The suitability of the food consumed by children in primary schools for satisfying their needs

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Abstract

Objective: This study evaluates the suitability of the food consumed by children in primary schools including the role of the lunch menus in satisfying the children's needs. **Methods:** 852 first-grade students were chosen from 14 randomly selected primary schools in Gaziantep to participate in this descriptive, cross-sectional study. Demographic and personal data of the students and their parents, their anthropometric measurements, food consumption habits and the lunch menus served in schools were studied. The Body Mass Index (BMI) of students was evaluated according to World Health Organization (WHO)'s percentile tables. Data were analyzed by SPSS 18 software, using the chi-square test for analyses. The study was approved by the Ethics Committee. **Results:** 51.4% of students were male, 48.6% were female (mean age, 7.05±0.24 years). According to the BMI results, 26.6% of the students were thin and 25.9% were overweight/obese. 73.5% and 85.8% of the children were having breakfast or lunch regularly, respectively. Maternal education levels and employment status did not affect the child's having breakfast on a daily basis ($p>0.05$). 27.7 % of children who ate lunch regularly, 15.7% of children who did not eat lunch regularly were overweight/obese ($p<0.05$). The most consumed food on a regular basis was bread (92.6 %), followed by milk and dairy products (76.5%). When lunch was served in schools (for 24.9% of the students), regular lunch consumption increased among children ($p<0.05$). The food group the most consumed by the students having lunch at school was fats-sugars-cereals. Only 43.3% of the lunch menus served at schools were found adequate. **Conclusions:** This study demonstrates that there is a need to improve lunch menus served in primary schools in order to satisfy energy and nutritional needs of children.

Keywords: Nutrition, school health, primary school

İlköğretim okullarında çocukların tükettiği gıdaların ihtiyaçlarına uygunluğu

Özet

Amaç: Tam gün eğitim veren ilköğretim okullarında servis edilen öğle yemek menüsü de dahil olmak üzere çocukların tükettikleri besinlerin çocukların günlük ihtiyaçlarına uygunluk durumunun değerlendirilmesi amaçlanmıştır. **Yöntem:** Tanımlayıcı, kesitsel tipteki bu araştırmaya, Gaziantep'te tam gün eğitim veren ilköğretim okullarından rasgele belirlenen 14'ünden, 852 birinci sınıf öğrencisi alınmıştır.

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Öğrencilerin ve ebeveynlerinin demografik ve kişisel bilgileri, antropometrik ölçümleri, okulda verilen öğle yemeği menüleri ve besin tüketim alışkanlıkları incelenmiştir. Öğrencilerin Beden Kitle İndeksi (BKİ) değerleri Dünya Sağlık Örgütü (DSÖ)'nün persentil tablolarına göre değerlendirilmiştir. Veriler SPSS 18 programında değerlendirilmiş, analizlerde ki–kare testi kullanılmıştır. Araştırma için etik kurul onayı alınmıştır. **Bulgular:** Öğrencilerin %51.4'ü erkek, %48.6'sı kız, yaş ortalamaları 7.05±0.24 yıldır. BKİ sonuçlarına göre %26.6'sı zayıf, %25.9'u hafif şişman/şişman bulunmuştur. Çocukların %73.5'i düzenli kahvaltı, %85.8'i düzenli öğle yemeği yemektedir. Annenin eğitim ve çalışma durumu çocukların her gün kahvaltı yapma durumunu etkilememektedir ($p>0.05$). Her gün öğle yemeği yiyenlerin %27.7'si hafif şişman/şişman iken düzenli yemeyenlerde bu oran %15.7 saptanmıştır ($p<0.05$). Her gün düzenli tüketilen besinler en fazla ekmek (%92,6), takiben süt ve süt ürünleri (%76,5)'dir. Öğrencilerin %24.9'unun okulunda öğle yemeği servis edilmektedir. Okullarda öğle yemeği servis edilmesi, çocuklarda düzenli öğle yemeği tüketimini arttırmaktadır ($p<0.05$). Öğle yemeğini okulda yiyen öğrencilerin okulda en çok tükettikleri grubun, yağ-şeker-tahıl olduğu saptanmıştır. Okulda servis edilen öğle yemeği menülerinin %43.3'ünün uygun olduğu belirlenmiştir. **Sonuç:** Bu çalışma, ilköğretim okullarında öğle öğünü menülerinin çocukların enerji ve besin öğeleri ihtiyaçlarına uygun hale getirilmesi için iyileştirme çalışmalarının gerekliliğini ortaya koymaktadır.

Anahtar Kelimeler: Beslenme, okul sağlığı, ilköğretim okulu

Introduction

Children of school-age, make up a sizeable portion of the country's population, and are constantly growing and developing. The school-age is a period of fast learning, acquiring knowledge, abilities, and new influences. Therefore, it is necessary to provide children with knowledge about adequate and balanced nutrition as well as health-related education so that they can maintain and develop their health.[1]

Failures to meet the needs for energy and nutritional elements during childhood lead to several health problems due to deficient and imbalanced nutrition.[2] School-age children are one of the groups that are most affected by nutritional deficiencies. Inappropriate dietary habits acquired during childhood as well as a sedentary lifestyle bring about major risk factors for health problems such as heart diseases, hypertension and obesity at later ages.[3]

Nutritional services provided to children are critical not only for encouraging adequate and balanced nutrition, but also for acquiring proper nutritional habits beginning from childhood. When planning a menu, one must take into consideration that for this age group the requirements per unit of body weight for energy and nutritional elements are high (especially for animal-derived proteins, minerals including calcium and iron, and vitamins) due to the rapid and continuous growth and development of children.[3]

When the total of nutritional services currently provided to school-age children are examined, it can be observed that in recent years school canteens as well as outsourced cafeteria services as part of the rapidly growing privatized services play a significant role in the students' nutrition. Particularly in all-day schools, it is of utmost importance to provide high quality overall nutritional services which follow the principles of adequate and balanced nutrition in order to positively contribute to the students' nutrition.[3]

In this study, the adequacy of the food consumed by first-graders in all-day primary schools for satisfying the daily needs of children was evaluated together with the menus served in some schools, as well as the factors affecting nutrition of the children in relation to their growth levels.

Methods

In this descriptive and cross-sectional study, the sample size was calculated by its

associated 95% confidence interval and with a 2% effect size, by taking into account a 9% obesity prevalence (the obesity prevalence in school-age children worldwide estimated by WHO in 2010) giving a minimum sample size of 7864. Sample size was calculated according to the $n= t^2pq/d^2$ formula. 14 primary schools were randomly chosen by random sampling numbers from 33 public and 11 private schools in Gaziantep. 852 primary school first-graders who were in school on the day of the research and who answered all the questions in a questionnaire were enrolled in the study. Questionnaires for parents consisted of 11 questions and questionnaires for students consisted of 15 questions. These questionnaires were delivered to and obtained from parents with the help of the students' teachers. The forms questioning the food consumed for lunches over 5 days were filled in by students with the help of teachers and the researcher of the study.

Demographic and personal data of the students and their parents, anthropometric measurements of the students, lunch menus given in schools, as well as the food groups consumed by students in lunch meals over five consecutive days and their food consumption habits were examined. Measurements of students' heights and weights were obtained by the investigator. Height was measured without shoes and with heels together pressed to the wall, and weight was measured by a digital scale sensitive to 100 grams with a 150 kg max value.

BMIs of students were calculated and evaluated according to their age and gender using the percentile tables of WHO. Students with BMI values below the 3rd percentile were considered to be very severely thin, those with values between 3rd–15th percentile, thin, those with values between 15th–85th percentile, normal, those with values between 85th–97th percentile, overweight, and those with values above 97th percentile were considered obese5.

The study's dependent variable was food habits of the children and the independent variables were the mother's educational level, occupational status, BMI, the children's physical activity levels and the time spent with TV and computer.

Data gathered from the study were assessed by SPSS 18 software, using the chi-square test for the analyses. Mean values were provided together with the standard deviation. The study was approved by the Ethics Committee of Gaziantep University on 24.02.2011, with decree no. 02/2011-04.

Results

51.4% of the students were male, 48.6% were female, and their mean age was 7.05±0.24 years. It was found that 26.6 % of the students were thin, 47.4% were normal, 13.0% were overweight, and 12.9% were obese. 73.5% of the study children were eating breakfast regularly, 85.8% were eating lunch regularly, and 85.8% were eating dinner regularly. It was observed that 24.4% of the male students and 38.7% of the female students skipped breakfast. Both male and female students showed similar patterns in their meal consumption. The status of children having breakfast is shown in Table 1 in relation to maternal education levels and employment status.

67.9% of the children whose mothers had an education lower than primary school and 73.8% of the children whose mothers had a primary school or a higher education were having breakfast regularly. There was not a statistically significant difference between the groups having or not having breakfast on a daily basis with respect to maternal education levels ($p>0.05$). Whereas 76.8 % of children with working mothers were eating breakfast regularly, this percentage was 72.1 for children whose mothers were not working. A statistically significant difference was not found between the groups having or not having breakfast on a daily basis with respect to the mother's employment status ($p>0.05$).

Table 1. Distribution of children by whether they eat breakfast, by the maternal education level and employment Status.

	Status of eating breakfast on a daily basis							
	Regular		Irregular		Total			
Maternal education level	n	%	n	%	n	%	χ^2	p
Lower than primary school	19	67.9	9	32.1	28	100.0	0.50	0.479
Primary school and beyond	607	73.8	215	26.2	822	100.0		
Total*	626	73.6	224	26.4	850	100.0		
Employment status of the mother								
Employed	195	76.8	59	23.2	254	100.0		
Unemployed	431	72.1	167	27.9	598	100.0	2.019	0.175
Total	626	73.5	226	26.5	852	100.0		

*2 children did not state the maternal education level

Table 2. Distribution of children relating to the status of eating breakfast and lunch, and BMI percentile groups

		BMI Percentile Groups							
		Thin		Normal		Overweight/Obese		Total	
		n	%	n	%	n	%	n	%*
Having breakfast on a daily basis**	Regular	162	25.9	307	49.0	157	25.1	626	73.5
	Irregular	65	28.8	97	42.9	64	28.3	226	26.5
Having lunch on a daily basis***	Regular	191	26.1	338	46.2	202	27.7	731	85.8
	Irregular	36	29.8	66	54.5	19	15.7	121	14.2
	Total	227	26.6	404	47.4	221	26.0	852	100.0

*Column percentage, **χ^2 =2.503 p=0.286, *** χ^2 = 7.72 p=0.021

Table 2 shows the distribution of the children's BMI percentile results according to their status in relation to having breakfast and lunch.

25.1% of children who had breakfast every day and 28.3% of those who did not have breakfast were overweight or obese ($p>0.05$). Also, 27.7 % of the children who had lunch every day and 15.7 % for those who did not eat lunch regularly were overweight or obese ($p<0.05$).

The food that was consumed the most on a regular basis was bread (92.6 %), followed by milk and dairy products (76.5 %). While there was not a significant difference in BMI percentile results with respect to the frequency of milk consumption, a difference was found with meat consumption. Accordingly, 17.7% of children who consumed meat every day were obese, and 14.9% were overweight. While 1 out of 8 children (12.5%) who never consumed meat, and 2 out of 50 children (4%) who consumed meat 1-2 times a month were found to be overweight, none of the children in these groups were obese. The BMI percentile values of the children who did not consume meat at all or only 1 or 2 times a month were lower compared to the other groups. 65.3% of the children consumed fresh fruits and vegetables regularly, while 31.7% ate chocolate and sugar on a daily basis.

57.0% of the children commute to school by a vehicle and 57.0% participate in sport activities regularly.

In this study, the percentage of children watching TV on school days was similar for girls and boys. The percentage watching TV over 2 hours on school days was 15.7 for girls and 20.5 for boys; the corresponding percentages were 56.5 and 60.9 respectively on non-school days. On the other hand, 57.0% of boys and 66.2% of girls never play games on a computer on school days and 33.6% of boys and 45.2 of girls never play games on the computer on non-school days. The study showed that there was a significant difference between the two genders in the duration of playing games on computers both on school-days and non-school days ($p<0.05$). On further analysis, the number of boys playing games on the computer for 1-2 hours or more both on school days and non-school days (12.5% on school days and 31.5% on non-school days) was higher than the girls (4.1% on school days and 22.2% on non-school days).

In our study, it was observed that 69.1% of children ate their lunch at school. While 24.9% of the students were offered lunch in their schools, the remaining 75.1% were not. 92.9% of the children who were offered lunch in their schools ate lunch regularly, and 83.4 of the children who were not offered lunch in their schools ate lunch regularly. The children who were offered lunch at school had a higher regular lunch consumption ($p<0.05$).

Table 3 shows the distribution of children according to the school type and the BMI percentile results.

17.5% of children studying at private schools were thin and 18.9% were obese; corresponding percentages were 29.7% and 10.9% at public schools, respectively. There was a significant difference between BMI percentile results for children with respect to school type and it was considered that this difference stemmed from the fact that children at public schools were thinner than their counterparts at private schools.

When food group consumption over five days was examined among children who ate their lunch at school, it was found that the food groups most consumed by the students who ate their lunch at school were fats, sugars, and cereals, and the least consumed food groups were fats, sugars, cereals, meat and milk.

In this study, the suitability of the food groups consumed at lunch over five days by the children and the menus that were served at the school were examined. In one of the primary schools taking part in the study, different menus were served every day in two first-grade classes. 6 menus were offered in 5 different schools in total.

Table 3. Distribution of children by school type and BMI percentile groups

BMI percentile groups	School type					
	Private school		Public school		Total	
	n	%	n	%	n	%
Thin	37	17.5	190	29.7	227	100.0
Normal	95	44.7	309	48.3	404	100.0
Overweight	40	18.9	71	11.1	111	100.0
Obese	40	18.9	70	10.9	110	100.0
Total	212	100.0	640	100.0	852	100.0

χ^2=24.496, p<0.001

In one school two different menus were offered. 5 day menus were evaluated in these schools. Thus, 30 menus from 5 primary schools were examined in total, and 13 of them (43.3%) were found to be adequate. The study revealed that the 1/3rd of the energy needed daily at lunch by school-age children was not appropriate in terms of the distribution of nutritional elements (carbohydrates, proteins, fats). It was observed that inappropriate menus contained the cereal group in excess, the milk or dairy group was only served 1 or 2 times a week and the meat group was inadequate.

Discussion

The fact that approximately 1 out of 4 children participating in the study skipped breakfast is important. Studies conducted in different cities of Turkey have revealed that the rate of skipping breakfast is between 12.3% and 63.9%.[6-11] Many studies conducted in our country and worldwide have shown that breakfast is the most skipped meal. There are studies suggesting that skipping breakfast has many detrimental effects and may be a risk factor for obesity.[12-15] Our study did not find a statistically significant difference in the rates of children having breakfast with respect to BMI percentile values. Perhaps, measurements obtained at advanced ages may reveal similar results in our sample as well. Consistent with our study, other similar studies also showed that other meals are less likely to be skipped compared to breakfast.[11, 16]

Children who ate lunch every day were more likely to be overweight or obese compared to children who did not eat lunch regularly. The reason for this may be that although they ate lunch regularly, the content of the meal was not healthy and balanced.

Our study did not find a significant difference between children's BMI percentile values with respect to maternal employment. However, several studies have shown that the socioeconomic environment and demographic structure, particularly the mother's educational level have an impact on the prevalence of overweight and obesity.[17,18]

Although our study did not detect a significant difference between children having or not having breakfast with respect to maternal working status, the fact that the children of working mothers had a higher rates of eating breakfast suggests that the criticism that working mothers do not care enough for their children seems unfounded.

Moreover, a working mother may provide more regularity for feeding her children due to her regular working hours.

In our study, it was observed that 69.1% of children ate their lunch at school. This percentage is considerable in that it underlines the significance of food consumed and the requirement for providing high quality food at schools. Also, the finding that nearly one third of children do not eat their lunch at school reveals that more detailed studies are needed to focus on lunch meals in all-day schools.

Our study found a statistically significant association between serving lunch at schools and the status of eating lunch every day. This fact also emphasizes the importance of offering lunch at schools.

Consistent with other studies in our country, the frequency of snacking between meals was found to be high in this study.[9,13] Among the snacks school-age children frequently consumed between meals were mostly unhealthy foods and beverages such as tea and coffee with sugar, candies and chocolate, simit (Turkish bagel) and cookies, carbonated beverages, fruits and fruit juices, mineral water, sandwiches, wafers and coke.[13,19,20]

It is well-known that being overweight in childhood is a global public health problem and that being overweight or obese affects more and more children every day. In 2007, Miller reported that the rates of being overweight or obese in children have increased more than 4 times (from 4 to 19%) in the past 40 years.[21] It was also reported that in the past 30 years, obesity has doubled in children and tripled among adolescents in the USA. Additionally, more than one third of children and adolescents were reported to be overweight or obese in 2010.[22]

The high rate of overweight or obese children as observed in our study may be related to regional dietary habits. The study results show that there is a cereal-based nutrition in parallel with the nutritional habits in our country.

The significant association found in our study between the meat consumption by children and their BMI percentile values suggest that the children who do not consume meat might also be consuming other foods in smaller amounts because of their socioeconomic status.

Although it does not seem to be at a significant rate yet, the amount of time children spend in front of the TV and computer should be considered in terms of its effects on children's health, and necessary measurements should be taken in order to control it. A study in the USA revealed that daily strenuous physical activity for less than an hour per day, spending too much time in front of the TV and computer, and excessive calorie intake are the most important determinants of being overweight.[23] In another study conducted on primary school children, a significant difference was found in the rate of obesity among study children who spent 4 or more hours per day in front of the TV or computer.[24]

It was noticed that the menus examined were rich in carbohydrates and fats; so, they are adequate in terms of energy but imbalanced in terms of nutritional elements. Also, it is distressing to see that more than half of the menus examined in our study failed to satisfy the needs of children with respect to food groups. Friedman reported that only two of the 40 schools examined (5%) had satisfactory menus; that the food suppliers in many schools did not serve foods rich in proteins and fruits-vegetables in sufficient quantities; that the size of meat portions and meat group foods were below accepted standards; and that nearly half of the schools served menus containing high amount of fats.[25] In our country, there is also a need for more detailed studies on school menus.

These menus, which have to be prepared under the supervision of a dietician, do not meet the criteria for a balanced diet. This is concerning, since these menus do not only affect children's present nutrition but also their nutritional habits in the future.

This study revealed that there is a need for conducting studies to improve lunch menus served at primary schools in order to satisfy energy and nutritional needs

of school-age children. Lunch should be served in primary schools, and it should be adequate, balanced and appropriate to the children's age and growth.

Most importantly, for healthy generations, country-wide policies should be developed and sustained for adequate and balanced nutrition of school-age children.

Further studies in the future should investigate regular follow-up of children's dietary habits, nutrition education in schools, the appropriateness of school menus, and specifically, a case study should be separately conducted among children in the overweight group.

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