



ORIGINAL ARTICLE

# ADHD Partners, ADHD Parents and ADHD Children: Relationship of ADHD Symptoms in Low Socioeconomic Status Families From Turkey

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## ABSTRACT

**Objective:** ADHD is one of the most common early-onset neurobehavioral disorders. It is highly heritable and persistent across the lifespan so is likely to co-exist in children and parents within families. In this study, we aimed to take a family-level approach linking parent-child symptom relationships, not only to the level of ADHD symptoms in each parent but also to the level of partner's symptoms.

**Method:** In this study, we used a case-control design. Participants of the study group were recruited from the newly diagnosed 100 children with ADHD and their parents and age- gender-matched control group was recruited from an elementary school in Ankara. Parents filled the demographic information form and Adult ADD/ADHD Diagnostic and Statistical Manual of Mental Disorders, and teachers filled the Conners Teacher Scales.

**Results:** Firstly we found that not only ADHD children parents but also control groups' have high ADHD symptoms when compared with the population-based studies in this cohort. Secondly, we demonstrated that women/men who have higher ADHD symptoms prefer ADHD marital partners than others. Thirdly, women's hyperactivity/ impulsivity (HI) is associated with all types of husband's ADHD symptoms, while women's ADHD related features are associated with the husbands' comorbidities. And finally, children's ADHD symptom correlations were stronger with fathers than mothers according to teacher scores.

**Conclusions:** This study showed that ADHD symptoms in families from low socioeconomic status could have different relations between individuals of the families. In future studies, it will be important to measure partner and parental satisfaction when ADHD is a general problem in the family.

**Keywords:** Parental ADHD, partner ADHD, family, low socioeconomic status

## INTRODUCTION

ADHD is one of the most common early-onset neurobehavioral disorders, affecting 1-20% of school-age children (1,2) and 4.4% of adults (2,3). It is highly heritable and persistent across the lifespan (4) so is likely to co-exist in children and parents within families (5).

ADHD is associated with impairments in numerous domains of family functioning (6) including marital

relationship, parenting difficulties and child outcomes (7-11). Studies have reported that adults with ADHD experience high marital dissatisfaction and elevated rates of dissolution due to their individual features, comorbidities, and the influence of child's problems including both ADHD and oppositional behaviors (10,12). But less is known about if ADHD symptoms or ADHD related problems of men and women may be related to choose the romantic partner. In other words, do men and women with ADHD choose ADHD ones as their partners? In addition, specifically, a few studies have examined the relationship between maternal and paternal ADHD symptoms, ADHD related problems and child's symptoms. In this study, we aimed to take a family-level

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**Table 1: Demographic Characteristics of parents and children**

Characteristics	ADHD group	Control Group	p-value
n	100	100	
males	73	71	
females	27	29	
Age (mean±SD years)	8.48±1.70	8.47±1.69	0.97
Paternal age (mean±SD years)	39.74±5.64	39.65±5.91	0.791
Maternal age (mean±SD years)	35.81±5.56	35.86±5.04	0.71
Paternal Education (mean±SD years)	9.18±2.80	9.61± 3.16	0.31
Maternal Education (mean±SD years)	7.82±3.18	8.57±3.19	0.09
Hollingshead- Redich scale (mean±SD)	3.46±1.22	3.68±1.12	0.188

\*There were no significant differences between the groups at  $p < 0.05$ . Unpaired t- test and Mann-Whitney U test. SD: standard deviation

approach linking parent-child symptom relationships, not only to the level of ADHD symptoms in each parent, but also to the level of partner symptoms. We set out to test a number of hypotheses expecting the following results:

H1: The severity of ADHD symptoms and ADHD related problems are positively correlated between partners (ADHD men/women prefer more ADHD partner than others).

H2: Not only ADHD symptoms, but also related problems of partners are correlated with ADHD symptoms/ other comorbid problems in children.

## METHODS

### Participants and Procedure

In this study, we used a case control design . The research protocol was approved by the Research Ethics Board of the Ankara University School of Medicine (December 2013-12-2013-154). Participants of the study group were recruited from the newly diagnosed 100 children with ADHD and their parents. The aim and procedure of the study were explained to the all parents and children, then written informed consent was obtained from parents. Children were aged 6 to 11 years ( $M=8.4$ ,  $SD=0.88$ ), and 73% of the sample were males. The mean Hollinshead-Redich Scale score was  $3.46 \pm 1.22$ . Mothers were aged 23 to 49 years ( $M=35.8$ ,  $SD=5.56$ ) and fathers were aged 28 to 56 years ( $M=39.7$ ,  $SD=5.64$ ). The majority of parents were married (96%).

Age- and- gender- matched control group was recruited from an elementary school in Ankara. The teachers and

parents were asked to complete the Conners Scales. Children who have an ADHD diagnosis according to the Schedule for Affective Disorders and Schizophrenia for School Age Children- Present and Lifetime version (K-SADS-PL) were excluded. Children in control group were aged 6 to 11 years ( $M=8.4$ ,  $SD=1.69$ ) and 71% of the participants were male. The mean Hollinshead- Redich Scale score was  $3.68 \pm 1.12$ . Mothers were aged 27 to 53 years ( $M=35.8$ ,  $SD=5.04$ ) and fathers were aged to 31 to 62 years ( $M=39.6$ ,  $SD=5.91$ ). All parents were married in this group.

According to Hollingshead- Redich Scale, SES of the groups were similar (see details in Table 1).

### Measurements

**Demographic Information Form.** This form consisted of questions that were prepared by authors for obtaining information about the demographic characteristics (age, school, parental age and education, monthly household income, and marital status of parents) of the participants.

**Adult ADD/ADHD Diagnostic and Statistical Manual of Mental Disorders (DSM –IV Based Diagnostic Screening and Rating Scale).** This rating scale assesses the ADHD symptoms in adults. It was developed by Turgay in 1998 (13) and was adapted to Turkish by Günay (Gunay et al. 2005). This scale is completed by a three-point Likert-type rating and consists of three sections: First section is composed of 9 items that are defined as the symptoms of attention deficit in DSM-IV. The total scores between 0 to 3:00 were interpreted as mild, 3.01- 10.99 as moderate and 11.00 or higher scores as severe attention deficit. Second section is composed of 9 items

of hyperactivity/ impulsivity that are conformed to those in DSM-IV. The total scores between 0 to 3:00 were interpreted as mild, 3.01-10.99 as moderate and 11.00 or higher scores as severe hyperactivity/ impulsivity. Third section is consisted of 30 questions that were prepared for obtaining information about the features and issues related to ADHD. (The feeling of failures, difficulty in starting to work, dealing with many work at the same time and so having difficulties in tracking the jobs, verbal aggression, physical aggression, alcohol abuse, substance abuse, legal challenges and difficulties, depression, self mutilative behaviours, anxiety, disappointment, discouragement etc.). The total scores between 0.00 to 12.99 were interpreted as mild, 13.00-34.99 as moderate and 35.00 or higher scores as severe features related to ADHD. Günay et al demonstrated that the Turkish version of Adult ADHD Rating Scale is transliterally equivalent, valid and reliable (14).

**Conners Teacher Rating Scales (CRS).** The Conners' Teachers Rating Scale (CPRS) is a popular research and clinical tool for obtaining childhood behavior problems (15). It was designed for use by teachers to assess ADHD symptoms in children ages 3-17 years. It has 28 items that are coded on a four point Likert scale that assess the symptoms of ADHD observed in classroom.

### Statistical Analysis

Demographic variables; rates of severe parental ADHD symptom and adult ADHD symptom scores in parents were compared with the control group using t tests, Pearson's chi square, Fisher's exact test, and Contingency Table analyses as appropriate, using SPSS 18 for Windows. The associations of different variables were calculated by correlation analyses. A 5% Type-1 error level was used to infer statistical significance. A p value < 0.05 was considered significant.

### RESULTS

The study and control group children were all from low socioeconomic level. There were no significant differences according to age, parental age, and parental education. In the study group, 5% of (n=5) children with ADHD were predominantly inattentive type, and 95% (n=95) of children were combined type.

In Table 2, the means and SD of attention deficit (AD), hyperactivity/ impulsivity (HI), and features associated with ADHD (FA-ADHD) of parents are presented. Parents of children with ADHD had significantly higher scores on adult ADHD symptoms (in all subgroups p < 0.001). In addition, the rates of severe ADHD symptoms were higher both in fathers and mothers of study group.

**Table 2: Group Differences in Parental ADHD Scores and ADHD Severity**

Characteristics of the Parents	ADHD group	Control Group	Test statistics and p- value
	(Mean±SD)	(Mean±SD)	
<b>Maternal ADHD Scores</b>			
• Attention Deficit	8.51±6.47	4.25±3.46	p<0.001
• Hyperactivity/ Impulsivity	7.07±5.92	3.02±3.10	p<0.001
• Features associated with ADHD	22.62±13.86	10.21±8.56	p<0.001
<b>Paternal ADHD Scores</b>			
• Attention Deficit	7.58±5.93	3.76±3.50	p<0.001
• Hyperactivity/ Impulsivity	7.61±6.28	3.06±3.84	p<0.001
• Features associated with ADHD	23.63±15.33	9.33±8.60	p<0.001
	(%) (n=100)	(%) (n=100)	
<b>Maternal ADHD Symptom Severity</b>			
• Attention Deficit (Moderate-Severe)	74	46	$\chi^2=16.33$ df=1, p<0.001
• Hyperactivity/ Impulsivity (Moderate-Severe)	65	34	$\chi^2=18.70$ , df=1, p<0.001
• Features associated with ADHD (Moderate-Severe)	72	36	$\chi^2=23.83$ , df=1, p<0.001
<b>Paternal ADHD Symptom Severity</b>			
• Attention Deficit (Moderate-Severe)	65	42	$\chi^2=12.83$ df=1, p<0.001
• Hyperactivity/ Impulsivity (Moderate-Severe)	60	28	$\chi^2=23.96$ , df=1, p<0.001
• Features associated with ADHD (Moderate-Severe)	64	30	$\chi^2=25.75$ , df=1, p<0.001

When we analyzed the mothers according to severe AD and HI symptoms, we found that their husband's also have high AD, HI, and FA-ADHD (in all subgroups  $p < 0.001$ ). Similarly when we analyzed the fathers according to severe ADHD symptoms, we found that their wife's also have high ADHD scores (in all subgroups  $p < 0.001$ ) (Table 3).

The Conners Teacher scores were presented in Table 4. As expected in all subscales, ADHD children have significantly higher scores than control group. Then we

calculated the correlation coefficients and their significance between parental ADHD scores in each other and child's ADHD scores using the Pearson correlation test. Correlations were generally significant but weak except child's cognitive problems and paternal FA-ADHD ( $p < 0.001$ ,  $r = 0.41$ ); child's AD scores and paternal HI-paternal FA-ADHD ( $p < 0.001$ ,  $r = 0.40$  and  $0.43$ , respectively); paternal AD and maternal HI ( $p < 0.001$ ,  $r = 0.44$ ); maternal HI and paternal HI -paternal FA-ADHD ( $p < 0.001$ ,  $r = 0.47$ ,  $r = 0.43$  respectively) and finally maternal

**Table 3: ADHD Types and Scores of Partners**

Maternal Attention Deficit	Severe (n=120)	None/Mild (n=80)	Test statistics and p- value
	(Mean±SD)	(Mean±SD)	
• Paternal Attention Deficit	7.02±5.51	3.50±3.93	F=12.61, t=-4.65, df=184, p<0.001
• Paternal Hyperactivity/ Impulsivity	6.08±5.96	4.13±4.97	F=1.77, t=-2.34, df=185, p=0.02
• Paternal Features associated with ADHD	11.69±12.06	19.53±14.84	F=0.80, t=-3.77, df=183, p<0.001
Maternal Hyperactivity/ Impulsivity	Severe (N=99)	None/Mild (N=101)	Test statistics and p- value
	(Mean±SD)	(Mean±SD)	
• Paternal Attention Deficit	7.18±6.00	4.09±3.68	F=23.71, t=-4.20, df=184, p<0.001
• Paternal Hyperactivity/ Impulsivity	6.86±6.19	3.68±4.58	F=7.76, t=-3.96, df=184, p<0.001
• Paternal Features associated with ADHD	20.29±14.42	12.36±13.14	F=0.01, t=-3.89, df=182, p<0.001
Paternal Attention Deficit	Severe (N=107)	None/Mild (N=93)	Test statistics and p- value
	(Mean±SD)	(Mean±SD)	
• Maternal Attention Deficit	7.55±5.50	4.79±5.47	F=2.43, t=-3.38, df=184, p=0.001
• Maternal Hyperactivity/ Impulsivity	6.28±6.07	3.65±3.39	F=21.27, t=-3.75, df=172, p=0.001
• Maternal Features associated with ADHD	19.03±14.45	12.47±10.44	F=5.37, t=-3.51, df=179, p=0.001
Paternal Hyperactivity/ Impulsivity	Severe (N=88)	None/Mild (N=112)	Test statistics and p- value
	(Mean±SD)	(Mean±SD)	
• Maternal Attention Deficit	7.79±5.67	5.14±5.34	F=2.82, t=-3.28, df=184, p=0.001
• Maternal Hyperactivity/ Impulsivity	7.34±6.24	3.26±3.19	F=39.76, t=-5.71, df=184, p<0.001
• Maternal Features associated with ADHD	21.68±13.52	11.68±11.24	F=1.64, t=-5.42, df=179, p<0.001

**Table 4: Childrens' ADHD Scores**

Conners Teacher Scale	ADHD (Mean±SD)	Control (Mean±SD)	p value
Oppositional Behaviors	4.59±3.91	1.17±1.23	p<0.001
Cognitive Problems/ Inattention	9.76±5.94	1.26±1.28	p<0.001
Hyperactivity	10.45±6.69	1.29±1.47	p<0.001
Anxious-shy	5.84±3.08	1.28±1.50	p<0.001
Perfectionism	3.32±3.16	0.90±1.03	p<0.001 <sup>2</sup>
Social Problems	5.45±4.08	1.10±1.35	p<0.001
DSM-IV Total	10.14±5.03	0.83±1.09	p<0.001
DSM-IV Hyperactivity/impulsivity	8.89±4.65	1.48±1.48	p<0.001
Emotional Liability	5.03±3.37	0.85±0.87	p<0.001

**Table 5: Correlation Analyses Between Partners and Children ADHD Scores**

	Maternal Attention Deficit	Paternal Attention Deficit	Maternal Hyperactivity/ Impulsivity	Paternal Hyperactivity/ Impulsivity	Maternal Features associated with ADHD	Paternal Features associated with ADHD
Oppositional Behaviors	0.19**	0.19**	0.26**	0.25**	0.29**	0.30**
Cognitive Problems/ Inattention	0.30**	0.31**	0.30**	0.38**	0.35**	0.41**
Hyperactivity	0.16*	0.26**	0.28**	0.30**	0.28**	0.28**
Anxious-shy	0.28**	0.11	0.23**	0.15*	0.32**	0.29**
Perfectionism	0.06	0.10	0.14*	0.17**	0.24**	0.27**
Social Problems	0.17*	0.23**	0.29**	0.26**	0.27**	0.31**
Emotional Labilty	0.18*	0.15*	0.20**	0.21**	0.30**	0.30**
DSM-IV Inattention	0.28**	0.34**	0.33**	0.40**	0.37**	0.43**
DSM-IV Hyperactivity/Impulsivity	0.13	0.26**	0.27**	0.32**	0.29**	0.30**
DSM-IV Total	0.22**	0.32**	0.32**	0.38**	0.35**	0.39**
Maternal Attention Deficit	-	0.32**	0.63**	0.26**	0.69**	0.36**
Paternal Attention Deficit	0.32**	-	0.44**	0.73**	0.36**	0.70**
Maternal Hyperactivity/ Impulsivity	0.63**	0.44**	-	0.47**	0.65**	0.43**
Paternal Hyperactivity/ Impulsivity	0.26**	0.73**	0.47**	-	0.39**	0.80**
Maternal Features associated with ADHD	0.69**	0.36**	0.65**	0.39**	-	0.58**
Paternal Features associated with ADHD	0.36**	0.70**	0.43**	0.80**	0.58**	-

\*p < 0.05 (two-tailed), \*\*p < 0.01 (two-tailed).

**Table 6: Partial Correlation Analyses (Controlling the other parents' ADHD scores)**

	Maternal Attention Deficit	Paternal Attention Deficit	Maternal Hyperactivity/ Impulsivity	Paternal Hyperactivity/ Impulsivity	Maternal Features associated with ADHD	Paternal Features associated with ADHD
Oppositional Behaviors	0.11	0.07	0.16**	0.14	0.16*	0.17*
Cognitive Problems/ Inattention	0.24	0.21**	0.19**	0.29**	0.19*	0.30**
Hyperactivity	0.12	0.15*	0.23**	0.18*	0.22**	0.15*
Anxious-shy	0.27**	-0.01	0.23**	0.02	0.22**	0.16*
Perfectionism	0.00	0.009	0.08	0.06	0.12	0.14
Social Problems	0.12	0.12	0.23**	0.14	0.18*	0.19**
Emotional Labilty	0.12	0.04	0.14	0.20	0.18*	0.16**
DSM-IV Inattention	0.20**	0.23**	0.20**	0.28**	0.20**	0.30**
DSM-IV Hyperactivity/Impulsivity	0.08	0.16**	0.20**	0.20**	0.21**	0.17**
DSM-IV Total	0.15	0.21**	0.21**	0.26**	0.22**	0.25**

\*p < 0.05 (two-tailed), \*\*p < 0.01 (two-tailed).

FA-ADHD and paternal FA-ADHD ( $p < 0.001$ ,  $r = 0.58$ ) (Table 5). Then we calculated the partial correlation coefficients between child's and parent's ADHD scores by controlling the other parent's, and we found that correlations coefficients decreased. We interpreted these results as the relationship between child's and one parent's ADHD scores is highly influenced by the other parent's.

## DISCUSSION

To our knowledge, this study is the first which address the relationship between ADHD symptoms of partners,

parents and children from low SES in a comparative design. Firstly we found that not only ADHD children parents but also control group had higher ADHD symptoms when compared with the population based studies. Secondly we demonstrated that women/men who have higher ADHD symptoms prefer marital partners with ADHD compared to others. Thirdly, womens HI is associated with all types of husband's ADHD symptoms, while womens ADHD related features are associated with the husbands' comorbidities. And finally, children's ADHD symptom correlations were stronger with fathers than mothers according to teacher scores.

As known ADHD's heritability is around 76% (16) and ADHD increase the risk of poor outcomes throughout stages of life according to clinically significant symptoms into adulthood (17,19). There is also evidence of an association between ADHD and low socio-economic status (SES). Biopsychosocial models of ADHD showed an association between parental socioeconomic disadvantage with an increased risk of ADHD (20-24). Our results are consistent with the studies mentioned, as the high prevalence of ADHD symptoms among parents in both ADHD and Non-ADHD children from low SES when compared with the population based studies.

ADHD causes many long term difficulties including interpersonal relationships, but research examining the romantic relationship functioning of ADHD adults extremely limited. Studies demonstrated that ADHD is related with the risky sexual behavior, earlier initiation of sexual activity, more sexual partners, more unwanted pregnancies (25) and fewer quality of romantic relationship (26,27). Adult ADHD is also an important problem for marital relationships. According to Williamsons et al., men's ADHD symptoms were related to their reports of couple functioning, and also men's ADHD symptoms were associated with their negative attributions for their wives' behavior (28). Also, Bouchard and Kachooei et al. demonstrated that attention deficits are related to an interpersonal disturbance and the experience of divorce after controlling for age, gender, income, and education (29,30). On the other hand some of the results are contradictory with these ones. For example in a study from Iran, there were no statistically significant differences between the scores of marital satisfaction of ADHD children mothers compared with healthy controls even they have more ADHD symptoms (31). Our results added a new approach to the relationship between low SES and ADHD partners which demonstrates that ADHD men and women had been mostly married with the ADHD ones in this SES and mostly have not been divorced. It could be associated with two different factor: the first one is the cultural effect / believe in this SES of our country: divorce is a situation the society does not accept. And the second one, maybe ADHD couples understand each other better and so the marriage may continue despite all the difficulties.

Our results also showed that womens' HI level is associated all types of husbands' ADHD symptoms and also womens' features associated with ADHD highly correlated with the his mens'. To our knowledge, this is the one of first studies addressing partners ADHD relationship in marriages from low SES. Although it is not possible to evaluate causality in a cross-sectional study like the present one, it can be speculated that womens' HI might be associated with more tolerance in marital relationship in these groups. These factors should be addressed in further researchs.

Finally we have investigated the relationship between childrens' ADHD symptoms and parental ADHD symptoms. Due to the high heritability, parents of children with ADHD are frequently affected by the disorder like in our sample. There are many studies examine the interrelations of parenting practices, emotional climate, and household chaos in families with ADHD children (32,33) Most research has centered on the associations between parent's ADHD symptoms and parenting difficulties such as over-reactive or inconsistent/ lax parenting (34,35). In addition some of the studies test the similarity-fit hypothesis that parenting is more positive when the parent and child have similar high levels of ADHD symptoms compared to when only one member of the dyad has high symptoms (34,35) But results have contradictions. Some of them demonstrated possible advantages associated with parent ADHD symptoms for aspects of parenting such as acceptance of the child, responsiveness, or supportive involvement (7) while others found negative correlation or no significant correlation with measures (36-38). In addition, the discovered relations are not consistent across mothers and fathers e.g. Mokrova et. al. (37). In randomized controlled multicenter trials, the efficacy of intensive multimodal treatment for maternal ADHD on improving the efficacy of parent training for children had been evaluated, but results demonstrated that no significant differences were found in change scores for children's externalizing symptoms between the ADHD and control group although maternal psychopathology improved (39,40). On the other hand we could not find any evidence about the relationship between fathers ADHD treatment and change in childrens' scores. Our study demonstrates a different approach to these situation: in our sample children's ADHD symptom correlations were



stronger with fathers than mothers according to teacher scores while Adult ADHD scores were both high among mothers and fathers. Could fathers ADHD treatment and education change the childrens ADHD symptoms and related comorbid problems? This interesting and important issue is waiting to be investigated.

**This study has several limitations:** Firstly, relatively small sample size and cross sectional design of the study does not allow generalizing our findings to all low SES families in Turkey. Secondly, although we examined the ADHD symptoms and ADHD related problems of parents, it is still a limitation that we did not use clinical scales for the evaluation of other psychiatric disorders. Thirdly, Hollingshead- Redlich scale is mostly used in Western samples and Conners' Teacher Report Form- Short Version has some problems with psychometrics, so these limitations could be important when interpreting our results. And

finally, considering that only 5.0% of the ADHD sample is ADHD-Inattentive type, a sensitivity analysis excluding those patients could display new findings. But unfortunately, we could not find any evidence about the relationship between ADHD subtypes and parental ADHD scores so we thought that removing these children could be a bias too. This important issue should address in future studies.

In conclusion, this study was the first examining the association of ADHD symptoms in family approach from low SES. We demonstrated that women/men who have higher ADHD symptoms prefer ADHD marital partners than others and childrens' ADHD scores were more associated with paternals than maternals. In future studies, it will be important to measure partner and parental satisfaction when ADHD is a general problem in family.

**Conflict of Interest:** Authors declared no conflict of interest.

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