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Brief Report / Kısa Araştırma

Effects of Attention Deficit and Hyperacitivity Disorder Subtypes on Family Functions

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ABSTRACT

Effects of attention deficit and hyperacitivity disorder subtypes on family functions

Objective: Attention deficiency and hyperactivity disorder (ADHD) is a mental disorder that seriously affects both the individual and his/her family. The aim of this study is to evaluate family functions of individuals with different subtypes of ADHD who have no significant cognitive and social impairments.

Methods: 27, 18, and 32 subjects with ADHD-inattentive (ADHD-I), ADHD-hyperactivity-impulsivity (ADHD-HI) and ADHD-combined (ADHD-C) subtypes, respectively, and 35 control subjects aged 6 to 10 years and their mothers were included in the study. Wechsler Intelligence Scale For Children, Conners Parent And Teacher Rating Scales and Family Assessment Scale (FAS) were used.

Results: FAS subtests indicated that problem solving score of ADHD-HI subgroup, communication score of ADHD-I subgroup, roles score of ADHD-C subgroup, "showing necessary interest" scores of ADHD-I and ADHD-HI subgroups, and general functioning scors of ADHD-HI subgroup were higher than the other subgroups. ANOVA results indicated that FAS subtest scores, other than behavior control score, were significantly different among subgroups.

Discussion: Assessment of ADHD treatment efficiency should include, not only the child, but also the family and family dynamics. Therefore, social adaptation skills -such as problem solving, social evaluation and emotional reactions of the individuals with ADHD- will be increased.

Key words: ADHD, family functions, social functions

ÖZET

Dikkat eksikliği hiperaktivite bozukluğu alt tiplerinin aile işlevleri üzerindeki etkisi

Amaç: Dikkat eksikliği hiperaktivite bozukluğu (DEHB), bireyi olduğu kadar ailesini de ciddi boyutlarda etkileyen bir ruhsal bozukluktur. Bu çalışmanın amacı, bilişsel-sosyal işlev düzeyinde belirgin bir bozulması olmayan DEHB'lilerin aile işlevselliğini değerlendirmektir.

Yöntem: Bu çalışmada, yaşları 6-10 arasında değişen 27 dikkat eksikliği alt tipi (DEHB-DE), 18 hiperaktivite/dürtüsellik alt tipi (DEHB-HD), 32 bileşik alt tipi (DEHB-B) tanılı hasta ve kontrol için yer alan 35 katılımcı ve anneleri değerlendirilmiştir. Veriler, Wechsler Çocuklar İçin Zeka Ölçeği, Conners Anne/Baba ve Öğretmen Derecelendirme Ölçekleri ve Aile Değerlendirme Ölçeği (ADÖ) kullanılarak toplanmıştır.

Sonuçlar: ADÖ alt testlerine ilişkin ortalama ve standart sapma değerleri incelendiğinde, problem çözme davranışı açısından DEHB-HD, iletişim alt testinde DEHB-DE, roller alt testinde DEHB-B, gereken ilgiyi gösterme alt testinde DEHB-DE, DEHB-HD ve genel işlevler açısından da DEHB-HD alt tipinde yer alan katılımcıların yüksek puanlar aldıkları görülmüştür. ADÖ'ye ilişkin yapılan tek yönlü varyans analizi sonucunda da davranış kontrolü alt ölçeği dışındaki ölçeklerde, gruplar arasında fark olduğu belirlenmiştir.

Tartışma: DEHB olguları değerlendirilirken sağaltım girişimlerinde, çocuğun yanı sıra aile de değerlendirilmeli, aile dinamiklerinin tedavi süreci üzerindeki etkinliği irdelenmelidir. Böylece çocuğun problem çözme, sosyal yargılama, duygusal tepki verebilme gibi sosyal yaşama uyum becerileri artırılmış olacaktır.

Anahtar kelimeler: DEHB, aile işlevselliği, sosyal işlevsellik

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INTRODUCTION

Attention Deficit and Hyperacitivity Disorder (ADHD) is a common child psychiatry disorder. Despite its high prevalence, most of the symptoms may be decreased with treatment. ADHD is a persistent disorder that may start at preschool ages and continue through adulthood with various symptoms. It may lead to significant developmental and functional difficulties in individuals' life (1). It may have negative impact on the relationship between child, and parents, particularly throughout the childhood (2). Besides the devastating effects on cognitive and social processes, presence of a comorbidity increases the interaction problems. It is reported that half or more than half of the children with ADHD have various other diagnoses as well (1,3,4). Forty percent and/or more of children who have symptoms of hyperactivity have oppositional defiant disorder and conduct disorder. In cases with oppositional defiant disorder and conduct disorder, family functions are more significantly impaired (4).

Parents of children with ADHD are reported to have lower self-esteem, think they are incompetent with coping with the problems they face and need for continuous support to raise their children (5).

Children with ADHD can cause serious problems in families (6). When this happens, professional support and psycho education for the family are essential components of the treatment. Information on the disorder, how to approach the child, organization of context or environment may not only decrease disruptive behaviors, but also increase the parents' self-esteem, and relieve the stress among the family members (6,7). The assessment and treatment of parenting problems are important in the evaluation of family functioning. Satterfield et al. (7) reported that besides the psychotherapy and medication, guidance and family education and support groups are significant treatment components. Furthermore, it is found that such programs help to decrease conduct disorder, increase academic success and level of adaptation.

ADHD is a heterogeneous disorder with three subtypes. Subtype alters the effects of the disorder family and individual functioning. For instance, while children with ADHD-Predominantly Inattentive Subtype (ADHD-I) have academic difficulties; conduct disorder is more common in ADHD-Predominantly Hyperactive-Impulsive Subtype (ADHD-HI) (8,10); for the ADHD-Combined Subtype different (ADHD-C) problems exist and cognitive problems are present (11). Effects of ADHD subtypes on family functioning may influence the treatment. Previous research demonstrated that ADHD dissolves interaction and bonds among family members; causes problems in orientation toward organization and success; and creates more conflict (12). Especially in cases with comorbidity, functionality has been heavily affected (13). Families are exhausted by hyperactivity and impulsivity, and impact of inattentiveness on learning and social communication has negative influence on the family functioning. In this respect, the clarification of the differences between the subtypes is of significance for the treatment process.

The objective of this study is to investigate how the family functioning is affected by ADHD subtype, in particular ADHD cases with no comorbidity cognitive, physical and social impairment.

METHOD

Participants

In clinical samples, ADHD is more common in boys than girls (the ratio ranges between 2:1 to 10:1) without any evident reason (12). In Turkey, it is reported that the ratio is 6:1 in favor of boys (13,14). Considering this, study group consists of only boys.

The study group includes 1st - 5th grades children of 6-10 years-old (72-131 months), either applied first time and/or diagnosed as ADHD before but have not taken medication for at least 2 months, without any psychiatric, neurological and/or pediatric disorder (such as specific learning difficulties, anxiety disorder, mood disorder, etc.), evaluated as at least on average intelligence level, with no uncorrected visual and/or hearing impairment.

The ADHD group was selected among the children of 6-10 years old (8.00±2.11), who admitted to the Gazi

University Pediatric Neurology and Pediatric Psychiatry Policlinics as having the symptoms of inattention and hyperactivity, with respect to the exclusion criteria of the study. The patient group consists of 27 children diagnosed with ADHD-Predominantly Inattentive Subtype, 18 children diagnosed with ADHD-Predominantly Hyperactive-Impulsive Subtype, and 32 children diagnosed with ADHD-Combined Subtype, 77 children in total.

Control group was matched in terms of gender and age. Children with low academic success were excluded. parents and teachers of the healthy children were asked to fill Connors forms. The children who were under the cut-off score were included. A semi-structured diagnostic interview regarding to DSM-IV diagnosis criteria was used for all children in the control group, and their families and children who were not diagnosed with any DSM-IV Axis I disorder were included in the study. the control group included 35 (31.3%) healthy male children, who had similar features with the diagnosis groupand met the exclusion criteria.

Furthermore, 112 mothers, whose age ranged between 27 and 46 (35.00±4.46), participated to the study. In terms of family patterns of those participants, the 87% of the diagnosis group is nuclear family, 5.2% of those are extended family, and 7.8% are single-parent family. For the control group, the percentage of the nuclear families is 88.6%, extended families is 5.7%, and single parent ones is 5.7%.

The participant mothers were informed about the study andtheir written informed consent was obtained.

Data Collection Tools

Wechsler Intelligence Scale for Children - Revised (WISC-R): It was developed by Wechsler in 1949. In 1974, it was revised. It was adapted by Savasir and Sahin (17) in Turkish in 1986. Within the scope of this study, Information, Similarities, Arithmetic, Digit Span, and Comprehension subtests of Verbal test, Picture Completion, Picture Concepts, Block Design, Picture Concepts, Object Assembly, and Coding subtests of Performance set were used (15).

Conners' Parent Rating Scale: It has 48 items. Dereboy and et al. (18) have translated and adapted in Turkey. Conners' Parent Rating Scale has subscales assessing Inattention, hyperactivity, conduct disorder, and oppositional defiant disorder.

Family Assessment Scale: It was developed by Bolwin and Bishop. The Turkish version of the device was adapted by Bulut (19). The device was designed to assess the family functioning generally, and outline the problematic dimensions of family functioning. It can be used with individuals over 12 years-old. It consists of 60 items covering 7 different subtests (Problem Solving, Communication, Roles, Affective Responsiveness, Affective Involvement, Behavior Control, and Common Functions). The scores range between 1.00 (healthy) and 4.00 (unhealthy). Although there are empirical studies going on, generally, the mean scores above 2.00 are accepted as an indication of presence of unhealthy dimensions in family functioning. Test–retest reliability of the device is between 0.62 - 0.90. Regarding to the construct validity, the difference between the mean scores of the device used to assess women having a divorce, and one of the parents having normal marriage, in t test, was found significant between 0.001 and 0.01 for all the subtests.

Data Collection Form: It was developed to gather socio-demographical data of the admitted participants by the researchers of this study.

Procedure

In the first stage of diagnosing ADHD cases, all the participants with primary symptoms of inattention and hyperactivity, who were directed to polyclinics, were assessed according to the DSM-IV-TR diagnosis criteria. Then, all criteria of Inattention and Disruptive Behavior Disorder were questioned in participants and the mothers per DSM-IV. The participants, who have continued at least 6 items from 1 group for ADHD-I, ADHD-HI, and ADHD-C subtypes inappropriate for their developmental level according to the diagnosis criteria, were determined. To rate ADHD, parents filled

Conners' Parent Rating Scale, and teachers filled Conners' Teachers Rating Scale. Participants having ADHD without comorbidity and history of pediatric diseases were identified. As a result, 27 children with ADHD-I, 18 children with ADHD-HI, and 32 children with ADHD-C were admitted to the study.

The control group consisted of 35 (31.3%) healthy male children having average or above IQ, without any psychiatric, neurological and pediatric disorders similar to that of diagnosis group, and studying at any elementary school in Ankara.

Children were assessed with WISC-R during morning hours. At the same time mothers were assessed with Family Rating Score. The same psychologist made IQ test.

Ethics Committee approved the study.

Statistical Analysis

Statistical Program for Social Sciences – SPSS v. 13.0 was used for the analysis of the data. Descriptive statistics was used for the socio-demographic data. One-way ANOVA was made for quadruplet comparisons. For the significant basic effects, in order to determine the source of difference between the groups, post-hoc analyses (Bonferroni) were made. The lowest significance level was assumed as 0.05 for the statistical tests.

RESULTS

The survey covers a group of male children who had ADHD diagnosis with subtype classification according to DSM-IV diagnosis criteria; and a group of healthy children. The ages of the groups ranged between 6-10 (8.00±2.11). The diagnosis group consisted of 27 boys (24.1%) with ADHD-I, 18 boys (16.1%) with ADHD-HI, and 32 boys (28.6%) with ADHD-C. The control group included 35 (31.3%) healthy boys. One-way ANOVA showed that there is no significant difference between the age groups of the admitted participants ($p>0.05$).

Participants had mean WISC-R IQ scores of 103.75±9.77 on verbal IQ, 104.62±11.31 on performance IQ, 104.38±10.44 on total IQ. Regarding the groups, children with ADHD-I had mean IQ scores of 100.25±6.86 on verbal IQ, 99.00±8.28 on performance IQ, and 99.44±6.7 on total IQ; children with ADHD-HI had mean IQ scores of 106.94±10.65 on verbal IQ, 110.38±13.50 on performance IQ, 108.72±12.08 on total IQ; children with ADHD-C had mean IQ scores of 101.46±11.49 on verbal IQ, 105.31±13.54 on performance IQ, and 106.54±8.07 on total IQ. The control group had mean IQ scores of 106.71±8.27 on verbal IQ, 105.387±7.95 on performance IQ, and 106.54±8.07 on total IQ.

One-way ANOVA showed that the children in control group had better scores than the ones in the diagnosis group. Verbal IQ was significantly different between ADHD-I children and control group; performance and total IQ scores were significantly different between ADHD-I<ADHD-HI and ADHD-I<Control Groups ($p<0.05$).

Mean and standard deviation of ADHD rating scale scores and the results of one-way ANOVA were summarized in Table 1.

Family assessment instrument administered to 112 mothers whose age ranged between 27-46 (35.00±4.46). 33% (n=37) of them was graduate of a primary school, 37.5% (n=42) was graduate of a high school, and 29.5% (n=33) was graduate of a university. 60.7% (n=68) of the mothers was housewife. 1.8% (n=2) was retired. 37.5% (n=42) was working. 81.3% of the mothers had no health problems. It was figured out that 7 of 21 mothers who had a medical history were being followed by the diagnosis of major depression. 6 of those mothers had a child with diagnosed ADHD.

The percentage of nucleus family was 87%, that of extended family was 5.2%, and that of single-parent family was 7.8% in diagnosis group. In the control group, there were 88.6% nucleus family, 5.7% extended family, and 5.7% single-parent families.

The mean and standard deviation scores of the subtests of Family Assessment Device showed that ADHD-HI type children had higher Problem Solving dimension scores, ADHD-I type children had higher Communication dimension scores,

Table 1: Mean scores and standart deviation of Conners Parent And Teacher Rating Scales and results of ANOVA post hoc analysis

Conners sub tests	ADHD-AD (n=27)	ADHD-HD (n=18)	ADHD-D (n=32)	CONTROL (n=35)	F	ANOVA Post Hoc Analysis Results
Attention deficit	6.96±3.28	5.72±2.44	7.12±2.68	2.40±1.55	24.995	CONTROL<ADHD-HD<ADHD-AD<ADHD-D
Hyperactivity	7.44±3.15	9.77±3.09	8.40±2.80	4.14±2.18	21.431	CONTROL<ADHD-AD<ADHD-D<ADHD-HD
Oppositional disorder	6.07±3.44	5.88±4.11	7.46±3.18	2.08±1.52	19.427	CONTROL<ADHD-HD<ADHD-AD<ADHD-D
Conduct disorder	9.03±5.45	9.11±7.67	9.00±6.02	2.60±2.03	11.819	CONTROL<ADHD-D<ADHD-AD<ADHD-HD

*p<0.05, ** p<0.01, *** p<0.001

Table 2: Mean scores and standart deviation of Family Assessment Scale and results of ANOVA post hoc analysis

FAS subtests	ADHD-AD (n=27)	ADHD-HD (n=18)	ADHD-D (n=32)	CONTROL (n=35)	F	ANOVA Post Hoc Analysis Results
Problem solving	1.76±0.47	2.02±0.68	1.71±0.67	1.52±0.45	3.113	ADHD-AD<ADHD-AD*** CONTROL<ADHD-AD** ADHD-D<ADHD-AD***
Communication	2.01±0.41	1.74±0.68	1.63±0.52	1.34±0.30	10.254	ADHD-AD<ADHD-D*
Roles	1.78±0.28	1.99±0.47	2.10±0.57	1.83±0.26	3.627	CONTROL<ADHD-AD** CONTROL<ADHD-HD**
Emotional reaction	1.94±0.51	1.99±0.60	1.69±0.57	1.49±0.49	5.040	CONTROL<ADHD-AD**
Showing necessary interest	2.14±0.40	2.06±0.51	1.96±0.58	1.73±0.25	4.859	
Behavior control	1.88±0.34	1.91±0.73	1.76±0.48	1.78±0.36	0.577	CONTROL<ADHD-AD CONTROL<ADHD-HD
General functions	1.88±0.51	2.01±0.53	1.60±0.68	1.37±0.50	6.733	CONTROL<ADHD-AD CONTROL<ADHD-HD

*p<0.05, ** p<0.01, *** p<0.001

ADHD-C type children had higher Roles dimension scores, ADHD-HI and ADHD-I type children had higher Affective Responsiveness dimension scores, ADHD-HI type children had higher Common Functions dimension scores. One-way ANOVA showed that there was a difference between the groups in terms of all the subscales except Behavior Control Dimension. The results are given in the Table 2.

There is not a significant correlation between Connors' Family Rating Scale and Family Assessment Device (p>0.05).

DISCUSSION

The familial genetic factors have been researched in ADHD etiology for 40 years (18-20). It is, generally, claimed that the genetic and environmental factors both effect the symptoms of attention deficiency and hyperactivity. Surveys covering the brothers, sisters and parents of children with ADHD picture out the probable genetic factors in the etiology of the disorder. The presumption about the role of the environmental factors in the etiology has not been proved yet. Biederman et al. (21) outlined and

investigated the relations between ADHD and disadvantages/problems (e.g.serious marriage conflicts, low social status, extended family, outlaw father, mother's mental illness, foster family care, etc.) that are accepted as the familial and environmental risk factors. They stated that these factors do not cause the disorder but make it more severe. They determined that comorbid conditions increase with those disadvantages (21).

In this study, the effects of the ADHD symptoms on family functioning were evaluated. The process, however, is thought as mutual. Since the inherited predisposition is significant in ADHD, it is highly probable that one or both parents of children with ADHD have ADHD. Therefore, it is possible to say that parental pathologies might have been contributing to the family dysfunction. The scope of this study covers mainly the children based effects.

Even though individuals with ADHD have both inattention and hyperactivity/impulsivity, in some cases only one symptom pattern can be predominant. For that reason, 3 subtypes are defined for ADHD diagnosis in DSM-IV (22). The frequency of ADHD-I and ADHD-C subtypes are approximately the same for the school age children (23,24). In another survey made in Turkey stated that the distribution of ADHD with regard to subtypes is 1% ADHD-I, 1.5% ADHD-HI, and 4% ADHD-C (13). In our study, the rating of ADHD diagnosed participants according to the subtypes is as follows: ADHD-C is the first, ADHD-I is the second, and ADHD-HI is the third. The frequency rating of this study is consistent with the results from clinical samples (25,26).

Attention deficiency and hyperactivity disorder diagnosis has a phenomenological basis. Therefore, it is of importance to identify the implications of child's behavior on different facets of daily life, along with the clinical assessment. For this reason, certain data is gathered from the parents and teacher. Behavior assessment and rating scales are administered to collect that data. Those scales are economic and contribute to both the diagnosis and monitoring of the participants. Their specificity and sensitivity have been proven (27). It is, however, stated that it is important to be careful in evaluating those data (28), since, it is known that parent and teacher data are inconsistent in 10-20% of children with ADHD (29). Those different reports and opinions are caused by the structured context of the school, and the more clear defined tasks and expectations, compared to home environment.

In our study, the association between family functioning and severity of the disorder was not significant. It is possible to interpret the result as families could not describe the ADHD characteristics well enough. Another reason for this might be that the admitted children did not have serious problems.

In this study, there were low scores in 5 subtests of Family Assessment Device. It demonstrates that there is a pervasive impairment in family functions. There are studies reporting that family functions are impaired in families with a member with psychiatric illness, and the family functions influence the course of the illness (30,31). According to previous studies in Turkey, the family functioning is generally poorer in families with psychiatric illness diagnosed members than the control group families. Most significant impairment is seen in affective responsiveness dimension (32). At this point, our study differs from the previous surveys. This study demonstrates that the Communication dimension was most impaired, which made a difference among the ADHD subtypes.

The mean and standard deviation scores of the Family Assessment Device showed that ADHD-HI type children had higher Problem Solving dimension scores, ADHD-I type children had higher Communication dimension scores, ADHD-C type children had higher Roles dimension scores, ADHD-HI and ADHD-I type children had higher Affective Responsiveness dimension scores, ADHD-HI type children had higher Common Functions dimension scores. There was a difference between the diagnosis and control groups in terms of all the subscales except Behavior Control Dimension. Pekcanlar et al. (13) found that family functioning children with ADHD were within normal limits. On the other hand, there are studies reporting that communication and behavior control dimensions are impaired when conduct disorder

and oppositional disorder are present (4,33). Our results revealed the diversification of the subtypes of ADHD according to the family functioning, as a contribution to the literature. Previous studies had compared the cases with different comorbid conditions.

In our study, it was found out that there were statistically significant differences between Communication and Roles dimension scores of Family Assessment Device with respect to ADHD subtypes. The structure in ADHD-I was unhealthy in terms of Communication Dimension, and ADHD-C in terms of Roles (see Table 2). The reason for the low communication subtest scores of parents of children with ADHD-I could be related with the cognitive processes of the children. Mean WISC-R scores were lowest in children with ADHD-I. It is a fact that academic failure is most common in children with ADHD-I (3,34). Such a child who cannot meet the expectations of his/her family because of attention deficit, regardless of parents' endless efforts may cause a decrease in the self-esteem of the parents. Those parents may feel like "I am not good enough as a parent, if I had taken care of his/her much more, he/she would have been more successful".

There are studies that assessed family functioning with respect to demographic data reporting different results. Bulut (34) reported that family functioning failed more when the patient was male, particularly in dimensions of Roles and Behavior Control. Our study included only male children. Unhealthiness was determined most in Roles dimension scores of ADHD-C subtype. It can be suggested that there is an obvious lost in expectations in particular areas such as family order, traditional roles attributed to the parents, expectations related with male children, and the value of the child.

In conclusion, family should be assessed along with the children during the treatment process, while evaluating ADHD. The effects of family dynamics on treatment should be examined. Therefore, particular skills of the child, such as problem solving, social judgement, emotional responsiveness, which are vital for the adaptation to the social life, will be strengthened. Parental/familial problems were reported to predict decreased treatment compliance or less positive results from the treatment (13). The education of the families, sharing problems and searching solutions together, collaboration of teacher, parents and clinician as a team shall have positive impacts on treatment process. Problem solving skills should be improved by working with the families. It is important to investigate whether the cause of impaired family functioning is the attitude of the parents or burnout syndrome depending on the ADHD case. In this respect, it was important for us to have mothers with depressive mood in our study. The probable role of the mothers' mood should not be ignored considering the overall picture.

Moreover, it is important to have an extended study including female children in future to examine the importance of the gender roles in family functioning. Our study included only maternal reports. Assessment of the fathers and brothers/sisters would provide remarkable data. Furthermore, the assessment of both parents in terms of psychopathology beside the family functioning evaluation would be helpful and useful to detect problems and plan the treatment.

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