmentally observing inner thoughts and feelings, participants become less prone to automatic or impulsive emotional reactions, thereby reducing emotional reactivity [15]. Among ADHD populations, emotion dysregulation is often regarded as an important comorbid or secondary difficulty [16]. Some preliminary studies have confirmed that mindfulness interventions can improve measures of emotion dysregulation [17].

Clinical trial evidence for mindfulness in adult ADHD is preliminary and relatively mixed, but overall leads toward positive effects. For example, Mitchell et al. [12] conducted a pilot randomized trial comparing mindfulness meditation to a waitlist control in a small sample of adults with ADHD. They reported improvements in self-reported ADHD symptoms, executive functioning/self-report, and emotion dysregulation in the intervention group compared to waitlist, with large effect sizes in those self-report measures. Besides, Janssen et al. [18] found that MBCT + usual care yielded a moderate reduction in clinician-rated ADHD symptoms ($d \approx 0.41$) relative to usual care alone, though executive function improvements were not significant immediately post-treatment.

2.3. Psychoeducation

Structured psychoeducational interventions provide foundational knowledge on about ADHD neurobiology, symptoms, and management strategies while teaching practical skills for daily functioning [19]. Psychoeducational programs aim to enhance understanding of ADHD, which can help reduce self-blame, normalize lived experiences, and foster motivation to engage in compensatory and self-management strategies [20]. The format of program delivery significantly influences both its effectiveness and participant engagement. Group-based psychoeducation offers unique therapeutic benefits beyond content delivery. It includes the powerful normalization that comes from meeting others with similar struggles, reducing the isolation often experienced by adults with ADHD [21]. Group settings encourage peer learning, as participants share strategies and learn from one another, creating a collaborative and supportive environment [19]. However, individual psychoeducation may be preferable for certain participants who benefit from tailored guidance or greater privacy. The personalized pace allows accommodation of varying cognitive abilities and learning styles, with content tailored to individual symptom profiles and life circumstances. Knouse et al. [22] found that individualized psychoeducation combined with skills training resulted in greater functional improvements compared to group formats for adults with severe ADHD and multiple comorbidities. The privacy of individual sessions may be preferred by those uncomfortable with group disclosure or those with significant shame about their ADHD-related difficulties.

Research evidence for psychoeducational interventions continues to accumulate despite important limitations. Yang et al.'s [23] network meta-analysis found psychoeducation achieved the largest short-term symptom improvements ($SMD = -6.38$), though based on only 3 studies with low evidence certainty. Hirvikoski et al.'s [21] PEGASUS trial remains the highest-quality RCT, with structured group psychoeducation achieving large effect sizes for ADHD knowledge (Cohen's $d = 0.97$) and >90% completion rates among 108 participants. Thus, psychoeducational interventions for adult ADHD show consistent small-to-moderate positive effects across diverse delivery formats and durations, with some programs achieving large effect sizes for specific outcomes.

2.4. Cognitive Training and Remediation

Cognitive training programs have emerged as promising non-pharmacological interventions for adults with ADHD. These computerized programs primarily target core cognitive deficits, particularly working memory and attention impairments that significantly impact daily functioning. Working memory training programs, such as Cogmed, use adaptive algorithms that adjust task difficulty in response to an individual's performance [24]. It is typically organized around verbal and visuospatial memory exercises delivered over a period of 5–8 weeks [25]. Attention training programs

focus on multiple attentional domains including sustained attention, selective attention, and cognitive flexibility through continuous performance tests and interference resolution tasks [26]. Commercial cognitive training platforms, including CogniFit, BrainTrain, and Lumosity, deliver multi-domain training modules. However, their program structures and theoretical foundations differ significantly across systems.

The efficacy of cognitive training for adult ADHD remains debated. Central debates revolve around the distinction between near transfer (improvements on similar untrained tasks) and far transfer (generalization to daily functioning and ADHD symptoms). Critics argue that observed improvements often remain confined to trained tasks without meaningful translation to real-world functioning [27]. Additionally, questions persist regarding the durability of training effects, appropriate control conditions for research studies, and the clinical significance of statistically significant improvements [28].

3. Comparative Analysis and Evidence Synthesis

3.1. Treatment Effectiveness Comparison

Recent comparative effectiveness research using component network meta-analysis has evaluated psychological interventions for adult ADHD. Ostinelli et al. [5] synthesized 113 RCTs (N = 14,887) and found that several non-pharmacological strategies demonstrated significant efficacy on clinician-rated ADHD symptoms. Cognitive Behavioural Therapy showed a large effect (SMD = –0.76, 95% CI = [–1.26, –0.26]), with comparable benefits observed for mindfulness (SMD = –0.79, 95% CI = [–1.29, –0.29]), psychoeducation (SMD = –0.77, 95% CI = [–1.35, –0.18]), and cognitive remediation (SMD = –1.35, 95% CI = [–2.42, –0.27]). These effects were evident only on clinician-rated but not self-rated, measures.

CBT shows robust effects on both ADHD symptom reduction and functional improvement. In a meta-analysis, Knouse et al. [7] reported large pre-to-post effects for self-reported ADHD symptoms (g = 1.00, 95% CI = [0.84, 1.16]) and substantial improvements in functional outcomes (g = 0.73, 95% CI = [0.46, 1.00]). It suggests that skills acquisition in CBT translates into meaningful real-world functioning gains. Mindfulness interventions demonstrate moderate effects on core ADHD symptoms. A meta-analysis by Cairncross and Miller [29] demonstrated significant reductions in inattention (d = –0.66, 95% CI = [–0.92, –0.40]) and hyperactivity–impulsivity (d = –0.53, 95% CI = [–0.74 to –0.32]), with larger improvements observed in adult samples (inattention d = –0.91). These findings suggest that mindfulness may serve as a useful adjunct for addressing attentional and behavioral dysregulation in ADHD.

3.2. Mechanisms of Action

Top-down and bottom-up therapeutic approaches reflect fundamentally different intervention strategies, with the former emphasizing cognitive control processes and the latter focusing on sensory and emotional regulation. Top-down approaches, such as CBT and psychoeducation, engage prefrontal executive control systems to support the use of compensatory strategies and the regulation of maladaptive thought and behaviour patterns [30]. These interventions rely on conscious, effortful engagement and depend on metacognitive awareness to guide behavioural change. Bottom-up interventions, including mindfulness and cognitive training, engage lower-level attentional and cognitive mechanisms. These processes are thought to enhance neural efficiency and plasticity while operating largely independently of executive control [31].

Skill acquisition in psychoeducational interventions occurs through the explicit teaching of compensatory strategies, environmental modifications and structured behavioural routines. The model posits that external structures can support impaired executive functions by reducing cognitive load and enhancing task performance. Cognitive restructuring in CBT targets maladaptive beliefs that maintain dysfunction, using deliberate reappraisal to modify emotional and behavioural responses.

Mindfulness practice enhances present-moment awareness and acceptance, reducing stress and improving the stability of attentional focus in everyday contexts.

Different theoretical frameworks underlying interventions reflect varied conceptualizations of ADHD. Neurobiological models emphasizing brain-based deficits support cognitive training and neurofeedback approaches. Cognitive-behavioural models focusing on learned patterns and environmental interactions inform CBT and skills training. Acceptance-based frameworks, which acknowledge the chronic and fluctuating nature of ADHD, underpin mindfulness approaches that focus on adaptive functioning rather than symptom elimination.

4. Clinical Implications and Treatment Recommendations

Evidence-based treatment planning should take into account individual symptom profiles, comorbid conditions, cognitive capacity, and patient preferences. CBT is recommended as the first-line psychological treatment for individuals exhibiting significant organizational deficits and functional impairments, with substantial empirical support for improving both symptoms and daily functioning [32]. Individuals showing substantial emotional dysregulation tend to respond well to mindfulness-based interventions, particularly when mood-related symptoms are also evident [12]. Psychoeducation serves as a foundational intervention for newly diagnosed adults or those with mild symptoms. It may be sufficient as a standalone treatment or a preparatory step for more intensive interventions.

Sequential and combined intervention strategies should be considered according to symptom severity and treatment response. A stepped-care model that begins with psychoeducation and progresses to psychotherapy as needed allows for efficient resource use. Combining pharmacological and psychological treatments generally produces better outcomes than either approach alone—medication offers rapid symptom relief, while psychological therapies support lasting behavioural and functional improvement. Integrative multimodal programs that blend elements from different approaches (e.g., CBT-based organizational training with mindfulness practice) may further optimize outcomes by addressing multiple symptom domains.

Implementing psychological interventions for adult ADHD requires therapist competence in ADHD-specific adaptations, as generic methods often show limited benefit. Routine monitoring with validated ADHD measures informs treatment revisions and tracks clinical progress. Accommodation of cognitive limitations through session structure, written summaries, and between-session reminders enhances engagement and retention. Family involvement, when appropriate, supports generalization of skills at home and provides external reinforcement for behavior change.

Current research on psychological interventions for adult ADHD reveals several key gaps. Few studies have conducted direct head-to-head comparisons between intervention types, with most trials relying on waitlists or treatment-as-usual controls. The mechanisms underlying treatment effects remain insufficiently understood, limiting efforts to optimize interventions and predict treatment response. Long-term outcomes beyond 12 months are seldom examined, hindering understanding of maintenance needs and the potential value of booster sessions. Furthermore, real-world effectiveness may diverge from outcomes observed in controlled settings, underscoring the need for implementation research in routine clinical practice.

5. Conclusion

This review investigated non-pharmacological interventions for adult ADHD to address gaps in treatment alternatives beyond medication. It examined four primary approaches, CBT, mindfulness-based interventions, psychoeducation and cognitive training, aiming to evaluate their empirical support, compare their relative effectiveness, and provide guidance for clinical practice.

Evidence consistently demonstrates that psychological interventions provide effective treatment options for adults with ADHD, each offering distinct advantages across specific symptom domains

and areas of functioning. CBT has the strongest empirical foundation with large effect sizes for both symptom reduction and functional improvement, particularly benefiting organizational deficits, time management difficulties, and maladaptive thought patterns. Mindfulness-based interventions enhance attention regulation and show particular benefits for emotional dysregulation, an often neglected but clinically important aspect of adult ADHD. Psychoeducation improves knowledge and engagement in treatment, with high participant acceptability. Cognitive training shows emerging benefits for executive function, though evidence for transfer to daily life remains limited. Given the variability in individual treatment response, these findings highlight the importance of personalized and integrative care strategies.

Clinical implications emphasize the importance of evidence-based, individualized treatment selection. CBT remains the preferred first-line intervention for organizational and functional difficulties, while mindfulness-based approaches are particularly effective for emotional dysregulation and mood-related symptoms. Psychoeducation serves as an appropriate foundational intervention for newly diagnosed adults or those with milder symptoms. The review shows that these interventions operate through distinct mechanisms. Top-down methods rely on deliberate executive control, while bottom-up methods enhance basic attentional and cognitive processes through repeated neural activation and practice. This mechanistic diversity suggests that treatment outcomes may be enhanced by aligning intervention approaches with individual cognitive profiles and deficit patterns. Moreover, accumulating evidence indicates that multimodal treatment frameworks combining pharmacological and psychological components yield superior outcomes compared to either approach alone.

This review helps address critical treatment gaps in adult ADHD care by demonstrating that effective management extends well beyond medication alone. Many adults with ADHD show inadequate response to medication or experience intolerable side effects, and discontinuation rates remain high. Consequently, the availability of diverse, evidence-based psychological interventions provides essential alternatives and adjuncts to pharmacotherapy. By synthesizing evidence across major psychological approaches and clarifying their relative efficacy, theoretical mechanisms, and clinical applications, this work offers clinicians comprehensive guidance for treatment selection and implementation. The review advocates for more personalized and integrative treatment models that address not only core ADHD symptoms but also the broader functional impairments spanning occupational, academic, interpersonal, and daily life domains. Future research should prioritize head-to-head comparative effectiveness trials, identification of treatment response predictors and mechanisms of change, long-term follow-up studies, and implementation research in real-world clinical settings to optimize intervention strategies for this underserved population.

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