

The Relationship Between BMI, KIDMED Score, and Nutritional Habits of Female Adolescents: A Cross Sectional Study

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ABSTRACT

Objective: This study aims to investigate the relationship between the eating habits of adolescent girls and their KIDMED scores and BMIs.

Methods: This cross-sectional and descriptive study was conducted with the participation of 391 female adolescents studying in Istanbul. Descriptive information, the consumption frequency of some foods and dietary habits, and the Mediterranean Diet Quality Index (KIDMED) were asked through a face-to-face questionnaire.

Results: 19.4% of the adolescents were found overweight and obese, whereas 15.1% were underweight. It was determined that the BMIs of adolescents who think that they have an adequate and balanced diet and who consume salad or raw vegetables more than once a day are significantly lower ($p < .05$). Adolescents' mean KIDMED score was found 4.42 ± 2.44 ; 35.5% had low and 53.8% had moderate KIDMED scores. It was found that the KIDMED scores of the adolescents who consume fruits and vegetables more frequently, never consume chips, consume products such as ready-made cakes/biscuits/wafers less frequently, drink nine glasses of water a day or more, have more meals, do not skip meals, and have breakfast every day are significantly higher ($p < .05$). No correlation was found between KIDMED and BMI. It was observed that the diet quality of female adolescents was generally at moderate and low levels, but there were no significant differences in BMI values.

Conclusion: It has been concluded that to improve the diet quality of adolescents, it is necessary to develop nutrition education, knowledge and habits, and to provide opportunities to reach healthy meal options in schools.

Keywords: Adolescent, nutrition, diet quality, Mediterranean diet

1. INTRODUCTION

Adolescence is a transitional period between childhood and adulthood in which physical and mental changes are experienced. The starting time and course of this transition period, which is the second significant growth stage of life after infancy, varies from society to person, and between genders. It is estimated that there are 1.8 billion adolescents in the world, mostly in low – and middle-income countries (1). According to the 2022 data from the Turkish Statistical Institute (TUIK), the adolescent population (10-19 years old) in our country constitutes 7.4% of the total population, and female adolescents constitute 3.6% of the total population (2).

Habits in adolescence affect later periods of life. Considering public health, the evaluation of adolescents as a priority group plays an active role in improving and improving health (3). Understanding the dietary habits of adolescent girls and the factors affecting them is an important public health priority. Adolescence is a crucial transitional period when adult lifestyle habits begin to emerge. Poor dietary habits

of adolescents are associated with increased risk for long-term health outcomes in a population with high baseline epigenetic modifications (4).

The high and increasing prevalence of overweight and obesity in adolescents is a major global public health problem. Since the 1980s, the global prevalence of overweight and obesity in children and adolescents has increased by 47%. This trend is observed in both high-income countries and low – and middle-income countries, with very little gender gap. While the rate of increase in overweight and obesity has slowed in high-income countries, the rate of increase is increasing for children and adolescents in low – and middle-income countries (5). Adolescents are vulnerable to several changes in their diet. Studies have found that because adolescents spend more time outside the home, they typically consume more fast foods and sugar-sweetened beverages, and less fruit and vegetables (6). Diet quality and overweight are strongly linked to social inequalities. In Western societies, the rate of overweight and obesity is highest among children and

adolescents of low socioeconomic status (SES). Therefore, SES is part of the multifactorial obesogenic environment to which children are exposed. In addition, high consumption of energy-providing foods and beverages, long-term exposure to media sources, and parental overweight are relevant risk factors for childhood obesity. These risk factors are linked to the home environment and therefore very difficult to address with preventive interventions, especially in families with low SES (7). Also, during the education period children and adolescents spend most of their waking time at school. Thus, breakfast and lunch behavior is partially dependent on schedule and food availability in the school setting (8,9) In addition, in a study conducted in Sweden reported that an estimated two in three adolescents in the European region and Canada do not consume enough nutrient-rich foods (10). A study conducted in Taiwan also revealed that female adolescents are a unique population and that their nutrition and quality of life are correlated with obesity (11).

Studies on the nutritional habits and knowledge levels of adolescent girls show that the vast majority of them have inadequate and unbalanced nutrition, and further and detailed studies are needed on this subject (12–15). Therefore, this study was conducted to investigate the eating habits of female adolescents living in Istanbul and the relationship between these habits and BMI and KIDMED scores.

2. METHODS

This cross-sectional and descriptive study was conducted in Istanbul, Beykoz in public schools with students from low SES backgrounds between February and March 2020. The sample of the study was calculated as 384 with 95% confidence interval and 5% margin of error. Students who could not be in schools during the study and did not give their consent, those with a chronic or metabolic disease, those on a diet, or those who applied a special nutritional therapy were excluded from the study. A total of 409 female students participated, and 18 of them who answered the questionnaire incompletely were excluded from the research. The study was completed with a total of 391 adolescent girls.

Ethical and scientific approval for this study numbered 10840098-604.01.01-E.66353 and dated 27/12/2019, was obtained from the Istanbul Medipol University Non-Interventional Clinical Research Ethics Committee. In addition, voluntary consent was obtained from the students with the permission of the official institutions to apply the questionnaire to the students for the conduct of the study.

The data of the study were collected through a structured questionnaire. The survey form consists of demographic information and physical activity habits of adolescents, food groups and consumption habits of sugary drinks, number of daily meals and skipping meals, anthropometric measurements, and Mediterranean Diet Quality Index (KIDMED).

The age of the students, their classes, the educational status of the parents, the number of people living in the

family and their regular physical activity habits were asked. The type and frequency of physical activity of the students who declared that they did regular physical activity were recorded. Afterwards, the number of main and snack meals, skipping meals and reasons, snack preferences and breakfast habits of the students were recorded. The frequency of consumption of fresh fruit, salad, raw vegetables, cooked vegetables, chips, candy-chocolate, ready-made cake-biscuit-wafer and sugary-carbonated beverages were questioned using the food consumption frequency form.

Before measuring the body weights of the students, ensure that accessories, heavy clothes and shoes were removed and they remained in the lightest clothing, while they were hungry. A scale (Sinbo SBS 4427 Digital Scale) was placed on a horizontal and flat surface, and the measurements were recorded in kg and with an accuracy of 0.1 kg. The height was measured with a non-stretchable measuring tape while standing in the Frankfurt plane. Body mass indexes (BMI) were calculated by dividing the body weight in kilograms by the square of the height in meters and evaluated according to the World Health Organization (WHO) classification (16).

The validity and reliability of the scale developed by Serra-Majem et al. have been demonstrated in Turkish adolescents and its widespread use has been accepted (17,18). The Mediterranean Diet Quality Index (KIDMED) is a diet quality index developed to evaluate the adaptation of children and young people to the traditional Mediterranean diet. It consists of 16 questions. Of the questions included in the KIDMED index, 12 are positive questions and 4 are negative questions, and those who answer yes to positive questions get +1 and those who answer yes to negative questions get – 1 points. Then these scores; are divided into 3 groups as ≥ 8 points for optimal Mediterranean diet (good), 4-7 points as the need to improve their suitability for the Mediterranean diet (moderate), and ≤ 3 points as very low nutritional quality (low) (18).

The data of the study were evaluated with SPSS 18.0 (SPSS Inc., Chicago, IL, USA) package program. Descriptive variables are mean (Mean), and standard deviation (SD); categorical variables are given as numbers (n), and percent (%). The Kolmogorov-Smirnov test was performed if the continuous data showed a normal distribution. Non-parametric tests were applied to the data that did not fit the normal distribution. The Mann-Whitney U test was used in two groups, and the Kruskal-Wallis test was used in more than two groups, in the evaluation of the BMI values and KIDMED scores of the adolescents according to their nutritional habits. In the Kruskal-Wallis analysis, the Mann-Whitney U test was used to determine which group had a statistically significant difference. Bonferroni correction was applied in the analysis of multiple comparisons. The correlation analyses of the continuous variables that did not show normal distribution were performed with the Spearman correlation test. The p-value of $<.05$ was considered significant for statistical differences.

3. RESULTS

Characteristics of adolescents are shown in Table 1. It was determined that the education levels of the mothers and fathers of the adolescents with a mean age of 16.35±1.32 years were primary school at the highest rate with 50.6% and 37.6%, respectively, and the number of people in their families was 4-5 people at the rate of 68.6%. In addition, it was determined that 52.4% of adolescents do not do regular physical activity, and those who do physical activity mostly prefer walking (54.3%). In anthropometric measurements, their BMI was found to be 22.00±3.99 kg/m², and 19.4% of them had BMIs above normal.

Table 1. Descriptive data of adolescents

Descriptive characteristics		
	Mean ± SD	
Age (years)	16.5±1.32	
Height (cm)	161.73 ± 5.73	
Body weight (kg)	57.37 ± 10.97	
BMI (kg/m ²)	22.00 ± 3.99	
	n	%
Mother's educational status		
Primary school	82	50.6
Middle school	52	32.1
High school	26	16.1
University	2	1.2
Father's educational status		
Primary school	61	37.6
Middle school	54	33.3
High school	38	23.5
University	9	5.6
Number of people living in the family		
2-3	15	9.2
4-5	111	68.6
6 and above	36	22.2
Doing regular physical activity		
Yes	186	47.6
No	205	52.4
BMI classification (kg/m²)		
<18.5	59	15.1
18.5-24.9	256	65.5
25.0-29.9	59	15.1
30 and above	17	4.3
Total	391	100.0

Adolescents' consumption frequency of some food groups and the relationship between BMI and KIDMED are shown in Table 2. Accordingly, 47.5% of the adolescents consume fresh fruit, 40% consume salad or raw vegetables, and 24.4% consume cooked vegetables at least once a day. There was no statistically significant difference between the frequency of fruit and cooked vegetables consumption and BMI ($p>.05$). Adolescents (11%) who consumed these foods more than once a day in salad or raw vegetable consumption were found to have significantly lower BMIs than those who consumed them once a day and less than once a week ($p<.0024$).

13.9% of adolescents consume chips, 55.2% consume candy or chocolate, 39.8% consume cake/biscuit/wafer, and 30.4% consume sugary-carbonated drinks at least once a day. There was no significant difference between the consumption frequency of these food groups and BMI ($p>.05$). The KIDMED scores of the adolescents who never consumed chips were significantly higher than the scores of all other consumption frequency groups (except for the occasional/rare consuming group) ($p<.0024$).

It was observed that adolescents consuming 9 glasses of water or more per day had significantly higher BMI than those consuming 1-2 glasses of water ($p<.0083$). In addition, it was determined that the BMI of the adolescents in the group who thought that they had an adequate and balanced diet were significantly lower than those who answered sometimes or no ($p<.0167$). KIDMED averages of those who think that they have adequate and balanced nutrition are statistically significantly higher ($p<.0167$). It was observed that the mean of KIDMED of those who drank 9 glasses of water or more per day was significantly higher than those who drank 1-2 glasses of water per day ($p<.0083$).

When the relationship between KIDMED scores and some food groups is examined, it is seen that those who consume more fresh fruit have higher KIDMED scores ($p<.001$). It was also found that those who consumed salad or raw vegetables more than once a day had a significantly higher KIDMED score. In terms of the frequency of consumption of cooked vegetables/vegetables, it was determined that the KIDMED scores of the groups consuming once a day and 3-6 times a week were significantly higher than those who consumed it occasionally/rarely and those who did not consume it at all.

The relationship between the status of adolescents in each BMI class regarding their adequate and balanced diet and their KIDMED scores is analyzed in Table 3. It was observed that the relationship between thinking about an adequate and balanced diet and KIDMED score was statistically significant in groups with underweight and normal BMI ($p<.05$). Accordingly, adolescents with lower BMI perceive their diet quality better.

BMI of adolescents and KIDMED scores were analyzed in Table 4 according to meal consumption habits. Accordingly, no significant relationship was found between meal consumption habits and BMIs. ($p>.05$). When KIDMED scores were examined, it was seen that the KIDMED scores of adolescents who consumed two or three main meals a day were significantly higher than those who consumed one main meal ($p<.0083$). In addition, the KIDMED scores of those who never had snacks were found to be lower. It was determined that the group that did not skip the main meal had higher KIDMED scores and the group that skipped breakfast had significantly lower KIDMED scores compared to the groups that skipped other main meals ($p<.0167$). It was determined that the KIDMED scores of the adolescents who had breakfast every day were significantly higher ($p<.0167$). It was determined that adolescents who had their breakfast at home had statistically higher KIDMED scores compared to those who had it at school ($p<.0167$).

Table 2. The relationship of adolescents’ consumption frequency of some food groups with BMI and KIDMED

Variables	n (391)	%	BMI (kg /m ²) Mean±SD	Test result	KIDMED Mean±SD	Test result
Frequency of consumption of fresh fruit						
More than once a day	88	22.3			5.18 ± 2.38	
Once a day	99	25.2	21.99±3.42		4.70 ± 2.36	
3-6 times a week	63	16.2	21.61±3.66		4.85 ± 2.44	
1-2 times a week	70	18.0	21.40±4.45	χ ² = 9,096 p =.168	3.44 ± 2.36	χ ² =34,006 p <.001
Less than once a week	5	1.3	21.78±3.86		2.40 ± 2.07	
Occasionally/rarely	61	15.7	21.77±4.69		3.74 ± 2.25	
None	5	1.3	23.66±4.79		3.80 ± 2.48	
			21.50±2.26			
Frequency of consumption of salad or raw vegetables						
More than once a day	43	11.0			6.04 ± 2.63	
Once a day	114	29.0	19.96±2.54		4.55 ± 2.57	
3-6 times a week	55	14.2	22.29±3.53	χ ² = 13,960 p =.030	4.35 ± 1.90	χ ² =28,110 p <.001
1-2 times a week	90	22.9	21.93±4.49		4.10 ± 2.29	
Less than once a week	8	2.0	22.41±4.54		3.99 ± 2.50	
Occasionally/rarely	61	15.7	23.68±3.05		4.10 ± 2.18	
None	20	5.2	22.23±4.09		2.90 ± 2.46	
			21.96±4.34			
Frequency of consumption of cooked vegetables/ vegetable meals						
More than once a day	34	8.7			4.99±2.44	
Once a day	61	15.7	21.83±3.70		5.03±2.40	
3-6 times a week	76	19.5	21.76±3.86	χ ² = 1.698 p =.945	4.97±2.16	χ ² =31,034 p <.001
1-2 times a week	118	30.0	22.02±4.31		4.28±2.28	
Less than once a week	13	3.3	22.20±4.08		5.25±2.80	
Occasionally/rarely	59	15.1	21.36±3.52		3.43±2.38	
None	30	7.7	21.80±4.04		3.16±2.84	
			22.53±3.79			
Chips consumption frequency						
More than once a day	19	4.9			3.78 ± 2.07	
Once a day	35	9.0	20.88±2.68		3.51 ± 2.06	
3-6 times a week	32	8.2	22.14±3.79	χ ² = 6.391 p =.381	3.45 ± 3.09	χ ² =27,476 p <.001
1-2 times a week	94	23.9	23.58±5.14		4.29 ± 2.33	
Less than once a week	36	9.3	21.63±3.88		3.99 ± 1.84	
Occasionally/rarely	140	35.7	21.03±3.44		4.78 ± 2.53	
None	35	9.0	22.07±3.75		5.82 ± 2.02	
			22.69±4.93			
Frequency of consumption of sugar, chocolate						
More than once a day	110	28.1			4.31±2.22	
Once a day	106	27.1	21.14 ± 3.39		4.07±2.58	
3-6 times a week	75	19.2	22.31 ± 4.17	χ ² = 9,470 p =.149	4.31±2.53	χ ² =8,981 p =.175
1-2 times a week	58	14.8	22.10 ± 4.46		4.91±2.33	
Less than once a week	11th	2.8	21.97 ± 3.90		5.45±2.38	
Occasionally/rarely	28	7.2	23.62 ± 3.69		4.77±2.59	
None	3	0.8	23.26 ± 4.16		6.33±2.51	
			22.83 ± 5.22			
Frequency of consumption of ready-made cakes, biscuits, wafers						
More than once a day	74	19.0			3.87 ± 2.40	
Once a day	82	20.8	21.48±3.87		4.20 ± 2.54	
3-6 times a week	47	12.0	22.36±4.06	χ ² = 2.727 p =.842	4.47 ± 2.50	χ ² = 15,540 p =.016
1-2 times a week	76	19.5	21.57±4.25		4.70 ± 2.38	
Less than once a week	27	6.9	22.20±3.71		3.92 ± 2.13	
Occasionally/rarely	71	18.2	21.92±4.27		5.22 ± 2.40	
None	14	3.6	22.19±3.69		3.57 ± 2.02	
			22.40±6.06			

Frequency of consumption of sugary-carbonated drinks						
More than once a day	51	13.1	21.67 ± 3.42	$\chi^2 = 5.507$ $p = .481$	3.79 ± 2.36	$\chi^2 = 11,925$ $p = .064$
Once a day	68	17.3	21.77 ± 3.58		4.07 ± 2.43	
3-6 times a week	48	12.4	22.55 ± 4.58		4.58 ± 2.39	
1-2 times a week	68	17.3	22.71 ± 3.74		4.18 ± 2.34	
Less than once a week	20	5.1	20.77 ± 3.73		3.85 ± 2.60	
Occasionally/rarely	113	28.9	21.97 ± 4.20		4.86 ± 2.31	
None	23	5.9	21.62 ± 4.97		5.13 ± 3.19	
Thinking that you have an adequate and balanced diet						
Yes	65	16.5	20.66 ± 3.49	$\chi^2 = 11,936$ $p = .003$	5.84 ± 2.46	$\chi^2 = 39,331$ $p < .001$
No	134	34.3	22.89 ± 4.34		3.48 ± 2.27	
Sometimes	192	49.2	21.90 ± 3.79		4.60 ± 2.28	
Daily water consumption						
1-2 cups	83	21.2	21.18 ± 3.30	$\chi^2 = 9,213$ $p = .027$	3.79 ± 2.71	$\chi^2 = 11.307$ $p = .010$
3-5 cups	125	32.0	21.46 ± 3.60		4.36 ± 2.39	
6-8 glasses	96	24.6	22.38 ± 4.54		4.35 ± 2.15	
9 glasses or more	87	22.2	23.10 ± 4.26		5.15 ± 2.46	

* Kruskal Wallis test, $p < .05$

**Mann Whitney U test, $p < .0024$ (for 21 comparisons), $p < .0167$ (for 3 comparisons), $p < .0083$ (for 6 comparisons)

In Table 5, adolescents' average scores of KIDMED, group distributions and the relationship of these distributions with BMI values are included. It was determined that the mean KIDMED score was 4.42 ± 2.44 and only 10.7% of the

adolescents had good scores. There was no statistically significant difference in BMI between the KIDMED groups ($p > .05$).

Table 3. The relationship between KIDMED scores and the state of adolescents' thinking that they have an adequate and balanced diet according to BMI classes

BMI (kg/m ²)	Thinking that you have an adequate and balanced diet	n (391)	KIDMED Mean ±SD	Test result
<18.5	Yes	14	5.71 ± 2.36	$\chi^2 = 12,463$ $p = .002$
	No	14	2.57 ± 1.74	
	Sometimes	24	4.83 ± 2.54	
18.5-24.9	Yes	41	6.02 ± 2.38	$\chi^2 = 23,126$ $p < .001$
	No	69	3.65 ± 2.45	
	Sometimes	113	4.73 ± 2.26	
25.0-29.9	Yes	4	4.75 ± 2.98	$\chi^2 = 4.957$ $p = .084$
	No	20	3.00 ± 1.94	
	Sometimes	27	4.29 ± 1.81	
30 and above	Yes	one	5.00 ± 0.00	$\chi^2 = 0.237$ $p = .888$
	No	8	5.25 ± 1.38	
	Sometimes	6	4.83 ± 2.04	

* Kruskal Wallis test, $p < .05$

**Mann-Whitney U test, $p < .0167$ (for 3 comparisons)

Table 4. The relationship of adolescents' mean KIDMED score and BMIs with KIDMED groups

Variables	n (391)	%	BMI (kg/m ²) Mean±SD	Test result	KIDMED Mean±SD	Test result
Number of main meals per day						
1	56	14.3	21.76±4.19	χ ² =2,875 p=.411	3.28 ± 2.53	χ ² =16,139 p=.001
2	172	44.0	22.17±4.08		4.34 ± 2.21	
3	133	34.0	22.37±4.16		4.96 ± 2.36	
4 and above	30	7.7	21.20±4.02		5.00 ± 2.86	
Number of snacks per day						
0	32	8.3	22.47±4.34	χ ² =2,881 p=.410	3.75 ± 1.87	χ ² =8,306 p=.040
1-2	257	65.6	21.93±4.06		4.24 ± 2.41	
3-4	76	19.4	22.47±4.52		4.91 ± 2.72	
5 and above	26	6.7	20.37±2.44		5.42 ± 2.85	
Main meal skipping status						
Yes	111	28.4	22.30±4.13	χ ² =4,129 p=.127	3.81±2.57	χ ² =25.386 p<.001
No	55	14.1	21.05±3.43		5.92±2.40	
Sometimes	225	57.5	22.09±4.04		4.34±2.24	
Skipped meal (n=336)						
Breakfast	159	47.3	22.16±4.18	χ ² =0.735 p=.693	3.57 ± 2.29	χ ² =12.982 p=.002
Lunch	121	36.0	22.08±3.71		4.49 ± 2.34	
Evening meal	56	16.7	22.77±4.49		4.64 ± 2.41	
Having breakfast						
I have breakfast every day	122	31.1	21.53±3.60	χ ² =2.394 p=.302	5.73 ± 2.13	χ ² =60,779 p<.001
Sometimes I have breakfast	220	56.3	22.30±4.17		4.05±2.28	
I never have breakfast	49	12.6	21.78±4.12		2.85±2.38	
Breakfast location						
At home	190	48.5	21.63±3.85	χ ² =3,550 p=.169	4.77 ± 2.43	χ ² =6.312 p=.043
At school	163	41.8	22.59±4.34		4.04±2.45	
Out-of-home and school	38	9.7	21.98±3.37		4.27 ± 2.29	

*Kruskal Wallis test, p<.05

**Mann-Whitney U test, p<.0167 (for 3 comparisons), p<.0083 (for 6 comparisons)

Table 5. The relationship of adolescents' BMI values and KIDMED scores with their meal consumption habits

KIDMED score	Mean ± SD (min-max)			
	n (391)	%	BMI (kg/m ²) Mean±SD	Test result
KIDMED score	4.42±2.44 (-4.00-11.00)			
KIDMED group				
Low	139	35.5	21.62±3.54	χ ² =3,338 p=.188
Moderate	210	53.8	22.43±4.38	
Good	42	10.7	21.16±3.35	

* Kruskal Wallis test, p<.05

4. DISCUSSION

Adolescence is an age when growth and development accelerate and accordingly, nutritional habits are of great importance (19). In our study, female adolescents with a mean age of 16.5±1.32 years have a height of 161.73±5.73 cm and a BMI of 22.00±3.99 kg/m². According to the WHO's growth reference values for age, the average height for girls between the ages of 14-19 is 162.7 cm, and the average BMI is 20.9 kg/m². Body weight was not seen as a valid indicator for children and adolescents over the age of ten (20). When compared with the reference values of WHO, it was seen that the adolescents participating in our study had high BMIs and one cm lower than average height. This may be due to

genetics and low SES, or it may be because the reference data used in the evaluation are not specific to our population.

In a review study, in 2019, on the dietary habits of adolescents living in North America, Europe and Oceania, fruit and vegetable consumption was examined. Accordingly, the average fruit and vegetable consumption was found to be quite low the recommended daily value of 400 grams or 5 servings in almost all of the populations studied (21). In a study examining the fruit and vegetable consumption frequency of Canadian adolescents participating in the Youth Smoking Survey 2012-2013, it was determined that 38.9% of female adolescents consumed 3-4 servings of fruit and vegetables a day, and 27.7% consumed 1-2 servings of fruit and vegetables a day. These amounts were found

to be considerably lower than the 7 servings of fruit and vegetable consumption per day recommended by Canada's Food Guide for Healthy Eating for girls aged 14-18 years (22, 23). In a study examining fruit and vegetable intake with data obtained from the first follow-up survey of Child and Adolescent Health Research (KiGGS) in Germany; It was determined that 50.7% of 14-17-year-old female adolescents consumed 1-2 servings and 19.9% consumed 3-4 servings of fruit and vegetables per day. It was observed that only 8.1% of 14-17-year-old girls found the recommended amount of 5 servings per day (24). Similar to other studies, it was observed that the adolescents participating in our study were quite low in the daily consumption recommendation of 5 servings of vegetables and fruits. Considering that fruit consumption is not low, it is thought that vegetable consumption is low and the underlying reasons need to be further clarified.

In a study on the water and beverage consumption of children and adolescents in the United Arab Emirates, it was determined that the average daily consumption of plain water in female adolescents was 1002.4 mL. It has been stated that only 31% of female adolescents between the ages of 14-18 consume 1.0-1.15 L/1000 kcal of water, which is the daily recommended water/energy ratio of the European Food Safety Authority (EFSA). The total amount of fluid intake by obese adolescents from foods, plain water and other beverages was statistically higher compared to other BMI classes. However, although there was no statistically significant difference in plain water consumption, it was observed that obese adolescents consumed plain water more than other groups (25). In a review examining the determinants of adolescent water consumption and studies on attempts to increase water consumption, it has been reported that daily water consumption of children and adolescents is below the recommended levels in data obtained from England, Australia, Canada and the USA (26). According to the TNHS 2019 report, when the water consumption of female adolescents in our country is examined, it is seen that the daily average water/mineral water/soda consumption is 1071.1±746.13 mL (27). Similarly, in our study, it was determined that adolescents with high BMI consumed more water. The BMI values of the adolescents who consumed 9 glasses or more of water per day were found to be statistically significantly higher than the adolescents who consumed 1-2 glasses of water. It is thought that this may be because adolescents with high BMI may also feel more thirsty due to their consumption of more food. However, it is seen that the daily average water consumption of the adolescents participating in our study is below the recommended amounts. This may be because adolescents do not know the importance of water consumption and the amount they should consume. Also, another explanation for the differences in the amount of consumed water might be that those who had higher BMI might consume more fast food for instance, including more salt.

In a study, 20.7% of adolescents in the Turkish Republic of Northern Cyprus consume two main meals a day, 79.3% consume three main meals, and 34% of them consume three or more snacks. Also, it was determined that 44% of

them skipped the main meal and the ones who skipped the main meal skipped the breakfast meal most frequently at the rate of 71.2%. However, in this study, different from our study, pre-adolescent younger age groups and sex were also included (28). In another study conducted in our country, significant relationships were found between the number of daily main meals and meal skipping status of adolescents and their KIDMED scores. It was observed that the KIDMED scores of both male and female adolescents consuming three meals a day were significantly higher than those consuming two meals (18). In our study, it was determined that adolescents consuming two or more main meals a day had significantly higher KIDMED values than those consuming one main meal. In addition, the KIDMED scores of those who never had snacks were found to be lower. This may be because those who have a higher number of main meals may have more opportunities to diversify their food consumption with different food groups.

It has been known for a long time that having a regular breakfast has important contributions to physical and mental health in adolescence. In a study examining the food consumption habits of adolescents in Brazil, it was determined that 62.2% of female adolescents had breakfast and 54.6% of those who had breakfast had their breakfast at home (29). According to the TNHS 2019 report, the frequency of having breakfast among girls aged 15-18 in our country is 62.3% and 86.4% in women aged 15 and over (27). In a study conducted on adolescents in Malaysia, it was determined that both male and female adolescents who have a regular breakfast every day have slightly lower total cholesterol, LDL cholesterol and BMI levels compared to those who have irregular breakfast habits (30). Arguing that a meta-analysis of 45 observational studies also reported an increased risk of overweight and obesity in those who skip breakfast compared to those who regularly consume breakfast (31). In our study, however, there was no significant difference between the BMI values of adolescents who regularly eat breakfast and those who do not. This may be due to the relationship between meals except for breakfast, overall diet quality and BMI.

In the HELENA study, which was conducted to observe how accurately adolescents could assess their diet quality, a positive correlation was found between the level of perception of diet quality of adolescents and their diet quality index scores. This positive relationship was not valid for obese adolescents but was observed in overweight, normal and malnourished groups. Factors such as gender, pubertal status and parents' education levels were not found to be effective in diet awareness. As a result, it was observed that both male and female European adolescents were able to evaluate their diet quality well, except for those who were obese (32). In our study, it was seen that the relationship between thinking about an adequate and balanced diet and KIDMED score was statistically significant in groups with underweight and normal BMI classes. It was concluded that adolescents with lower BMI values perceived their diet quality better.

One of the limitations of this study is that it was conducted cross-sectionally and only with adolescents studying in public schools. On the other hand, the fact that it was conducted only on female adolescents constitutes a strong aspect in terms of revealing the situation and needs specific to one gender.

5. CONCLUSION

In our study, we found that consuming fresh fruit, salad or raw vegetables and cooked vegetables more frequently, never consuming chips, consuming products such as ready-made cakes/biscuits/wafers less frequently, drinking nine glasses of water a day or more, having a large number of meals, not skipping meals, and having breakfast every day appear to have higher diet quality. BMI values were found low in those who frequently consumed salad or raw vegetables, and higher in those who consumed more water. In addition, those who think that they have an adequate and balanced diet have lower BMI values. On the other hand, no significant relationship was found between the number of meals, having breakfast, KIDMED scores and BMIs. Nutritional habits in adolescence significantly affect both the growth and development of adolescents and their general health in the following years. It has been concluded that the nutrition education of these young people, who will play an important role in raising healthy generations, should improve their knowledge and habits, improve their diet quality, and provide an environment for accessing healthy meal options in schools.

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