

Psychological and Psychosocial Interventions in Attention Deficit Hyperactivity Disorder: A Systematic Review



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ABSTRACT

Objective: Attention Deficit Hyperactivity Disorder (ADHD) is typically treated with medications however psychological and psychosocial interventions are recommended for symptoms that persist despite pharmacological treatment. This study aims to review randomized controlled trials focusing on the psychological and psychosocial interventions in the treatment of ADHD.

Method: Eight databases were searched using keyword pairs “ADHD” and “therapy”, “ADHD” and “psychological treatment”, “ADHD” and “psychosocial treatment”, “ADHD” and “CBT”, “attention deficit” and “therapy”, “attention deficit” and “psychological treatment”, “attention deficit” and “psychosocial treatment”, “attention deficit” and “CBT”. The search was conducted at March 2022.

Results: Forty-five studies met the inclusion criteria. Of these studies, 51% included the child and adolescent age group, 49% included the adult age. In 87% of these studies, psychosocial interventions, when implemented in addition to medication, resulted in significant improvements in ADHD symptoms.

Conclusion: The results indicate that the use of psychosocial interventions, in addition to medical approaches, makes significant contributions to the treatment of ADHD. There is a need for studies investigating the effectiveness of psychosocial interventions in the treatment of ADHD in Türkiye.

Keywords: Attention Deficit Hyperactivity Disorder, Therapy, Psychosocial Intervention

INTRODUCTION

Attention deficit hyperactivity disorder (ADHD), which has its roots in childhood but can persist throughout life, is categorized under ‘neurodevelopmental disorders’ in the DSM-5 due to this nature. While hyperactivity symptoms tend to decrease with age, a significant portion of individuals diagnosed with ADHD in childhood continues to experience difficulties in their adult lives [American Psychiatric Association (APA) 2013]. Follow-up studies conducted in clinical settings support this information, indicating that more than half of children diagnosed with ADHD in childhood deal with symptoms that disrupt their functionality during early adulthood, regardless of gender (Biederman et al. 2010a, Biederman et al. 2010b). These individuals, who must cope with the functional problems brought about by current symptoms for an extended period, are also at a high

risk for comorbid psychiatric diagnoses such as anxiety and depression (Miller et al. 2007). All of these challenges make the methods used in the treatment of individuals with ADHD an important issue in terms of achieving positive outcomes, the potential for the long-term effects of these outcomes, and enhancing functionality in their lives.

While pharmacological approaches, primarily stimulant medications, take precedence in the treatment of ADHD, the possibility of various side effects associated with the use of these drugs has also been a concern (Hurman 2013, Young 1999). Some patients may have a negative attitude towards medication treatment, and others may not respond adequately to medication treatments when used alone. Even when a positive response is obtained from medication treatments and successful symptom reduction is achieved, individuals with ongoing bothersome symptoms that continue to affect daily functionality are often advised to combine psychosocial

Received: 12.07.2022, Accepted: 04.07.2023, Available Online Date: 17.12.2023

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approaches with medication treatments, and it is suggested that the course of the disorder can be improved with such interventions (Hurman 2013, Knouse et al. 2009, Vance et al. 2012, Young 1999).

In this study, it was planned to collect data from randomized controlled trials involving psychological and psychosocial interventions used in the treatment of ADHD, and to present information on the effects of these interventions. To achieve this goal, the literature has been systematically reviewed. The aim of this review is to facilitate access for professionals working in the field to current and significant research on the subject. In order to address psychological and psychosocial approaches in the treatment of ADHD and to elucidate their potential benefits, this study has focused on high-quality randomized controlled trials. While there have been several research and review studies conducted on this topic in different cultural contexts, to the best of our knowledge, there has been no research or review study conducted on this subject within our country. In this regard, it is believed that the present study will make a significant contribution to the academic literature in the field.

METHOD

On March 19, 2022, eight databases, namely Pubmed (N=405), Ebscohost (N=606), ScienceDirect (N=152), Scopus (N=730), Web of Science (N=694), Sage (N=110), Wiley Online Library (N=126), and Taylor and Francis (N=111), were systematically searched in English using the following keyword pairs: “ADHD” and “therapy,” “ADHD” and “psychological treatment,” “ADHD” and “psychosocial treatment,” “ADHD” and “CBT”; “attention deficit” and “therapy,” “attention deficit” and “psychological treatment,” “attention deficit” and “psychosocial treatment,” “attention deficit” and “CBT.” Access to full-text articles was completed between March 19 and April 20, 2022. During the screening process, each database search was refined to narrow down the results by excluding publications outside of academic journals and eliminating duplicate sources. Consequently, a total of 2933 sources were identified. In the first stage, 1885 duplicate sources were removed, leaving 1048 articles. In the second stage, non-article publications such as letters to editors, book and article commentaries, conference proceedings, totaling 256, were excluded, resulting in 792 studies. In the third stage, the studies were examined for language, and 129 articles written in languages other than English were further excluded, leaving 663 publications. In the fourth stage, 113 publications without full-text access were excluded, resulting in 550 publications. Subsequently, the articles were reviewed and screened based on their topics and types. Initially, 260 studies that did not address psychological or psychosocial interventions were excluded, leaving 290 articles. Among

these 290 articles, non-research articles such as reviews, case reports, book chapters, totaling 147, were further excluded, resulting in a final selection of 143 articles. In the last stage, the publications were evaluated for their methodology and research quality. Within the scope of this evaluation, inclusion and exclusion criteria were categorized under specific subheadings:

Date: Studies published between 2000 and 2022 that include psychological treatment or psychosocial interventions and evaluate their effects were included. This date range was preferred to provide an up-to-date presentation of the literature, and diagnostic classification systems and assessment tools used before this period may differ from the methods used today.

Research Design: Studies that included randomly assigned comparison and control groups were considered, while quasi-experimental and single-subject research designs were excluded.

Sample Characteristics: The inclusion criteria were defined as follows: the studied sample must not have been community-based but rather a clinical sample, clinical diagnoses must have been made by a clinician, and the classification system used during diagnosis (e.g. DSM/ICD) and/or structured or semi-structured assessment and interview forms, if used, must have been specified. All studies that included sample groups where all participants received the same comorbid diagnosis in addition to ADHD, and/or where the primary study group was formed by a different diagnosis, while ADHD remained in a comorbid position, were excluded.

Other Criteria: Publications containing preliminary results and information from ongoing research have been excluded. Pilot studies have been included.

In the final stage, 98 more articles that did not meet the criteria in terms of date (N=10), research design (N=55), sample characteristics (N=22), and other criteria (N=11) were excluded. A total of 45 studies were included in this study, obtained from the following databases: Pubmed (N=28), Ebscohost (N=5), Web of Science (N=5), Scopus (N=4), Sage (N=2), Wiley Online Library (N=1), ScienceDirect (N=0), Taylor and Francis (N=0). The article screening and selection process is presented in Figure 1 following the PRISMA flowchart guidelines (Page et al. 2021).

RESULTS

When examining the distribution of samples in the 45 articles included in this study based on developmental stages, it is observed that twenty-three (51%) studies included samples from the child and adolescent age group, while twenty-two studies (49%) focused on the adult age group. It is evident that

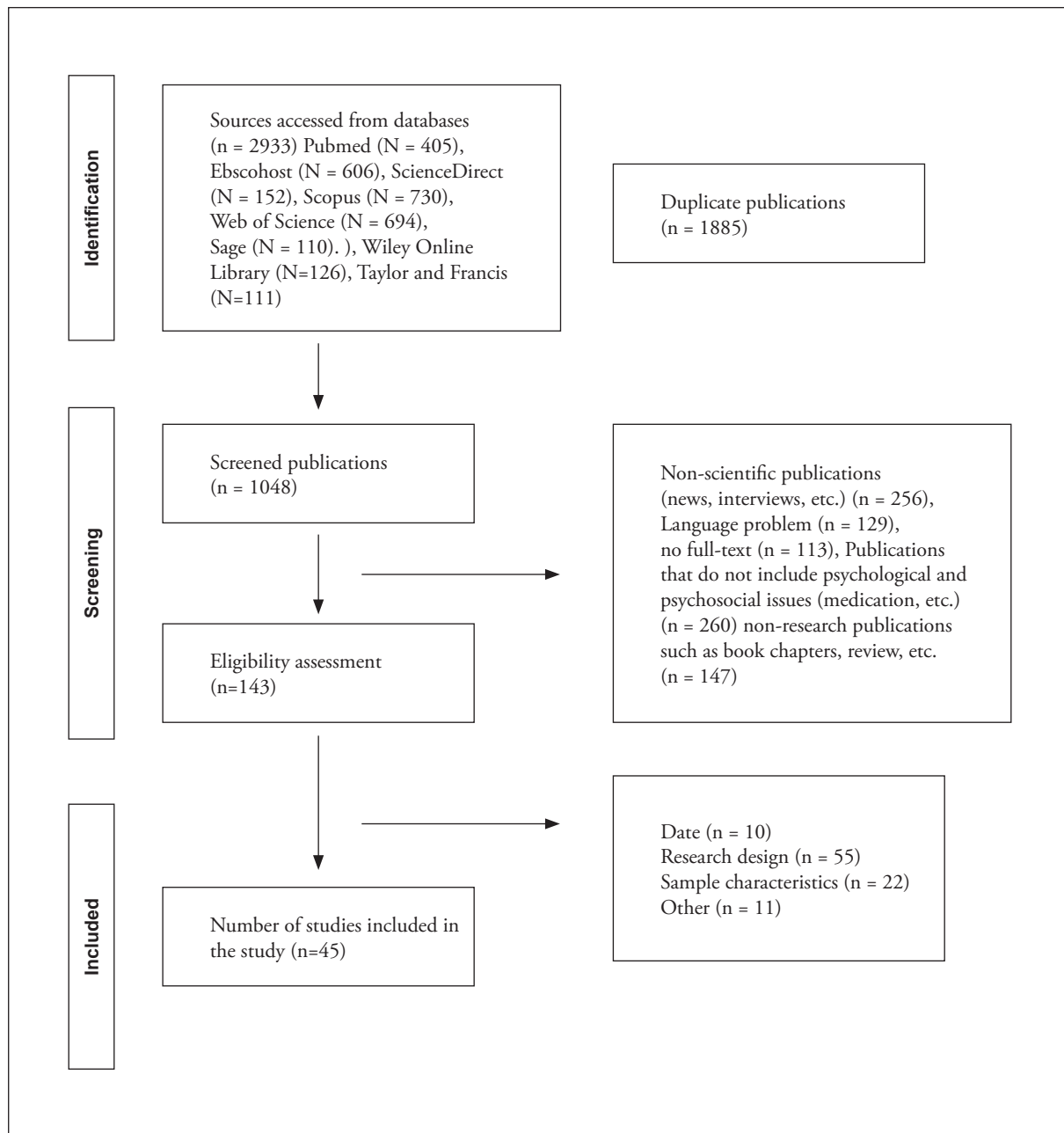


Figure 1. PRISMA flow chart.

there is a balanced distribution of the sample group researched in terms of developmental stages across the publications. The studies considered have been categorized under different headings based on these developmental periods. Studies involving the child and adolescent age group (Table 1) and studies involving the adult age group (Table 2) have been presented in separate tables, including the first author and year of publication, research and sample characteristics, intervention details, the general measurement methods, and a brief summary of the results. Detailed information about the measurement tools used has not been provided extensively due to the fact that many of these tools are adaptations not widely used in our country.

Psychological and Psychosocial Treatments in Children and Adolescents

In this section, Table 1 presents a summary of the twenty-three studies, including the first author and year of publication, research and sample characteristics, intervention details, the general measurement method used, and the results. The percentages provided about the characteristics of the studies were calculated based on the number of articles in this section. When examining the age groups of the studies, it was observed that there were two studies (9%) including the preschool 2-7 age group (Leung et al. 2017) and the 4-6 age group (Matos et al. 2009). Twelve studies (52%) included the

Table 1. Studies Involving the Child and Adolescent Age Groups

First author/ Year	Research and Sample Characteristics	Intervention features	Measurements	Results
Abikoff / 2004; Hechtman / 2004	Active control/ MPH (N=34)/ MPH+MPT (N=34)/ MPH+ ACT (N=35) - 7-9 years old	Individual administration - 2 years - Child social skill training / individual therapy / Parent training/teacher DRC system - attention control training	Observational measurements (blinded) / parent, teacher self- report measurements - preliminary / 6-12-18-24 month measurements	The results of the group receiving a multidimensional treatment approach were not superior to other groups and the approach did not provide additional benefits regarding academic achievement, emotional adjustment, and social behavior.
Boyer / 2015; 2016	Active control – PML (N=83)/ PFT (N= 76) – 12-17 years – mean age: 14	Group administration – 8 weeks 8+2 (parent training) sessions – Comparison of two different CBT-based, plan-focused, and solution-focused approaches	Neuropsychological measurement - parent, and teacher self-report measurements - pre/post/ follow- up measurement (3 Month/1 year)	Both methods had positive effects on ADHD symptoms, planning skills, executive functions, comorbid symptoms, and general functionality, but the effects of the plan-oriented approach were superior. Positive effects were also monitored during the follow-up period.
Curtis / 2020	Active control – SDBT (N=16) / CCDT (N=18)- 8-12 years old	Individual administration - 12 weeks - structured dyadic behavior therapy / child-centered dyadic therapy	Parent self-report measurement - Pre/half/post measurements	The group receiving structured intervention showed greater reductions in ADHD symptoms and greater increases in functioning.
Ferrin / 2020	Active control – psychoeducation (N=35)/ TaU (N=34) – 5-18 years – mean age: 10.5	Group administration - 6 weeks - family psychoeducation program based on adapted manual	Clinician evaluation ² - parent, and teacher self-report measurements - Pre/post/follow-up measurements (6th month) ¹	Children of participants who received psychoeducation showed continued reductions in ADHD symptoms at follow-up compared to the treatment as usual group.
Hahn- Markowitz / 2020	Waiting list ³ CG – Cog-Fun OT (N=54) /CG (N=53) – 7-10 years old – mean age: 8.5	Group administration – 12 weeks- manual-based occupational therapy administration	Parent, and teacher self-report measurements - pre/post/follow-up (3rd month) measurements	According to parent evaluations, children in the intervention group showed a decrease in their ADHD symptoms and continued increases in their executive functions and quality of life during follow-up.
Leung / 2017	Waiting list ³ CG – PCIT (N=32) / CG (N=32) – 2-7 years old – mean age:5.5	Individual administration – mean: 17 weeks – intervention to increase parent and child interaction based on the manual	Clinician assessment ² - parent self-report measurement - Pre/ post/follow-up measurements (3rd months) ¹	Decrease in behavior and attention problems of children in the intervention group; an increase in parents' positive parenting skills and a decrease in their child-related stress were observed.
Matos / 2009	Waiting list ³ CG – PCIT (N=20) / CG (N=12) – 4- 6 years old	Individual administration – 14 weeks – intervention to increase parent and child interaction based on the manual	Clinician assessment ² - parent self-report measurement - Pre/ post/follow-up measurements (3.5 months) ¹	There was a decrease in inattention, hyperactivity and aggressive behavior in the intervention group, which continued during follow-up; An improvement in the parents' adequate parental behavior and a decrease in their stress were observed.
Milea / 2012	Active control – MM (N=31) / Medication (N=32) – 6-14 years old - mean age: 9	Individual / group administration - 14 weeks - parent and teacher training and counseling / Child therapy	Participant, parent, teacher self- report measurements-Pre/post measurements	Both methods were effective in reducing core ADHD symptoms, while the addition of multicomponent treatment approaches was more effective in reducing social and familial difficulties.
Mirzaie / 2019	Active control + waiting list ³ CG – AT (N=17) /FT (N=17)/ CG (N=17)- 6-12 years old-age mean: 8	Group administration – 10 weeks - Adlerian play therapy / filial play therapy	Neuropsychological measurement- parent, teacher self-report measurements (blinded) - pre/post/ follow-up (3rd month) ¹	Decreases in hyperactivity and inattention symptoms were observed in both play therapies. However, filial therapy had higher effectiveness. Improvements continued during follow-up.
Moreno-Garcia / 2019	Active control - NF (N=21) / DT (N=19) / Medication (N=19) - 7-14 years - mean age: 8.8	Individual/group administration – 15 weeks – group parent training/ teacher training / cognitive therapy for kids	Attention and response control measurement/parent, teacher self-report measurements - pre/post measurements	Positive results were more widespread in behavior therapy, but medication and neurofeedback, specifically for inattention-related symptoms, had more positive results.

Table 1 continued

First author/ Year	Research and Sample Characteristics	Intervention features	Measurements	Results
Pfiffner / 2014; Hack / 2017	Active control – CLAS (N=74)/ PFT (N=74)/ TaU (N=51)- 7-11 years- mean age: 8.6	Group administration -10+3(booster) weeks – (CLAS) Child skills training/Parent training/teacher counseling- (PFT) parent training- treatment as usual ⁴	Parent, teacher self-report measurement - Pre/post/follow- up measurement (between 5-7 months) ¹	In the CLAS group, more positive results were reported by teachers for inattention, organization, social skills and functionality, while more positive results were reported by parents for planning skills. Only differences between CLAS and TaU groups persisted at follow-up. Multicomponent interventions were found to be more effective and parental behaviors had an impact on functional outcomes in the child.
Schuck / 2015	Active control – CBT+CAI (N=12) /CBT (N=12) – 7-9 years old	Group administration - 12 weeks – CBT program with therapy dog/ toy dog (PACK) / parent training	Parental self-report measurements - Pre/Post/follow-up measurement (week 6) ¹	Both groups showed improvements in social skills, prosocial behaviors, problem behaviors, and ADHD symptom severity, but these improvements were greater in the dog-assisted group.
Sibley / 2016	Active control – Family therapy+MI+medication (N=67) / TaU (N=61) - 11-15 years old	Group administration – mean: 8.3 sessions – manual-based parent-adolescent skill-based behavior therapy (STAND) and motivational interviewing/ treatment as usual ⁴	Clinician assessment ² /parent, teacher, and participant self-report measurements - Pre/Post/follow-up measurements (6th month) ¹	Reductions in ADHD symptoms, organization, planning and time management skills, and parental stress reported by the parents of participants in the intervention group were observed. Although improvements decreased, they continued at follow-up.
Sprich / 2016	Waiting list ³ CG- BDT (N=24)/ CG (N=22)- 14-18 years old- mean age: 15	Individual administration – 10 +2 sessions -10 sessions of adolescent CBT / Parents were included in the process for 2 sessions	Clinician assessment ² (blinded) / Adolescent and parent self- report measurements - pre/post measurements	CBT sessions added to medication treatment in adolescents contributed to a decrease in inattention symptoms and an increase in self-esteem.
Teimourian /2020	Active control - PT (N=14) / OT (N=14) - 6-12 years - mean age: 8	Individual/group administration - 6 weeks / 12 sessions - group play therapy and individual occupational therapy	Parental self-report measurements - Pre/post measurements	In both interventions, reductions in aggressive and rule-breaking behaviors and social problems were observed at the end of the administration. However, improvements were greater in the group that received group play therapy.
van der Oord / 2007; 2012	Active control - MPH+MTA (N=27)/ MPH (N=23) / 8-12 years old - mean age: 10	Group administration - 10 weeks - Barkley parent training / Child CBT / teacher training and DRC system	Parent, teacher self-report measurements pre/post/follow-up measurements (4.5-7.5 years) ¹	Participants receiving medication did not gain additional benefits from therapy in terms of conduct problems and self-worth. Although there were age-related decreases in symptoms, difficulties still existed.
van der Oord / 2020	Waiting list ³ CG - Intervention group (N=30)/ CG (N=28) - 17- 25 years old	Individual administration - 6 weeks - cognitive behavioral intervention focused on improving planning skills	Clinician assessment ² /self-report measurements - Pre/Post/follow-up measurements (4th month) ¹	Only mild improvement in inattention symptoms was observed in the intervention group.
Vidal / 2015	Active control - CIS (N=59) / CG (N=60) - 15-21 years - mean age: 17	Group administration - 12 weeks - cognitive behavioral therapy based on motivational interviewing techniques	Clinician assessment ² (blinded) / self-report measurements – pre/ post measurement	Reductions in ADHD symptoms and severity, and ADHD-related anger management difficulties, depression and anxiety symptoms, and functioning problems were observed.
Waxmonsky / 2010	Active control- ATX (N=27)/ ATX+BDT (N=29) - 6-12 years old- mean age: 8.6	Group administration - 8 weeks - Parent training (COPE) / Child social skills training/teacher DRC system	Observational measurements (2nd observer blinded) / parent, teacher self-report measurements - pre/post measurements	There were positive changes in home and school behaviors in the ATX group/ A greater improvement in the home behaviors of the ATX+CBT group compared to school and an increase in parents' perceptions of academic success.

MPH: methylphenidate; MPT: multimodal psychosocial treatment; ACT: attention control training; DRC: daily report card; PML: plan my life, SFT: solution-focused therapy; SDBT: structured dyadic behavior therapy; CCDT: child-centered dyadic therapy; TaU: treatment as usual; CG: control group; Cog-Fun OT: cognitive-functional occupational therapy; PCIT: parent-child interaction therapy; MM: multimodal therapy; AT: Adlerian therapy; FT: filial therapy; NF: neurofeedback; BT: behavior therapy CLAS: child life and attention skills treatment; PFT: parent-focused treatment; CBT: cognitive behavioral therapy; CAI: canine-assisted intervention; PACK: positive assertive cooperative kids; MI: motivational interviewing; STAND: supporting teens' academic needs daily; PT: play therapy; OT: occupational therapy; MTA: multimodal therapy; ATX: atomoxetine; COPE: community-oriented parent education.

¹Follow-up measurements refer to the time since the end of treatment.

²Clinician evaluations include at least one of the structured/semi-structured interview forms and self-report scales being evaluated and completed by the clinician.

³In some of the studies using control groups that included a waiting list, the control group did not receive any treatment or intervention, while in others, there were participants who received an uncontrolled intervention in the group, but since this did not include all participants on the waiting list, it was not taken as an active control group.

⁴Treatment as usual includes follow-ups where medication treatments are carried out. During this period, people can also receive non-systematic interventions from the clinician in addition to medication treatment. Since it has been stated that these groups function like an active control group they are defined as active control (Janssen et al. 2018; Young et al. 2017).

Note 1: Session numbers are not reported for administrations where sessions are followed weekly, with the same number of weeks and sessions.

Note 2: In some studies, only the mean age or only the age range is reported.

Note 3: For ease of review, abbreviations have been taken in their original form in the articles.

Table 2. Studies Involving the Adult Age Group

First author/ Year/	Research and Sample Characteristics	Intervention features	Measurements	Results
Anastopoulos / 2021	Waiting list 1 CG – ACCESS (N=149)/ CG (N= 131) – 18-30 years – mean age: 20	Individual/group administration – 8 weeks– cognitive behavioral-based intervention (ACCESS program)	Participant self-report measurements - pre/post measurements	Positive effects on ADHD symptoms and executive functions were observed in the intervention group. No change was observed in anxiety and depression levels.
Cherkasova / 2020	Active control – CBT + medication (N=42)/ CBT (N=46) 18-49 years - mean age: 35	Group administration - 12 weeks - R and R2 intervention program - treatment as usual for the other group 2	Clinician assessment 3 / self-report measurement - pre/post/ follow-up measurements (3rd/6th month) 4	The CBT+medication group had more positive results on ADHD symptoms, self-esteem, and planning skills. During follow-up, improvements in the medication- free group continued and the difference between groups decreased.
Corbisiero / 2018	Active control – CBT + medication (N = 20) / SCM + medication (N = 23) 18-49 years - mean age: 32	Individual administration -10-12 weeks- cognitive behavioral therapy/ standard clinical approach based on manual	Participant self-report measurement - Pre/post/follow-up measurements (9th month) 4	Although positive improvements were achieved in both groups over time, individualized standard cognitive behavioral therapy was no better than the standard clinical approach at the end of treatment and at follow-up.
Dittner / 2018	Active control – CBT+TaU (N=30) /TaU (N=30) - mean age: 36	Individual administration - 30 weeks/16 sessions – treatment as usual and R and R2 program - only treatment as usual for the other group 2	Clinician assessment 3 (blinded)/ self-report measurement -pre/post/ follow-up measurements (week 12) 4	Participants in the CBT group had more positive results in their ADHD symptoms, functionality in work and social life, and emotional stress compared to treatment as usual.
Emilsson / 2011	Active control - CBT +Medication (N=27) /TaU (N=27) - mean age: 34	Group administration - 8 weeks/15 sessions - R and R2 intervention program - treatment as usual for the other group 2	Clinician assessment 3 (blinded) / self-report measurement - pre/ post/ follow-up measurements (3rd month) 4	In those who had residual symptoms despite medication, CBT intervention resulted in improvements in ADHD symptoms, depression, and anxiety symptoms that continued at follow-up.
Fleming/ 2015	Active control – DBT (N=17) / SH (N=16) – 18-24 years old – mean age: 21	Group administration – 8 weeks- dialectical skills training/self-help skill notes	Neuropsychological measurement - Participant self-report measurement - pre/post/follow-up measurements (3rd month) 3	Improvements in ADHD symptoms, executive functions, and quality of life were observed in the intervention group, which continued at follow-up.
Gu /2018	Waiting list 1 CG – MBCT (N=28) /CG (N=26) – 19-24 years old – mean age: 20	Group administration – 6 weeks – mindfulness-based cognitive therapy based on adapted manual	Neuropsychological measurement - self-report measurement- pre/ post/ follow-up measurements (3rd month) 4	Decrease in ADHD symptoms, anxiety, and depression levels in the intervention group; An increase in neuropsychological performance and mindfulness levels was observed. The difference continued at follow-up.
Hiltunen / 2014	Active control – Hypnotherapy (N=8, mean age: 32)/ CBT (N=9, mean age: 39) – 18- 49 years old	Individual administration – 10 weeks – cognitive hypnotherapy / brief cognitive behavioral therapy	Clinician assessment 3 - participant self-report measurement - Pre/post/ follow-up measurements (3rd/6th month) 4	It was observed that the ADHD symptoms of the participants who received hypnotherapy continued to decrease during the follow-up period, and in this respect, the long-term results were reported to be stronger and more stable.
Huang/ 2015	Active control + waiting list 1 CG – BDT (N=43)/ CBT+B (N=43)/ CG (N=22) – 18-45 years - mean age: 26	Group administration – 12 +12 (booster) weeks- manual-based cognitive behavioral therapy/ CBT and booster sessions	Neuropsychological measurement - participant self-report measurements - Pre/post measurements	CBT administration provided improvements in the core symptoms of ADHD, impulsivity, executive functions, spatial skills and working memory. Booster sessions provided no additional benefit.
Janssen / 2018	Active control – MBCT+TaU (N=60)/ TaU (N=60) – 18 years and above - mean age: 39.5	Group administration – 8 weeks- mindfulness-based cognitive therapy + treatment as usual 2	Clinician assessment 3 (blinded)- self-report measurement- Pre/post/ follow-up measurements (3rd/6th month) 4	Participants who received the intervention showed continued reductions in ADHD symptoms at 6-month follow-up, but participants did not report improvements in executive function.
Moritz / 2021	Active control – DBT-ST (N=16) / TaU (N=15)- 18-60 years	Group administration - 12 weeks - dialectical skill training in addition to treatment as usual	Self-report measurement - Pre/6th week/post/follow-up measurements (4th week) 4	Although DBT skills training was found to be a feasible method for the ADHD group, it did not provide additional benefits to usual treatment.
Nakashima / 2022	Active control – CBT+ TaU (N=24, mean age: 40)/ TaU (N=24, mean age: 39)- 20-65 years	Group administration -8 weeks- treatment as usual and time management focused CBT/ treatment as usual 2	Clinician assessment 3 - (blinded)/ family and participant self-report measurements - Pre/post/ follow- up measurements (2nd/4th/6th month) 4	The CBT group showed improvements in time management and severity of ADHD symptoms that continued at follow-up

Table 2 continued

First author/ Year/	Research and Sample Characteristics	Intervention features	Measurements	Results
Pan / 2022	Active control – CBT + medication (N=49, mean age: 27)/ TaU (N=49, mean age: 25)- 18-45 years	Group administration -12 weeks- CBT based on published manual/ treatment as usual 2	Neuropsychological measurement - Self-report measurement - Pre/post/ follow-up measurements (24th/36th week) 4	In the CBT group, ADHD symptoms, emotional symptoms, anxiety, and quality of life in the social domain showed greater improvement both after treatment and at follow-up. Executive functions improved in both groups.
Safren / 2005	Active control - CBT + medication (N = 16) / TaU (N = 15) - 23-59 years - mean age: 45.5	Individual administration – 15 weeks- CBT administration/ treatment as usual 2	Clinician assessment 3 (blinded)/ self-report measurement - Pre/post measurements	Significant improvements were achieved in residual ADHD symptoms and secondary symptoms such as depression and anxiety in the group receiving therapy.
Safren / 2010	Active control – CBT (N=43, mean age: 42)/ RLX (N=43, mean age: 44) 18-65 years old	Group administration – 12 weeks – manual-based CBT/relaxation training and supportive therapy	Clinician assessment 3 (blinded)/ self-report measurement - Pre/ Post/ follow-up measurements (3rd/9th month) 4	Improvements in residual ADHD symptoms were observed in both groups, but these improvements were greater in the CBT group. The gains continued until the 9th month post-treatment follow-up.
Solanto/ 2010	Active control - MCT (N = 45) / Support group (N = 43) 18-65 years - mean age: 41.5	Group administration – 12 weeks – metacognitive therapy based on manual/group support and psychoeducation	Clinician assessment 3 (blinded) / participant and relative self-report measurements - pre/post measurements	More improvement was achieved in terms of inattention symptoms in the therapy group, which focused on time management, organization, and planning skills, than in the support group.
Solanto/ 2018	Active control- CBT (young N=29, old N=12)/Support group (young N=26, old N=14) 18-65 years old	Group administration – 12 weeks – CBT based on manual/ group support and psychoeducation	Clinician assessment 3 (blinded) / self-report measurement - pre/post measurements	Youth showed greater improvement in ADHD-related problem areas in the CBT group than in the support group. Elderly people experienced benefits that were high and similar to younger people in both groups.
Stevenson / 2003	Waiting list 1 CG- Intervention group (N=17) CG (N=18) - mean age: 38.9	Individual administration - 8 weeks - self-help intervention delivered with minimal contact with practitioners	Self-report measurement-Pre/post/ follow-up measurements (2nd month) 4	At the end of the administration, improvements were achieved in ADHD symptoms, organizational skills, self-esteem, and anger management. The gains continued in the follow-up.
Vidal / 2013	Active control – CBT (N=15)/ psychoeducation (N=17) – 18 years and above – mean age: 39.5	Group administration – 12 weeks – cognitive behavioral therapy/ psychoeducation focused on coping skills	Clinician assessment 3 (blinded) - self-report measurement - Pre/post measurements	Both interventions resulted in positive improvements in baseline ADHD symptoms and self-esteem, depression and anxiety levels, and levels of functioning.
Virta / 2010	Active control + waiting list 1 CG - CIS (N=10, mean age: 38) / CT (N=9, mean age: 32) / CG (10) - 18-49 years	Individual administration -10 weeks- CBT based on manual (10 sessions) / Computerized cognitive training (20 sessions)	Clinician assessment 3 (blinded)/ neuropsychological measurement/ self-report measurements- pre/post measurements	Positive effects were observed in the CBT group in terms of ADHD symptoms, mood, and quality of life. The interventions did not produce significant improvements in cognitive performance.
Weiss / 2012	Active control- CBT+DEX (N=23) / CBT+placebo (N=25)-18-66 years- mean:35	Individual administration -20 weeks/ 9 +2 (booster) sessions- Problem-focused CBT/booster sessions	Clinician assessment 3 / self-report measurements - Pre / 15th week / 20th week measurement	Brief and structured CBT was effective in both symptom reduction and increased functioning in adult ADHD, regardless of the administration of stimulant medication or placebo.
Young / 2017	Active control - CBT+Medication (N=48) /TaU (N=47) - 23-59 years - mean age: 35	Group administration - 8 weeks/15 sessions - R and R2 intervention program /treatment as usual for the other group 2	Clinician assessment 3 (blinded) / self-report measurement - pre/ post/ follow-up measurements (3rd month) 4	The CBT+Medication group showed a decrease in ADHD and comorbid symptoms/significant improvements in functionality and quality of life at the end of treatment and at follow-up.

CG: control group; ACCESS: accessing campus connections and empowering student success; CBT: cognitive behavioral therapy; SCM: standard clinical management; TaU: treatment as usual; R and R2: Reasoning and rehabilitation program; MBCT: mindfulness-based cognitive therapy; SH: self-guided skills handout; B: booster sessions; DBT-ST: dialectical behavior therapy-skill training; RLX: relaxation condition; MCT: meta-cognitive therapy; CT: cognitive training; DEX: dexedrine; R and R2: reasoning and rehabilitation program.

1 In some of the studies that used control groups with a waiting list, the control group did not receive any treatment or intervention, while in others there were participants who received an uncontrolled intervention in the group, but since this did not include all participants on the waiting list, it was not taken as an active control group.

2 Treatment as usual includes follow-ups where medication treatments are carried out. During this period, people can also receive non-systematic interventions from the clinician in addition to medication treatment. Since it has been stated that these groups function like active control groups (Janssen et al. 2018; Young et al. 2017), they are defined as active control.

3 Clinician evaluations include at least one of the structured/semi-structured interview forms and self-report scales being evaluated and completed by the clinician.

4 Follow-up measurements refer to the time since the end of treatment.

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Note 2: In some studies, only the mean age or only the age range is reported.

Note 3: For ease of review, abbreviations are taken in their original form in the articles.

primary school-age group ranging from 6 to 12 years of age, extending to pre-adolescence (Abikoff et al. 2004, Hechtman et al. 2004, van der Oord et al. 2007, Waxmonsky et al. 2010, van der Oord et al. 2012, Piffner et al. 2014, Schuck et al. 2015, Haack et al. 2017, Mirzaie et al. 2019, Curtis et al. 2020, Hahn-Markowitz et al. 2020, Teimourian et al. 2020). However, it was noted that Abikoff et al. (2004) and Hechtman et al. (2004) published different findings for the same sample group, as did Boyer et al. (2015) and Boyer et al. (2016), and Piffner et al. (2014) and Haack et al. (2017). Apart from these, nine studies (39%) included a mixed age group of children/adolescents and adolescents/young adults (Milea ve Cozman 2012, Boyer et al. 2015, Vidal et al. 2015, Boyer et al. 2016, Sibley et al. 2016, Sprich et al. 2016, Moreno-Garcia et al. 2019, Ferrin et al. 2020, van der Oord et al. 2020). The overall age range of the studies was between 2 and 25 years of age.

Regarding the characteristics of the control groups used, five studies (22%) used only waiting list control groups, while seventeen studies (74%) used only active control groups. One study (4%) included both a waiting list control group and an active control group. In studies that used waiting list control groups, some control groups did not receive any intervention, while in others, participants received non-standard interventions within the group. However, since this situation did not include all participants on the waiting list, these groups were not considered as active control groups. In the studies, groups receiving routine clinical treatment often received medication interventions, but individuals in these groups could also receive non-systematic interventions from clinicians alongside medication treatment. Since these types of groups were considered to function similarly to active control groups (Young et al. 2017, Janssen et al. 2018), when these treatments were present for all participants in the group, the control group was defined as an 'active control'.

Within a single study, the minimum number of participants for a single group ranged from twelve (Matos et al. 2009, Boyer et al. 2015, Schuck et al. 2015, Boyer et al. 2016) to a maximum of eighty-three (Boyer et al. 2015, Boyer et al. 2016). In this regard, the study conducted by Boyer et al. (2015) had the largest sample size in terms of the number of participants in each group. However, when considering the total number of participants (N=199), the largest sample size was found in the studies conducted by Piffner et al. (2014) and Haack et al. (2017). Regarding the gender distribution of participants, the percentage of male participants ranged from 58% (Piffner et al. 2014, Haack et al. 2017) to 90% (van der Oord et al. 2007, van der Oord et al. 2012). In the majority of studies, approximately 70% of the participants were male.

When considering the method of implementing the selected interventions, six studies (26%) used only individual interventions, fourteen studies (61%) used only group

interventions, and three studies (13%) used a combination of individual and group interventions. The total duration of the interventions ranged from six weeks (Ferrin et al. 2020, Teimourian et al. 2020, van der Oord et al. 2020) to twenty-four months (Abikoff et al. 2004, Hechtman et al. 2004). These interventions targeted only the child/adolescent, only the parent, the parent and the child/adolescent together, or the parent, child/adolescent, and teacher together. Interventions based on social skills training, parent education, and cognitive-behavioral therapy approaches are the most commonly used interventions.

In the studies, the measurement methods used to evaluate the outcomes of interventions mostly included self-report measures completed by parents and scales and/or interview forms scored based on clinician observations. Some studies also included self-report measures completed by participants and self-report measures completed by teachers, depending on the ages of the participants. Apart from these measurement methods, only three studies (13%) used direct observation measures (Abikoff et al. 2004, Hechtman et al. 2004, Waxmonsky et al. 2010), and three studies (13%) used neuropsychological measures (Boyer et al. 2015, Boyer et al. 2016, Mirzaie et al. 2019).

Selected measurement tools were used in each study to evaluate the results by taking pre- and post-measurements. Three studies that used observation-based measurements (13%) included interim assessments (Abikoff et al. 2004, Hechtman et al. 2004, Waxmonsky et al. 2010). Thirteen studies (57%), on the other hand, included post-treatment follow-up assessments (Matos et al. 2009, van der Oord et al. 2012, Piffner et al. 2014, Boyer et al. 2015, Schuck et al. 2015, Boyer et al. 2016, Sibley et al. 2016, Haack et al. 2017, Leung et al. 2017, Mirzaie et al. 2019, Ferrin et al. 2020, Hahn-Markowitz et al. 2020, van der Oord et al. 2020). Among the studies that included follow-up measurements, four studies (17%) conducted follow-up measurements at different time points within a time frame (van der Oord et al. 2007, van der Oord et al. 2012, Piffner et al. 2014, Haack et al. 2017).

When the findings of the studies were evaluated, twenty one studies (van der Oord et al. 2007, Matos et al. 2009, Waxmonsky et al. 2010, Milea ve Cozman 2012, van der Oord et al. 2012, Piffner et al. 2014, Boyer et al. 2015, Schuck et al. 2015, Vidal et al. 2015, Boyer et al. 2016, Sibley et al. 2016, Sprich et al. 2016, Haack et al. 2017, Leung et al. 2017, Mirzaie et al. 2019, Moreno-Garcia et al. 2019, Curtis et al. 2020, Ferrin et al. 2020, Hahn-Markowitz et al. 2020, Teimourian et al. 2020, van der Oord et al. 2020) assessed changes in core ADHD symptoms as the outcome measure. Among these, nineteen studies (83%) reported decreases in core ADHD symptoms and positive developments in children and adolescents following psychological and/or

psychosocial interventions. Two studies (9%) by van der Oord et al. (2007) and van der Oord et al. (2012) reported that such interventions did not provide additional benefits in symptom reduction compared to medication treatment. Two studies (9%) by Abikoff et al. (2004) and Hechtman et al. (2004) did not include measurements to assess core ADHD symptoms.

Regarding the other variables measured in the studies, academic achievement was evaluated in three studies, with only one of them (4%) reporting on academic improvement (Abikoff et al. 2004, Hechtman et al. 2004, Waxmonsky et al. 2010). Executive functions were assessed in three studies (13%) (Boyer et al. 2015, Boyer et al. 2016, Hahn-Markowitz et al. 2020), while comorbid depression, anxiety, and oppositional defiant symptoms were examined in seven studies (30%) (Matos et al. 2009, Waxmonsky et al. 2010, Boyer et al. 2015, Vidal et al. 2015, Boyer et al. 2016, Curtis et al. 2020, van der Oord et al. 2020). Changes in social behaviors were studied in ten studies and six of them (26%) reported positive changes in social behaviors (Abikoff et al. 2004, Hechtman et al. 2004, van der Oord et al. 2007, Waxmonsky et al. 2010, Milea ve Cozman 2012, van der Oord et al. 2012, Pfiffner et al. 2014, Schuck et al. 2015, Haack et al. 2017, Teimourian et al. 2020). For a more detailed analysis of the studies that address different variables and their outcomes, please refer to Table 1 and consider reviewing the original research articles.

The twelve of the thirteen studies that included follow-up assessments (52%) reported that positive results were maintained in at least one area compared to the pre-treatment condition (Matos et al. 2009, van der Oord et al. 2012, Pfiffner et al. 2014, Boyer et al. 2015, Schuck et al. 2015, Boyer et al. 2016, Sibley et al. 2016, Haack et al. 2017, Leung et al. 2017, Mirzaie et al. 2019, Ferrin et al. 2020, Hahn-Markowitz et al. 2020). In the study conducted by van der Oord and colleagues (2020), despite follow-up assessments, meaningful results could not be obtained due to a high rate of participant attrition.

Psychological and Psychosocial Treatments in Adults

In this section, the first author and publication year, research and sample characteristics, intervention details, the general measurement methods, and a summary of the results for the twenty-two studies are presented in Table 2. When examining the sample characteristics of studies conducted with adults, the overall age range is 18-66 years, with mean ages ranging from 20 to 45.5. Within a single study, the minimum number of participants for one group was eight (Hiltunen et al. 2014), and the maximum number of participants was one hundred forty-nine (Anastopoulos et al. 2021). It is noted that the study conducted by Anastopoulos et al. (2021) used the largest sample size (N=280), while the study by Hiltunen et al. (2014) used the smallest sample size.

When examining the characteristics of the control groups used in the studies, it is observed that three studies (14%) used only waiting list control groups, while eighteen studies (82%) used only active control groups. One study (4%) included both a waiting list control group and an active control group. Active control groups are defined here as described in studies involving children and adolescents. Gender distributions among participants varied across studies, but it is generally noted that the percentage of male participants falls within the range of approximately 50-60%. Interestingly, in some studies, the proportion of female participants was higher (Solanto et al. 2010, Vidal et al. 2013, Hiltunen et al. 2014, Janssen et al. 2018, Solanto et al. 2018, Nakashima et al. 2022) compared to studies involving children and adolescents.

When considering the method of intervention, seven studies (32%) exclusively used individual sessions, while fourteen studies (64%) exclusively used group sessions. In one study (4%), a combination of individual and group sessions was employed. The duration of the interventions ranged from six weeks (Gu et al. 2018) to thirty weeks (Dittner et al. 2018), and since they targeted adult groups, they solely focused on participants themselves. The interventions were primarily based on evidence-based cognitive-behavioral therapy approaches. However, two studies (9%) specifically utilized mindfulness-based cognitive therapy (Gu et al. 2018, Janssen et al. 2018), two studies (9%) used skills training based on dialectical behavior therapy (Fleming et al. 2015, Moritz et al. 2021), and one study (4%) used hypnotherapy (Hiltunen et al. 2014).

When it comes to the measurement methods used to assess the outcomes of interventions in these studies, the following patterns were identified: There were four studies (18%) that solely utilized self-report measures (Stevenson et al. 2003, Corbisiero et al. 2018, Anastopoulos et al. 2021, Moritz et al. 2021). In five studies (23%), additional neuropsychological measurements were used (Virta et al. 2010, Fleming et al. 2015, Huang et al. 2015, Gu et al. 2018, Pan et al. 2022). In fourteen studies (64%), clinician-rated scales and/or interview forms were used for assessments (Safren et al. 2005, Safren et al. 2010, Solanto et al. 2010, Virta et al. 2010, Emilsson et al. 2011, Weiss et al. 2012, Vidal et al. 2013, Hiltunen et al. 2014, Young et al. 2017, Dittner et al. 2018, Janssen et al. 2018, Solanto et al. 2018, Cherkasova et al. 2020, Nakashima et al. 2022). Only one of these studies (4%) additionally included assessments from participants' close relatives (Nakashima et al. 2022).

The measurement methods used to evaluate the results in all studies included assessments at both the pre-intervention point and at the end of the interventions as a standard practice. Only one study (4%) included interim measurements (Weiss et al. 2012). In fourteen studies (64%), post-treatment follow-up assessments were conducted (Stevenson et al. 2003, Safren et

al. 2010, Emilsson et al. 2011, Hiltunen et al. 2014, Fleming et al. 2015, Young et al. 2017, Corbisiero et al. 2018, Dittner et al. 2018, Gu et al. 2018, Janssen et al. 2018, Cherkasova et al. 2020, Moritz et al. 2021, Nakashima et al. 2022, Pan et al. 2022). In studies that included follow-up assessments, six studies (27%) conducted assessments at multiple time points (Safren et al. 2010, Hiltunen et al. 2014, Janssen et al. 2018, Cherkasova et al. 2020, Nakashima et al. 2022, Pan et al. 2022). The follow-up durations in these studies ranged from four weeks (Moritz et al. 2021) to nine months (Safren et al. 2010, Corbisiero et al. 2018, Pan et al. 2022).

When evaluating the findings of the conducted studies, it was observed that all studies assessed changes in core ADHD symptoms as the outcome measure. However, two of these studies (9%) reported that psychological interventions did not provide additional benefits (Corbisiero et al. 2018, Moritz et al. 2021). In studies where neuropsychological measurements were directly taken, improvement in neuropsychological performance was observed in four out of five studies (18%) (Fleming et al. 2015, Huang et al. 2015, Gu et al. 2018, Pan et al. 2022). In six studies (23%) that were assessed using self-report measures (Solanto et al. 2010, Huang et al. 2015, Janssen et al. 2018, Solanto et al. 2018, Anastopoulos et al. 2021, Pan et al. 2022), participants reported positive outcomes. Furthermore, in four studies (18%), it was reported that individuals experienced an improvement in their quality of life after psychological interventions (Virta et al. 2010, Fleming et al. 2015, Young et al. 2017, Pan et al. 2022). In five studies (23%), improvements in self-esteem were observed (Stevenson et al. 2003, Solanto et al. 2010, Vidal et al. 2013, Cherkasova et al. 2020, Pan et al. 2022). In six studies (27%), improvements in social and/or overall functioning levels were reported (Weiss et al. 2012, Vidal et al. 2013, Young et al. 2017, Dittner et al. 2018, Cherkasova et al. 2020, Pan et al. 2022). Additionally, among the thirteen studies that addressed comorbid symptoms (Safren et al. 2005, Solanto et al. 2010, Virta et al. 2010, Emilsson et al. 2011, Vidal et al. 2013, Hiltunen et al. 2014, Huang et al. 2015, Dittner et al. 2018, Gu et al. 2018, Solanto et al. 2018, Cherkasova et al. 2020, Anastopoulos et al. 2021, Pan et al. 2022), eleven of them (50%) reported improvements in comorbid depression and anxiety symptoms. In the fourteen studies that included follow-up assessments to evaluate improvements observed in measurements taken before and after any intervention, it was seen that in thirteen of them (59%), positive results were maintained in at least one area compared to the pre-treatment condition (Stevenson et al. 2003, Safren et al. 2010, Emilsson et al. 2011, Hiltunen et al. 2014, Fleming et al. 2015, Young et al. 2017, Corbisiero et al. 2018, Dittner et al. 2018, Gu et al. 2018, Janssen et al. 2018, Cherkasova et al. 2020, Moritz et al. 2021, Nakashima et al. 2022, Pan et al. 2022). However, in the study conducted by Dittner et al. (2018), despite the

inclusion of follow-up assessments, meaningful results could not be obtained due to a high participant attrition rate.

DISCUSSION

This study provides a systematic review of randomized controlled trials evaluating the effectiveness of psychological and psychosocial interventions in children, adolescents, and adults diagnosed with ADHD. A total of forty-five studies meeting inclusion criteria were evaluated through an English-language literature search. In thirty-nine of these studies (87%), it is reported that interventions administered in addition to medication therapy resulted in significant improvements in core ADHD symptoms. Therefore, even though a reduction in symptoms is achieved with medication treatment, individuals often continue to experience difficulties, and the used interventions have been shown to have positive effects on residual symptoms following medication treatments. In these types of interventions, it is reported that even if the effects do not become more pronounced and provide additional benefits after long-term follow-up, there is a possibility of preventing deterioration and reducing medication use (Solanto et al. 2010, van der Oord et al. 2012). Studies indicate that along with psychological and psychosocial interventions, positive results are achieved not only in core ADHD symptoms but also in social and overall functioning, quality of life, self-esteem, and accompanying symptoms such as anxiety and depression. For the limited number of studies that have shown no additional benefits of such interventions to medication treatment, one possible explanation could be the ceiling effects associated with medication treatment (van der Oord et al. 2012, Haack et al. 2017). Two studies that assessed adults and reported no additional contributions of psychological interventions (Corbisiero et al. 2018, Moritz et al. 2021), compared these interventions to routine clinical treatments. It is believed that the lack of differences in outcomes may be associated with the likely implementation of non-systematic psychological interventions during routine clinical treatments. Some of the studies reporting that used psychological and psychosocial interventions do not provide additional benefits have considered responding to specific medication treatment as a precondition for assignment to other treatment conditions. (Abikoff et al. 2004, Hechtman et al. 2004). This situation could introduce selection bias into the sample, thus potentially influencing the results. The inclusion of only individuals who respond to medication treatment in the study may have led to a ceiling effect, as previously mentioned, and could explain the lack of a statistically significant impact of psychosocial interventions in the research results (Haack et al. 2017, van der Oord et al. 2012). However, working with a representative sample that includes individuals who do not respond to medication treatment and even comparing these two sample groups in

the research could be considered as one of the methods to explain why a significant effect of psychosocial intervention is not observed in the research results. It is worth noting that another notable feature of studies involving children and adolescents and reporting no additional benefits of psychological interventions in the results is that they focused on a single type of medication treatment, such as methylphenidate (Abikoff et al. 2004, Hechtman et al. 2004, van der Oord et al. 2007, van der Oord et al. 2012). Indeed, this raises the possibility that the results could be influenced by applying the same medication treatment to all participants. However, ADHD is more than just a uniform presentation and symptom cluster; it is a diagnosis that can manifest with different types and severities of symptoms.

At this stage, it is important to note that while our search results did not include some research findings due to the absence of all relevant keywords or the unavailability of the full text as of the search date, there are some significant research findings that have made important contributions to the field. In a series of extensive studies supported by the National Institute of Mental Health and conducted with children, the results of four different treatment groups were examined: medication-only treatment, medication treatment combined with parent and teacher training, behavioral intervention including therapeutic summer camp (combined treatment), and routine clinical treatment (MTA Cooperative Group 1999). Instead of a one-size-fits-all medication approach, participants in the medication treatment group received tailored medication plans based on individual needs. The results showed that, at the 14-month follow-up (MTA Cooperative Group 1999) and at a follow-up 10 months later, the medication-only treatment group and the combined treatment group had superior treatment outcomes compared to the other two groups. However, it was suggested that the benefits observed in the combined treatment group may be mediated by medication (Owens et al. 2003, MTA Cooperative Group 2004). Furthermore, at a 22-month follow-up, an overall positive change associated with treatment continued to be observed, although the differences between groups were reported to have diminished (Jensen et al. 2007). The initial results of these studies suggested that behavioral interventions could reveal small differences compared to medication and that the benefits they offered did not make it possible to reduce medication use. However, considering that the findings in the group receiving only behavioral therapy produced similar results to community health practices involving medication use, it could not be concluded that behavioral interventions were ineffective (MTA Cooperative Group 1999, 2004). As shown in the initial research results, participants in the combined treatment group exhibited less aggressive behaviors, fewer internalizing symptoms such as anxiety and depression, better social skills, and reading

achievement compared to the medication-only treatment group. Moreover, parents of participants in this group reported higher treatment satisfaction. It was evident that all these benefits were more pronounced in comorbid groups (MTA Cooperative Group 2004). Subsequent studies over time have indicated that behavioral interventions alone might be more effective for specific subgroups with certain characteristics (e.g. those with anxiety symptoms) and that the long-term and relative effects of different treatment approaches may also depend on various characteristics of the treated individual. While medication treatments can reduce negative behaviors, they do not facilitate the acquisition of new positive behaviors and skills (MTA Cooperative Group 2004, Swanson et al. 2008). In this regard, behavioral therapeutic interventions that emphasize learning processes, as mentioned before, may play an important role in preventing their condition from worsening and addressing residual symptoms in the treatment of ADHD (Solanto et al. 2010, van der Oord et al. 2012).

The gender distribution of ADHD, according to APA (2013), is reported to be 2:1 in childhood and 1.6:1 in adulthood, with more males being diagnosed in childhood. In the studies included in this review focusing on children and adolescents, similar gender distributions are observed, with the percentage of male participants ranging from 58% (Piffner et al. 2014, Haack et al. 2017) to 90% (van der Oord et al. 2007, van der Oord et al. 2012). In the case of these studies, the majority of participants, approximately 70%, are male. However, when looking at adult studies, the gender distribution of participants appears to be more variable, with some studies reporting a higher percentage of female participants. This situation suggests that in psychological intervention studies where individuals' voluntariness plays a significant role, female participants may have been more willing to participate.

In research related to ADHD, it is noted that due to the nature of the disorder, participants may face challenges in terms of compliance and continuity in studies, and high dropout rates are possible (Philipsen et al. 2015, Huang et al. 2019). However, it is apparent from some of the studies discussed here that participant attrition has been relatively low. (Fleming et al. 2015, Young et al. 2017, Gu et al. 2018, Curtis et al. 2020, Pan et al. 2022). In only two (4%) of the studies that included follow-up assessments, research could not be conducted due to high participant attrition, and even in studies involving long-term follow-ups, participant numbers have been maintained at a level conducive to analysis. Researchers interpret this as a situation that can demonstrate the effectiveness and utility of the treatments implemented. (Solanto et al. 2010). The higher dropout rates, particularly in conditions that do not involve psychological interventions, are seen as supportive of this statement and are considered to be a potential outcome of the research rather than a deficiency (Solanto et al. 2010, Philipsen et al. 2015, Dittner et al. 2018). This situation

raises the question of whether therapeutic interventions, along with their own effects, also have motivational characteristics in the relationships established during this process. From this perspective, the impact and contribution of relationships established with individuals diagnosed with ADHD in treatment approaches can be explored in future studies. Indeed, researchers especially note that as individuals with ADHD reach adolescence, there is a dramatic decrease in their adherence to medication treatment, and there may be a need to work with motivational elements to maintain or increase treatment participation (Swanson et al. 2008).

In this review, it can be considered a strength that in 47% of the studies, in addition to self-report measurements, there were clinician assessments with at least one aspect of blinding, direct observations, teacher evaluations, and/or direct neuropsychological measurements. The use of active control groups in thirty-seven studies (82%) is also a strength as it helps eliminate placebo effects. On the other hand, studies that solely rely on self-report measurements and cannot blind the assessors to the experimental conditions raise concerns about potential bias effects, and these are considered limitations of the studies (Waxmonsky et al. 2010, Schuck et al. 2015, Sprich et al. 2016, Leung et al. 2017). However, researchers also emphasize that blinding can be challenging in such psychosocial interventions (Virta et al. 2010). In future research in this area, using multiple measurement methods that include not only self-report measurements but also direct assessments will strengthen the results.

Another issue that can be considered a limitation of the studies is the lack of examinations specific to subtypes of ADHD. In this regard, there are very few studies that only examine a specific subtype (Matos et al. 2009, Piffner et al. 2014, Haack et al. 2017, Curtis et al. 2020). However, conducting research based on subtypes would pose significant challenges, as it would limit the number of participants. Indeed, in the majority of the studies presented here, the sample size is a significant limiting factor (Stevenson et al. 2003, Safren et al. 2005, van der Oord et al. 2007, Virta et al. 2010, Weiss et al. 2012, Vidal et al. 2013, Hiltunen et al. 2014, Schuck et al. 2015, Sibley et al. 2016, Gu et al. 2018, Solanto et al. 2018, Moritz et al. 2021).

The use of active control groups involving routine clinical treatment as a comparison group is a commonly employed method in the studies discussed here. Both the participants in routine treatment conditions and the vast majority of participants in the conditions where the effects of interventions are examined typically involved medication use. Only Matos et al. (2009) and Schuck et al. (2015) conducted research with groups that did not use medication. As can be seen in Table 1 and Table 2, in some studies, all participants received the same medication treatment, while in others, participant groups differed in terms of whether they received

medication or not. In such studies, researchers have often treated medication use status as a covariate in order to control for medication-related changes among participants, and they have used statistical analyses to eliminate this factor. While there are studies that show that participants' medication use status does not affect the results (Fleming et al. 2015, Hahn-Markowitz et al. 2020), the overall picture presented by existing research suggests that medication-related changes can be an important factor in such studies, and difficulties can arise in distinguishing whether the effects observed are attributable to medication or other interventions. Not only would it be unethical to deprive individuals recruited for research purposes of necessary medical treatment, but also finding participants in clinical samples who do not use medication can be challenging when participants are selected from clinics. From this perspective, it may be considered a strong feature of research to pay attention to the balancing of medication use before starting psychological treatment and to examine the effects of this factor using statistical methods, even if it appears to be an uncontrollable factor.

In this review, studies directly addressing comorbid major diagnoses alongside ADHD have not been included. However, comorbidities or the presence of symptoms cannot be completely eliminated. While this may be seen as a limitation, considering the high risk of comorbidity in ADHD, including participants with such symptoms in studies is also considered a representative feature for this patient group (Abikoff et al. 2004, Hechtman et al. 2004, Miller et al. 2007, Sprich et al. 2016).

Finally, it is considered an important factor in research on ADHD treatments whether the results are dependent on differences in research design or other independent variables. Studies designed differently methodologically do not allow for meaningful comparisons of results. Therefore, there is needed repeated researches using the same research designs and statistical methods and to explore new variables and hypotheses that can be investigated by evaluating the differences that will arise despite the use of the same methods. It is considered that all these efforts can make it possible stronger data can be obtained, and contributions to the field can be enhanced.

Limitations

The discussion section highlights the strengths and limitations of the research, but it's important to acknowledge that this review itself has certain limitations. Firstly, the studies included in this review are randomized controlled trials, and the criteria used for their selection (such as including clinically based sample groups, using reliable diagnostic methods, and diagnoses made by a clinician) are considered strengths. However, there are limitations to this review as well. Firstly, access to important databases in the field, such as PsychINFO,

was not possible. The searches were conducted only in the English language, and effect sizes of the studies were not considered. Furthermore, it is noted that the publications considered in this review primarily consisted of randomized controlled trials, which are believed to benefit from the highest level of scientific research methods, and certain specific selection criteria were chosen for the reliability of the findings. Due to these selection criteria, it is important to be aware that there may be research that has made significant contributions to the literature but could not be included in this review. The large number of articles included, the restrictiveness of selection criteria, the limited number of studies employing similar methods, and the variability in methodologies among the available studies should be taken into consideration. Due to these factors, it should be noted that this article does not provide a comparison of the superiority of the therapy methods used. However, previous systematic reviews and meta-analyses in the field have indicated that the literature has not yet yielded definitive results regarding which intervention method is superior in ADHD treatment. (Rajeh et al. 2017).

CONCLUSION

This study, which evaluates researches on the effectiveness of psychological and psychosocial interventions in ADHD, suggests that multidimensional treatment approaches provide additional benefits alongside medication use in children and adolescents. It also emphasizes that involving parents to a large extent in these treatment processes can have a positive impact on the results. For adults, especially interventions based on cognitive-behavioral approaches, have been shown to lead to improvements not only in core ADHD symptoms but also in functionality, accompanying symptoms, and overall quality of life.

The duration, frequency, and intensity of psychological interventions are considered important factors that can influence the outcomes of these interventions. While significant changes have been reported in short-term interventions in the studies discussed here, it is suggested that short-term interventions may not be sufficient to achieve effective results in ADHD, especially considering that longer treatment durations, including interventions aimed at increasing daily life practices, may be necessary (Barkley et al. 2008). Due to the long-term functional difficulties associated with ADHD, the adaptation and dissemination of such interventions to larger groups and real-world settings are seen as important considerations (Knight et al. 2008).

This study does not provide data on whether the individual or group delivery of interventions makes a difference in outcomes. It may be necessary to assess this difference in future researches. In group interventions, there is uncertainty about whether individual adaptations might be overlooked

in a diagnosis like ADHD, which has different subtypes and presentations, and whether this could have negative effects on treatment effectiveness.

The study reports the potential for psychological and psychosocial interventions to reduce medication use and mitigate potential worsening of symptoms, even if they do not directly provide additional benefits beyond medication (Solanto et al. 2010, van der Oord et al. 2012). Therefore, it is considered important to include such interventions in treatments. During the process of writing this review, it was observed that there are no such studies available in our country. Hence, there is a need for research on the effectiveness of psychological treatments for ADHD. It is also noted that individuals with ADHD face difficulties in accessing appropriate psychological treatments in addition to medication (Kahveci Öncü and Tutarel Kışlak, 2022). It is hoped that this study will encourage similar research efforts in our country.

In the future, to expand on review articles focusing on the effectiveness of psychological and psychosocial approaches in ADHD, it is recommended to access sources from databases such as PsychINFO that were not available for this study. Additionally, searching for different publications using keywords like “ADHD” and “intervention” can provide access to further resources. These efforts can contribute to the development of a more comprehensive and data-rich review article on this topic.

The author(s) have not declared any potential conflicts of interest in the research, authorship, and/or publication of this article, and they have not received any financial support for the research, authorship, and/or publication of this article.

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