Nutritional habits and obesity: Primary school students in Sinop, the northernmost point of Turkey

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ARTICLE INFO	ABSTRACT

The conditions in which energy intake is more than energy consumption and the clinical conditions which arise with the increase in fat tissue is generally called obesity. The World Health Organization (WHO) defines obesity as the abnormal or excessive accumulation of fat in the body such that it endangers health. A combination of environmental and genetic factors rather than an organic illness underlie most cases of pediatric obesity. The aim of this research is to examine the nutritional habits and obesity conditions of primary school students. This descriptive study was carried out on all students in primary schools affiliated to the Sinop Provincial Directorate of National Education, from May 10th, 2010 to May 10th, 2011, after gathering all necessary permissions. The research comprises 3352 students who agreed to take part in the research; there was no sub-selection within the sample. After examining the percentile assessment of the participating children, the following categorization has been made: 7% (under five) underweight, 78.4% (between 5-85) normal, 8.7% (between 85-95) overweight and 6% (95 and over) obese. Examining the children's BMI according to gender found that 9.6% of boys and 7.6% of girls were overweight, and 7.6% of the boys and 4.3% of the girls were obese, a higher rate of excessive weight in boys than in girls. As a result, it is suggested that nurses should continue an effective counseling service to enable children's sufficient and balanced nutrition, that they cooperate with the families while carrying out this service, and consider social factors that increase tendencies to obesity. It is also suggested that further research should be done on the relationship of parents and children.

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1. Introduction
Definition, diagnosis and etiology

The conditions in which energy intake is more than energy consumption and the clinical condition, which arises with the resultant increase in fat tissue, is generally called obesity. The World Health Organization (WHO) defines obesity as the abnormal or excessive accumulation of fat in the body such that it endangers health (Ergül and Kalkım, 2011). A combination of environmental and genetic factors, rather than organic illnesses, usually underlies most cases of pediatric obesity (Rosenthal and Gitelman, 2003). Some studies show the hereditary factors in the etiology of obesity. For example, children with an obese mother show an increase in obesity risk of 40%, while an obese father increases a child's risk to 80%. As well, children with obese parents have a lower metabolisc rate (Günöz, 2002). On the other hand, because it is impossible to explain the worldwide excessive increase of childhood obesity by hereditary means alone, the Public Health Institution of Turkey considers environmental factors to have a prominent role in this phenomenon (PHIT, 2012a).

Risks

Obesity is a very important risk factor for coronary heart disease, hypertension, paralysis, type 2 diabetes, cancers of the uterus, breast, prostate, and colon, osteoarthritis, varicosis, sleep apnea syndrome, birth difficulties, ovarian cysts, and

depression. Today, obesity has been accepted as a disease, which needs treatment (Tiryakioğlu, 2012).

With the increase in the frequency of the obesity during childhood period and in the length of time people remain obese, morbidity and mortality rates will inevitably rise. Examining research on the matter shows that 40% of those who are obese in their childhood, and 75-80% of those who are obese during puberty are also obese in adulthood. Meanwhile, the longer the time one spends obese, overall lifespan and quality of life will decrease (Aycan, 2012).

Extent of obesity in Turkey and in the world
Obesity has become an important public health problem as it continually increases in developed and developing countries. The MONICA study, which WHO carried out in six different regions of Asia, Africa and Europe over 12 years, discovered a 10-30% increase in the prevalence of obesity (PHIT, 2012b). In the United States, the most recent national research comparing BMI with older data shows a 50-60% increase in childhood and adolescent obesity over a single generation (Schwarz, 2012). Spain and Portugal have the highest prevalence of overweight school children across both genders: 35% of 6-9-year-old Spaniards, 32% of 7-9-year-old Portuguese. The countries with the lowest rates are Slovakia at 15% of 7-9-year-olds, France at 18% of 7-9-year-olds, and Switzerland and Iceland each with an obesity rate 18% of 6-9-year-olds (Ergül and Kalkım, 2011). Obesity frequency in both children and adults has rapidly increased particularly in the last 20 years, and the trend is estimated to continue into the 21st century. In the USA, 430,000 obesity-related deaths are reported each year, although after excluding other reasons, the number of deaths caused only by obesity is 120,000. It is estimated that in the 21st century, the expected lifespan of obese American children will grow shorter than that of their parents (Aycan, 2012).

The Turkish Obesity Research Association (TOAD) studied 1821 children of the 12-15 age group in Istanbul's Şişli district. The study found that the percentage of children with a BMI of 18-25 kg/m^2 (overweight) is 9.9%, while 6.2% have a BMI of greater than 30 kg/m^2 (obese) (PHIT, 2012c). In Kayseri, a study of 1032 children from ages 6-10 and 2671 children from ages 11-17 age group, a total of 3703 children from 6-17 age group, found that 10.6% of the children are overweight and 1.6% of the children obese (PHIT, 2012c). Research carried out in Istanbul, Ankara and Izmir on 1044 adolescents from ages 12-13, found that 12% of the children are underweight, another 12% are overweight and 2% are obese. Another study in those three major cities on 1014 adolescents from 12-13, found a total obesity prevalence of 15.1% for boys and 13.3% for girls. A Yeditepe University nutrition study on 1669 wealthy children from 20 private kindergartens, primary schools, and high schools found that one child out of six is on the verge of obesity, the obesity rate for girls is 16.7% and 25% for boys, while 34.4% of boys from age 10-12 is under great threat of obesity. Away from these major cities, a study in Muğla of 4260 children from 6-15 years found that 7.6% of girls and 9.1% of boys are obese (PHIT, 2012c).

The aim of this research is to examine the nutritional habits and obesity conditions of primary school students.

2. Method
This descriptive research was carried out on all primary school students affiliated to the Sinop Provincial Directorate of National Education, between May 10th 2010 and May 10th 2011 after all the necessary permits had been taken. 3352 students took part in the research, and there was no further selection within the sample

Research data was obtained selection has been carried out through an information form with 19 questions regarding the students' nutritional habits. The form also includes questions about age, gender, height and weight, whether they had breakfast regularly, their frequency of eating fast food, snacking on junk food between meals, and what foods are consumed most often. These factors are thought to affect body mass index.

After explaining what was to be done, the questionnaires are given, and the participants filled them at the same time.

The BMI evaluation was done according to the following criteria: a score under five is underweight, between 5-85 is normal, between 85-95 is overweight, 95 and over is obese (Arı and Süzer, 2008; Neyzi et al., 2008; Güler et al., 2009). The chi square test and Anova test in SPSS for Windows 13.0 were used to calculate and evaluate data.

Regarding ethics. Participation was secured only after taking necessary verbal and written permissions according to the voluntary participation principle. Students gave verbal permission, while written permission was secured from the Directorate of Education.

3. Results
The gender breakdown of the study's participants was 52.4% male and 47.6% female; 58.3% are ages 7-11, and 41.7% are ages 12-16 (Table 1).

Table 1. Distribution of the student groups according to the age and gender

	Categories	n	%	Total
Age	Age 7-11	1954	58.3	3352
	Age 12-16	1398	41.7	
Gender	Girl	1597	47.6	3352
	Boy	1755	52.4	

Examining the education levels of the mothers of participating children 8.5% of mothers for the underweight group of students had graduated from primary school only, 81.6% of mothers for students of normal weight had graduated secondary school, while the maternal education levels of overweight and obese students were 11.3% and 11.4% respectively. Only 8.6% of the children participating in the study consume fast foods such as hamburger and pizza very often, while 91.4% do not consume this type of food very often (Table 2).

Correlating the children's frequency of meal times with their body mass index, 67.8% of obese and 78.2% of overweight students eat a full meal three times each day (Table 3). However, a statistically reasonable correlation (p>0.05) could not be found between BMI and the times of day that children ate (Table 4).

When children are sad, excited or angry, 27.4% of the children reported feeling a need to eat, while 72.6% of them did not.

Regarding nutritional habits, results show that 94.4% of participating children have breakfast, while 5.6% do not. Re-

Table 2. Distribution of the student groups according to the education level of the mother

	Categories									
	Underweight		Normal		Overweight		Obese		Total	
Education of the mother	Number	%	Number	%	Number	%	Number	%	Number	%
Illiterate	6	6.8	68	77.3	4	4.5	10	11.4	88	100
Literate	22	6.5	245	72.7	38	11.3	32	9.5	337	100
Primary school	117	8.5	1070	77.6	112	8.1	79	5.7	1378	100
Secondary school	49	5.4	734	81.6	76	8.4	41	4.6	900	100
University	39	6.0	510	78.6	60	9.2	40	6.2	649	100

Table 3. Distribution of the student groups according to the number of meals a day

Categories	2 meals		3 meals		4 or more meals		Total	
	n	%	n	%	n	%	n	%
Underweight	13	5.5	181	77.6	39	16.9	233	100
Normal	193	7.4	2066	78.6	368	14.0	2627	100
Overweight	27	9.3	227	78.2	36	12.5	290	100
Obese	29	14.4	137	67.8	36	17.8	202	100

Table 4. The relationship between the number of meals and BMI

Categories		BMI		
	n	Mean	Std. Deviation	Statistics
The number of meals				
2 times	262	1850.90	410.85	f=1.593 P=0.204
3 times	2611	1821.67	321.27	
4 or more	479	1804.55	381.12	
Total	3352	1821.51	338.18	

*f: One Way ANOVA test (p>0.05).

Table 5. Distribution of the nutritional behaviors of the students

Categories	n	%
Those with the habit of having breakfast	3165	94.4
Those with no habit of having breakfast	187	5.6
Total	**3352**	**100**
Those having lunch at school	232	6.9
Those having lunch at home	2949	88.0
Those having lunch at other places	171	5.1
Total	**3352**	**100**
Those having dinner at a diner/restaurant	42	1.3
Those having dinner at home	3262	97.3
Those having dinner at other places	48	1.4
Total	**3352**	**100**
Those with the habit of drinking acid drinks during the meal	1256	37.5
Those with no habit of drinking acid drinks during the meal	2096	62.5
Total	**3352**	**100**
Those who consume foods such as hamburger, pizza, very often	288	8.6
Those who do not consume foods such as hamburger, pizza, very often	3064	91.4
Total	**3352**	**100**
Those who are insisted by their families to finish their plate	2855	85.2
Those who are not insisted by their families to finish their plate	497	14.8
Total	**3352**	**100**
Those who feel a need to eat under great sadness, anger or excitement	920	27.4
Those who do not feel a need to eat under great sadness, anger or excitement	2432	72.6
Total	**3352**	**100**

garding where children eat lunch and dinner, 6.9% have their lunch at school, 88% of them at home, and 5.1% of them in other places. As for dinner, 1.3% of the children have dinner at a restaurant, 97.3% of them at home, and 1.4% somewhere else. The study found that 37.5% of the children drink soda with their meals and 62.5% of them abstain from acidic carbonated beverages. Only 8.6% of the children participating in the study consume fast foods such as hamburger and pizza very often, while 91.4% do not consume this type of food very often (Table 5).

When children who participated in the research is examined according to junk-food eating between meals; 17.2% of them eats junk-food and 82.8% doesn't. It's seen vegetable dishes are most liked meals by 32.6% and most eaten meals by 44.7% (Table 6).

Besides, when junk-food eating habits of the children between meals is examined, it's seen all groups answer "No" (Table 7).

According to the information intended for how these children relieve their hunger in school; God decides the situation of donut-pastry type is seen at highest level in all groups as 68.2% in underweight group, 66.2% in the normal group, 59.7% in overweight group and 51.5% in the obese group (Table 8).

The gender breakdown of the children's BMI shows a

Table 6. Distribution of the students according to nutritional habits and choices

Categories	n	%
Those who prefer to eat bagel-pastry when hungry at school	2175	64.9
Those who prefer to eat biscuit when hungry at school	296	8.8
Those who prefer to eat the food in their lunch box when hungry at school	881	26.3
Total	**3352**	**100**
Those who eat 2 meals a day	262	7.8
Those who eat 3 meals a day	2611	77.9
Those who eat 4 or more meals a day	479	14.3
Total	**3352**	**100**
Those who eat junk food between meals	577	17.2
Those who do not eat junk food between meals	2775	82.8
Total	**3352**	**100**
Those who prefer to eat at the table	3110	92.8
Those who prefer to eat in front of the television	242	7.2
Total	**3352**	**100**
Those whose favorite foods are cookie and pastry	518	15.5
Those whose favorite foods are milk, yogurt and ayran	809	24.1
Those whose favorite foods are chips, cola and chocolate	485	14.5
Those whose favorite foods are vegetable dishes	1093	32.6
Those whose favorite foods are other than those	447	13.3
Total	**3352**	**100**
Those whos consume most cookie and pastry	231	6.9
Those whose consume most milk, yogurt and ayran	760	22.7
Those who consume most chips, cola and chocolate	306	9.1
Those who consume most vegetable dishes	1499	44.7
Those whose consume most are other than those	556	16.6
Total	**3352**	**100**

higher rate of obesity and being overweight in males than fe-males; 9.6% of males and 7.6% of females are overweight, while 7.6% of males and 4.3% of females are obese.

Comparison across age-groups finds a statistically mean-ingful difference in BMI between the age ranges of 7-11 and 12-16, with the younger children being heavier (Table 9).

Table 7. Distribution of student groups junk-food eating habits

Categories	Underweight		Normal		Overweight		Obese	
Junk-food eating between meals	n	%	n	%	n	%	n	%
Yes	51	21.9	458	17.5	37	12.8	31	15.4
No	182	78.1	2169	82.5	253	87.2	171	84.6
Total	233	100	2627	100	290	100	202	100

Table 8. Distribution of BMI by school students hunger reduction behaviors

Categories	Underweight		Normal		Overweight		Obese	
	n	%	n	%	n	%	n	%
Bagel-Pastry	159	68.2	1739	66.2	173	59.7	104	51.5
Biscuit	19	8.2	242	9.2	18	6.2	17	8.4
Food in their lunch box	55	23.6	646	24.6	99	34.1	81	40.1
Total	233	100	2627	100	290	100	202	100

of 12.4% and an obesity prevalence of 6.5%, similar to our work (Öztürk and Aktürk, 2011). BMI data for the Kayseri survey show a similar gender disparity with 9.6% of boys and 7.6% of girls being overweight, and 7.6% of boys and 4.3% of girls being obese. However, among the 7-11 age group, girls have a higher BMI.

A different survey of 1014 adolescents from ages 12-13 in Istanbul, Ankara and Izmir discovered a total obesity prevalence rate of 15.1% for boys and 13.3% for girls (PHIT, 2012a). Research on 4260 children from ages 6-15 in Muğla found that 7.6% of girls and 9.1% of boys are obese (PHIT, 2012c), although being overweight tends to be more common among girls during primary school and puberty compared to boys (Spinu, 2012). Those results show parallelism with our own.

Table 9. Student groups by age and sex distribution of BMI

Categories	Underweight		Normal		Overweight		Obese		Total	
Gender	n	%	n	%	n	%	n	%	n	%
Girls	139	8.7	1267	79.4	122	7.6	69	4.3	1597	100
Boys	94	5.4	1360	77.4	168	9.6	133	7.6	1755	100
Age	n	%	n	%	n	%	n	%	n	%
7-11	108	5.5	1472	75.2	211	10.8	163	8.5	1954	100
12-16	125	8.9	1155	82.6	79	5.7	39	2.8	1398	100

4. Discussion

The weight classes of participating children broke down as follows: 7% were underweight (BMI under 5), 78.4 were nor-mal (between 5-85), 8.7% were overweight (between 85-95), and 6% were obese (95 and over). This is a higher rate of obesity than was discovered in the Istanbul, Ankara and Izmir survey of 1044 adolescents from ages 12-13, in which 12% of the children are underweight, 12% overweight and only 2% obese (PHIT, 2012a).

According to the information intended for how these chil-dren relieve their hunger in school; God decides the situation of donut-pastry type is seen at highest level in all groups as 68.2% in underweight group, 66.2% in the normal group, 59.7% in overweight group and 51.5% in the obese group (Table 8).

The gender breakdown of the children's BMI shows a higher rate of obesity and being overweight in males than fe-males; 9.6% of males and 7.6% of females are overweight, while 7.6% of males and 4.3% of females are obese. Howev-er, all our research samples are taken from urban areas, and obesity rates in cities are much higher compared to rural ar-eas (Parlak and Çetinkaya, 2007; TOMKP, 2009). Research carried out in Poland found that obesity is twice as common among men living in urban areas than those living in rural areas (Aneta et al, 2012), which may clarify why obesity rates in our research turned out high. Furthermore, a 2012 survey in Kayseri found a prevalence of overweight children

Schools can play a pivotal role in preventing childhood obesity. Institutions offering full-time schooling have control over the content of student lunches (Öztora, 2005). Foods available to children in their schools are often the donut-pas-try type, no matter their weight class: 68.2% in the under-weight group, 66.2% for the normal group, 59.7% of over-weight children and 51.5% of the obese. These foods are part of our culture, and children and adults prefer them because they are easily accessible, fast, comfortable and satisfying foods. They can become more healthy meals when supple-mented with additional nutrients such cheese and olives.

When a child's obesity situation is correlated with the ed-ucation level of their mothers, children of university gradu-ates mothers have healthier weights than children of non-lit-erate mothers, indicating that obesity decreases as a family's education level increases. It also parallels Chinese research results that specify high levels of maternal education as a pro-tective factor against obesity (Xiaoqing et al., 2012). The rate at which children eat three meals per day is high across all weight groups, while the obese group exceeds this limit most frequently, eating four or more meals each day. However, the gap between them is not statistically meaningful (p>0.05) (Öztürk and Aktürk, 2011).

The content of the meal is as important as the frequency of eating. Therefore, the best solution is to provide children with a nutrition program that will maintain a diet in accordance with the requirements of their bodies. For this reason, it is

important to work with the school nurses and pediatric nurses to prepare school programs for supplying children the energy they need. Furthermore, nurses can only carry out this role in cooperation with the students' family (Güler et al., 2009).

Even though obesity rates are rising across Turkey, only 17.2% of participating children eat junk-food regularly while 82.8% do not; in fact, vegetable dishes are the most liked meals of 32.6% of children and are the most frequently eaten type of meal for 44.7% (Table 6). Virtually no respondents eat junk food between meals (Table 7). Press publications, schools and parents express that eating junk foods negatively affect health; children cannot escape exposure. However, attractive junk-food advertisements also appear frequently across media, affecting the eating habits of adults as well as children.

Meta-analysis on interventions to prevent childhood obesity includes 37 studies on a total of 27.947 children found evidence supporting the beneficial effects of programs similar to our recommendations, especially programs targeting the 6-12 age group. Examining evidence-based programs shows that developing a school curriculum including quality of food available at school, increasing physical activity during school time, and encouraging body image confidence work best in collaboration with parents (Waters et al, 2011). This conclusion is corroborated by a study of 64 randomized controlled trials focused on treatment programs including interventions in lifestyle, physical activity, and diet. (Oude Luttikhuis et al., 2009). An Australian study, discovered that expert advice physical education helps to regulate students' percentage of body fat across age groups and contributes to academic improvement (Telford et al., 2012).

Poor mother-child relationships in early life is a closely related to obesity. Therefore, it is suggested to examine potential mechanisms including stress response and emotion regulation to assess the effects of mother-child relationships in cases of excessive childhood weight gain (Anderson et al., 2012).

In conclusion, in the light of this information, it is suggested that nurses continue maintaining effective counseling services to enable sufficient and balanced nutrition in every area in which children are offered service, that they cooperate with the families during their duties, to consider social tendencies, and carrying out research on parent-child relationships.

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