

Original article / Araştırma**Disturbed eating behavior and obesity in drug naïve children diagnosed with attention deficit hyperactivity disorder**Hasan Cem AYKUTLU,¹ Işık GÖRKER²**ABSTRACT**

Objective: In recent studies, attention deficit hyperactivity disorder (ADHD) was found to be linked with disturbed eating behavior and obesity. However, more studies needed to assess this relationship in pediatric age group. Therefore, eating behavior, dietary habits and obesity prevalence were evaluated in children who were newly diagnosed with ADHD. **Methods:** Eighty-six children with ADHD between the ages of 6 and 9 without medical treatment and chronic medical disease were included in the study group. 86 age and sex matched children without chronic medical and psychiatric disease were obtained as the control group. Sociodemographic Data Form, Children's Eating Behavior Questionnaire (CEBQ), the Turgay DSM-IV Based Disruptive Behavior Disorders Child and Adolescent Rating and Screening Scale (T-DSM-IV-S) and Schedule for Affective Disorders and Schizophrenia for School Age Children were applied to all cases. Weight and height of all cases were measured. Weight and height z scores, body mass index percentiles were calculated. **Results:** CEBQ desire to drink subscale scores were found significantly higher in ADHD group than controls. CEBQ food responsiveness, emotional overeating and desire to drink subscale scores were found as positively correlated with T-DSM-IV-S ADHD total scores in ADHD group. It was found that children with ADHD eat more often, prefer to consume less water than controls. Higher rates of obesity and overweight, lower rates of underweight were found statistically significant in ADHD group. **Discussion:** Our findings provide evidence that children who are newly diagnosed with ADHD could have impaired eating behaviors, high rates of obesity and overweight. Therefore, it is important to evaluate growth measures and dietary habits in this population. (*Anatolian Journal of Psychiatry* 2019; 20(6):659-666)

Keywords: attention deficit disorder with hyperactivity, feeding behavior, pediatric obesity, child

Dikkat eksikliği hiperaktivite bozukluğu olan, ilaç kullanmayan çocuklarda bozulmuş yeme davranışları ve obezite**Öz**

Amaç: Günümüzde yapılan çalışmalar dikkat eksikliği hiperaktivite bozukluğu (DEHB) ile obezite ve bozulmuş yeme davranışlarının birliktelik gösterdiğini ortaya koymuştur. Özellikle çocuk yaş grubunda bu ilişkiyi inceleyen daha fazla çalışmaya gerek duyulmaktadır. Bu nedenle çalışmamızda, ilk kez DEHB'li çocukların yeme davranışları, beslenme alışkanlıkları ve obezite sıklığı değerlendirilmiştir. **Yöntem:** Araştırma grubu olarak, polikliniğimizde DEHB tanısı konan, tedavi görmeyen ve başka bir kronik tıbbi hastalığı bulunmayan, 6-9 yaşları aralısındaki 86 çocuk alındı. Kontrol grubu olarak yaş ve cinsiyet açısından benzer, kronik tıbbi ve psikiyatrik hastalığı olmayan 86 çocuk alındı. Çalışmaya alınan araştırma ve kontrol grubu olgularına Sosyodemografik Veri Formu, Çocuklarda Yeme Davranışı Anketi (ÇYDA), Çocuk ve Ergenlerde Davranım Bozuklukları için DSM-IV'e Dayalı Tarama ve Değerlendirme Ölçeği - Turgay (T-DSM-IV) ve Okul Çağı Çocukları için Duygulanım Bozuklukları ve Şizofreni Görüşme Çizelgesi uygulandı. Olguların boy ve kilo ölçümleri yapılarak boy ve kilo z değerleri ve beden kitle indeksi

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yüzdelikleri hesaplandı. **Sonuçlar:** DEHB'li olguların ÇYDA içme tutkusu alt ölçek puanı kontrollere göre anlamlı yüksek bulundu. DEHB grubunda ÇYDA gıda heveslisi, duygusal aşırı yeme ve içme tutkusu alt ölçek puanları ile T-DSM-IV DEHB toplam puanı arasında pozitif yönde ilişki bulundu. DEHB'li olguların kontrollere göre daha sık öğün tükettiği, daha az su içmeyi tercih ettikleri bulundu. DEHB grubunda kontrol grubuna göre daha yüksek oranda obezite ve aşırı kiloluluk, daha düşük oranda düşük kiloluluk olduğu bulundu. **Tartışma:** Bulgularımız ilk kez DEHB tanısı konan ve tedavi görmeyen çocuklarda, bozulmuş yeme davranışları ile yüksek oranlarda obezite ve aşırı kiloluluk görülebildiğini ortaya koymaktadır. Bu nedenle bu grupta büyüme-gelişim ölçümleri yapılması ve beslenme alışkanlıklarının sorgulanması önem taşımaktadır. (*Anadolu Psikiyatri Derg* 2019; 20(6):659-666)

Anahtar sözcükler: Dikkat eksikliği hiperaktivite bozukluğu, beslenme davranışı, pediatrik obezite, çocuk

INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) is a neuropsychiatric disorder characterized by attention problems, hyperactivity and impulsivity which are disturbed to functionality or normal development.¹ In addition to cognitive and behavioral symptoms, studies suggest that ADHD affects the children's physical growth beyond the stimulant medications.²⁻⁴ Many of these studies also showed that the prevalence of obesity in ADHD has increased.^{2,5}

Studies investigating the eating behavior of children had shown that over eating, binge eating and disturbed eating behavior are both associated with obesity and ADHD.^{2,6} Two cross sectional studies^{7,8} and one longitudinal study⁹ in 10-year-old children showed a positive correlation between ADHD and binge eating behavior. Ptacek et al. found that children with ADHD have irregular and/or impulsive eating habits and supposed that this could lead to high body mass index (BMI) by affecting their physical development.^{10,11} Recent meta-analyses on this subject had also shown that ADHD is both associated with impaired eating behavior¹² and obesity.¹³ However, another meta-analysis results had shown that ADHD and obesity association is not significant in pre-adolescence period but significant in adolescence and adulthood.¹⁴ In the light of the above, the present study was designed to identify and elucidate the weight status, eating behavior and related lifestyle factors in children newly diagnosed with ADHD in our outpatient clinic.

METHODS

Sample

Eighty-six patients who were newly diagnosed with ADHD between November 2016 and May 2017 in our outpatient clinic were included to research group. The inclusion criteria for the research group as follows: 1) the first diagnosis of ADHD and the absence of any psychotropic medication, 2) aged between 6 and 9 years, 3) Anatolian Journal of Psychiatry 2019; 20(6):659-666

absence of chronic medical disease, psychotic disorder, autism spectrum disorder and intellectual disability. In order to form the control group, 86 cases who were admitted to the general pediatric outpatient clinic, without any chronic medical or psychiatric diseases were included in the study. Ethics approval dated 23.11.2016 was taken from the Local Ethics Committee of Trakya University for the execution of the study (Annex-1).

Data collection tools

In order to determine the psychopathologies of the children, the Schedule for Affective Disorders and Schizophrenia for School Age Children-Present and Lifetime (K-SADS-PL), the Turgay DSM-IV Based Disruptive Behavior Disorders Child and Adolescent Rating and Screening Scale (T-DSM-IV-S) were applied. The sociodemographic Data Form was filled out by interviewing with both the children and caregivers. The Children's Eating Behavior Questionnaire (CEBQ) was filled by caregivers.

The weight of the children was measured in kg with the Pınar® brand 100-gram sensitive digital scale. Children's shoes and clothes were removed at the measurement. The height of children was measured with a 1mm sensitive vertical flat measuring indicator of the same scale and the results were recorded in cm. Children's weight percentile, weight z-score, height percentile, height z-scores and BMI percentile (BMI-p) were evaluated using the age and gender specific standardized growth chart for Turkish children.¹⁵ Weight z-score was defined as the difference between a subject's absolute weight and the mean weight, for children of the same age and gender, divided by the standard deviation of the weight. BMI was calculated by dividing the subject's weight by the square of the height. Cut-off points were chosen for underweight as BMI-p<5, normal as 5-85 p, overweight as 85-95 p and obese as BMI-p>95.¹⁶

Sociodemographic Data Form: This form was developed based on the literature for the purpose of collecting information about sociode-

mographic characteristics, dietary and life habits of the children.

The Schedule for Affective Disorders and Schizophrenia for School Age Children-Present and Lifetime (K-SADS-PL): This form is a semi-structured interview form developed by Kaufman et al., in order to determine the present and past psychopathologies of children and adolescents according to DSM-IV and DSM-III-R diagnostic criteria.¹⁷ The Turkish validity and reliability was conducted by Gokler et al.¹⁸

The Turgay DSM-IV Based Disruptive Behavior Disorders Child and Adolescent Rating and Screening Scale (T-DSM-IV-S): In this scale, DSM-IV ADHD criteria were turned into the question format without changing their contents. Items in the scale are assessed between 0 and 3.¹⁹ In addition, the total score of 18 items that questioned the symptoms of ADHD was used for the correlation analysis. The reliability coefficient of the whole scale was found to be %95.0 and a reliable scale for diagnosing ADHD in our study ($p < 0.001$).

The Children's Eating Behavior Questionnaire (CEBQ): CEBQ is a Likert type scale which was developed by Wardle et al., based on the previous literature on obesity and data obtained from caregiver interviews.²⁰ The Turkish validity and reliability study was conducted by Yilmaz et al.²¹ The reliability coefficient of the whole scale was to be %78.4 and a reliable scale for evaluating eating behavior in our study ($p < 0.001$).

Data analysis

Statistical analysis was performed using the SPSS 19.0 (IBM Corp. Armonk, NY: IBM Corp.). Mean, standard deviation, median, lowest,

highest, frequency and ratio values were used for quantitative variables in the descriptive statistics of the data. The distribution of the variables was measured by the Kolmogorov Simirnov test. Independent t test was used if it fulfils the parametric test parameters and Mann Whitney U if not, in the analysis of quantitative data. Chi-square test was used to analyze qualitative data, and Fischer test was used when chi-square test conditions were not provided. In order to test for the presence or absence of relationships between continuous variables, the Spearman correlation analysis was used in the data set which is detected to not fit the normal distribution. Statistical significance level was determined as $p < 0.05$.

RESULTS

The mean age of the cases in the research group was 7.31 ± 1.09 years and the mean age of the cases in the control group was 7.46 ± 1.08 years. There was no statistically significant difference between the groups in terms of age ($p = 0.338$). 83.7% ($n = 72$) of the cases were male and 16.3% ($n = 14$) were female in both the ADHD and the control group. Both groups were found similar in terms of gender ($p = 1.000$).

As Table 1 shows, there was no statistically significant difference between the groups in terms of weight z-scores. But it was found that ADHD group has significantly higher weight z-scores than the control group. Likewise, when the cases were classified according to BMI-p values, it was detected that there are significantly more obese and overweight children and less underweight children in ADHD group than the controls ($p < 0.05$) (Table 2).

Table 1. The comparison of the ADHD and control groups in terms of the growth measures

	ADHD group (n=86) Mean±SD Median (min - max)	Control group (n=86) Mean±SD Median (min - max)	p
Height (cm)	128.50±7.0 128.0 (112.5 - 148.5)	128.70±7.8 129.0 (114.0 - 148.5)	0.883*
Height z-score	1.04±1.06 0.91 (-1.27 - 3.65)	0.96±0.96 0.96 (-1.13 - 3.32)	0.585**
Weight (kg)	29.08±6.51 28.00 (18.00 - 49.55)	27.53±8.34 24.38 (17.00 - 61.00)	0.019*
Weight z-score	1.00±1.22 1.00 (-0.93 - 4.00)	0.44±1.25 0.29 (-1.63 - 3.76)	0.004*

*: Mann Whitney U test; **: Independent samples t-test.

Table 2. The comparison of the obese, overweight, normal weight and underweight cases between the ADHD and control group

	ADHD group (n=86)		Control group (n=86)		p*
	n	%	n	%	
Obese	20	23.3	10	11.6	0.044
Overweight	18	20.8	7	8.2	0.017
Normal weight	47	54.7	58	67.4	0.085
Underweight	1	1.2	11	12.8	0.003

*: Chi-square test

Table 3. The comparison of the Children Eating Behavior Questionnaire subscale scores between the ADHD and the control group

	ADHD group (n=86)		Control group (n=86)		p*
	Mean±SD	Median	Mean±SD	Median	
Food responsiveness	9.8±4.7	9.0	9.0±3.9	8.0	0.388
Emotional overeating	6.3±2.7	6.0	5.6±2.2	5.0	0.230
Enjoyment of food	15.6±4.7	16.0	15.4±4.4	14.0	0.643
Desire to drink	8.7±3.7	8.5	7.5±3.8	7.0	0.032
Satiety responsiveness	20.9±6.1	20.0	19.8±6.6	20.0	0.321
Slowness in eating	9.5±4.3	9.0	8.4±3.7	8.0	0.119
Emotional undereating	10.3±3.0	10.0	10.2±3.8	10.0	0.762
Food fussiness	7.0±3.3	6.0	7.9±3.4	7.0	0.056

*: Mann Whitney U test

ADHD and control groups CEBQ scores were presented in Table 3. It was found that desire to drink (DD) scores were statistically significantly higher in ADHD group than the controls ($p < 0.05$) but there was no significant difference between the groups in terms of other subscales. Also, the correlation between T-DSM-IV-S ADHD subscale total score and CEBQ subscale scores were investigated. It was detected that there was statistically significant positive correlation between the T-DSM-IV-S ADHD total scores and CEBQ food responsiveness (FR), emotional overeating (EO), DD subscale scores (Table 4).

When the dietary habits were evaluated, it was detected that there was no significant difference between the groups in terms of adherence to meals ($p > 0.05$). However, it was found that ADHD group eat significantly more than five times a day than do control group ($p < 0.05$) (Table 1). Likewise, there is significant difference between the groups in terms of the most consumed beverage ($p < 0.05$). It was detected that the ADHD group prefer to drink less water detected that there is no significant difference than the control group ($p = 0.001$). In terms of fruit

Table 4. The correlation of the Turgay's ADHD Subscale total score and the CEBQ subscale scores in ADHD group

	Turgay's ADHD subscale total score Rho (r) p*	
Food responsiveness	0.275	0.010
Emotional overeating	0.333	0.002
Enjoyment of food	0.135	0.215
Desire to drink	0.246	0.022
Satiety responsiveness	0.052	0.632
Slowness in eating	0.065	0.550
Emotional undereating	0.169	0.119
Food fussiness	-0.002	0.983

*: Spearman test

and vegetable consumption, it was between the groups ($p > 0.05$) (Table 5).

In our study, there was no statistically significant difference between the research and control group in terms of family income and residence addresses ($p > 0.05$). Also, no correlation was found between independent variables (age,

Table 5. The comparison of the dietary habits between ADHD and the control group

		ADHD group (n=86)		Control group (n=86)		p*
		n	%	n	%	
Breakfast	No	27	31.4	17	19.8	0.081*
	Yes	59	68.6	69	80.2	
Snack	No	17	19.8	14	16.3	0.552*
	Yes	69	80.2	72	83.7	
Lunch	No	6	7.0	6	7.0	1.000*
	Yes	80	93.0	80	93.0	
Snack	No	11	12.8	4	4.7	0.059*
	Yes	75	87.2	82	95.3	
Dinner	No	4	4.7	0	0.0	0.121**
	Yes	82	95.3	86	100.0	
Meal more than 5 times/day	No	40	46.5	66	76.7	<0.001*
	Yes	46	53.5	20	23.3	
Type of beverages	Water	36	41.9	58	67.4	0.007
	Milk	23	26.7	12	14.0	
	Tea	5	5.8	2	2.3	
	Sweetened beverage	8	9.3	9	10.5	
	Juice	14	16.3	5	5.8	
Water	No	50	58.1	28	32.6	0.001
	Yes	36	41.9	58	67.4	
Fruit and vegetable intake	Everyday	54	62.8	49	57.0	0.257
	At least 1/week	21	24.4	30	34.9	
	Less than 1/week	11	12.8	7	8.1	

*: Chi-square test; **: Fisher's Chi-square test

gender, family income, BMI-p) in Spearman analysis. Likewise, there was no correlation between age, gender, family income and CEBQ subscale scores (data not shown).

DISCUSSION

Disruptive eating patterns and obesity in ADHD gained significant attention in the literature.^{12-14,22} To our best knowledge, we are the first to evaluate eating behavior with CEBQ and examine the dietary habits in clinical sample of Turkish children with ADHD.

Two studies evaluating eating behavior with CEBQ in children with ADHD, were found in the literature. According to the results of the study conducted by Leventakou et al. with Greek preschool children in 2015, it was shown that there is a positive dose-response correlation between the ADHD total scores and the FR and EO subscales. Researchers stated that the findings support the association between ADHD and food approach behaviors hypothesis.²³ Likewise, the results of the study conducted by Tong et al. with

Asian school children in 2017, it was found that there is positive correlation between the ADHD scores and EO, emotional undereating and bulimia nervosa symptom scores. However, when the researchers investigated the relationship between ADHD, emotional eating behaviors and BMI, it was found that emotional eating behaviors have no effect on the ADHD and BMI association. Researchers proposed that the findings show the association between ADHD and emotional overeating. But they also stated that the obesity which could develop as a result of these eating behaviors, would become evident in future years.²⁴ In our study, we also found a positive correlation between ADHD scores and FR, EO, DD scores. Our finding is in the line with previous reports by others and we suggest that children with ADHD have food approach eating behaviors. However, we did not find similar results in comparison of CEBQ scores. We think that this could be a result of the limited number of the cases.

When we evaluate the dietary habits of children in our study, we found that children with ADHD

prefer to drink significantly less water than controls in daily beverage intake. Likewise, according to the study conducted by Holton et al. with 7 to 11-year-old children with ADHD, it was shown that children with ADHD consume less water and more artificially sweetened juice drinks than healthy controls.²⁵ Similarly in another study, it was shown that 6 to 10-year-old boys with ADHD drink more sweetened beverage than healthy controls and the sweetened beverage intake is nearly half of the daily beverage.¹⁰ When we evaluate both the results of the increased DD scores and the less water consumption in children with ADHD, we could purpose that this could lead to increased daily calorie intake and develop weight gain later on.

In our study, we found that children with ADHD eat more often during the day than controls. Furthermore, it was detected that children with ADHD more often skip meals than controls but the difference was marginally significant. Similar results were found in the study conducted by Ptacek et al. with boys with ADHD in a clinical sample. It was shown that boys with ADHD eat more than 5 times a day and skip meals more often than the healthy controls.¹⁰ According to the results of the study conducted by Tong et al. with 9 to 13-year-old children in a school sample, the children who have symptoms of ADHD likely to snack before bedtime and prefer to eat while using a computer or smart phone more than children without ADHD symptoms.²⁶ Our finding is in the line with previous reports and we may suggest that children with ADHD eat less regularly and more frequently than children without ADHD.

One of the important dietary habit is the food choices and it is widely investigated in children with ADHD. In the longitudinal study conducted by Howard et al. with 1799 adolescents, results show a positive association between ADHD and western type of diet.²⁷ In another study, it was found that boys with ADHD prefer to eat less vegetable and fruit than healthy controls.¹⁰ In the study of Çöl et al., it was shown that children with ADHD consume more sugar/chocolate than controls.²⁸ Similarly, in the study of Ebenegger et al. with preschool children, it was detected that high hyperactivity or inattention scores are associated with less fruit and vegetable consumption. But after adjustment for the age, sex and socio-demographic confounders, this relationship lost its significance.²⁹ In our study, there was no significant difference between the groups in terms of fruit and vegetable consumption. The discrepant findings may be attributed to differ-

ences in regional and cultural dietary habits.

A significant number of studies report an association between ADHD and obesity in children.^{6,14} As far as we aware, there are only two studies which investigated the weight status of children with ADHD in a clinical sample from Turkey.^{28,30} In the study conducted by Güngör et al, it was found that overweight (%9.4 vs %1.5) and obese (%7.1 vs %0.2) children were significantly higher in ADHD group according to BMI values. No difference was found between the groups in terms of underweight (%16.8 vs %15.8). However, according to the other growth measures (weight for height, weight z-score) prevalence of underweight children was found to be higher in ADHD group.³⁰ Also, in the study of Çöl et al., the obesity prevalence in ADHD group was found to be higher than the controls (%16.9 vs %13).²⁸ Although our results had shown that overweight and obese children were more in the ADHD group, prevalence rates were higher than the previous studies. Also, we found that the prevalence of underweight children was lower than the controls in the ADHD group. These discrepant findings may be attributed to differences in exclusion criteria of the studies. In the study of Güngör et al., there was a broad age range (5 to 15 years) and children on medication or children with epilepsy were also included in the ADHD group³⁰ and similarly there was no exclusion of chronic medical disease or children on medication in the other study.²⁸ It is known that the weight gain is higher in preadolescent period, especially in boys and differentiate by developmental periods. Also, it is known that some chronic medical disease and medications could contribute to the development of obesity.¹⁶ Additionally, it was shown that stimulant medications could induce underweight by appetite suppression.²

We want to emphasize several strengths of this study. First, our study focused in school children with a narrow age range. According to a recent systemic review, it was proposed that age is an important cofounder on ADHD and disturbed eating behavior association in girls but also it was stated that more studies needed to clarify this relationship.¹² In the meta-analysis conducted by Cortese et al., it was shown that ADHD and obesity association is relevant in childhood but was proposed that more studies needed to focus on school age and adolescence separately.¹³ Second, our sample was similar in socioeconomic status and there was no correlation between possible cofounders. It is known that socioeconomic status is an important co-

founder in obesity and eating behavior development.³¹

Our results should be evaluated within existing limitations. First of all, the small number of subjects limited to present some potential disappearances and generalizability of the study. Second, our study was cross sectional and could not elucidate causal relationships. Third, the research and control sample was conducted in a tertiary healthcare service. And lastly, we had created an interview based on literature to inves-

tigate dietary habits because of the lack of standardized questionnaire in this topic.

Children who are newly diagnosed with ADHD could have impaired eating behaviors, high rates of obesity and overweight in clinical sample. Therefore, it is important to evaluate growth measures, eating behavior and dietary habits and detect obesity early in this population. Further studies needed to focus on children with ADHD to elucidate these relationships and develop potential interventions.

Authors' contributions: H.C.A: literature review, sample collection, applying scales, statistics, writing the manuscript; I.G.: finding the subject, conducting research, review the manuscript.

REFERENCES

1. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*. Arlington: American Psychiatric Pub., 2013.
2. Cortese S, Vincenzi B. *Obesity and ADHD: Clinical and Neurobiological Implications*. C Stanford, R Tannock (Eds.), *Behavioral Neuroscience of Attention Deficit Hyperactivity Disorder and Its Treatment, Current Topics in Behavioral Neurosciences 9*, Berlin Heidelberg: Springer-Verlag, 2012, pp.199-218.
3. Ptacek R, Kuzelova H, Paclt I, Zukov I, Fischer S. Anthropometric changes in non-medicated ADHD boys. *Neuro Endocrinol Lett* 2009; 30(3):377-381.
4. Ptacek R, Kuzelova H, Paclt I, Zukov I, Fischer S. ADHD and growth: anthropometric changes in medicated and non-medicated ADHD boys. *Med Sci Monit* 2009; 15(12):595-599.
5. Waring ME, Lapane KL. Overweight in children and adolescents in relation to attention-deficit/hyperactivity disorder: results from a national sample. *Pediatrics* 2008; 122(1):1-6.
6. Docet MF, Larranga A, Mendez LFP, Garcia-Mayor, RV. Attention deficit hyperactivity disorder increases the risk of having abnormal eating behaviours in obese adults. *Eat Weight Disord* 2012; 17(2):132-136.
7. Cortese S, Bernardina BD, Mouren MC. Attention-deficit/hyperactivity disorder (ADHD) and binge eating. *Nutr Rev* 2007; 65(9):404-411.
8. Reinblatt SP, Leoutsakos JMS, Mahone EM, Forrester S, Wilcox HC, Riddle MA. Association between binge eating and attention-deficit/hyperactivity disorder in two pediatric community mental health clinics. *Int J Eat Disord* 2015; 48(5):505-511.
9. Sonnevile KR, Calzo JP, Horton NJ, Field AE, Corsby RD, Solmi F, et al. Childhood hyperactivity/inattention and eating disturbances predict binge eating in adolescence. *Psychol Med* 2015; 45(12):2511-20.
10. Ptacek R, Kuzelova H, Stefano GB, Raboch J, Sadkova T, Goetz M, et al. Disruptive patterns of eating behaviors and associated lifestyles in males with ADHD. *Med Sci Monit* 2014; 20:608-613.
11. Ptacek R, Kuzelova H, Paclt I, Zukov I, Fischer S. Somatic and endocrinological changes in non medicated ADHD children. *Prague Med Rep* 2009; 110(1):25-34.
12. Kaisari P, Dourish CT, Higgs S. Attention deficit hyperactivity disorder (ADHD) and disordered eating behaviour: A systematic review and a framework for future research. *Clin Psychol Rev* 2017; 53:109-121.
13. Cortese S, Moreira-Maia CR, St. Fleur D, Morcillo-Peñalver C, Rohde LA, Faraone SV. Association between ADHD and obesity: a systematic review and meta-analysis. *Am J Psychiatry* 2015; 173(1):34-43.
14. Nigg JT, Johnstone JM, Musser ED, Long HG, Willoughby MT, Shannon J. Attention-deficit/hyperactivity disorder (ADHD) and being overweight/obesity: new data and meta-analysis. *Clin Psychol Rev* 2016; 43:67-79.
15. Neyzi O, Günöz H, Furman A, Bundak R, Gökçay G, Darendeliler F. Türk çocuklarında vücut ağırlığı, boy uzunluğu, baş çevresi ve vücut kitle indeksi referans değerleri. *Çocuk Sağlığı ve Hastalıkları Dergisi* 2008; 51(1):1-14.
16. Buchanan AO, Marquez ML. Obesity. KJ Marcante, RM Kleigman (Eds.), *Nelson Essentials of Pediatrics, seventh ed.*, Philadelphia: Elsevier Saunders, 2015, pp.90-93.
17. Kaufman J, Birmaher B, Brent D, Rao U, Flynn C, Moreci P, et al. Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS-PL): initial reliability and validity data. *J Am Acad Child Adolesc Psychiatry* 1997; 36(7):980-988.

18. Gökler B, Ünal F, Pehlivan Türk B, Kültür EÇ, Akdemir D, Taner Y. Okul Çağı Çocukları için Duygulanım Bozuklukları ve Şizofreni Görüşme Çizelgesi-Şimdi ve Yaşam Boyu Şekli-Türkçe Uyarlamasının Geçerlik ve Güvenirliliği. *Çocuk ve Gençlik Ruh Sağlığı Dergisi* 2004; 11(3):109-116.
19. Ercan E, Amado S, Somer O, Çıkoğlu S. Dikkat eksikliği hiperaktivite bozukluğu ve yıkıcı davranım bozuklukları için bir test bataryası geliştirme çabası. *Çocuk ve Gençlik Ruh Sağlığı Dergisi* 2001; 8(3):132-144.
20. Wardle J, Guthrie CA, Sanderson S, Rapoport L. Development of the Children's Eating Behaviour Questionnaire. *J Child Psychol Psychiatry* 2001; 42(7):963-970.
21. Yılmaz R, Esmeray H, Erkorkmaz Ü. Çocuklarda Yeme Davranışı Anketinin Türkçe uyarlama çalışması. *Anadolu Psikiyatri Derg* 2011;12(4):287-294.
22. Cortese S, Tessari L. Attention-deficit/hyperactivity disorder (ADHD) and obesity: Update 2016. *Curr Psychiatry Rep* 2017; 19(1):4.
23. Leventakou V, Micali N, Georgiou V, Sarri K, Koutra K, Koinaki S, et al. Is there an association between eating behaviour and attention-deficit/hyperactivity disorder symptoms in preschool children? *J Child Psychol Psychiatry* 2016; 57(6):676-684.
24. Tong L, Shi H, Li X. Associations among ADHD, Abnormal Eating and Overweight in a non-clinical sample of Asian children. *Sci Rep* 2017; 7(1):2844.
25. Holton KF, Nigg JT. The association of lifestyle factors and ADHD in children. *J Atten Disord* 2016; 1087054716646452.
26. Tong L, Xiong X, Tan H. Attention-deficit/hyperactivity disorder and lifestyle-related behaviors in children. *PLoS One* 2016; 11(9):e0163434.
27. Howard AL, Robinson M, Smith GJ, Ambrosini GL, Piek JP, Oddy WH. ADHD is associated with a "Western" dietary pattern in adolescents. *J Atten Disord* 2011; 15(5):403-411.
28. Çöl N, Gökçen C, Kılıç B, Karadağ M. Prevalence of obesity/hypertension in children and adolescents with ADHD and evaluation of total body composition. *Anatolian Journal of Psychiatry* 2018; 20(1):93-100.
29. Ebenegger V, Marques-Vidal PM, Munsch S, Quartier V, Nydegger A, Barral J, et al. Relationship of hyperactivity/inattention with adiposity and lifestyle characteristics in preschool children. *J Child Neurol* 2012; 27(7):852-858.
30. Gungor S, Celiloglu OS, Raif SG, Ozcan OO, Selimoglu MA. Malnutrition and obesity in children With ADHD. *J Atten Disord* 2016; 20(8):647-652.
31. Lobstein T, Baur L, Uauy R, Task Force IIO. Obesity in children and young people: a crisis in public health. *Obes Rev* 2004; 5(Suppl.1):4-104.