Obesity State of 12-15 Years Old Children in Turkey

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Abstract

This study was aimed to determine the obesity states of children between 12-15 years and to orientate the child and his/her parents by informing them. While the overweight percentage of the female and male pupils was the same, it was determined that 34.9% of the female and 65.1% male was obese. It was seen that 84.1% of obese pupil watch TV ≤2 hours and 15.9%>2 hours. Furthermore it was determined that 61.9% of obese pupils play ≤2 hours games and 38.1% >2 hours and a statistically significant relation was found between pupils' play time and BMI (p=0.044). The obtained findings from this study show that 42.4% of the participating pupils are overweight and obese. Overweight and obesity prevalence obtained in our study is significantly high. As obesity prevention is of great importance it should began in childhood.

Keywords: *Body Mass Index (BMI), child, obesity*

I. INTRODUCTİON

Obesity is a chronic energy metabolism disorder which comes out as a result of wrong and excessive eating habit with excessive fat storage in the body, which may cause physical and psychological problems, which adversely affect the quality and duration of lifetime, which may cause death at an early age, and which is a combination of multi-factorial environmental, psychological, and genetic factors (Donohoue, 2004; Söderlund, Fischer, & Johansson, 2009; Yıldırım, 2010).

Nowadays obesity in all age groups especially in childhood has become a major public health problem due to prevalence particularly in developed countries and all over the world and diseases caused by it (Selassie & Sinha, 2011). Childhood obesity, which shows a remarkable increase causes an increase of morbidity and mortality in the adulthood period for those who were obese as child and induces obesity in adulthood for those who are entering the adolescent period as obese (Iskender, Tura, Akgul, & Turtulla, 2014). Obesity emerges as a disease, of which physicians do not think that it needs a treatment and unfortunately parents often are not aware of overweight and obese children. As health problems in childhood has the ability to reflect in adulthood (Reilly & Kelly 2011) it is necessary to prevent health problems like overweight and obesity in this period if possible and if they already exist to recognize them early and get necessary treatment (Atamturk, 2009; Bereket & Atay, 2012). For this reason it is essential to define obesity in childhood and to realize regular Body Mass Index (BMI) screenings in schools in order to prevent complications related to obesity in adulthood.

Although child obesity prevalence studies cover the children and is important in terms of society health in future, it seems that studies with children between 12-15 years are remarkably less. Accordingly in this study it was aimed to determine the obesity states of children between 12-15 years and to orientate the child and his/her parents by informing them.

II. METHOD

A. Sample

The defining type study was conducted in all secondary schools in Turkey. As in these schools are 370 pupils between 12-15 years old, the universe of the study consisted of 370 pupils. No sample selection was made in this study and all volunteer 12-15 years children visiting the secondary school between these dates (351) constituted the sample of the study. The ones who do not wanted to participate voluntarily were excluded from the study. This study is limited with the obtained findings from 351 volunteer pupils continuing the secondary school.

B. Measurements

Before starting the study required permissions have been obtained from the local authority (2.11.12/21507), Ondokuz Mayıs University Clinical Researches Ethics Committee (4.4.13/373). Written consent has been obtained from the institution where the study will be conducted and the parents of the children by informing them about the purpose of the study.

As means of data collection the questionnaire developed by the researchers and issued in order to be understood by the pupils was used. The questionnaire included questions about children's age, mother-father education, mother-father employment state, income level, family type, chronic disease, DM-Genetic disease state in family and daily water, daily food consumption states and daily

activity states determining questions. The questionnaire was filled out by using the face to face method in approximately 15 minutes.

Anthropometric measurements of children enrolled in the study (body weight – body height) were realized by the researchers. In total 351 children height were measured nude by standing, heels conjunct head, feet, back and hips to the wall so that it touches it with Harpenden Stadiometer from head to sole in meters. All children were put on the SECA brand scale (767 model) sensitive to digital weighing to 100 grams with both feet and measured in kg. The device was reset after every measurement.

According to BMI assessment (Centres for Disease Control-CDC, 2000); the index obtained with the measured weight and height square meter ratio is assessed according to the schedules prepared for children in each country. If the calculated value is more than 95%, it is accepted as obese. In a study where the specificity and sensitivity of body mass index was researched, 95% was accepted as cut-off value, 88% as sensitivity and 94% as specificity (Akcam, Boyacı, Pirgon, & Dundar, 2013). The Centre for Disease Control-CDC (2000) takes for childhood and adolescence periods the BMI percentages as basis and defines the percentage range 85-95% as overweight and over 95% as obese (Bradford, 2009; Hering, Pritsker, Gonchar, & Pillar, 2009; Ozturk et al., 2008). In our study BMI of the children was calculated by using their height and weight measures with the formula Weight [kg] / Height^2 [m^2].The percentage curve, which is defined for Turkish children was used and the ones with BMI <5% were accepted as underweight, 5%-84% normal, 85%-95% as overweight and BMI >95% as obese (Ozturk et al., 2008).

C. Data Analysis

The obtained findings were assessed by taking the percentages and frequencies and using the SPSS (Statistic Pockets for Social Sciences) program. Findings obtained from the study have been listed in a table and absolute and percentage values were taken. The data was analysed with the Chi-Square test.

III. RESULTS

49% of the participating pupils were female and 51% male. While the overweight percentage of the female and male pupils was the same, it was determined that 34.9% of the female and 65.1% male was obese (Table 1).

No statistically significant relation was determined between pupils' gender, age, mother-father education and employment state, family income state, family type, chronic disease of child, DM-Genetic disease state of family and BMI ($p>0.05$);whereas a significant relation was found between daily water consumption states ($p=0.007$). It was seen that the daily water consumption of 46.6% normal weighed pupil and 57.7% of obese pupil was 1-2 litres (lit.) (Table 1).

No statistically significant relation was found between BMI and daily food consumption states of the pupils, whereas 76.4% consume every day regular food in the mornings, 24.2% in the mid-morning, 88.3% at noon, 22.5% in the afternoon, 93.4% in the evenings and 18.5% nights ($p>0.05$; Table 2).

After having analysed the pupils' daily activity states; no statistically significant relation was found between the pupils' watching TV and being in front of the PC periods and their BMI (respectively; $p=0.689$; 0.987). It was seen that 84.1% of obese pupil watch TV ≤2 hours and 15.9%>2 hours. Furthermore it was determined that 61.9% of obese pupils play ≤2 hours games and 38.1% >2 hours and a statistically significant relation was found between pupils' play time and BMI ($p= 0.044$). It was detected that 95.3% of pupils going to school by car are overweight and 93.7% obese, whereas 4.7% of pupils going to school by foot are overweight and 6.3% obese however no statistically significant relation was found between the pupils' transportation type and BMI ($p>0.05$; Table 3).

IV. DISCUSSION

The obtained findings from this study show that 42.4% of the participating pupils are overweight and obese.

As it is seen that with increasing age of children BMI increases, it is very important to identify risk factors, which may develop related to obesity in the upcoming years early and to take the necessary precautions (Diez & Fortis 2009; Iskender et al., 2014). Generally BMI is often used for the evaluation of children' body weight and a useful and simple method to determine overweight and obesity (Ozcebe & Bagcı Bosi, 2013). According to the BMI, which was preferred in our study due to abovementioned, it was seen that 24.4% of the pupils are overweight and 18.0% obese (Table 1). Herring reported in his study conducted in the United States of America that 30.1% of 2-19 years old children are overweight and 10.9% obese (Hering et al., 2009). In our study was determined that according to the United States of America overweight is lower (Our study:24.4%, USA:30.1%) but obesity prevalence is higher (Ourstudy:18% USA:10.9%). In a study conducted in Brazil it was reported that 21.9% of pupils are overweight and 13.3% obese (Monteiro & Matioli, 2010). Flores et al. (2009) found the obesity prevalence in a study conducted in Mexico as 25.5%. The high overweight and obesity rate of children in conducted studies demonstrate as in accordance with

our study how important it is to do screenings in schools in order to identify overweight and obesity early. It is thought that with these screenings the obesity prevalence can be reduced.

Obesity is seen in both genders (Iskender et al., 2014). As there are studies in literature reporting that obesity rate of men is higher there are also studies indicating that obesity rate of women is higher (Akcam et al., 2013; Iskender et al., 2014; Gozu, 2007; Kirchengast & Schober, 2006). In our study was detected that 34.9% of girls and 65.1% of boys are obese. Although in both genders between 12-15 years there was no statistically significant difference in terms of BMI ($p > 0.05$; Table 1) found it was observed that obesity is more common in men.

After having analysed the obesity state according to the children' age variable; It was seen that there are studies indicating that the obesity state is decreasing with increasing age (Tutuncu, 2014) but there are also studies reporting that overweight prevalence is increasing towards adolescent period (Maddah, Shahraki, & Shahraki, 2010). No statistically significant difference between pupils' age and obesity was determined in our study however it was observed that with increasing age overweight and obesity rate also increases (12age:40.8%; 13age:55.4%; 14age:55.6%; 15age:57.7%) (Table 1).

Whereas obesity prevalence is frequent in families and children with low socio-economic status in developed countries, in families with high socio-economic level in developing countries it is high (Bereket & Atay, 2012). In our study no statistically significant relation was found between the pupils' socio-economic and cultural features and their BMI ($p > 0.05$). The obesity rate among pupils with high socio-economic status, i.e. more income than expenses is high (Table 1). Considering Turkey as developing country our study is in accordance with literature.

It is reported that parental education has a significant impact on BMI of the pupils (Maddah et al., 2010; Ševčikova et al. 2007). In addition to this Gumusler (2006) has mentioned in his study that the family' education level does not influence the obesity state of children. Tutuncu (2014) reported in his conducted study on 5-15 years group pupils that paternal education influences the BMI of children ($p<0.05$), and that those whose family are high school graduates have the highest rate of overweight and obesity. Metinoglu, Pekol, and Metinoglu, (2012) reported in his study the more the paternal education status increases the more heavier are the children, whereas Gozu (2007) mentioned that due to being a country of which the socio-economic environment and demographic structure is developing, overweight and obesity prevalence is affected. Although in our study paternal education level does not influence the BMI of pupils ($p > 0.05$) it was observed that pupils whose parents are university graduates have a high overweight and obesity prevalence as similar with literature (Table 1). This result may make think that families with high education level offer better opportunities to the child which leads him/her to take in more calories.

It is reported that the more the number of people living in the same house and the number of siblings increases there is a reduction in overweight and obesity prevalence (Gozu, 2007). Anamur Uguz and Bodur (2007) stated that parents who have one child take more care and pay more attention to the nutrition of their child and therefore may cause more tendency to obesity. Although in our study pupils' family type has no statistical meaning on BMI ($p>0.05$), it was seen that as similar to literature obesity prevalence in big families is low (15.9%), whereas in nuclear families high (84.1%) (Table 1).

It is stated that in obesity formation there is genetic predisposition and obesity tendency in some families (Donohoue, 2004). Maffeis, Banzato, Talamini, and Obesity Study Group of The Italian Society of Pediatric Endocrinology and Diabetology (2008) reported in his study that families whose children were diagnosed obese have diseases like history of obesity, heart disease, diabetes etc. In our study was determined that between the children's chronic disease status, family's DM, genetic disease status and BMI is no statistically significant relation ($p>0.05$; Table 1).

It is noted that in healthy, balanced and adequate nutrition water is very important and that a daily water amount of 2 lit. in daily foods and drinks is sufficient (Maffeis et al., 2008). In our study was observed that 82.9% of pupils consume water under the recommended amount. Dubnov-Raz, Constantini, Yariv, Nice, and Shapira (2011) stated that liquid consumption increase raises energy consumption during resting and thus cause weight loss. In our study was seen that those consuming less than 2 lit. water have a higher overweight and obesity prevalence in comparison to those consuming 2 or more than 2 lit. (Table 1). Between pupils' daily water consumption status and their BMI a statistically significant relation was found ($p<0.05$)

It is reported that regular meal consumption has a positive effect on the BMI of children (Maffeis et al., 2008; Schmidt, 2012). Schmidt (2012) stated in his study that the rate of those who have three meals per day (breakfast, lunch, dinner) is 47%. Kutlu and Civi (2009) informed in their study that 82.2% eat their breakfast, 93% their lunch and 94.9% their dinner every day regularly. In our study was determined that 76.4% consume every day regularly breakfast, 88.3% lunch and 93.4% dinner and no statistically significant difference was found between

pupils' regular meal consumption states and their BMI ($p>0.05$; Table 2). Taking into consideration that breakfast, which is an important meal of the day has an impact on physical growth and development as well as school success (Kılınc & Cagdas, 2012), it is observed that pupils in our study do not have a very good breakfast prevalence. This result reveals the necessity to create awareness in order to inform the families about sufficient and balanced nutrition.

Obesity became a major health problem especially in industrialized societies due to changes in environmental conditions like consuming lots of high energy foods and gradual decrease of physical activities in our lives (Gozu, 2007). It is also reported that decrease of physical activity is causing obesity (Metinoglu et al., 2012; Uskun, Ozturk, Kisioglu, Kırbıyık, & Demirel, 2005). Uskun et al. (2005) mentioned in his conducted case and control study in order to evaluate pupils' daily physical activities, that the influence of both groups' play time on their BMI is statistically significant ($p<0.05$), and informed that the daily play time of the control group was longer in comparison to obese pupils (Uskun et al., 2005). Therefore it is reported that children, who do not perform regular daily activity, watch TV for a long time and pass seldom time outside home, obesity development risk increases and is seen more frequent (Metinoglu et al., 2012; Uskun et al., 2005). In our study was determined that there is no statistically significant relation between pupils' watching TV, sitting in front of PC and transportation to school and their BMI ($p>0.05$; Table 3), whereas between their play time and BMI there is a statistically significant relation ($p=0.044$; Table 3). In Table 3 was detected that overweight and obesity prevalence of pupils who are playing two or less than two hours (respectively; 77.9%, 61.9%), is higher than those who play more than two hours (respectively; 22.1%, 38.1%)

V. CONCLUSIONS

Overweight and obesity prevalence obtained in our study is significantly high. As obesity prevention is of great importance it should began in childhood. Therefore, education about the importance of adequate and balanced nutrition and physical activity should be given, routine follow-up and evaluation of height and weight of the children should be performed and families, school management, teachers, dieticians and school nurses should take great responsibilities. The fulfilment of these responsibilities will benefit the prevention of obesity.

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Tables

Table 1. Comparison of Socio-Demographic Characteristics and BMI of The Pupils (N= 351)

Socio-Demographic Characteristics	BMI Classification										p-value x^2
	underweight (<5%)		normal (5%-84%)		overweight (85%-95%)		obese (≥95%)		TOTAL		
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	
Gender											
female	3	33.3	104	53.9	43	50.0	22	34.9	172	49.0	0.051**
male	6	66.7	89	46.1	43	50.0	41	65.1	179	51.0	7.759
Age											
12	5	55.6	36	18.7	20	23.3	11	17.5	72	20.5	0.213**
13	2	22.2	46	23.8	19	22.1	21	33.3	88	25.1	11.997
14	0	0	45	23.3	22	25.6	13	20.6	80	22.8	
15	2	22.2	66	34.2	25	29.1	18	28.6	111	31.6	
Mother Educational State											
elementary	4	44.4	44	22.8	25	29.1	20	31.7	93	26.5	0.122**
high	2	22.2	79	40.9	21	24.4	21	33.3	123	35.0	10.073
university	3	33.4	70	36.3	40	46.5	22	34.9	135	38.5	
Mother Working State											0.071**

yes	3	33.3	57	29.5	28	32.6	30	47.6	118	33.6	7.020

Table 2. Comparison of Daily Food Consumption States and BMI of The Pupils *(N= 351)*

no	*6*	*66.7*	*136*	*70.5*	*58*	*67.4*	*33*	*52.4*	*233*	*66.4*	
Father Educational State											
elementary	*3*	*33.3*	*26*	*13.5*	*15*	*17.4*	*12*	*19.0*	*56*	*16.0*	*0.389***
high	*0*	*0.0*	*52*	*26.9*	*19*	*22.1*	*13*	*20.6*	*84*	*23.9*	*6.315*
university	*6*	*66.7*	*115*	*59.6*	*52*	*60.5*	*38*	*60.3*	*211*	*60.1*	
Father Working State											
yes	*8*	*88.9*	*186*	*96.4*	*80*	*93.0*	*58*	*92.1*	*332*	*94.6*	*0.397***
no	*1*	*11.1*	*7*	*3.6*	*6*	*7.0*	*5*	*7.9*	*19*	*5.4*	*2.967*
Family Income State											
incomes lower	*4*	*44.4*	*78*	*40.4*	*44*	*51.2*	*20*	*31.7*	*146*	*41.6*	*0.117***
income higher	*5*	*55.6*	*115*	*59.6*	*42*	*48.8*	*43*	*68.3*	*205*	*58.4*	*5.897*
Family type											*0.740***
nuclear	*8*	*88.9*	*171*	*88.6*	*73*	*84.9*	*53*	*84.1*	*305*	*86.9*	*1.254*
not nuclear	*1*	*11.1*	*22*	*11.4*	*13*	*15.1*	*10*	*15.9*	*46*	*13.1*	
Chronic Disease State											*0.379***
Yes	*1*	*11.1*	*10*	*5.2*	*3*	*3.5*	*6*	*9.5*	*20*	*5.7*	*3.084*
No	*8*	*88.9*	*183*	*94.8*	*83*	*96.5*	*57*	*90.5*	*331*	*94.3*	
DM State of Family											*0.057***
Yes	*0*	*0.0*	*25*	*13.0*	*16*	*18.6*	*16*	*25.4*	*57*	*16.2*	*7.515*
No	*9*	*100*	*168*	*87.0*	*70*	*81.4*	*47*	*74.6*	*294*	*83.8*	
Genetic Diseases State of Family											
Yes	*1*	*11.1*	*13*	*6.7*	*7*	*8.1*	*6*	*9.5*	*27*	*7.7*	*0.869***
No	*8*	*88.9*	*180*	*93.3*	*79*	*91.9*	*57*	*90.5*	*324*	*92.3*	*0.719*
Water Consumption State (litres/day)											
≤ 1	*8*	*88.9*	*71*	*36.8*	*31*	*36.0*	*13*	*20.6*	*123*	*35.0*	
1-2	*1*	*11.1*	*90*	*46.6*	*41*	*47.7*	*36*	*57.1*	*168*	*47.9*	*0.007**
≥2	*0*	*0*	*32*	*16.6*	*14*	*16.3*	*14*	*22.2*	*60*	*17.1*	*17.677*
TOTAL	***9***	***2.6***	***193***	***55.0***	***86***	***24.4***	***63***	***18.0***	***351***	***100***	

Notes. BMI= Body Mass Index

*Values are given either as %. *p-value<0.05, **p-value>0.05*

Daily Food Consumption States (every day regular food)	BMI Classification: underweight (<5%) n	%	normal (5%-84%) n	%	overweight (85%-95%) n	%	obese (≥95%) n	%	TOTAL n	%	p-value x²
Morning											
Yes	6	66.7	152	78.8	64	74.4	46	73.0	268	76.4	0.648**
No	3	33.3	41	21.2	22	25.6	17	27.0	83	23.6	1.652
Mid-morning											
Yes	1	11.1	48	24.9	23	26.7	13	20.6	85	24.2	0.653**
No	8	88.9	145	75.1	63	73.3	50	79.4	266	75.8	1.627
Noon											
Yes	9	100	168	87.0	77	89.5	56	88.9	310	88.3	0.651**
No	0	0	25	13.0	9	10.5	7	11.1	41	11.7	1.636
Afternoon											
Yes	5	55.6	42	21.8	20	23.3	12	19.0	79	22.5	0.104**
No	4	44.4	151	78.2	66	76.7	51	81.0	272	77.5	6.157
Evening											
Yes	9	100	181	93.8	78	90.7	60	95.2	328	93.4	0.560**
No	0	0	12	6.2	8	9.3	3	4.8	23	6.6	2.058
Night											
Yes	1	11.1	42	21.8	17	19.8	5	7.9	65	18.5	0.092**
No	8	88.9	151	78.2	69	80.2	58	92.1	286	81.5	6.437

Notes. BMI= Body Mass Index
*Values are given either as %. *p-value<0.05, **p-value>0.05*

Table 3. Comparison of Daily Activity States and BMI of The Pupils (N= 351)

Daily Activity States	BMI Classification: underweight (<5%) n	%	normal (5%-84%) n	%	overweight (85%-95%) n	%	obese (≥95%) n	%	TOTAL n	%	p-value x²
watching TV(hours)											
≤2	7	77.8	170	88.1	73	84.9	53	84.1	303	86.3	0.689**
>2	2	22.2	23	11.9	13	15.1	10	15.9	48	13.7	1.471
being in front of the PC periods (hour)											
≤2	8	88.9	178	92.2	79	91.9	58	92.1	323	92.0	0.987**
>2	1	11.1	15	7.8	7	8.1	5	7.9	28	8.0	0.135
Games (hour)											
≤2saat	7	77.8	153	79.3	67	77.9	39	61.9	266	75.8	0.044*
>2saatten	2	22.2	40	20.7	19	22.1	24	38.1	85	24.2	8.125
going to school by											
car	9	100	180	93.3	82	95.3	59	93.7	330	94.0	0.788**
foot	0	0.0	13	6.7	4	4.7	4	6.3	21	6.0	1.053

Notes. BMI= Body Mass Index
*Values are given either as %. *p-value<0.05, **p-value>0.05*