

Attention Deficit and Hyperactivity Symptoms in A Group of University Students and Relations with Temperament and Character Profiles

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ABSTRACT

Attention deficit and hyperactivity symptoms in a group of university students and relations with temperament and character profiles

Objective: In a subgroup of adult patients with a childhood diagnosis of attention deficit and hyperactivity disorder (ADHD), the symptoms decrease but persist at sub-threshold levels, although not fulfilling DSM 5 criteria for ADHD. Diagnostic difficulties, chronicity of the situation and psychiatric comorbidities also increase the risk of personality disorders in this group of patients. The aim of this study is to evaluate the relations between this subgroup of ADHD and personality characteristics in a population who did not attend a clinic for psychiatric problems.

Method: Hundred and twenty two of students from different faculties of a university are included in the study. Turgay's Adult ADHD Rating Scale is used to evaluate ADHD symptoms and Cloninger's Character and Temperament Inventory (TCI) is used to evaluate personality characteristics.

Results: Moderate levels of ADHD symptoms were present in 14.7% of cases. This group also showed statistically lower scores in cooperativeness and self-directedness in TCI with respect to students who showed low levels of ADHD symptomatology. There were also statistically significant correlations between TCI subgroups and ADHD symptoms.

Conclusion: ADHD symptoms should be investigated particularly, as they are temperamental traits for the development of personality characteristics.

Keywords: Attention deficit/hyperactivity, character, personality disorders, temperament



ÖZET

Bir grup üniversite öğrencisinde dikkat eksikliği ve hiperaktivite bozukluğu semptomları ve mizaç ve karakter profili ile ilişkisi

Amaç: Çocukluk dikkat eksikliği hiperaktivite bozukluğu (DEHB) tanısı olan bir erişkin hasta alt grubunda belirtiler azalır ama DSM 5 DEHB tanı ölçütlerini karşılamasa da eşikaltı seviyelerde devam etmektedir. Bu gruptaki vakaların tanı koymada yaşanan güçlüklerle birlikte hastalığın süreğen seyri ve psikiyatrik eştanı riskinin artmasıyla birlikte yüksek oranda kişilik bozuklukları geliştirme ihtimali de bulunmaktadır. Bu araştırmada, klinik başvurusu olmayan bir toplulukta erişkin DEHB'nin özellikle eşikaltı belirtilerle seyreden tipinin kişilik özellikleriyle ilişkisini değerlendirmeyi amaçladık.

Yöntem: Bir üniversitenin farklı fakültelerinden 122 öğrenci çalışmaya dahil edilmiştir. Olgulara DEHB bulgularını değerlendirmek için Turgay'ın Erişkin DEHB Ölçeği, mizaç ve kişilik özelliklerini değerlendirmek için Cloninger'in Silinecek Mizaç ve Karakter Envanteri (TCI) uygulanmıştır.

Bulgular: Olguların %14.7'sinde, orta düzey DEHB belirtileri saptanmıştır. TCI ve DEHB belirtileri arasında yapılan karşılaştırmalarda, orta seviyede DEHB belirtileri gösteren öğrencilerin işbirliği yapma ve kendi kendini yönetme puanları, düşük seviyede DEHB belirtileri gösteren gruba göre istatistiksel olarak anlamlı derecede düşük bulunmuştur. TCI alt tipleri ve DEHB kriterleri arasında da istatistiksel olarak anlamlı korelasyonlar tespit edilmiştir.

Sonuç: Özellikle kişilik özelliklerinin değerlendirilmesinde temelde yatan bir DEHB olup olmadığına dair ayrıntılı bir inceleme yapmak önemlidir.

Ahtar kelimeler: Dikkat eksikliği/hiperaktivite, karakter, kişilik bozuklukları, mizaç

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INTRODUCTION

A dimensional approach to personality disorders requires a more detailed study on developmental features affecting the personality characteristics and an investigation of the development of personality disorders from a life-long perspective. Temperamental features play a role in the processes that reveal compliance and noncompliance in the long term and determine the personality features as well as preparing the ground for personality disorders (1). While attention deficit hyperactivity disorder (ADHD) is accepted as a childhood-onset psychiatric disorder, some authors suggest that this manifestation is an extreme point of a behavioral spectrum, which has numerous genetic variations in the population (2). It is widely accepted that ADHD is a disturbance in the development of self-regulatory mechanisms (3,4).

When evaluated from this perspective, it should be assumed that there are individuals in the population who have problems related with ADHD, even though they do not have enough symptoms to make a clinical diagnosis of ADHD. This point of view suggests that ADHD symptoms should be investigated particularly as being temperamental characteristics underlying personality development.

Epidemiological studies report the frequency of ADHD as 3.0-10.0% in pre-adolescent children, and the female/male ratio was revealed as 1/3-5 (5).

Recent studies suggest that adolescent-age symptoms are detected also in adulthood in a significant proportion of cases (6). Prevalence of adult ADHD is reported as 3.7% and 3.1% in USA and Germany, respectively (7). The effects of psychostimulants in a group of adults who have symptoms of childhood ADHD were first demonstrated by Wood et al. (8).

Faraone et al. (9,10) examined ADHD cases in three different groups. The first group was defined as fulfilling the DSM-IV criteria, the second group was defined as fulfilling the DSM-IV criteria with the exception of age, and the third group was defined as having ADHD symptoms although scores were not

exceeding the DSM-IV threshold limit. In the third group, which was defined as sub-threshold, at least 3 symptoms of attention, hyperactivity or impulsiveness were required. Clinical problems in this group were found to be higher than in the population without ADHD; however, their severity was not as high as in the first group fulfilling the criteria. The cases in this group also have a high possibility of developing personality disorders because of diagnostic difficulties in addition to the natural course of the disease and the increasing risk of psychiatric comorbidity.

Finally, DSM 5 has updated the definition of ADHD to illustrate the symptoms experienced by adults affected by the condition. A symptom threshold change has been made for adults; the patient only needs to meet 5 symptoms – instead of 6 required for children – in either of the two major domains, inattention and hyperactivity/impulsivity. Also the age limit for the symptoms to be present has been changed from “before 7” to “before 12” (11).

In this study, we aimed to investigate the effects of ADHD symptoms on the personality development in a population without significant functional problems. We also aimed to examine the personality characteristics of subjects with ADHD symptoms who did not attend the clinic. We think that accepting ADHD as a temperamental trait rather than a disease would contribute a new approach to the dimensional aspects of personality development and personality disorders.

METHOD

To represent different personality characteristics, student volunteers from different departments of Yeditepe University were accepted into the study.

Representative samples were not used, as the aim of the study was to investigate the relationship between the scales. Students were verbally informed by the investigators before the start of the study and voluntarily enrolled to the study.

The sample consisted of 122 students from the university's medicine, psychology, fine arts, dentistry, and preparation school departments. Students were

Table 1: Sociodemographic characteristics of the sample

Age	Mean (min-max)= 22.3 (18-35)	
	n	%
Gender		
Female	78	63.9
Male	44	36.1
Faculty		
Psychology	18	14.8
Arts	33	27.0
Medicine	26	21.3
Dentistry	14	11.5
Preparation	31	25.4

given a socio-demographic form, asking for their age, gender, department, and psychiatric medical history. Socio-demographic characteristics of the participants are presented in Table 1.

Ethics committee approval of the study was obtained from Yeditepe University Ethics Committee.

Measures

Adult ADHD Scale was developed by A. Turgay in Canada in 1995 and was also translated to Turkish by him. Turkish validation, safety and norm studies of this scale had been carried out by Gunay et al. (12). There are 9 items, screening the attention deficit (AD) symptoms in the first part of three-partite scale. Patients whose scores were less than 3 were classed as having mild AD symptoms, those with 3-10 points were defined as having moderate AD symptoms and those with a score of 11 and above were described as having severe AD symptoms. The second part of the scale evaluated the symptoms of hyperactivity and impulsiveness. Similar stratification was made on the 9-point scale with cut-off points for mild, moderate and severe. The third part regards ADHD-related characteristics and problems. In this 30-item part, scores with 0-12 indicated mild, 13-35 indicated moderate and 36-75 indicated serious disease. In general, patients with a total of 20 points were classified as having mild symptoms, those with 21-59 as moderate and those with scores of 60 and higher were classified as having severe ADHD symptoms.

The Temperament and Character Inventory (TCI) (13) was used for the evaluation of personality and temperament characteristics of the cases. Cloninger et al. (13) developed and described a dimensional psychobiologic personality model which identified normal and abnormal variations in temperament and character as the two main components of the personality. Cloninger's psychobiologic personality model describes 4 dimensions of temperament with Novelty Seeking (NS), Harm Avoidance (HA), Reward Dependence (RD), and Persistence (P). Cloninger's model also includes three dimensions of character as Self-directedness (SD), Cooperativeness (C) and Self-transcendence (ST), which are believed to develop throughout adulthood.

A Turkish validation and safety study for the form was conducted by Kose et al. (14), and it consists of 240 self-report questions in yes/no format.

Statistical Analysis

Data were analyzed by using SPSS 16.0 software package. Continuous variables were compared with t-test and categorical variables were compared with chi-square analysis.

RESULTS

The sample consisted of 122 students, 78 were female (63.9%) and 44 were male (36.1%). The mean age was 22.3 (22.5 for females and 21.9 for males). No significant difference was found between females and males in terms of mean ages ($t=0.97$, $p>0.05$).

Among the sample 27.0% ($n=33$) consisted of students from the department of fine arts, 25.0% ($n=31$) were from preparation class, 21.0% ($n=26$) were from the school of medicine, 15.0% ($n=18$) were from the psychology department, and 12.0% ($n=14$) were from the faculty of dentistry.

Among the students 13.0% ($n=16$) had a history of psychiatric examination during their childhood and 5.0% ($n=6$) reported that they had been diagnosed with hyperactivity in their childhood, but none of them had ever been treated.

The educational status of the participants' mothers was as follows: 43.0% (n=52) high school graduates, 31.0% (n=38) bachelor's degree, 20.0% (n=24) primary school graduates. Educational status of the fathers was: 44.0% (n=54) bachelor's degree, 33.0% (n=41) high school graduates, 16.0% (n=20) primary school graduates.

In none of the cases severe ADHD symptoms were detected. Among the sample 14.7% (n=14) had moderate ADHD symptoms. This ratio was found to be 15.9% (n=10) in females and 12.5% (n=4) in males. In 85.3% (n=81) of the sample, scores of ADHD symptoms were included in the mild/no group of the scale. This rate was found to be 87.5% (n=28) in males and as 84.1% (n=53) in females. In the sub-scales, in 18.3% (n=21) of the sample moderate AD symptoms were observed. According to the gender distribution, 20.0% (n=15) of females and 15.0% (n=6) of males had moderate attention deficit symptoms. Hyperactivity/impulsivity symptoms alone were observed in 17.1% of the students with moderate severity with a female/male ratio of 17.8% (n=13) to 15.8% (n=6). Table 2 presents the distribution of attention deficit-

hyperactivity/impulsivity levels according to gender.

In the comparison of TCI and ADHD symptoms, students with moderate ADHD symptoms were found to have statistically significant lower scores in C and SD scales, compared to the group without or with mild ADHD symptoms ($p<0.01$, $p<0.002$). HA was found to be higher in those with moderate ADHD symptoms almost at significance level ($p<0.06$). Table 3 presents differences between groups with or without ADHD symptoms in terms of TCI sub-scale scores.

Considering the correlations between TCI subtypes and ADHD criteria, a significant positive correlation was found between NS and behavioral problems ($r=0.219$), hyperactivity/impulsivity ($r=0.304$) and total ADHD scores ($r=0.252$), and a significant negative correlation was found between SD and behavioral problems ($r=-0.573$), AD ($r=-0.298$), hyperactivity/impulsivity ($r=-0.419$) and total ADHD scores ($r=-0.580$). A significant negative correlation was found between C and behavioral problems ($r=-0.380$), AD ($r=-0.280$), hyperactivity/impulsivity ($r=-0.233$) and total ADHD scores ($r=-0.387$). Correlations between TCI and ADHD are shown in Table 4.

Table 2: Distribution of ADHD levels according to gender

		Hyperactivity/Impulsivity Level		Attention Deficit Level		ADHD Level	
		None/low (0-3)	Medium (3-10)	None/low (0-3)	Medium (3-10)	None/low (0-20)	Medium (20-59)
Female	%	82.20	17.80	80.00	20.00	84.10	15.90
	n	60	13	60	15	53	10
Male	%	84.20	15.80	85.00	15.00	87.50	12.50
	n	32	6	34	6	28	4
Total	%	82.90	17.00	82.70	18.30	85.30	14.70
	n	92	19	94	21	81	14

ADHD: Attention deficit hyperactivity disorder

Table 3: Comparisons of low and moderate ADHD groups with TCI dimensions (independent t-test)

	Low ADHD	Moderate ADHD	p
Novelty Seeking	19.92	21.27	0.43
Harm Avoidance	15.09	18.76	0.06
Reward Dependence	13.80	12.91	0.45
Persistence	4.15	3.35	0.13
Cooperativeness	29.45	24.50	0.01*
Self-transcendence	18.60	21.30	0.09
Self-directedness	28.60	21.60	0.002*

ADHD: Attention deficit hyperactivity disorder, TCI: Temperament and Character Inventory, * $p<0.05$

Table 4: Correlations between TCI dimensions and ADHD criteria (Pearson r co-efficient)

	ADHD Related Problems	Attention Deficit	Hyperactivity/Impulsivity	Adult ADHD Scale
Temperament				
Novelty Seeking	0.219 *	0.2	0.304**	0.252*
Harm Avoidance	0.294**	0.282**	-0.064	0.268*
Reward Dependence	-0.167	-0.126	-0.016	-0.153
Persistence	-0.192	-0.182	-0.019	-0.238*
Character				
Self-directedness	-0.573**	-0.298**	-0.419**	-0.580**
Cooperativeness	-0.380**	-0.280**	-0.233*	-0.387**
Self-transcendence	0.187	0.08	0.185	0.203

ADHD: Attention deficit hyperactivity disorder, TCI: Temperament and Character Inventory, * $p < 0.05$, ** $p < 0.01$

The regression analysis showed that total ADHD scores significantly predicted self-directedness scores ($p < 0.001$, $R^2 = 0.293$) and cooperativeness scores ($p < 0.001$, $R^2 = 0.126$). No significant relation was found between total ADHD scores and the other TCI subtypes. When regression analysis was performed between the subgroups of ADHD and the TCI parameters, we found that the behavioral problem subgroup of ADHD significantly predicted self-directedness ($p < 0.001$, $R^2 = 0.302$) and cooperativeness ($p < 0.001$, $R^2 = 0.127$) scores. No significant relation was found between the other ADHD subtypes and TCI subtypes.

DISCUSSION

ADHD is a neuro-developmental condition that is accompanied by a progressive deterioration of social functioning and various psychiatric comorbidities. Longitudinal studies in children with ADHD showed that symptoms continued into the adolescent and adulthood period in most of the cases (5,15). In addition, some individuals have not met the diagnostic criteria because the severity of symptoms decreased with increasing age, yet they continued to experience problems below the threshold limit (5,10).

Some of the ADHD symptoms disappear, while some of them are transformed during adulthood. Even in adults with partial ADHD symptoms, impulse control problems, inadequate problem solving strategies, lack of self-confidence, insufficient academic success are frequently observed. Furthermore,

difficulties in sustaining social relationships, divorce, personality disorders, substance abuse, traffic accidents, and criminal behaviors are reported more frequently (16-20).

Considering consequences in adulthood, it is important to address the ADHD symptoms in a dimensional perspective and investigate their effects on personality development. It is ineluctable for such kind of neuro-developmental disorders with genetic origin to affect individual responses and the development of personality and character. However, studies on personality character features in ADHD in the literature are scarce. Purper-Ouakil et al. (21) reported higher rates of Cluster B personality disorders in adults with ADHD. Robin et al. (22) used the "Million Index of Personality Styles" in order to describe the characteristics of personality in adults with ADHD, reporting that they had a pessimistic world view, insufficient control over their lives, and hesitancy in interpersonal relations. They were introverted, passive, withdrawn and rebellious. In their study, May and Bos (23) used MCMI-II (Millon Clinical Multiaxial Inventory-II) in 104 adult cases with ADHD and detected mild histrionic properties. Jacob et al. (24) applied NEO-PI-R (revised NEO personality inventory) in 372 adult cases with ADHD and detected higher levels of neurotism and lower levels of extraversion, openness to experience and conscientiousness. In the same study, Cloninger's TCI was also applied, and scores of novelty seeking and harm avoidance were found to be higher than the control group.

In brief, it can be said that in many cases, ADHD causes some kind of functional problems in different aspects of life without any clinical manifestation (25).

In this study, we investigated which ADHD symptoms were correlated with which temperament and character profiles, considering that the ADHD symptoms were indicators of a general self-regulation deficiency. In our study, cases with moderate ADHD symptoms were found to have lower – inadequate – scores in terms of cooperation and self-directedness characteristics. In his study, investigating the correlation between Cloninger's temperament and character profiles and the DSM Personality Disorders, Arkar (26) reported that low self-directedness and cooperation scores were significantly correlated with a high number of symptoms in any personality disorder, classified under three DSM clusters (A, B, C Clusters). SD and C were shown to be negatively correlated with all types of personality disorders. Low self-directedness explains difficulties in accepting responsibility for one's own choices, lack of goal orientation, persistently low self esteem, self dispute and lack of personal confidence in the psychological model of Cloninger and Svrakic. Usually these individuals have a low tendency for C. People with low C scores are self-absorbed, intolerant, critical and revengeful (22). Ankar (26) suggested that this model was identical with borderline personality organization in the psychodynamic model. In our study, this result can be interpreted as a high risk of developing any kind of personality disorder in individuals with sub-threshold ADHD, in addition to C and SD problems. Individuals scoring high in these temperamental traits may also benefit from medication with mood-regulators and

antidepressants, which are also commonly used in borderline personality disorder (27).

In the literature, NS and HA scores were found to be statistically significantly high in studies in adults with ADHD symptoms (16,28,29). We also found a direct correlation between hyperactivity and NS sub-dimension of temperament and character inventory in our study. Behavioral problems and attention deficiency had a high correlation with HA temperament. A highly negative correlation was found between all criteria of ADHD and SD and C characteristics. It can be thought that this non-clinical population with moderate ADHD scores is at risk for behavioral problems.

There is increasing scientific evidence supporting that ADHD is not only a childhood disorder but also affects the adulthood period. It is important to recognize symptoms in adulthood which do not fulfill the DSM 5 criteria for ADHD but cause serious psychosocial problems for the individual, in order to determine the possible risks and to plan an appropriate approach. Especially in the evaluation of personality characteristics and temperamental traits, it is very important to make a detailed investigation of the presence of underlying ADHD symptoms.

There are several limitations to our study. First of all, as a cross sectional survey study, our sample is not representative of clinical subjects. Also, the results we obtained from the study depend on self-report of data, since we did not make a psychiatric interview. Another limitation is the lack of a control group. Despite these limitations, in parallel with DSM 5 approach to personality disorders which takes temperamental traits as a dimension, our study may be an example for further studies with larger samples.

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