ORIGINAL ARTICLE

A Comparative Study of Participation in Extracurricular Activities between Children with and without Attention-Deficit/Hyperactivity Disorder

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ABSTRACT

Objectives: The symptoms of Attention-Deficit/Hyperactivity Disorder (ADHD) consist of persistent challenges with lack of attention and/or hyperactivity and impulsiveness. ADHD can have far-reaching and long-lasting effects on every part of an individual's life, influencing various areas such as daily activities, work, social participation, and family life. "Engagement in a life situation" defines participation and encompasses various aspects, including being present and actively engaging. There is increasing evidence that children diagnosed with ADHD have restricted participation compared to their typically developing peers. Little research has focused on the involvement of children with ADHD in their everyday routines and leisure activities. Hence, this study aims to investigate the participation patterns in extracurricular activities among children with and without ADHD.
Materials & Methods: The participants included 100 children aged 7-11 years with ADHD and 100 children without ADHD of the same age. They were recruited from multiple clinics and one hospital across Tehran city as a convenient sample. All the participants completed the child symptom inventory (CSI-4) and the Children's Assessment of Participation and Enjoyment (CAPE). The study examined various aspects of participation, including diversity, intensity, enjoyment, place, and partners across 55 activities. The study was conducted online and completed by parents.
Results: The two groups showed no statistically significant difference in demographic characteristics (P> 0.05). The results show that children with ADHD had notably lower participation rates in all types and domains of activities, indicating lower intensity (P value<0.001).
Conclusion: Based on this study's findings, children between the ages of 7 and 11 with ADHD experience significant limitations in engaging in daily activities compared to their typical peers. According to the results, including extracurricular activities in treatment plans seems particularly significant. Therapists and parents should focus on the child's daily life at home and in therapy sessions and emphasize the inclusion of extracurricular activities in the treatment of children with ADHD.

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Introduction

The symptoms of Attention-Deficit/ Hyperactivity Disorder (ADHD) involve ongoing difficulties with inattention and/or hyperactivity and impulsivity(1). ADHD can have extensive and enduring effects on all areas of a person's life, impacting different aspects such as daily activities, work, social participation, and family life (1, 2). Studies have indicated that people with ADHD may participate in recreational activities less frequently, experience less pleasure from organized leisure activities, and demonstrate a decreased preference for certain leisure activities, such as physical and social, compared to individuals without ADHD (3, 4). Additionally, children and adolescents with ADHD may face challenges in social interaction, impacting their participation in different social events (3-6). According to a systematic review with meta-analysis by S. Popit, the overall prevalence of ADHD in registered studies was 1.6% (7).

Participation, encompassing both attendance and engagement, is a multifaceted concept reflecting one's involvement in various life situations (8). The attendance aspect is about children being present, precisely, attending various activities at a particular frequency. The involvement aspect pertains to the immediate experience of participation and might encompass emotions, motivation, or social interaction (9). Participation is a significant gauge of progress in rehabilitation and benefits health and well-being through meaningful activities (8-10). It is crucial for enhancing children's and adolescents' capabilities, self-efficacy, skill acquisition, and skills development (10-12).

Children with ADHD may experience limitations in their participation compared to their typically developing peers (13, 14) and tend to engage in less varied leisure activities. A greater frequency of quiet recreation activities and fewer social activities manifest their participation (15, 16). Their social isolation and loneliness also impact their activity preference (4, 17).

These constraints can be attributed to symptoms of ADHD, social isolation, and exclusion from interpersonal relationships, leading to social challenges (3). Few studies have focused on the participation of children with ADHD in their daily routine and leisure activities (3, 4, 18). Researchers have found that children with ADHD exhibit decreased daily functioning and participation intensity, showing less interest in physical and social activities compared to children without ADHD. Additionally, they are less interested in activities requiring ability and formal activities (3, 4, 18).

This population may encounter academic difficulties (19, 20), leading to a higher likelihood of academic underachievement, suspension or expulsion from school, more absences, and even permanent school dropouts than those without ADHD (21, 22). The studies concentrate on one performance aspect, with Harpin pointing out challenges in the involvement of people with ADHD in different settings(23). Lavi et al. also observed a significant reduction in the engagement of adolescents with ADHD in everyday activities, as well as in school and home involvement, compared to those without ADHD (24). Differences in participation are believed to potentially vary across cultural groups on a communal level, possibly stemming from distinct community structures and ideologies (25).

According to the conducted research, children with ADHD, despite better participation in some factors such as intensity of participation or unstructured activities such as computer games, compared to the control group, have less participation in the areas investigated by participation tests, which can endanger the physical and social skills and acceptability of these children in their future life (26)

Children with disabilities face various barriers to participating in extracurricular activities (15), including environmental, attitudinal, and economic factors (27). The International Classification of Functioning, Disability, and Health (ICF) highlights that participation takes place within a context (8), stressing the importance of taking into account the impact of personal factors (e.g., age, severity of disability) and environmental factors (e.g., socioeconomic status, geographical location). Currently, limited information is available about how children with ADHD participate in extracurricular activities. For example, studies on involvement in computer games have shown that kids with ADHD might be prone to internet addiction and are likely to spend more time playing computer games compared to children who are developing typically (28-30).

The studies mentioned above highlight the impact of ADHD on children's self-esteem, well-being, and participation in daily activities. The importance of conducting further comprehensive research on the variety and level of activities investigated is stressed. It is essential to examine the participation patterns of children with ADHD in activities outside of regular school hours.

The participation patterns of children and adolescents aged 7-11 years with and without ADHD in activities outside mandated school hours are compared in the current study. The data on the activities children engage in, as well as their frequency, location, and enjoyment level, is not well-documented and could help develop intervention strategies. Occupational therapists can benefit from additional knowledge about children's participation patterns and

activity preferences to promote functional independence in clients. Furthermore, it is possible to increase the awareness of the families of children with ADHD about their children's participation outside of class hours and help them pay more attention to their children's extracurricular activities in their daily lives.

Materials & Methods

The current study is a descriptive and cross-sectional one conducted from March 2023 to July 2023 in hospitals and rehabilitation clinics across Tehran.

Participants

The study included 200 Iranian children ages 7–11 years (100 children in 'study' and 100 children in 'comparison' groups). Study group participants were recruited from three private clinics and one hospital throughout Tehran city as a convenient sample. The inclusion criteria for children with ADHD were 1) diagnosis of ADHD by a child psychiatrist based on DSM-IV, 2) age range 7 to 11 years, 3) no simultaneous diagnosis of other neurological disorders such as cerebral palsy and types of epilepsy based on the child's medical record, 4) obtaining required score in the ADHD section of the CSI-4 questionnaire (31), and 5) the absence of other psychiatric disorders such as autism spectrum disorders based on the CSI-4 questionnaire. The comparison group participants were recruited from families referring to the same medical centers and rehabilitation groups of virtual networks. The inclusion criteria for children of the comparison group were 1) an age range of 7 to 11 years, 2) no diagnosis of neurological and psychological disorders, and 3) education in typical schools.

GPOWER software was used to estimate the sample size. Considering the effect size of 0.4 based on the study of the article by Shimoni et al., the power of the test was 80%, and the first type error was 5%. The sample size was estimated to be 100 people in each group (3).

Procedure

Participants were screened for eligibility criteria, and after obtaining informed consent from the parent of the child, assessments were conducted online on the Porsall website (via questionnaires including CAPE, CIS-4, and demographics). The link was distributed in rehabilitation clinics all over Tehran for parents to fill out. The sampling, data collection, and analysis process lasted five months, from February 2023 to July 2023.

Instruments

Demographic questionnaire: A demographic questionnaire pertaining to participants' personal data, such as age, gender, school grade, family members, socioeconomic level, learning difficulties, and health status.

The Child Symptom Inventory (CSI-4): The CSI-4 is a behavior rating scale that screens 18 behavioral and emotional disorders in children aged 5 to 12 with DSM-IV. The parent form has 112 questions set for 11 significant groups and one additional group of behavioral disorders.

Children's Assessment of Participation and Enjoyment (CAPE): This instrument is designed to elicit participation patterns of children and youth, ages 6-21, outside mandated school activities. The CAPE version in the present study included 55 activities. The activities are classified into two domains: (1) formal activities – 15 structured activities involving rules or goals and have a formally designed coach, leader, or instructor (e.g., art or dance lessons, sports, or schoolwork tutors); (2) informal activities – 40 activities that have little or no planning and are often initiated by oneself (e.g., reading, playing cards). The CAPE activities are further categorized in terms of the type of activity (recreational, active-physical, social, skill-based, and self-improvement) (32).

Scores for these dimensions were calculated as follows: Intensity: the average of the participation frequency in the activity domains (rated on a 7-point scale 1 = Once in four months vs. 7 = Once a day or more); Diversity: a count of the number of activities in which the child has participated out of 55 activities; With whom: the average of the participation with somebody or alone in the domains activity (rated on a 5-point scale 1 = alone vs. 5 = with others); Where: the average of where participation take place in the domains activity (rated on a 6-point scale 1 = home vs. 6 = beyond your community); Enjoyment: average enjoyment of the child across the activities he does (rated on a 5-point scale 1 = not at all vs. 5 = love it).

The test-retest reliability for the CAPE's formal, informal, and total participation intensity score ranges from 0.64 to 0.86. These results are based on random effects of intra-class correlation coefficients. This statistical measure indicates the consistency of scores across different test administrations. The reliability of the study methodology was assessed with 48 children and youth with disabilities (32).

Data analysis

All data were collected, tabulated, and statistically analyzed using the SPSS 20.0 for Windows (SPSS Inc, Chicago, IL).

Data are presented as mean ± standard deviation. ANOVA was used to analyze the variations between the groups in the total scores and each participation

aspect: diversity, intensity, enjoyment, partner (with whom), and location. Furthermore, this study contrasted the average scores of children's involvement in the Formal and Informal categories and each type of activity (recreational, active-physical, social, skilled-based, and self-improvement).

The significance level was established at $p < .05$, an essential boundary that emphasizes the strength of our results.

Results

All participants enrolled in regular primary schools possessed average IQ levels, spoke Farsi, and hailed from various socioeconomic backgrounds. (Table 1).

Table 1: participant's demographic information

		Children with ADHD No. (%)	Children without ADHD No. (%)	p-value
Gender	Boy	69 (69)	61 (61)	0.236
	Girl	31 (31)	39 (39)	
Age (years)	7-8	29 (29)	33 (33)	0.633
	8-9	17 (17)	22 (22)	
	9-10	18 (18)	15 (15)	
	10-11	36 (36)	30 (30)	
School grade	Pre-school	11 (11)	5 (5)	0.067
	First	19 (19)	23 (23)	
	Second	12 (12)	19 (19)	
	Third	13 (13)	18 (18)	
	Fourth	12 (12)	17 (17)	
	Fifth	33 (33)	18 (18)	
Monthly family income	Below 10 mil	50 (50)	35 (35)	0.085
	10-30 mil	42 (42)	57 (57)	
	30-50 mil	8 (8)	8 (8)	
Father's education	Under diploma	29 (29)	18 (18)	0.155
	Diploma	34 (34)	40 (40)	
	Bachelor's degree	20 (20)	29 (29)	
	Master's degree	17 (17)	13 (13)	
Mother's education	Under diploma	18 (18)	12 (12)	0.777
	Diploma	42 (42)	47 (47)	
	Bachelor's degree	31 (31)	32 (32)	
	Master's degree	7 (7)	6 (6)	
	Doctorate	2 (2)	3 (3)	
Father's job	Full time	64 (64)	68 (68)	0.127
	Part time	32 (32)	32 (32)	
	Unemployed	4 (4)	0 (0)	
Mother's job	Full time	8 (8)	13 (13)	0.322
	Part time	13 (13)	17 (17)	
	Housewife	79 (79)	70 (70)	

Regarding gender, 130 (65%) were boys, and 70 (35%) were girls. Most children are between 10 and 11, making up 36% of the group. About 25.5% of them are in the fifth grade of primary school. Regarding family income, 49.5% earn 10 to 30 million Tomans monthly. Regarding education levels, 37% of the fathers have a diploma, while 44.5% of the mothers also hold a diploma. As for employment, 66% of the fathers work full-time, and 74.5% of the mothers are housewives.

The two groups showed no statistically significant difference in demographic characteristics ($P > 0.05$). As shown in Table 1, children in both the with/without ADHD group were matched evenly for all demographic variables: age, gender, school grade, and the like.

Participation diversity

Table 2 shows a significant difference between the average diversity of participation in extracurricular activities of the two groups of children ($P<0.001$). Thus, the average score of participation diversity in extracurricular activities in Children without ADHD was higher compared to children with ADHD. The amount of this difference was equal to -9.60 units. Moreover, Hedges effect size was used to show the overall difference in society. The size of the Hedges effect of participation in extracurricular activities in

terms of the number of activities was equal to -2.066 units, showing that this difference is high in society.

Participation intensity

Table 3 presents the group participation intensity's mean scores and standard deviations (Children with ADHD vs. children without ADHD). Table 3 shows a significant difference between the average intensity of participation in extracurricular activities of two groups of children (P<0.001). Hence, the average score for the intensity of participation in extracurricular activities was higher in children without ADHD than in children with ADHD. The amount of this difference was equal to -0.75 units. Furthermore, Hedges effect size was used to show the overall difference in society. The Hedges effect size of participation in extracurricular activities in terms of activity intensity was found to be -1.796 units, indicating that this difference is high in society.

Table 2: Overall scores of diversity, where, with whom and enjoyment participation between two groups

	Children with ADHD	Children without ADHD	T	P value	Hedges' g
Diversity	17.56 (3.99)	27.16 (5.19)	-14.65	<0.001	-2.066
Where	2.38 (0.49)	2.58 (0.41)	-3.16	0.002	-0.441
With whom	1.97 (0.33)	2.10 (0.30)	-2.95	0.004	-0.411
Enjoyment	3.17 (0.48)	3.81 (0.41)	-10.12	<0.001	-1.428

Table 3: Comparison of 'participation intensity' of children with and without ADHD.

		Children with ADHD	Children without ADHD	T	P value	Hedges' g
Overall		1.33 (0.34)	2.08 (0.48)	-12.51	<0.001	-1.796
Domain	Formal	0.45 (0.41)	1.07 (0.68)	-7.79	<0.001	-1.10
	Informal	1.67 (0.44)	2.46 (0.54)	-11.27	<0.001	-1.598
Activity type	Recreational	2.34 (0.90)	3.26 (1.01)	-6.79	<0.001	-0.958
	Physical	0.52 (0.43)	1.16 (0.59)	-8.58	<0.001	-1.235
	Social	1.95 (0.72)	2.51 (0.80)	-5.05	<0.001	-0.733
	Skill-based	0.38 (0.20)	1.17 (0.93)	-7.42	<0.001	-1.170
	Self-improvement	1.53 (0.65)	2.31 (0.62)	-8.75	<0.001	-1.223

Where

The data in Table 2 indicates a significant difference between the average participation in extracurricular activities regarding the activity location of the two groups of children (P<0.001). Therefore, the average participation score in extracurricular activities regarding activity location was higher in Children without ADHD than in children with ADHD. The amount of this difference was equal to -0.21 units. Besides, Hedges effect size was used to show the overall difference in society. The size of the Hedges effect of participation in extracurricular activities regarding activity location was found to be -0.441 units, showing that this difference is low in society.

With whom

According to Table 2, there is a significant difference between the average participation in extracurricular activities in terms of with whom in the two groups of children (P<0.001); thus, the average score of participation in extracurricular activities regarding with whom was higher in children without ADHD compared to children with ADHD. The amount of this difference was equal to -0.13 points. Moreover, Hedges effect size was used to show the overall difference in society. The Hedges effect size of participation in extracurricular activities in terms of with whom to do the activity was equal to -0.411 units, indicating that this difference is low in society.

Enjoyment

Table 2 shows a significant difference between the average participation in extracurricular activities in terms of enjoyment of the two groups of children (P<0.001). Therefore, the average participation score in extracurricular activities in terms of enjoyment was higher in children without ADHD than in children with ADHD. The amount of this difference was equal to -0.64 units. Furthermore, Hedges effect size was used to show the overall difference in society. The value of the Hedges effect size of participation in extracurricular activities in terms of enjoyment was equal to -1.428 units, revealing that this difference is high in society.

Discussion

The primary purpose of this study was to investigate and compare participation in extracurricular activities of children with and without ADHD using the CAPE test in clinics in Tehran. The results showed that, in general, a significant difference exists in participation intensity in extracurricular activities between children with and without ADHD. Children with ADHD typically show lower intensity scores across all areas

and types of activities. Compared to their peers without ADHD, the difference is significant, with a Hedges' effect size greater than 0.7. These findings can be applied broadly to the general population. Possibly, this significant difference occurred for two reasons: 1) low attention capacity and restlessness in ADHD, and 2) low activity intensity scores may reflect problems related to motivation and continuity in doing activities. Children with ADHD may try to compensate for their lack of participation by participating in various activities (3). Furthermore, according to previous studies, children with ADHD show unacceptable social behaviors and social problems to a greater extent, leading to non-acceptance and isolation (33-35). Because of these problems, social activities may be boring for boys with ADHD, as expressed by the low scores of social activities in terms of intensity. In most skill-based activities, positive results and rewards rely on participation over a relatively long period (such as sports, music, or dance). In children with ADHD, their capacity to tolerate a delay in getting a reward and sustain their motivation is diminished (36-38).

In a study, Shimoni et al. (3) obtained a similar result in the overall intensity of activities and formal, informal, social, skill-based, and self-improvement activities between children with and without ADHD. However, they observed no significant difference between the two groups in recreational and physical activities. This lack of significant difference in Shimoni et al.'s study is because, unlike skill-based activities (such as gymnastics), physical activities include unstructured sports and physical-motor activities (such as riding a bicycle). In these activities, children actively participate without the need to adhere to rigid regulations or commands from a teacher or a group. Recreational activities, like physical activities, include unstructured free time activities (such as playing on the playground). Although no significant difference was observed between participation in physical and recreational activities between the two groups, boys with ADHD showed a greater tendency to do activities individually than their healthy counterparts (3).

The participation diversity in activities at home in Shabat et al.'s study was similar to the present findings, but no significant difference was observed between the two groups in school and community environments (26).

Participation in extracurricular activities between children with and without ADHD significantly differed in diversity, with whom, where, and enjoyment. However, the Hedges' effect size was higher than 0.7 and showed the ability to generalize to the larger society. At the same time, this rate was lower than 0.5 in terms of with whom and where, and the difference observed in the samples of this study regarding the two mentioned types cannot be expected in the larger society. In contrast with the present study, Shimoni et al. found no significant difference in participation diversity in the reported results between the two groups. Contrary to the current study, the diversity scores of boys with ADHD in formal activities were higher than their healthy peers, which is also different from the lower diversity scores of children with ADHD in the present study. This significant difference in diversity scores observed only in formal activities can be due to private activities in this area, such as "using a private teacher." In this study, 74% of boys with ADHD had problems in learning, which is similar to other studies that in ADHD disorder, there is a high incidence of learning disorders (39). Therefore, it seems natural that children diagnosed with ADHD require additional assistance with their academic challenges. Possibly, children with ADHD benefit from structured and formal supervision to actively engage in extracurricular activities. In Shabat et al.'s research, children and adolescents with ADHD participated in activities in all three environments at home, school, and community to a lesser extent than Children without ADHD. The results are similar to those of the current study regarding the number of activities. This reduction in the number of activities in the school and community can be due to these people's problems in their social functioning.

In Shimoni et al.'s study, in contrast to the current results, the two groups did not show a significant difference in terms of "where" and "with whom" they did activities. While attending school is obligatory, participating in extracurricular activities indicates an individual preference, children's choices, and their interests. Children with ADHD demonstrated comparable levels of enjoyment of activities in comparison to children without ADHD, except for formal activities, where boys with ADHD showed less enjoyment. Seemingly, the lower scores of the participation enjoyment of boys with ADHD in formal activities can be due to the educational courses or the different abilities required for a performance in an adaptive manner (e.g., academic skills, obeying, complying with the rules). The deficiency might account for the diverse yet subdued involvement of boys with ADHD. Boys with ADHD are prone to have learning and school-related problems(20, 39). As a result, parents and teachers may motivate these children to participate in educational classes to attain academic success, which can affect the diversity of participation. However, due to these problems, the intensity of participation is likely to be negatively affected.

In the study of Blanco-Martinez et al. (40), similar to the current study, children with Neurodevelopmental Disorders (NDD), including children with ADHD, showed less participation in all environments and limitations in instrumental activities of daily living and self-care were much more. In addition, children with ADHD are more likely to face academic problems and not continue their studies in high school or university due to attention and behavioral problems. Social participation in children with NDD is one of the most limited areas for these children, and the parents of these children also show double concern about this area of their children's participation. Seemingly, children with NDD not only show less participation than their healthy counterparts, but their activities are primarily stereotyped and highly structured and are done under the supervision of their parents (40).

To gain more general insights into participation patterns in Iran, further research should focus on the "place" of activities and "with whom" involved, considering a larger population. In addition, qualitative studies can examine not only the person or persons that the child engages in his activities but even the extent and nature of the child's bond with them and the extent of the child's communication with them. Among the possible systematic errors, we can mention the length of the test.

The significant limitation of this study was that the duration of completing the online test was long and had to be done continuously, and the information was not saved if it was interrupted and not completed in one step. It is recommended that the participant be asked at the beginning of the assessment if he/she is ready to take the assessment for at least 30 minutes. In case of any problem, the assessment can be done in two separate sessions. The test can be completed as an in-person interview to clear possible ambiguities in the assessment tool.

According to Hedges' effect measured in domains and types, the result can be generalized to a more extensive community in the whole country (Hedges' effect=0.733-2.066) except for the location and partners of activities (Hedges' effect=0.441 & 0.411) that children may do outside of their mandatory school time. The obtained results can help occupational therapists pay more attention to activities outside of school in the treatment planning of children with ADHD and pay more attention to the independence of these children in the activities of this area in the exercises they consider for them.

In Conclusion

According to the results obtained from the present study, children with ADHD aged 7 to 11 years have moderate to severe limitations in participating in daily activities compared to their healthy peers. These limitations can cause problems in the child's skills, interactions with others, and his/her social life. Therefore, disabilities and problems that limit children's participation can ultimately reduce the child's prosperity and sense of well-being. The current research results also show the importance of treatment in extracurricular activities. Parents and therapists should pay attention to this part of the child's daily life in the home environment and clinics and prioritize children's participation in extracurricular activities in treatment programs and counseling families. It is advisable for parents who constantly emphasize their children's academic performance to also pay attention to other areas of the children's participation. This involvement includes participation in treatment and everyday life at home and in the community, which can positively influence the child's academic performance and educational status at school. The CAPE questionnaire in clinics and medical centers can help therapists evaluate and plan interventions to improve the participation of children with ADHD in all areas of activities, especially those that happen outside of mandatory time in school.

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The present study was approved by the Research Ethics Committee of Shahid Beheshti University of Medical Sciences (code: IR.SBMU.RETECH.REC.1401.844).

Authors' Contribution

R.A.K and Z.P conceptualized and designed the study. M.M provided the data and conducted the statistical analysis and interpretation. Z.P and R.A.K contributed to the writing and revision of the manuscript. All authors read and approved the final version of the manuscript.

Conflict of Interest

The authors declare that there is no conflict of interest.

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