

Health promotion lifestyle profile scores are not associated with obesity in high school students

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Background/aim: Obesity is a cause of preventable morbidity and mortality with an increasing prevalence. Health promoting lifestyle activities maintain or improve an individual's health and in adolescence many habits are configured. The aim of this study was to determine the prevalence of overweight and obesity among adolescents and the relation between obesity and health promoting behaviors.

Materials and methods: This is a cross-sectional study including 848 high school students aged 15–17. All students were administered a questionnaire including the Health Promotion Life-Style Profile Scale. Weight and height were measured and body mass index was calculated. Descriptive analysis, Pearson's chi-square test, Kruskal–Wallis and Mann–Whitney U tests, and multivariate logistic regression analysis were used. $P < 0.05$ was considered statistically significant.

Results: Of the included students, 80.8% ($n = 685$) had normal ranges of body mass index, 10.1% ($n = 86$) were overweight, and 9.1% ($n = 77$) were obese. The Health Promotion Life-Style Profile Scale average score was found to be 126.7 ± 20.4 . There was no significant difference between Health Promotion Life-Style Profile Scale and obesity ($P = 0.921$).

Conclusion: Adolescence is an era of development when individuals start to implement their own features to life. According to this study adolescents do not perform health promoting lifestyles whether they are obese or not.

Key words: Obesity, adolescence, Health Promotion Life-Style Profile Scale

1. Introduction

Obesity is an energy metabolism disorder associated with excessive body fat deposition that can cause physical and mental problems. It is the leading cause of preventable morbidity and mortality with an increasing prevalence in every age group all over the world (1). It is believed that many factors play a role in the development of obesity, but some studies revealed that this is not true and obesity is a multifactorial disease resulting from the interaction of genes and the environment (2). In obese and overweight children, metabolic changes occur; for prevention of these damages obese children should be treated. They also have a higher risk of cardiovascular disease, dyslipidemia, and diabetes as major health problems. Overweight adolescents have a higher risk of being overweight as adults (3).

At least 10% of school-age children are thought to be overweight or obese all over the world. The prevalence is 32% in the United States, 20% in Europe, and 16% in the Middle East (2). For adolescents, a few studies collected

national representative body mass index (BMI) data (based on measured height and weight) and showed the highest prevalence of overweight in Irish girls (22.7%) and Spanish boys (31.7%) (4,5). The lowest prevalence of overweight adolescents was in the Czech Republic for both sexes at 9% (6). However, in developing countries there is a more rapid increase than in developed countries. Obesity is more common among low socioeconomic levels in developed countries but more common among higher socioeconomic levels in developing countries (2,7). There is no reported national study for Turkey but different results were found in regional studies. According to the different studies in children and adolescents, obesity has a rate between 1.6% and 7% in boys and 2.1% and 8.4% in girls, with the total obesity rate between 2.3% and 8.4% (8–11).

Adolescence is a transition from childhood to adulthood during which important changes occur in the body structure. Obesity in this period is investigated for

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its relations with different effective factors. One of them is health promoting behavior, which is defined as the multidimensional patterns of the individual's self-initiated actions and perceptions that serve to maintain or enhance the level of wellness, self-actualization, and fulfillment of the individual (12). During adolescence gaining health promoting behavior is important as acquired behaviors can continue lifelong.

The aim of this study was to determine the prevalence of overweight and obesity among adolescents in order to determine the relation between obesity and health promoting behaviors.

2. Materials and methods

2.1. Subjects

The setting of this cross-sectional study was all the high school students ($n = 1224$) aged 15–17 in a district (Balçova) of İzmir, Turkey, during the academic year 2008–2009. The study protocol was reviewed and approved by the İzmir Provincial Directorate of National Education and the Ethics Committee of the Dokuz Eylül University Faculty of Medicine in April 2009. Written informed consent was obtained from parents before the study and the adolescents were asked for assent before the data collection. Out of 1224 students, 1089 (88.9%) completed the questionnaire and 848 (77.9%) assented to anthropometric measurements.

2.2. Procedure

In May and June 2009, the questionnaire, including sociodemographic characteristics of the students and the Health Promotion Life-Style Profile Scale (HPLPS), was administered, and the anthropometric measurement of students was completed in each school during a school day. The students were first asked to fill out the questionnaire, and then the measurement was performed among students who assented.

2.3. Instruments

2.3.1. Healthy behavior

The HPLPS was utilized to determine the level of healthy behavior of the adolescents. The scale was developed by Walker et al. (12). The validity and reliability study in Turkey was done by Esin (13). The HPLPS contains a four point Likert-type scale measuring the frequency of 48 reported health promoting behaviors; the lowest score is 48 and the highest score is 192. The scale has six subscales, including Self-Actualization, Health Responsibility, Exercise, Nutrition, Interpersonal Support, and Stress Management. Questions of the scale measure the individual's healthy lifestyle and improvement of healthy behavior. A rise in scale scores indicates individuals' high levels of applying healthy behaviors (12,13). All students were administered the HPLPS questionnaire (12). Cronbach's alpha for the scale was found to be 0.926.

2.3.2. Weight status

The anthropometric measurements were administered by the same researcher with the same tools. Height was measured by using an inflexible tape meter chart with 0.1-cm intervals and weight was measured by using a portable scale that was set to zero on a flat surface, being sure that students were not wearing overly heavy clothing. Weight and height were measured and BMI was calculated. In Turkey there is no national study investigating the percentile curves of BMI yet. The recent WHO 2007 child growth standards were used for the definition of overweight and obesity, based on sex and age, as specific 85th and 97th BMI percentiles, respectively (14).

2.3.3. Sociodemographic measurements

Sex (male/female), socioeconomic status (SES) (highest, high, low, lowest), education of parents (primary school, middle school, high school, university), obesity in parents (mother/father), and chronic disease in parents (mother/father) were included. A socioeconomic classification for Turkey that was developed by Neyzi et al. was used for assessment of SES (15). In this classification the mother and father's education and father's occupational status were evaluated.

2.4. Data analysis

Data were analyzed using SPSS 10.0. Descriptive statistics were used to describe the sample and Pearson's chi-square and Fisher's exact tests were utilized to identify potential differences in weight status of the adolescents by their sociodemographic characteristics. Multivariate logistic regression analysis was used to calculate the odd's ratio for the independent associations between significant variables (sex, mother and father's weight status, chronic diseases in parents, mother and father's education level) and adolescent weight status by entering all into the model as the first step. Removal of variables in the final model was done using a backward stepwise likelihood ratio test based on significance testing. Hosmer–Lemeshow goodness of fit statistics were used to assess model fit. Statistical significance was set at $P < 0.05$ for all analyses.

3. Results

In this study, BMI was used to define obesity and the prevalence of obesity was 9.1%. Of the students, 75.3% of girls ($n = 494$) and 81.8% of boys ($n = 354$) assented to the measurements ($P = 0.014$). Some characteristics of the students according to their weight status were shown in Table 1. There were statistically significant differences between adolescents with normal weight and overweight-obese adolescents according to their sex, mother and father's weight status, chronic disease in parents, and mother and father's education level.

The group with high SES had the highest obesity prevalence, although this was not statistically significant.

Table 1. Characteristics of the students according to BMI (n = 848).

		Adolescents				Total	P
		Normal weight		Overweight and obese			
		n	%	n	%		
Class							0.581
	9	331	48.3	86	52.8	417	
	10	258	37.7	54	33.3	312	
	11	96	14.0	23	14.2	119	
Sex							0.002
	Male	268	39.1	86	52.8	354	
	Female	417	60.9	77	47.2	494	
Mother*							0.016
	Normal weight	307	53.5	61	42.1	368	
	Overweight and obese	267	46.5	84	57.9	351	
Father**							0.003
	Normal weight	231	41.7	38	27.7	269	
	Overweight and obese	323	58.3	99	72.3	422	
Chronic disease in parents							0.031
	No	509	74.3	107	65.6	616	
	Yes	176	25.7	56	34.4	232	
Mother's graduation							0.002
	Primary school	278	40.6	55	33.7	333	
	Middle school	119	17.4	27	16.6	146	
	High school	214	31.2	45	27.6	259	
	University	74	10.8	36	22.1	110	
Father's graduation							0.022
	Primary school	168	24.5	33	20.2	201	
	Middle school	150	21.9	25	15.3	175	
	High school	215	31.4	52	31.9	267	
	University	152	22.2	53	32.5	205	
Socioeconomic status							0.199
	Lowest	103	15.0	35	21.5	138	
	Low	137	20.0	34	20.9	171	
	High	289	42.2	59	36.2	348	
	Highest	156	22.8	35	21.5	191	

*n = 719.

**n = 691.

The HPLPS and subscale scores assessed showed no statistically significant difference among adolescents with normal weight and overweight and obese ones. The scores are shown in Table 2.

Table 3 presents the results from the logistic regression analyses of associations between weight status of adolescents and associated factors of obesity. Being male, presence of obesity in the mother and father, presence of chronic disease in parents, and university graduation of mothers were found to be associated with the weight status of adolescents. The boys were 1.69 times significantly more likely to be obese than girls (95% CI [1.14–2.51]; $P = 0.009$). Adolescents who reported their mothers and fathers as obese were more likely to be obese (1.61 and 1.69 times, respectively) compared to adolescents who reported their mothers and fathers as being of normal weight (95% CI [1.06–2.42]; $P = 0.024$ and 95% CI [1.69–1.11]; $P = 0.015$).

Adolescents whose parents had chronic diseases such as hypertension, type 2 diabetes mellitus, and hyperlipidemia and those with mothers having university education were also found to have increased risk of obesity.

Table 4 presents the comparison of HPLPS and subscale scores according to the sex of the adolescents. Exercise, stress management scores, and total HPLPS scores were significantly higher in boys than girls. There was a significant difference between SES and total HPLPS, and also all subscales except nutrition ($P < 0.001$). The group with the lowest SES had lower total scale and subscale scores.

4. Discussion

Adolescence obesity has an increasing prevalence and the prevalence of overweight is dramatically higher in economically developed regions, but it is rising significantly

Table 2. Comparison of HPLPS and subscale scores according to BMI.

	Normal weight		Overweight and obese		P
	Mean	SD	Mean	SD	
Self-actualization	38.21	6.47	38.13	7.06	0.885
Health responsibility	21.01	5.62	21.13	5.60	0.806
Exercise	11.90	3.65	11.94	3.54	0.901
Nutrition	15.41	3.58	14.92	3.27	0.109
Interpersonal support	21.34	3.68	21.30	4.00	0.896
Stress management	18.66	3.75	18.79	3.70	0.687
Total HPLPS	126.72	20.53	126.54	19.82	0.921

Table 3. Logistic regression model predicting weight status.

	Odds ratio	95% CI		P
Sex (male vs. female)	1.69	1.14	2.51	0.009
Mother (overweight-obese vs. normal)	1.61	1.06	2.42	0.024
Father (overweight-obese vs. normal)	1.69	1.11	2.58	0.015
Chronic disease in parents	1.57	1.03	2.41	0.036
Mother's graduation				
Primary school (reference)				0.002
Middle school	1.59	0.90	2.81	0.111
High school	1.25	0.75	2.06	0.390
University	2.95	1.67	5.23	< 0.001
Observations	687			
Likelihood ratio (χ^2)	645.963			
Hosmer and Lemeshow	4.487	P = 0.811		

Table 4. Comparison of HPLPS and subscale scores according to sex.

	Male		Female		P
	Mean	SD	Mean	SD	
Self-actualization	38.46	6.70	37.78	6.36	0.093
Health responsibility	20.88	5.89	20.98	5.47	0.771
Exercise	13.11	3.51	10.82	3.40	<0.001
Nutrition	15.44	3.52	15.09	3.55	0.109
Interpersonal support	21.01	3.79	21.45	3.68	0.057
Stress management	19.10	3.71	18.20	3.69	<0.001
Total HPLPS	128.02	20.88	124.63	19.81	0.007

in most parts of the world (2). Adolescent obesity was not paid the necessary attention by the community because surveys about this issue are rare. The media and health authorities began to emphasize the importance of the issue due to serious health problems caused by the rise. Thus, the purpose of this study was to determine the prevalence of obesity in adolescents, the relation between obesity and healthy lifestyle behaviors, and factors associated with weight status of adolescents.

Our study and two other studies in different developed cities in Turkey have similar results (11,16). On the other hand, some have reached different results relevant to obesity. Regional cultural and SES differences in eating and exercise habits may be the cause of this difference (17,18). Different studies show relations between SES and obesity and reported rates of obesity also differ in regions of Europe. In addition, use of different diagnostic methods causes difficulties in comparing the prevalence (19,20). For this purpose, the Working Group of the International Task Force on Childhood Obesity focused on BMI. Obesity was more common in families with middle and high SES in developing countries (19). In this study the findings are similar; obesity prevalence was higher in students with high SES. Children whose mothers had graduated from university were found to be more obese, possibly due to their exposure to Westernized diets. Lobstein et al. pointed out that developing countries are undergoing rapid socioeconomic and nutritional transitions, experiencing a shift from under- to overnutrition problems and showing obesity to be more prevalent among higher income sectors of the population (2).

The distribution of obesity also varies by age. For example, in this study obesity is observed mostly in ninth grade students (63.6%). This may be due to their high participation in the study but also because as students' ages increase so does their level of knowledge about health care.

There was a significant difference between boys and girls in the prevalence of obesity. During the research it was observed that especially female students showed behaviors

for avoiding measurement. All students answered the questionnaire (n = 1089), but the percentages of males and females assenting to the measurement were 81.8% and 75.3%, respectively (n = 848). This also may be the reason, but in a study by Raistenskis et al. it was found that the boys had higher BMI unrelated to adiposity (21). In studies about adolescents and nutrition, results show that adolescents are at risk because of unhealthy eating habits and male students behave unhealthily. However, dieting due to dissatisfaction of the external appearance regardless of weight gain has also been reported, especially in girls (22).

Obese parents are likely to have higher rates of obese children. It is reported that an obese child has 90% obese family and relatives (16). Among male students in Denizli, obesity rate was found to be 25.9% if there was a family history of obesity; if the mother or father was obese the rate was 43% (23). Similar to this study, in our study, if the mother was obese, 15.3% of the students are obese, and 14.3% were if the father was. The percentage of obese students was found to be 69.1% among those who had a mother and father who were both obese.

Students do not show healthy lifestyle behaviors whether they are obese or not. This is concluded based on their answers showing what they thought of as correct. In our study, the total scale scores were higher in boys. Boys were more successful in exercise and stress management. These results are similar to previous studies (24). In another study, boys had higher scores in exercise, nutrition, and health responsibility compared to girls and girls had higher scores in the self-actualization, stress management, and interpersonal support than boys. Adolescents have the highest scores in the subgroup of self-actualization and lowest in health responsibility (25). As a result of many studies the high level for boys in exercise can be said to be associated with their freedom in this area, whereas girls are more limited depending on sex and cultural reasons. Many studies suggest that health professionals need to encourage overweight adolescents to participate

in sports (26). However, not only the regulation of exercise and eating habits but also the gaining of healthy lifestyle behaviors is emphasized in many studies to be important (27). It was also expected in this study, but the findings of this study demonstrate that healthy lifestyle behaviors are not associated with being obese or not. Several studies mentioned that determining the necessity of a special strategy for health promotion is important for adolescents concentrating on sex differences to have effective results (25).

Future research in this context should involve topics about the environment, family, eating and exercise, social life, health responsibility, and lifestyle. Social, cultural, and nutritional dimensions of adolescent obesity need to be further investigated. Adolescence is an era of development in which individuals start to implement their own features to life. Maintained properties in this age are kept lifelong. Healthy lifestyle behavior in this age group varies by sex.

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