

MINDFULNESS-BASED TREATMENTS FOR PATIENTS WITH ADHD

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INTRODUCTION

Attention deficit disorder with hyperactivity (ADHD) is one of the most common neurodevelopmental disorders in childhood and often persists into adulthood. The diagnosis requires attentional or hyperactive/impulsive symptoms. Although these are the core symptoms, executive function deficits and emotion dysregulation are also key areas of impairment. Pharmacological (mainly stimulants) and behavioral treatments are the most effective interventions. To alleviate some of the deficits of these treatments there has been a growing interest in new therapies. Mindfulness has positioned itself as a promising approach to address core symptoms of the disorder and other related effects (emotional dysregulation and deficits in executive functions). Mindfulness involves the formal practice of adopting a nonjudgmental attention to one's experiences in the present moment, with curiosity, openness and acceptance. The aim of this work is to review the evidence of mindfulness-based treatments for people with ADHD.

METHODS

A systematic literature search of Pubmed was conducted. The key words used were: "mindfulness", "ADHD" and "attention deficit disorder with hyperactivity". Fifteen articles were obtained. Inclusion criteria were: studies that used or revised mindfulness-based interventions to treat patients (children and adults) with ADHD. Because of the few studies found, exclusion criteria were not strict; research was not limited by temporary criteria, language, design quality or dependent variables. Five articles which meet the criteria were selected (all of them used group interventions).

RESULTS

Positive results were found in all the studies regarding reduction of attentional and hyperactive/impulsive symptoms measured through self-reports. Neuropsychological tasks results were not so positive^{1,2,3,4}. One study reported improvements in neurophysiological correlates (measured by means of evoked potentials)⁵ (see table 1). The most important results of the five studies selected were:

- Zylowska et al. (2008): Significant improvements were found for both adolescents and adults ($p < 0.01$) in self-reported symptoms of ADHD. Regarding neuropsychological tasks, there were significant improvements ($p < 0.01$) in attentional conflict (ANT and Stroop color-word) and divided attention (TMT A and B) but not for tests that measured working memory. Considering the subgroup of adults, they significantly reduced ($p < 0.01$) depressive (BDI) and anxiety symptoms (BAI).
- Van der Oord, Bögels, Peijnenburg (2011): It was detected a significant reduction ($p < 0.05$) of attentional and hyperactive/impulsive symptoms informed by parents (DBDRS) and their own symptoms (measured by the ARS). Parents showed a significant increase in their awareness of mindfulness (MAAS). Follow-up at 8 weeks showed significant reductions of attentional and hyperactive/impulsive symptoms for both children and parents. Additionally it was observed a reduction in parental stress and over-reaction (PSI and PS).
- Van de Weijer-Bergsma et al. (2011): At 8 weeks follow-up, parents and adolescents reported a significant reduction ($p < 0.05$) of attentional problems. Considering externalizing problems, parents reported a significant improvement after treatment and at follow-up at 8 weeks. Internalizing problems did not show a significant reduction. It was detected no significant improvements with respect to executive functioning (BRIEF) or awareness of mindfulness (MAAS). Computerized tests to measure attention detected a significant reduction in the reaction rate and in false alarms, which were not maintained at the follow-up.
- Mitchell et al. (2013): The treatment group reduced significantly ($p < 0.05$) attentional symptoms (self-reported and clinically observed) compared with the control group. There were also significant differences between the groups regarding hyperactive/impulsive symptoms (self-reported and clinically observed). Considering executive functions it was detected a significant improvement in self-report scales (DEFS and BRIEF) and clinically observed (DEFS). However, this difference was not observed in neuropsychological tasks (ANT, TMT, CPT or digits span).
- Schoenberf et al. (2014): Patients in the treatment group had a significant increase in the amplitude of the potential Pe (related to the prominence of errors) and Nogo-P3 (related to the inhibitory control) that correlated with improve of attentional and hyperactive/impulsive symptoms. Examining self-reports (CAARS, OQ-45.2) it was observed a significant reduction ($p < 0.01$) with respect to ADHD symptoms and social role discomfort.

Table 1. Studies of mindfulness-based treatments for patients with ADHD

Study	N	Participant description	Age mean (SD), % male	Treatment	Study design	Retention	Dependent variables	Results
Zylowska et al. (2008)	32	8 children 24 adults	15,6 (1,1), 38% 48,5 (10,9), 38%	2,5h, group, 8 weekly sessions and daily practice at home.	Pre/post, no control	88% 75%	ADHD rating scale IV (adults), SNAP-IV (children), BAI, BDI, CDI, RCMAS, ANT, Stroop, TMT, Digit span, vocabulary.	78% reported a reduction of symptoms. Significant improvements in attentional tasks (ANT, Stroop, TMT). Adults improved in BDI and BAI.
Van der Oord, Bögels, Peijnenburg. (2011)	33	22 mindfulness 11 waiting list (22 parents)	- (-), 8-12 years, 73% - (-), 8-12 years, -	1,5h, group, 8 weekly sessions and daily practice at home. Mindfulness training for parents.	Pre/post, control. Follow-up at 8 weeks.	81,80%	DBDRS, PSI, PS, MAAS, ARS.	Reduction of ADHD symptoms reported by parents, parental stress reduction.
Van de Weijer-Bergsma et al. (2011)	10	10 children (19 parents 7 teachers)	13,4 (-), 50%	1,5h, group, 8 weekly sessions and daily practice at home. Mindfulness training for parents.	Pre/post, no control. 2 follow-ups: at 8 and 16 weeks.	100%	YSR, CBCL, TRF, BRIEF, MAAS, SAD, SAA, PS, PSI, ANT.	Improvement of attentional symptoms and behavior, executive functions (self-reports parents and teachers report). Improvement in attentional tasks. Fathers (not mothers) referred reducing parental stress. Strongest effects in the first follow-up, but lower in the second.
Mitchell et al. (2013)	20	11 mindfulness 9 waiting list	40,55 (6,83), 45,5% 36,22 (6,92), 33,3%	2,5h, group, 8 weekly sessions and daily practice at home.	Pre/post, control, randomised.	100%	CAARS, CGI, BDI, BAI, DEFS, BRIEF, DERS, ANT, TMT, digit span, CPT.	Improvement of attentional, hyperactive/impulsive symptoms and executive functions and emotional dysregulation (self-reports). No improvement in executive function tasks.
Schoenberf et al. (2014)	50	26 MBCT 24 waiting list	39,5 (9,5), 37,5% 33,9 (9,8), 60%	3h, group, 12 weekly sessions, daily practice of 30-45 minutes.	Pre/post, control, randomised.	82%	Electroencephalographic activity, CAARS-S:SV, OQ-45.2, KIMS,	MBCT group was associated with an increase of potentials (Pe and NoGo-P3) and a decrease of attentional and hyperactive/impulsive symptoms.

N: sample size; SD: standard deviation; ADHD: attention deficit hyperactivity disorder; SNAP-IV: Swanson, Nolan and Pelham Scale; BAI: Beck anxiety inventory; BDI: Beck Depression inventory; CDI: child depression inventory; RCMAS: revised children's manifest anxiety scale; ANT: attention network test; TMT: trail making test; DBDRS: disruptive behavior disorder rating scale; PSI: parenting stress index; PS: parenting scale; MAAS: mindfulness attention and awareness scale; ARS: ADHD rating scale; YSR: youth self report; CBCL: child behavior checklist; TRF: teacher report form; BRIEF: behavior rating inventory of executive functioning; SAD: sustained attention dots; SAA: sustention attention auditory; MBCT: Mindfulness based cognitive therapy; CAARS: Conners' adult ADHD rating scale; CGI: clinical global impression; DEFS: deficits in executive functioning scale; DERS: difficulties in emotion regulation scale; CPT: continuous performance test; OQ-45.2: outcome questionnaire; KIMS: Kentucky inventory of mindfulness.

DISCUSSION

The selected studies have shown promising results. Future research will need to incorporate methodological improvements regarding sample sizes, control groups (not only the waiting list), follow-up assessments, family and teachers' self-reports, clinical assessments, neuropsychological tests and laboratory tasks.

CONCLUSIONS

1. All studies reported significant improvements in attentional and hyperactive/impulsive symptoms after applying mindfulness-based treatment (measured with self-reports).
2. When the symptoms were assessed using neuropsychological tasks the results were not so favorable (one of the studies detected discrete progress in attentional tasks measured with subtests of the ANT, Stroop and TMT A-B). Another study showed neurophysiological improvements using evoked potentials.
3. The selected articles have significant methodological shortcomings that must be solved in future research.

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