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Evaluation of body mass index and related lifestyle factors among 14–17-year-old Turkish adolescents

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ABSTRACT

OBJECTIVE: During adolescence, unhealthy body weight status is considered as a global concern as it may lead to adverse health consequences in adulthood, therefore evaluation of the risk factors is crucial. The aim of the study was to determine the prevalence of adolescents under the risk of being underweight, overweight, and obese among 14–17-year-old Turkish adolescents. In addition, we examined the association between unhealthy body weight categories and lifestyle factors.

METHODS: This study was designed as cross-sectional study which included body weight status and associated parameters of 1561 adolescents aged between 14 and 17 who were registered 25 different high schools in Istanbul, Uskudar. Height and body weight of participants were measured and related factors were obtained through a questionnaire. Differences in distributions were analyzed using the Chi-square test and to control confounding factors, multivariate logistic regression analysis was performed. As statistical significance limit of $p<0.05$ was determined.

RESULTS: Body mass index (BMI) percentile analyses indicated that 3.6% of participants were underweight, 14.3% were overweight, and 13.8% were obese. We demonstrated that age, gender, and school types were statistically very significantly associated with BMI ($p<0.001$) and daily meal frequency, eating speed, and mealtime regularity were significantly related with BMI ($p<0.05$). In addition, according to multivariate analysis results, gender and school types were closely related with obesity among 14–17-year old Turkish adolescents.

CONCLUSION: This study has been demonstrated that frequency of adolescent obesity in Istanbul, Turkey, has increased and obesity closely related to gender and type of school. Further educational and interventional studies should be organized in this region with consideration of relevant risk factors.

Keywords: Adolescents; body mass index; lifestyle factors; obesity; school type.

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During adolescence being underweight, overweight or obese is considered as a global concern because these conditions may lead to adverse health consequences in adulthood. Non-communicable Disease Risk Factor Collaboration (NCD-RisC) study has declared that the worldwide number of underweight girls and boys adolescents are 75 million and 117 million, respectively, while a number of obese girls and boys are 50 million and 74 million (NCD-RisC, 2017) [1]. Underweight adolescents have higher risk for get-

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ting infectious disorders and also underweight girls have higher risk for pregnancy abnormalities such as preterm births, intrauterine growth retardation, and maternal mortality at childbearing age [2]. Overweight or obese adolescents have greater risk and earlier onset of Type 2 diabetes; hyperlipidemia, insulin resistance, and hypertension; and anxiety and depression [3, 4].

Energy imbalance, unhealthy food preferences, inadequate micronutrient intake, sedentary lifestyle, irregular sleep duration, and low sleep quality are some of the lifestyle factors which influence the tendency to abnormal body mass index (BMI) percentile values during this period [5, 6]. To prevent from unhealthy body weight status associated problems, dietary habits and lifestyle factors among adolescents should be well known.

Several epidemiological studies have focus on the determination of underweight, overweight, and obese prevalence in 11–18-year old Turkish adolescents [7–9]. According to these studies, many factors such as socioeconomic status, residential area, gender and age can interfere with body weight status of adolescents. Especially, high school life which covers the 14–17 years, has critical importance because it includes the completion of adolescence and transition to adulthood. Therefore, the purpose of this study has determined the frequency of underweight, overweight, and obese in 14-17-year old Turkish adolescents which were high school students in Uskudar, Istanbul, according to BMI percentile classification. It has been evaluated the associations between BMI-percentile values and lifestyle associated parameters such as sleep duration, meeting recommended physical activity (PA), and nutritional habits. In addition, the most critical body weight status has been determined as obesity in terms of amount of rapid increase when compared with other epidemiological studies [7–10]. Detailed statistical analyses have been applied to determine the risk factors of obesity.

Highlight key points

- Adolescent obesity has reached to alarming level in the Istanbul, Turkey.
- Gender and type of school were risk factors for obesity without coincidence.
- Frequency of obesity among girls was determined as half of boys.
- Frequency of obesity was determined as two times more in private high schools and 3 times more in health vocational high schools when compared to religious vocational high school.

MATERIALS AND METHODS

Study Design and Sampling Process

This study conducted with 1561 high school students in Uskudar, Istanbul, Turkey, in during the time period from September 2017 to November 2017. Uskudar district was selected as a research area because of population diversity and various types of high schools are available.

For calculation of the sample size, the list of high schools and total number of registered students in the high schools in Uskudar were obtained from Istanbul Provincial Educational Directorate's website. According to records, the total number of students in 46 high schools which were located in Uskudar was 31,365 and this was the total universe in our study. Afterward, power analysis was performed at a confidence level of 97.5% and minimum sample size was determined as 1460 students. However, with the thought of some of the participants would have been excluded from the project due to some exclusion criteria (out of being specified age range, diabetes, and dieting), the total number of sample was determined as 1600 participants which meant 10% more than the calculated number. There is at least one high school in 25 neighborhoods of Uskudar and one high school was selected randomly from each neighborhood. The number of individuals sampled in each school was proportional to the total existing students of each one. Equal number of students were chosen from each class grade in the schools and project was carried out completely randomized in terms of selection of high school, classroom, and student. Sampling was applied in accordance with two-step stratified random sampling method.

Measurements and Data Collection

Before the beginning of the study, dietitians of the research team were trained about height and body weight measurements and the questions of the survey. In this training period, the aim and distinct combination of each question were discussed and the appropriate communication practices with adolescents were explained by a psychologist to obtain standardization and accuracy as much as possible.

Trained dietitians measured the height and body weight of the adolescents. Height was measured with a stadiometer (SECA, model. 213 1721009, Birmingham, UK) with subjects standing in the Frankfurt plane. Body weight measurements were taken with a

portable scale (SECA, model. 869 1321004, Birmingham, UK). To calculate BMI percentile values of adolescents, the WHO AnthroPlus program was used from WHO website [11]. Percentile values were evaluated according to BMI percentiles (WHO/NCHS/CDC, 1983). 95th or greater percentile was assessed as obese, 85th to less than the 95th percentile was assessed as overweight, and less than the 5th percentile was evaluated as underweight [12].

Data on personal and nutritional information were collected in the classroom through the questionnaire by the dietitians of the research team through face-to-face interview technique. This process was authorized by schools' principals. Questionnaire was designed for this project and questions were addressed to background characteristics, PA, sleep duration, and nutritional information in adolescents.

Participants were asked to think about the past 1 month within the school term while answering in questions. In addition, it has been questioned whether there has been any change in PA and nutritional habits in the recent time. The sustainability of this change for next period was questioned. They were asked to give examples about the nutritional habits and PA during the present and/or previous week in order to eliminate the recall bias. In the questionnaire, general nutritional habits were evaluated and so at least 5 days in a week was accept as enough. PA status was evaluated by multiple-choice questions according to their frequency within 1 week. Detailed information about options were given at below.

Background characteristics of adolescents included gender, age, type of school, and class grade (Table 1). Type of school was examined within two main groups as private high school and state high school. According to academic success and interested area of the students, state high schools were divided into four groups which are Anatolian high school, technical vocational high school, health vocational high school, and religious vocational high school.

PA status was addressed as frequency, type of sports (walking, running, football, volleyball, cycling, etc.), and total activity duration. In this context, the options in frequency of PA were none, 1 or 2 days in a week, 3 or 5 days in a week, and every day in a week. Choices in PA duration were less 30 minute (min), 30–45 min, 46–59 min, 1–1.5 hour (h), 2 h, and more than 2 h. According to responses, PA status assessed by meeting recommended PA for these age groups (>300 min of PA per week) [13, 14]. In this context, adolescents were grouped into two categories: Physically active adolescents who meet recommended PA and physically inactive adolescents who do not meet recommended PA.

Table 1. The distribution of the characteristics of the participants

Background characteristics	%
Gender (n=1561)	
Girls	69.4
Boys	30.4
Age	
14	30.4
15	27
16	28.6
17	14
Class grade	
Foreign language preparation class	1.4
1st Class	34.3
2nd Class	26.7
3rd Class	26.2
4th Class	11.4
School type	
Private high school	3.5
Anatolian high school	19
Technical vocational high school	47.3
Health vocational high school	10.3
Religious vocational high school	19.9

Adequate sleep duration can be different between individuals depending on age [15]. To obtain healthy sleeping, the National Sleep Foundation recommends to 8–10 h sleep duration for 14–17 years of adolescents [16]. In this study, sleep duration was classified into four groups: Very short sleep duration (5 h); short sleep duration (6–7 h); normal sleep duration (8–9 h); and long sleep duration (≥10 h).

We have addressed nutritional habits among adolescents including daily meal frequency, meal skipping, snacking habits, number of snacks, mealtime consistency, eating speed, and alteration in nutritional behavior with emotional status. In this context, daily meal frequency means number of main meal per day and reference value is three. Meal skipping refers that skipping of main meals which are breakfast, lunch, and dinner. Snacking means eating or drinking anything between main meals. Snacking habit was based on three possible responses

(frequently, sometimes, and none) to the question "Do you eat anything between main meals? Mealtime consistency was defined as regular main meal consumption at specific time periods of a day. To determine the eating speed of adolescents, we questioned that "How do you define your eating speed when compared with others?" and there were three options which are fast, normal, and slow [17, 18]. To determine the relationship between emotional status and nutrition behavior, we asked that "How does your nutritional behavior change in emotional alterations such as sadness and happiness?"

The project was approved by the Yeditepe University Clinical Research Ethics Committee with June 07, 2017 date and 739 number. According to this protocol which is adjusted to the Declaration of Helsinki, adolescents and their parents were informed about the research objectives and procedures. Then we obtained informed consent from parents and legal representatives of adolescents.

Statistical Analyses

Data were analyzed using the SPSS software, version 21 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics were calculated as the mean±standard deviation, frequencies, and percentages. Differences in distributions were analyzed using the Chi-square test. To determine the risk factors for the development of obesity, backward stepwise logistic regression from multivariate analyses was performed. Statistical significance was defined as $p<0.05$.

RESULTS

The study population consisted of 1561 students, with 1086 girls (69.4%) and 475 (30.4%) boys. The mean age of adolescents was 15.26±1.04 years (range 14–17 y). According to school types, 3.5% of the participants were registered in private high school, while rest of the participants were registered in state high school. In this part, approximately 20% of adolescents were educated in Anatolian high school. The majority of the adolescents were registered in vocational high school which educated specifically for technical; health or religious issues; and their prevalence were 47.3%, 10.3%, and 19.9%, respectively (Table 1).

According to BMI percentile classification, about 68.4% of the adolescent were at normal weight, 3.6% of the adolescents were underweight, 14.3% were overweight, and 13.8% were obese. We assessed the relationship between BMI classification and background characteristics of the participants and results are presented in Table 2. Gender was found significantly associated with BMI ($p<0.001$). Boys had more susceptibility to the unhealthy BMI classes which are underweight, overweight, and obese when compared with girls. Other significant associations of BMI were determined as age and school groups. For underweight adolescents, just 17-years were found higher prevalence than expected value, while 14 and 15-years had more tendency to overweight. Furthermore, 14-years were found as the vulnerable group for obesity. Class grade was significantly related to BMI percentile values ($p<0.05$). In these categories, lower class grade was determined more tenderness for being overweight and obese while higher class grades had more susceptibility for being underweight. Another very significant association with BMI was school type. In this classification, technical and health vocational high school students had more susceptibility to underweight, overweight and obesity ($p<0.001$).

Approximately 10% of adolescents were active who meet the recommended PA and boys were more active than girls statistically ($p<0.05$). There were not any statistically significant relationship between sleep duration and BMI (Table 3).

Overweight and obese adolescents had once or twice main meal per day while underweight adolescents had higher main meal frequency (<4) ($p<0.001$). Another evaluated nutritional habit was mealtime consistency. We found that adolescents who had irregular mealtime had more tendency for being underweight, overweight, and obese significantly ($p<0.05$). On the other hand, snacking habits and number of snacks were not significantly associated with BMI. The association between eating speed and BMI was found significant. Slow eating speed declared that adolescents were more underweight while fast eating speed declared adolescents were overweight and obese ($p<0.05$). Alteration in nutritional behavior with emotional status was not found associated with BMI.

In addition, age, gender, school type, meeting recommended PA, chronic disease status, sleep duration, and eating speed are considered as a risk factor for appearing of obesity and so all of them are taken into multivariate analyses. As a result of this analysis, gender and school type were very significantly associated with obesity ($p<0.001$). In this model, boys were selected as reference parameter for gender and frequency of obesity among

Table 2. The association between body mass index and demographic variables

Demographic variables	Underweight (<5th)	Normal (<5th–85th)	Overweight (85th–<95th)	Obese (≥95th)	Total		χ^2	p
	%	%	%	%	n	%		
Subjects	3.6	68.4	14.3	13.8	1561	100		
Gender							27.6	**0.000****
Girls	55.4	73.2	67.4	54.4	1086	69.6		
Boys	44.6	26.8	32.6	42.6	475	30.4		
Age							40.3	**0.000****
14	23.2	27.5	38.9	37.5	474	30.4		
15	39.3	28.5	15.8	28.2	422	27.0		
16	16.1	28.9	33.5	25	446	28.6		
17	21.4	15.1	11.8	9.3	219	14.0		
Class grade							21.4	**0.045***
Prep. class	1.8	1.2	2.3	1.4	22	1.4		
1st class	30.4	32.1	39.4	40.7	535	34.3		
2nd class	33.9	27.1	21.7	28.2	417	26.7		
3rd class	19.6	26.8	28.1	23.1	409	26.2		
4th class	14.3	12.8	8.6	6.5	178	11.4		
School type							55.6	**0.000****
Private high school	1.8	3.8	3.6	2.3	55	3.5		
Anatolian high school	5.4	20.7	20.4	12.5	296	19		
Technical vocational high school	55.4	44.6	48.4	57.9	739	47.3		
Health vocational high school	25	8.5	10	15.7	161	10.3		
Religious vocational high school	12.5	22.4	17.6	11.6	310	19.9		

*: Significantly different between underweight, normal, overweight, and obese subjects ($p<0.05$); **: Significantly different between underweight, normal, overweight, and obese subjects ($p=0.000$).

girls was determined as half of boys. On the other hand, in this model, religious vocational high schools were automatically accepted as reference for school type. In this context, frequency of obesity was determined as two times more in private high schools and three times more in health vocational high schools when compared to religious vocational high school. The frequency of obesity in Anatolian high schools and technical vocational high schools was found as similar with religious vocational high schools (Table 4).

DISCUSSION

Our study revealed that 3.6%, 14.3%, and 13.8% frequency of underweight, overweight, and obesity, respectively, among adolescents. BMI was significantly associated with gender, age, class grade, and school type among participations of 14–17-year old adolescents ($p<0.05$). Male adolescents tended to be more underweight and obese. In addition, our results showed a very significantly decrease in overweight and obesity prevalence with age and class grades increase. Similar with our findings, a cross-sectional study conducted with 1216 Turkish adolescents aged between 14 and 18 showed that being 14–15 years and being male are factors associated with being obese [10].

According to a systematic review evaluating the prevalence of overweight and obesity of the adolescents from worldwide, boys had a higher prevalence of obesity in Turkey [19]. Higher rates of overweight and obesity in boys have been shown in different countries [8, 20–22]. On the other hand, Yilmaz et al. [23] have found overweight and obesity prevalence of 26.9% and 12.4% among girls and 25.7% and 9.5% among boys

TABLE 3. The association between body mass index and lifestyle factors

	Underweight	Normal	Overweight	Obese	Total		χ^2	p
	%	%	%	%	n	%		
Lifestyle factors								
Physical activity							0.58	0.902
Active	4.1	69.4	12.2	14.3	147	9.4		
Inactive	3.5	64.1	14.4	13.8	1414	90.6		
Sleep duration							12.93	0.166
Very short sleep (≤5 h)	1.8	3	5.4	2.3	50	3.2		
Short sleep (6–7 h)	41.1	38.5	34.8	36.6	590	37.8		
Normal (8–9 h)	42.9	48.3	52.5	54.6	774	49.6		
Long sleep (≥10 h)	14.3	10.2	7.2	6.5	147	9.4		
Nutritional habits								
Daily main meal frequency							21.24	**0.002***
≤2 main meal per day	26.8	34.6	39.8	47.2	574	36.8		
3 main meal per day	66.1	63	58.8	50.9	950	60.9		
≥4 main meal per day	7.1	2.4	1.4	1.9	37	2.4		
Mealtime consistency							8.34	**0.039***
Consistent	39.3	47	43	37	699	44.8		
Inconsistent	60.7	53	57	63	862	55.2		
Snacking habits							5.56	0.474
Frequently	73.2	72.1	67	66.7	1103	70.7		
Sometimes	19.6	21.7	25.3	24.1	351	22.5		
Never	7.1	6.2	7.7	9.3	107	6.8		
Number of snacks							8.81	0.185
≤2 main meal per day	63	72.9	76.3	71.3	967	72.9		
3 main meal per day	32.6	19.5	14.6	20.4	257	19.4		
≥4 main meal per day	4.3	7.5	9.1	8.3	103	7.8		
How do you define your eating speed when compared with others?							14.82	**0.022***
Fast	23.2	26.1	32.1	33.3	435	27.9		
Normal	50	55.3	56.1	52.3	856	54.8		
Slow	26.8	18.5	11.8	14.4	270	17.3		
How does your nutritional behavior change in emotional alterations?							12.06	0.844
Does not change	37.5	25.7	39.4	40.3	576	36.9		
The amount of consumption increase	26.8	32.4	31.7	33.8	504	32.3		
The amount of consumption decrease	35.7	29.7	26.2	25.5	450	28.8		
In same amount but faster or slower	0	0.9	1.4	0.5	13	0.8		
Increased fatty or sweet food preference	0	1.4	1.4	0	18	1.2		

*: Significantly different between underweight, normal, overweight, and obese subjects ($p<0.05$).

in Eastern Turkey. Differently from our results, they found higher prevalence of obesity in girls. This contradiction could be associated with sociocultural and economic differences between regions.

We selected the schools from different neighborhoods randomly and they were classified as private, Anatolian, technical vocational, health vocational, and religious vocational high schools. There was a very significant rela-

Table 4. The association between obesity and demographic variables with lifestyle factors

Variables	Odds ratio	95% confidence interval	p
Gender			
Boys (ref)			
Girls	0.510	0.375–0.692	**0.000****
School type			
Religious vocational high school (ref)			
Private high school	2.106	1.335–3.323	**0.001****
Anatolian high school	1.118	0.630–1.984	0.702
Technical vocational high school	1.017	0.369–2.801	0.974
Health vocational high school	3.032	1.728–5.320	**0.000****

Chronic disease status, gender, school type, sleep duration, meeting recommended physical activity, and eating speed are taken into multivariate analyses to determine the effective factors with obesity. **: Significantly different between underweight, normal, overweight, and obese subjects (p=0.000).

tionship found between school type and BMI. We considered that selection of high school types plays key role in the development of obesity through determining of lifestyle factors. For instance, each school has different school starting and ending hours, dining hall facilities, products of canteen, sports area, lunch break, curriculum, and number and time of between courses and all of them assign the meal pattern, food preferences, and PA. In addition, different neighborhoods and school types commonly represent different demographic and socioeconomic status [24–28]. In our study, a close relationship between being a private high school student and being obese was determined. Moreover, only one student was determined as underweight among the total participation from private high schools. We considered that this association is the result of physical inactivity and unhealthy food preference brought by high socioeconomic level. In addition, students of health vocational high schools are under risk of obesity and technical vocational high school students are found more vulnerable for unhealthy BMI ranges. Those are the school types in Turkey which aim to educate students in a specific occupation. Thus majority of them provide the income without university education after high school education. In this context, we observed that health vocational high school students could not reach healthy foods due to socioeconomical reasons, intensive courses, and internship programs.

In the analysis of PA status, adolescents were grouped as active and inactive which depend on the meeting 300 min of regular activity weekly [14]. Physically active adolescents were only 9.4% while inactive ones were 90.6% of the total sample. Percentage of physically active adolescents was found lower than in the studies conducted in the capital of Turkey, Ankara, which accepted regular PA as at least 3 days a week, each episode lasting at least 60 min that counted 180 min/week [10]. Differently, we asked for the total exercise duration weekly and verified with recommendations of 300 min/week. Majority of the students which declared they have regular PA were not meeting the criteria classified as inactive. In this context, we questioned the resident neighborhood and arrival methods to school such as walking or by bus. Participants were so heterogeneous in terms of these criteria. In addition, the relationship between PA and BMI was not statistically significant unexpectedly. We discussed that the reason might be that the physically active ones to be the adolescents aiming weight loss with PA.

Some of the students reported that they came to school by walking due to suitable weather conditions because the study was carried out in the autumn months. It contributes to increased PA status. On the other hand, it has been determined from the students' and school management declaration that this situation causes the shopping of fast food and packaged food from various markets around the school or on the road route. Therefore, it can related to the unhealthy eating habits among adolescents.

In the literature, it has shown that short sleep duration in adolescents is associated with obesity [29–31]. Nevertheless, some controversial evidences are available [32, 33]. In the current study, the relationship between sleep duration and BMI was not statistically significant.

Snacking and irregular meals are considered as risk factors for being overweight and obesity [34, 35]. According to the American Heart Association Scientific Statement, frequency of meal skipping and snacking may increase the risk of obesity and also irregular eating patterns cause large increase in the risk of unhealthy cardiometabolic profile [36]. In our study, meal frequency had a significant relationship with BMI and the adolescents who consumed two or less main meals as a routine were more obese and overweight as expected but snacking and number of snacks were not associated with BMI. Underweight adolescents were found to be consuming four or more meals daily. It thought that as a result of the increase in the number of meals, people can consume low amounts of food each time without getting hungry [37]. Similar to our results, the cross-sectional analysis within the prospective Seasonal Variation of Blood Cholesterol Study in Worcester County, Massachusetts study (SEASONS) which found individuals who ate ≥4 times a day had a significantly lower risk of obesity [38]. Mealtime consistency was found significantly associated with BMI as adolescents with consistent mealtimes were less likely to be underweight, overweight and obese. Eating speed was significantly faster in overweight and obese participants in the current study. Similarly, it has been found that eating fast may be a risk factor for being overweight in university students [34].

In the case of mood dependent effects in portion size, consumption speed, food preferences and how alteration in this nutritional behavior with emotional status was questioned. We could not find any relationship between BMI and increased/decreased amounts of food consumption, eating speed, and fatty or sweet/dessert preferences.

In this study, we have identified that adolescent obesity has reached to alarming level when compared with other studies [9, 10]. Our backward stepwise logistic regression results have shown that gender and type of school choice were risk factors for obesity without coincidence.

This study has several limitations. Firstly, gender distribution of the study was not balanced as 69.6% of the sample was girls while 30.4% was boys. This was due to random selection of the schools that some of the schools were gender specific and only had girl or boy students. The high number of girl specific schools were higher in the study. Secondly, this study was carried out in the only one district of the Istanbul which is localized in city center. Nevertheless, this result cannot reflect the whole characteristics of the Turkey. Moreover, this study provides a significant data regarding relatively high number of adolescents, including various age and school types in a district of Istanbul which has a distribution among different levels of socioeconomic status. Finally, participation from technical vocational high schools was higher than other type of high schools. The reasons of this situation are higher number of technical vocational high school in these regions and each one of them has higher number of students when compared to other high schools.

On the other hand, this study has several strengths when compared to other BMI associated epidemiological descriptive cross-sectional studies. These are presence of dieticians of the research team, application of face-to-face interview method, participation of adolescents from different socioeconomic classes, and several types of schools. Finally, although the study was conducted in Uskudar, there were participants from all over the Istanbul.

We have some recommendations to decrease the unhealthy BMI frequency and increase healthy lifestyle awareness in Turkish adolescents. In this context, nutrition knowledge levels of adolescents should be increase with various interventional nutrition education methods which based on population characteristics (socioeconomic, cultural factors, etc.). In order to maintaining the increased healthy eating awareness, students should be taught how to analyze their eating habits. In addition, it should be provide to adolescents the various opportunities as delicious/appetitive and healthy foods. Media and social pressure can cause to meal skipping, fast food consumption, snacking, sedentary lifestyle, etc., unhealthy habits among adolescents. Collaborating with parents, school personnel, health professionals, and other authorities (government, etc.) is required to removal of these unhealthy life barriers in adolescents [39].

Conclusion

In this study, our results have shown that frequency of adolescent obesity in Istanbul, Turkey, has increased and also obesity was closely related to gender and school type. Moreover, meal frequency, eating speed, and mealtime consistency identify the individuals under the risk and determine the conditions causing the risk in terms of body weight status at the population specific. At this point, we considered that school types manage to lifestyle associated factors such as sleep duration, PA, and nutritional habits. Therefore, in consideration of these factors, appropriate and reliable new interventional and educational studies can be organized.

In conclusion, the unhealthy BMI frequency in adolescents should be reduced through educational and interventional studies that are community based and depends on collaborating with family, school management, and health professionals.

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