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Self-perceived Body Weight Status and Weight-control Behaviors of High School Students in a Southern City of Turkey

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A B S T R A C T

Defining »healthy weight« is not easy and for an adolescent with all concerns about newly developing physiognomy it is even harder. The aim of this study was to find out the frequency of obesity and the association between the body mass index (BMI), weight-control behaviors and self-perceived body weight status in high school students of a southern city of Turkey. The students from 10 schools were randomly selected among 46,271 students of 72 high schools in Adana from 1999 to 2000. The response rate was 94.8% (2,352/2480). The Turkish version of Youth Risk Behavior Survey Questionnaire (YRBSQ) was completed by the students. The students' weights and heights were measured. The mean age was 16.5±1.0 years of age (range=14–21 years). The mean BMI was 21.0±3.1, 25.5% of students were underweight, 65.7% were normal, 6.4% were overweight and 2.3% were obese (p=0.0001). Of all students, 24.3% defined themselves as thin, 45.3% as normal, 24.9% as overweight and 5.5% as obese (p=0.0001). The percentage of girls defining their body weight as overweight and obese was significantly higher than the boys (p=0.0001). Of all students, 35.5% wanted to lose weight, 22.3% wanted to gain weight, 27.8% wanted to keep their current weight. Intention (p=0.0001) and interventions to lose weight such as going on a diet (p=0.0001), provocative vomiting (p=0.0001) and 24-hours starving (p=0.0001) were significantly higher in girls than boys. Of students, 26.8% (n=620) were on a diet program either to lose or to keep their body weight. There was significant relationship between being on a diet program and intention to change body weight (p=0.047). We concluded that adolescents living in Adana have relatively higher risk of being underweight than being obese and have unhealthy weight changing plans due to their misperception of their body images. Adolescents may be unconscious on plans and attempts to change their body weights and nutrition and we suggest that education on nutrition and health is required for adolescents.

Key words: *adolescent, nutrition, body mass index, perception, body image*

Introduction

Adolescence is a unique period of life with dramatic physical, psychological and cognitive changes. Adolescents gain up to 50% of their adult weight and skeletal mass and more than 20% of their adult height in adolescence. This means calorie, protein and nutrient uptakes should be appropriate in this period. However, participating into social and school life, increased physical activity, menstruation combined with poor eating habits, performing special diets accentuate the risk of poor adolescent nutrition[1–3]. As their bodies change, adolescents develop tremendous concern about whether their body images are or will be right. Uncertainty about appearance and attractiveness, comparison of their body with those of others, increased interest in sexual anatomy and physiology are the common body image concerns for this age group. Adolescents spend more time to make their body more attractive as they get older. These youngsters generally concentrate on their body weight instead of healthy nutrition. During this period social pressure for excessive slenderness and weight discrimination may lead them into unsafe weight loss practices. Growth in height, weight, and body components together with the changes of eating habits may cause a crisis in a teenager's nutritional needs[4]. While excessive weight places children at an increased health risk, unsafe weight loss practices also jeopardize adolescents' healthy growth.

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The emotional well-being of adolescents is also influenced when they develop poor self-esteem because of their body size and experience weight discrimination or use unsafe weight loss practices. Serious health problems such as malnutrition, obesity, psychiatric problems, anorexia and bulimia nervosa may become established with the addition of societal emphasize on youthful body image[5,6].

The dissatisfaction with the body weight and body image in adolescents was first reported five decades ago[7]. Fifty percent of girls and 25% of boys considered themselves overweight even their BMI adjusted for age and height was ≤85th percentile. Therefore, while BMI may be considered as a valuable indicator of obesity it may not be so valuable for recognizing the jeopardy related with adolescent's body images. Data published by Rovira et al. had shown that adolescents' knowledge of their body size and weight that should be adequate for their age and tallness were not adequate to make correct assumptions[8].

The aim of this study was to find out the frequency of obesity and the association between the body mass index, weight-control behaviors and self-perceived body weight status in high school students of a southern city of Turkey.

Subjects and Methods

This study was part of a cross-sectional study performed to determine high-risk behaviors in adolescents of Adana, the fifth largest city in Turkey.

Sample

Maximum acceptable difference was set as 10%, design effect was taken as two, with the total number of clusters six, estimated true rate at 10%, and confidence interval of 95%, the required sample size needed was 72 (6 clusters with 12 in each) students[9].

Sampling procedure was as follow: Adana city has two main regions named Yuregir and Seyhan. We randomly selected three high schools out of nine in Yuregir region and seven high schools out of 63 in Seyhan region after classifying the schools as »high schools with female students in majority«, »high schools with male students in majority« and »high schools mixed by gender«. Two thousand four hundred and eighty students (5% of all students) were randomly selected from 10 schools among 46271 students in 72 high schools in 1999–2000 in Adana and 2352 (94.8%) were reached. Sample size was calculated using the sampling scheme in Figure 1.

Questionnaire

Youth Risk Behavior Survey (YRBSQ) is a student health survey conducted biennially in the United States since 1990. Specifically, the survey was developed to monitor the prevalence of health risk behaviors among high school students (grades nine through 12) which lead to the top causes of morbidity and mortality among youth and adults in the United States[10]. We used the Turkish version of the questionnaire. It was first translated into Turkish and then back to English. It was piloted on 30 students out of the main sample group. Minor wording changes were made. There are national studies performed successfully using this questionnaire[11].

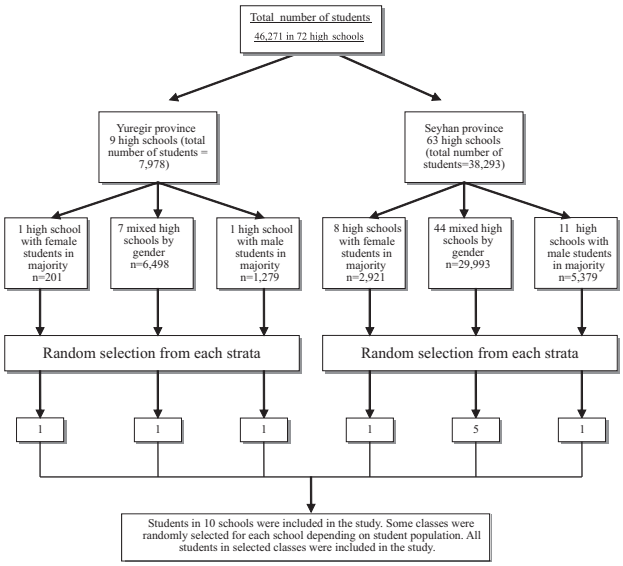


Fig. 1. Sampling scheme.

The questionnaires were administered to students in a single session at school after informed consent was obtained by the study coordinator. Students were asked not to write their names and school numbers. Sociodemographic details such as gender, age, grade, parental educational and occupational status, mean monthly income were asked. Self-perception for body weight and weight control behaviors were asked. Assurance for confidentiality was provided. The study was approved by the Ethics Committee of Faculty of Medicine, Cukurova University.

Measurements

Students' weights were measured by a platform scale which was sensitive to 0.1 kg. During this procedure students were in their school uniforms, but without shoes. The heights were measured by a wall-mounted unit. The back of the student's head touched the unit and to enhance reproducibility of head positioning, the head was placed in the Frankfort plane, while student looked straight ahead[12].

Statistics

Data was installed using Visual dBase program and was analyzed using Statistical Package for Social Science (SPSS) for Windows version 9.0 (Statistical Package for Social Science (SPSS) for Windows version 9.0). Chi-square and marginal homogeneity tests were used.

Results

The total number of students was 2352 [1179 boys (50.1%), 1173 girls (49.9%)]. The mean age was 16.5±1.0

years (range=14–21 years) (16.7±1.0 years for boys and 16.4±0.9 years for girls). The sociodemographic details of the students were presented in Table 1.

The mean BMI of the students was 21.1±3.1 (21.0±3.1 for boys and 21.1±3.1 for girls). Of students 25.5% were underweight and only 2.3% were obese (Table 2). The body weight difference between boys and girls was significant (p=0.0001).

While 24.3% of all the students defined themselves as underweight, 45.3% classified their body weight as normal. On the other hand, 24.9% and 5.5% defined themselves as overweight and obese, respectively. The percentage of students defining their body weight as ideal was higher in boys (49.9%) than girls (40.6%). While, the percentage of boys defining themselves as thin was higher than girls, the percentage of girls defining themselves as overweight was higher than boys. There was a significant relationship between the students' body image perception and gender (p=0.0001) (Table 3).

Of students defining themselves as thin, only 27.9% were, in fact, underweight and of students defining themselves as overweight, only 4.6% were, in fact, overweight. While none of the obese students defined themselves as obese, 27.1% of underweight, 69.8% of normal, and 3.1% of overweight students classified themselves as obese. The marginal homogeneity test was used to compare the students' actual BMIs and body weight perceptions and the difference was significant (p=0.0001) (Table 4).

TABLE 1
GENDER, AGE, PARENTAL EDUCATIONAL STATUS AND FAMILY INCOME OF THE STUDENTS (n=2352)

Variable	Description	n	(%) [a]
Gender	Male	1179	(50.1)
	Female	1173	(49.9)
Age	14	24	(1.0)
	15	308	(13.1)
	16	846	(36.0)
	17	783	(33.3)
	18	350	(14.9)
	19+	41	(1.7)
Mother's educational status	Illiterate	268	(11.4)
	Basic reading-writing skills	91	(3.9)
	Elementary school	888	(37.8)
	Secondary school	312	(13.3)
	High school	523	(22.2)
	University	270	(11.5)
Father's educational status	Illiterate	53	(2.3)
	Basic reading-writing skills	54	(2.3)
	Elementary school	816	(34.7)
	Secondary school	401	(17.0)
	High school	556	(25.6)
	University	472	(20.1)
Monthly income (USD)	Below minimum income*	731	(31.1)
	3 folds of minimum income	1063	(45.2)
	4–6 folds of minimum income	377	(16.0)
	More than 6 folds of minimum income	181	(7.7)

[a] column percentage
* minimum income=approx. 300 US dollars, defined by the government

TABLE 2
BODY MASS INDEX PERCENTILE CLASSIFICATION OF STUDENTS

Gender	Underweight n (%*)	Normal n (%*)	Overweight n (%*)	Obese n (%*)	Total n (%**)
Male	379 (32.1)	710 (60.2)	66 (5.6)	24 (2.0)	1179 (50.1)
Female	220 (18.8)	837 (71.4)	85 (7.2)	31 (2.6)	1173 (49.9)
Total	599 (25.5)	1547 (65.8)	151 (6.4)	55 (2.3)	2352 (100.0)

Pearson X^2=55.9 SD=3 p=0.0001
*Row percentage, ** Column percentage

TABLE 3
SELF-PERCEPTIONS OF THE STUDENTS FOR THEIR BODY WEIGHT

Gender	Underweight n (%*)	Normal n (%*)	Overweight n (%*)	Obese n (%*)	Total n (%**)
Male	332 (28.4)	585 (49.9)	210 (17.9)	45 (3.8)	1172 (50.1)
Female	238 (20.3)	475 (40.6)	373 (31.9)	84 (7.2)	1170 (49.9)
Total	570 (24.3)	1060 (45.3)	583 (24.9)	129 (5.5)	2342 (100.0)

Pearson X^2=84.3 SD=3 p=0.0001
*Row percentage, ** Column percentage

TABLE 4
COMPARISON OF SELF-PERCEPTION AND ACTUAL BODY WEIGHT

Self-perception	Actual body weight				
	Underweight n (%*)	Normal n (%*)	Overweight n (%*)	Obese n (%*)	Total n (%**)
Underweight	159 (27.9)	357 (62.6)	44 (7.7)	10 (1.8)	570 (24.3)
Normal	247 (23.3)	703 (66.3)	75 (7.1)	35 (3.3)	1060 (45.3)
Overweight	157 (26.9)	389 (66.7)	27 (4.6)	10 (1.7)	583 (24.9)
Obese	35 (27.1)	90 (69.8)	4 (3.1)	0 (0.0)	129 (5.5)
Total	598 (25.5)	1539 (65.7)	150 (6.4)	55 (2.3)	2342 (100.0)

p=0.0001(marginal homogeneity test); SD: 6; Value: 336.712
*Row percentage, **Column percentage

Students' body weight changing plans

Of students, 35.5% (n=830) were planning to lose weight, 22.3% (n=522) were planning to gain weight, 27.8% (n=651) were planning to keep their current weight and 14.4% (n=336) had no intention for weight change. While the percentage of boys planning to gain weight (30.3%, n=355) was higher than the girls' (14.3%, n=167), the percentage of girls planning to lose weight (49.4%, n=577) was higher than the boys' (21.6%, n=253). The relationship between the students' body weight changing plans and gender was significant (p=0.0001) (Table 5).

Concerning with the correct body weight perceptions (when the perception meets the actual weight), none of the boys who defined themselves correctly as underweight wanted to lose weight whereas 7.1% (n=3) of girls who defined themselves as underweight, 12.1% (n=44) of boys who defined themselves as ideal, 33.6% (n=114) girls who defined themselves as ideal, 55.6% (n=5) of boys who defined themselves as overweight, and 83.3% (n=15) of girls who defined themselves as overweight were planning to lose weight. Body weight changing plans and body weight perceptions of the students were significantly related (p=0.0001) (Figure 2).

The assessment of the dietary interventions, during the last 30 days, of the students with correct body weight perceptions revealed that 26.8% (n=620) of them were on a diet program (either to lose or keep their body weight) and it was more common in girls than boys (38.2% *vs.* 15.4 %, respectively) (Table 6). There was a significant relationship between gender and being on a diet (p=0.0001). Most respondents declared that they got their diet formula from their family members (16.8%) or media (20.9%) instead of a physician or a dietician (16%). Girls were twice more likely to use newspaper diet programs than boys (p=0.0001).

More girls were starving for 24 hours during the last 30 days (either to lose or to keep their body weight) compared to boys (9.8%, n=110 *vs.* 2.5%, n=28). The difference between genders in terms of starving for 24 hours was significant (p=0.0001). Girls (14.5%, n=167) were

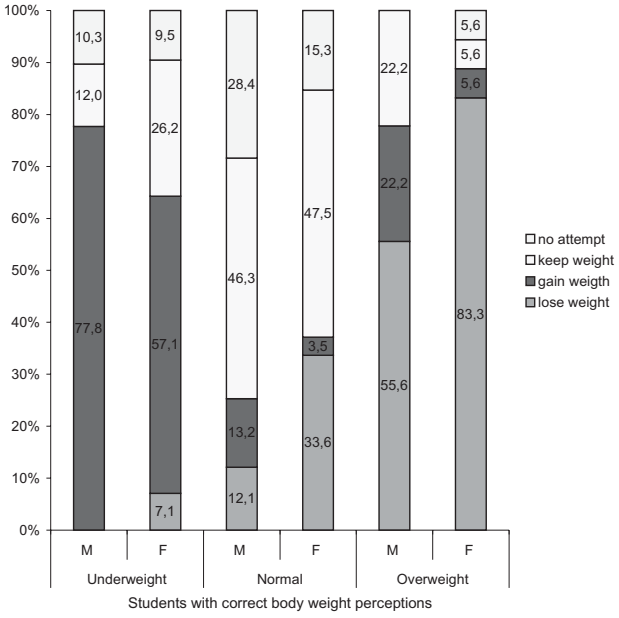
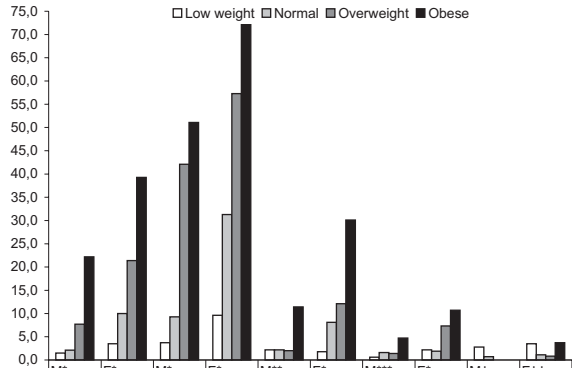


Fig. 2. The percentage of the male (M) and female (F) students' intentions to control their body weight in relation with their correct body weight perceptions (Pearson X^2=21.0, SD=4, p=0.0001 for all).



Low weight	1,5	3,5	3,7	9,6	2,2	1,8	0,6	2,2	2,8	3,5
Normal	2,1	10,0	9,3	31,3	2,2	8,1	1,6	1,9	0,7	1,1
Overweight	7,7	21,4	42,1	57,3	2,0	12,1	1,4	7,3	0,0	0,8
Obese	22,2	39,3	51,1	73,8	11,4	30,1	4,7	10,7	0,0	3,7

* p=0.0001, **p=0.002, *** p=0.183, † p=0.008, ††p=0.025

Fig. 3. The percentages of body weight control interventions' of the male (M) and female (F) students who have correct body weight perceptions (Pearson X^2)

more likely to consume dietary products than boys (3.7%, n=43) (p=0.0001) (Table 6). While vomiting was significantly higher in girls, there was no difference between genders in drug use for loosing weight (p=0.0001, p>0.05, respectively) (Table 6).

The unhealthy interventions to control body weight and the students' correct body weight perceptions were presented in Figure 3. There was an increase in the consumption of dietary products during the last 30 days (either to lose or to keep body weight) with parallel to the increase in body weight perceptions in both genders. The relationship between body weight perception and provocative vomiting (either to lose or to keep their body weight) during the last 30 days was not significant for boys (1.4%, n=16) (p=0.183) but was significant for girls (4.3%, n=50) (p=0.0001). Of students, 1.1% of boys (n=1157) and 1.7% of girls (n=1148) stated that they used drugs (either to lose or to keep body weight) during the last 30 days. There was significant relationship between body weight perception and drug use in boys and girls (p=0.0008, p=0.025, respectively). Of 13 boys with correct body weight perception, nine (69.2%) declared that they were using drugs to control their body weight.

TABLE 5
BODY WEIGHT CHANGING PLANS OF THE STUDENTS

Gender	Lose weight n (%*)	Gain weight n (%*)	Keep weight n (%*)	No plan n (%*)	Total n (%**)
Male	253 (21.6)	355 (30.3)	349 (29.8)	214 (18.3)	1171 (50.1)
Female	577 (49.4)	167 (14.3)	302 (25.9)	122 (10.4)	1168 (49.9)
Total	830 (35.5)	522 (22.3)	651 (27.8)	336 (14.4)	2339 (100.0)

X^2=222.8; SD=3; p=0.0001
* Row percentage, **Column percentage

TABLE 6
BODY WEIGHT CONTROL INTERVENTIONS OF THE STUDENTS WITH CORRECT BODY WEIGHT PERCEPTION

Interventions (in the last 30 days)	Gender	Yes n (%)	No n (%)	Total n (%)	p*
On diet	M	177 (15.4)	975 (84.6)	1152 (49.8)	
	F	443 (38.2)	718 (61.8)	1161 (50.2)	0.0001
	Total	620 (26.8)	1693 (73.2)	2313 (100.0)	
Consuming dietary products	M	43 (3.7)	1118 (96.3)	1161 (50.2)	
	F	167 (14.5)	986 (85.5)	1153 (49.8)	0.0001
	Total	210 (9.1)	2104 (90.6)	2314 (100.0)	
24 hours starving	M	28 (2.5)	1076 (97.5)	1104 (49.5)	
	F	110 (9.8)	1016 (90.2)	1126 (50.5)	0.0001
	Total	138 (6.2)	2092 (93.8)	2230 (100.0)	
Vomiting	M	16 (1.4)	1130 (98.6)	1146 (49.8)	
	F	50 (4.3)	1104 (95.7)	1154 (50.2)	0.0001
	Total	66 (2.9)	2234 (97.1)	2300 (100.0)	
Drug use	M	13 (1.1)	1145 (98.9)	1158 (50.2)	
	F	19 (1.7)	1129 (98.3)	1148 (49.8)	0.274
	Total	32 (1.4)	2274 (98.6)	2306 (100.0)	

* Pearson X^2

Discussion

The main finding of this study was the difference between the actual and the self-perceived body weight in adolescents. This disparity may cause risky behaviors for adjusting body weight in adolescents.

Burgut and Ozer compared the population in the National Center for Health Statistics/Centers for Disease Control and Prevention (NCHD/CDC) study with children living in Adana and showed that Turkish children were shorter than their peers in the United States (US)[13]. However, Neyzi et al. recently published a paper to create updated reference standards for the growth of Turkish infants and children. They reported that height growth of Turkish children conformed to the updated US growth data and showed an upward secular trend from the earlier Turkish data and weight for age and BMI for age also indicated an increase starting in prepubertal ages. Although this new data presents an increasing trend for obesity, it cannot be generalized to all Turkish children as the study population consisted of only well-to-do families[14]. Neumark-Sztainer and Hannan found in their study that 15–16% of adolescents were overweight and 8–9% was obese[15]. According to the Youth Risk Behavior Surveillance–2007, 13.0% of students were obese nationwide in the US and overall, the prevalence of obesity was higher among male students (16.3%) than female (9.6%)[16]. Our results are inconsistent with this study. However, the rates of overweight and obesity in adolescents for different researchers from Turkey were similar to our findings[17–19]. Different nutritional habits, economical and cultural disparities may explain the variability in the prevalence of obesity in these populations. Chinese Health and Nutrition Survey data underlined the importance of malnutrition and reported that the prevalence of underweight in adolescence was 12–13% which is lower than the prevalence in our study (25.5%)[20]. Therefore, we may conclude that, at present, malnutrition is a more serious problem compared to obesity for Turkish adolescents.

In one of their study, Argnani et al. indicated that the analysis of body image perception is a valid source of information and that it should be assessed in studies on youth growth, as it varies with age, sex and BMI values[21]. Self-defined body weight may be important to anticipate the body weight changing plans as well as the nutrition habits in adolescents. One of the interesting finding of our study was none of the obese adolescents (n=55) defined themselves as obese. On the other hand, 5.5% of all students reported themselves as obese. Of students who defined themselves obese, 96.9% of them were, in fact, either underweight or normal. Of students who defined themselves as overweight, 93.6% of them were, in fact, either underweight or normal. This finding is not consistent with the results of NHANES III survey which reported that 42% of children reporting themselves as overweight had a BMI less than the 85th percentile and 70% had a BMI less than the 95th percentile[22]. The correct self-perception for underweight, normal and overweight in our study were 28.1%, 66.3% and 4.6%, respectively. The highest correct perception was in the group with normal weight. Another interesting finding related to body weight perception was the effect of gender differences. Similar to the study by Neumark-Sztainer and Krowchuk, expressing one's body weight as overweight or obese was more frequent in girls than boys in our study[15,23]. Societal emphasize on youthful body image may produce more pressure on girls than boys.

It was also interesting to see that although none of the students defined themselves as obese they were trying to lose weight. While the underweight group was trying to gain weight, normal group was trying to keep their current body weight. These results indicated that the self-defined body weight may not reflect the real feeling of an individual on body weight during completing the questionnaire. The students stated that they were implementing various strategies to control their body weight. Most of them declared that they were on a diet program (not recommended by a physician or a dietician) and this finding is consistent with the results of Field et al.[24].

It has been shown that dissatisfaction with body weight, being on a diet and weight control behaviors were common in young people, especially girls[25,26]. Our similar finding on girls and obese adolescents (being more enthusiastic to control their body weight compared to boys and underweight adolescents) may be due to the social pressure for extreme slimness and weight discrimination in public and media. Non-scientific body weight control strategies may be harmful. Starving for 24 hours and provocative vomiting are some examples of dangerous methods used to lose weight[27]. Even drug use has been reported in underweight and obese girls. This may indicate a serious psychological problem such as distorted body image or fear of obesity especially in underweight adolescents. The consumption of dietary products and being on a diet were the two other common strategies to control body weight and this may be related to the common newspaper advertisements[28]. As the calculation of daily calorie expenditure requires professional supervision, physician or dietitian recommended diet programs are needed for a healthy weight control program.

For our study group, having correct body perception does not mean to have healthy body weight changing plans, most students with correct body weight perception had unhealthy weight changing plans. Body weight control is a complicated phenomenon. Management of adolescents for healthy nutritional development requires comprehensive evaluation of BMI with risky weight control behaviors and self-perceived body weights. This study showed that the prevalence of obesity was not as high as that of the western countries. Our findings emphasized that being underweight which may cause serious health problems was a problem for the Turkish adolescents. Therefore, the assessment of adolescence well-being related to eating habits requires multiple aspects for successful approach.

Limitations

Certain limitations of this study deserve mentioning. First, we note that our data was self-reported, and the extent of under- or over-reporting for the risky behaviors cannot be determined. Second, our data was school--based, and therefore cannot be generalized for all Turkish adolescents. Finally, our sample was selected from an urban area and cannot represent the rural area.

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SAMOPROCJENA STATUSA TJELESNE TEŽINE I KONTROLIRANJA TJELESNE TEŽINE KOD SREDNJOŠKOLSKIH UČENIKA U GRADU U JUŽNOJ TURSKOJ

SAŽETAK

Definiranje »zdrave težine« nije lako, a za adolescente, sa svim zahtjevima vezanim uz novo-razvijajuće fizionomiju, još je teže. Cilj ovog istraživanja bio je otkriti frekvenciju pretilosti te povezanost između indeksa tjelesne mase (BMI), kontroliranja težine i samoprocjene statusa tjelesne težine kod srednjoškolskih učenika u gradu u južnoj Turskoj. Izabrani su učenici iz 10 škola slučajnim odabirom između 46271 učenika iz 72 srednje škole u Adani u periodu između 1999. i 2000. godine. Postotak odaziva bio je 94,8% (2352/2480). Učenici su ispunili tursku inačicu Upitnika mladenačkog rizičnog ponašanja (YRBSQ). Izmjerene su težina i visina učenika. Srednja vrijadnost godina bila je 16,5±1,0 godina života (raspon=14–21 godina). Srednja vrijednost indeksa tjelesne težine bila je 21,0±3,1; 25,5% učenika bili su pothranjeni, 65,7% bili su normalni, 6,4% bili su prekomjerene težine, a 24,9% bili su pretili (p=0,0001). Postotak djevojčica koje su definirale svoju tjelesnu težinu kao prekomjerenu i pretilu značajno je bio viši od onoga kod dječaka (p=0,0001). Od svih učenika, njih 35,5% htjelo je smanjiti težinu, 22,3% htjelo je pridobiti težinu, a 27,8% nije htjelo promjenu težine. Namjera (p=0,0001) i intervencija kao što su odlaženje na dijetu (0,0001), isprovocirano povraćanje

(p=0,0001) i 24-satno izgladnjivanje (p=0,0001) bile su značajno više kod djevojčica nego kod dječaka. Među učenicima, 26,8% (n=620) bilo je na dijeti kako bi ili izgubilo težinu ili zadržalo trenutačnu težinu. Pokazao se značajni odnos između držanja dijete i namjere za promjenom težine (p=0.0,47). Zaključili smo da adolescenti u Adani imaju relativno viši rizik za pothranjenost nego za pretilost i za nezdravim planiranjem promjene težine zbog vlastite krive procjene izgleda vlastitog tijela. Adolescenti mogu biti nesvjesni u planiranju i pokušajima za promjenu vlastite tjelesne težine i prehrane te tvrdimo da je obrazovanje o prehrani i zdravlju potrebno za adoslecente.