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High tendency to the substantial concern on body shape and eating disorders risk of the students majoring Nutrition or Sport Sciences

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BACKGROUND/OBJECTIVES: Studies have indicated that university students majoring in nutrition and dietetics or sport sciences may have more obsessions associated with eating attitudes and body shape perception compared to other disciplines *i.e.* social sciences. Therefore, this study aimed to assess and compare the risk of eating disorders and body shape perception.
MATERIALS/METHODS: Data was collected from 773 undergraduate students at the Departments of Nutrition and Dietetics (NDD) (n = 254), Physical Education and Sports (PESD) (n = 263), and Social Sciences (SOC) (n = 256).A socio-demographic and personal information questionnaire, Eating Attitudes Test (EAT-40), Body Shape Questionnaire (BSQ-34), Perceived Figure Rating Scale (FRS) were applied; and body weights and heights were measured.
RESULTS: Mean EAT-40 scores showed that, both male and female students of PESD had the highest scores (17.4 ± 11.6) compared with NDD (14.3 ± 8.3) and SOC (13.0 ± 6.2) ($P < 0.05$). According to EAT-40 classification, high risk in abnormal eating behavior was more in PESD (10.7%) compared to NDD (2.9%) and SOC (0.4%) students ($P < 0.05$). Students of PESD, who skipped meal, had higher tendency to the risk of eating disorders ($P < 0.05$). In parallel, body shape perception was found to be marked with higher scores in NDD (72.0 ± 28.7) and PESD (71.5 ± 32.8) compared with SOC (64.2 ± 27.5) students ($P < 0.05$). Considering BSQ-34 classification, high concern (moderate and marked) for body shape were more in PESD (7.4 %) compared to NDD (5.2%) and SOC (1.9%) students ($P < 0.05$). The body size judgement via obtained by the FRS scale were generally correlated with BMI. The Body Mass Index levels were in normal range (Mean BMI: 21.9 ± 2.8 kg/m^2) and generally consistent with FRS data.
CONCLUSIONS: Tendency to the abnormal eating behavior and substantial body shape perception were higher in PESD students who have more concern on body shape and were not well-educated about nutrition. In conclusion, substantial concern on physical appearance might affect eating behavior disorders in PESD students.

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INTRODUCTION

Diet and physical exercise are global key aspects to develop healthy lifestyle. However, changes over the decade in the attitudes of the young population to the body satisfaction were not toward healthier lifestyle [1,2]. The body dissatisfaction, accompanied with eating disorders and abnormal concern on body image can be achieved by health professionals from nutrition and sport sciences [2]. Since they consult the people about diet and physical activity to shape the body, physical appearance and eating attitudes of these professionals are important as well [3].

Body image with cognitive, affective and behavioral influences, based on two basic components: perception of current body size and body shape. Since high worry on body image found to be a risk factor for eating disorders, researchers currently have focused on individual's body shape and size perceptions and eating attitudes [4-6]. Although most of the current studies have concerned about university students' problems associated with eating attitudes only some of them were related to body shape dissatisfaction [1,7-9]. Recent estimates indicated that 25% of the university students were binge eating and 24% were dieting at some level [9]. A study from Turkey showed that eating disorders risks are more prevalent among female university students and overweight students were at higher risk of eating disorders [10]. In addition, there was a positive correlation between the abnormal eating attitudes, meal skipping and body size [10,11]. In parallel, the studies shown by others from different countries of the world have indicated that university students generally have problems associated with eating attitudes and body shape perception [11-14]. However, no data appeared comparing Nutrition and Dietetics or Physical Education and Sports students with Social Sciences.

Due to occupational education, the students of "Nutrition and

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Dietetics" and "Physical Education and Sports" might have high concern on body shape and size [3,15]. Current data suggest that junior and senior majors may be more affected than freshmen as a result of their amplified exposure to diet and sports related information [3,16]. Notwithstanding, although a few of studies concerned about eating attitudes, there is a lack of knowledge about body shape perception and the interaction with eating attitudes of the students majoring in Nutrition and Dietetics or Physical Education and Sports compared with other disciplines *i.e.* Social Sciences [3,7,15-17]. As a result of occupational education of these students in these disciplines, they program their life to behave and look healthy lifelong which may take them into obsession [7,16]. Because, they have duties such as an educator in the society and as a role model for the family and friends; have a huge affect on the public via media mass; and they are also policy makers in the ministries of health and sports. That is why it is vital to monitor the trends in body image and eating behavior within these groups.

Taken together, students at the departments of nutrition and sport sciences may have a substantial concern on physical appearance and eating attitudes due to their occupation related education [3,15,18]. Since the students will eventually be counseling others professionally about diet and physical fitness, it is important to reveal whether their occupation affect individual behavior to their own body. Therefore, to monitor the trends in behavior about body image, and to understand the factors such as education that might impact on the uptake of the eating habit and perception on body image in the students at the nutrition and dietetics, and sport sciences departments are important issues. Hence, this survey aimed to assess (i) the abnormal eating behaviors; (ii) perception of body shape and relationship between eating attitude and body shape perception; and lastly (iii); the difference between current body size and subjective ideal body size judgement among these students. This unique data set from Turkey is vital, because international comparisons are valuable, since they delineate variations in behavioral risk in different cultures, point to common determinants, and help to highlight good practice in preventive medicine.

SUBJECTS AND METHODS

Participants

The subjects of this study were chosen from the universities (Hacettepe, Ankara, Gazi, and Başkent Universities) consisting of Nutrition and Dietetics Departments in the capital city of Turkey. All of the undergraduate senior and junior students from the departments of Nutrition and Dietetics, Physical Education and Sport Sciences were enrolled to the study (n = 614). Participants with metabolic, chronic or psychological diseases, current dieters, students not to volunteer were excluded from the study. The response rate was 84% (n = 517). For comparison, students from Social Sciences *i.e.* the Departments of History, Law, and Political Sciences, without any health and psychology/ behavior theme related education, with the same excluding criteria and similar mean body mass indexes for each gender were chosen randomly. Consequently, the total subjects of this study was 870 undergraduate seniors and juniors in which left participants conducted to this study were 773 studentsfromthe Departments of Nutrition and Dietetics (NDD) (n = 254), Physical Education and Sports (PESD) (n = 263), and Social Sciences (SOC) (n = 256).

Instruments and data collection

A sample of 773 students (62% male and 38% female) aged 22 ± 1.9 years participated to this cross-sectional survey performed in Spring Semester of 2013. Students who agreed to participate voluntarily in this study, approved by Ethics Board (IRB: 2013-12), were asked to sign a written consent form according to the Helsinki Declaration. A demographic and personal information questionnaire, Eating Attitudes Test, Body Shape Questionnaire, and Perceived Figure Rating Scale were enrolled individually by interview; then body weights and heights were measured.

Eating attitues test (EAT-40)

The test was originally developed by Garner and Garfinkel [19]. It contains 40 items in which the frequencies of attitudes and beliefs are rated using 6-point likert-type scale. In the EAT-40 scale, the score is ranging between 0-120 points. Higher scores point to an increased abnormal eating behavior. A score of 30 and above is used as a cut-off point to identify individuals with high risk.The reliability and validity of the Turkish version of EAT-40 were conducted by Savaşır and Erol [20].

Body shape questionnaire (BSQ-34)

The test was originally developed by Cooper [21] which measures individuals' degree of concern on their body shape. The items are rated on a Likert-type scale. Briefly, in the scale, the score is ranging between 34-204 points. Higher scores point to an increased level of concern on body shape. Score from 110 to 140 refer to moderate and more than140 refer to marked concern with body shape. The reliability and validity studies of the Turkish version of BSQ were conducted by Akdemir *et al*. [22].

Perceived figure rating scale (FRS)

The Stunkard Figure Rating Scale is based on subjective self-selection of body image figures. In this scale study participants were asked to rate how they perceived their current body shape by choosing an image that corresponded to their figure from the scale. Gender-specific body images range from 1 to 9, with 1 being the thinnest body type and 9 being the largest. Images 1 and 2 represent being underweight, 3 and 4 appropriate weight, 5 slightly overweight, 6 and 7 moderately overweight, 8 and 9 very overweight body size [23,24].

Anthropometric measurements

The body weights of participants, wearing minimal clothing without shoes, were measured with a portable scale. The heights were measured with a flexible body measuring tape. All measurements were obtained as previously described [25]. Body Mass Index (BMI: weight/height^2, kg/m^2) was calculated for each subject. The BMI classified according to the World Health Organization Classification [2].

Statistical analysis

Results were expressed as mean ± SD. Statistical significance was set at $P < 0.05$. Data analysis and significance of differences were determined with a one-way ANNOVA followed by post-hoc Tukey HSD test and parametric t test, as required. To exclude the gender inference ANCOVA analysis was also performed. All the analyses were carried out using the statistical package for social sciences (SPSS version 19.0, Chicago IL, USA).

RESULTS

Characteristics of the participants

In order to discuss the body shape perception and eating attitudes of the students the descriptive characteristics of the participants are shown in Table 1. Males and females were comparable in the groups except the students in NDD. Since there was quite less male students in Nutrition and Dietetics Departments, retrieved amount of the male students of NDD was the least in all groups. Mean age was 21.5 ± 1.4, 22.7 ± 2.1, and 21.6 ± 1.9 in NDD, PESD, and SOC students respectively. The Body Mass Index levels were in normal range (Mean BMI: 21.9 ± 2.8 kg/m^2) and comparable for all groups (Table 1).

Meal skipping was frequent in PESD (70.7%) students who were mainly living with their family (66.9%). The students of NDD skipped meals less (52.4%) that were living with their friends (40.6%). The most skipped meal was breakfast followed by lunch in all groups. The frequent reason for meal skipping of students at NDD was "lack of time" whereas at SOC was "no habit". Multivitamin and mineral complex usage was frequent at SOC students, while 25.9% of PESD students were taking protein/amino acid powder to increase muscular appearance. Thus, regular exercisers were the highest in PESD students (77.2%) as expected (Table 1). Taken together these results might give a supportive explanation about nutrition education may affect eating habits.

Table 1. Descriptive characteristics of the participants

Characteristics	NDD (n = 254)	PESD (n = 263)	SOC (n = 256)
Age, yrs, mean (SD)	21.5 (1.4)	22.7 (2.1)	21.6 (1.9)
Gender,%			
Male	10.2	52.1	50.4
Female	89.8	47.9	49.6
BMI, kg/m^2,mean (SD)			
Male	23.7 (2.8)	23.8 (2.4)	23.6 (3.1)
Female	20.9 (2.3)	20.7 (1.9)	20.7 (2.1)
Residence, %			
with family	21.3	66.9	30.5
at dormitory	29.5	7.2	32.0
with friends at house	40.6	19.4	33.6
other	8.6	6.5	3.9
Meal-skipping (frequent), %	52.4	70.7	65.2
Breakfast	46.6	47.3	52.1
Lunch	15.8	30.6	31.1
Dinner	2.3	5.9	3.0
Reason of meal skipping			
Lack of time	67.7	47.8	49.1
No habit	17.3	22.0	25.7
Reluctant/unwilling	10.5	21.0	15.6
Use of dietary supplement, %	14.2	10.3	6.3
Multivitamin	22.2	22.2	43.8
Vitamin B_{12}	2.8	14.8	18.8
Iron	36.1	11.1	25.0
Protein/Amino acid powder	0.0	25.9	0.0
Regular exercisers, %	20.5	77.2	28.9

NDD, department of nutrition and dietetics; PESD, department of physical education and sports; SOC, department of social sciences.

Eating attitudes and body shape perception

We sought to determine body image dissatisfaction among the university students educated for nutrition and sports compared with social sciences. Higher scores at EAT-40 test estimated increased abnormal eating behavior. As presented in Table 2, mean EAT-40 scores showed that, both male and female students of PESD had the highest scores (17.4 ± 11.6) compared with NDD (14.3 ± 8.3) and SOC (13.0 ± 6.2) ($P < 0.05$). Although, low risk of abnormal eating behavior was detected in all groups, it was shown that the females had the highest mean scores which might be a predictor of having extra predisposition to abnormal eating behavior than males (Table 2). The comparison of the participants in terms of EAT-40 classification according to the cut offs showed that, high risk in abnormal eating behavior was higher in PESD (10.7%) compared to NDD (2.9%) and SOC (0.4%) students ($P < 0.05$). Thereby, tendency to the eating disorders was higher in PESD than NDD or SOC students (Fig. 1A, B). In the high risk of abnormal eating behavior group, it was determined that 6.2% were meal-skippers and 4.2% werenon-skippers.The further comparison of the meal skippers showed that students of PESD, who skipped meal, had higher tendency to the risk of eating disorders ($P < 0.05$). Briefly, 5.9% of females (mean score: 37.3 ± 9.3) and 0.0% of males in NDD; 14.0% of females (mean score: 41.7 ± 10.7) and 9.3% (mean score: 44.8 ± 14.1) of males in PESD; 1.3% of females (mean score: 31.0 ± 0.0) and 0.0% of males in SOC had high risk of abnormal eating behavior (Fig. 1C, D).

To predict the concern on the body shape among participants, BSQ-34 score was calculated. In parallel, body shape perception was found to be marked with higher scores in NDD (72.0 ± 28.7) and PESD (71.5 ± 32.8) compared with SOC

Table 2. Comparison of the three groups in terms of Eating Attitudes Test (EAT-40) and Body Shape Questionnaire (BSQ-34) scores

Measure	NDD (n = 254)	PESD (n = 263)	SOC (n = 256)	F-score	*P*-value
EAT-40					
Male	11.8 ± 4.9	16.5 ± 11.7*	12.2 ± 5.7	8.34	0.001
Female	14.6 ± 8.5	18.3 ± 11.4*	13.8 ± 6.6	9.71	0.001
Total	14.3 ± 8.3	17.4 ± 11.6*	13.0 ± 6.2	16.05	0.001
BSQ-34					
Male	59.7 ± 34.5	71.9 ± 32.6*	56.6 ± 19.6	10.29	0.001
Female	73.4 ± 27.7	71.1 ± 33.2	71.9 ± 31.9	0.27	0.766
Total	72.0 ± 28.7*	71.5 ± 32.8*	64.2 ± 27.5	5.51	0.004

NDD, department of nutrition and dietetics; PESD, department of physical education and sports; SOC, department of social sciences.
Data is expressed as in Mean ± SD, * $P < 0.05$compared with SOC group.
Significance was calculated by one way ANOVA analysis followed by post-hoc test called Tukey HSD.

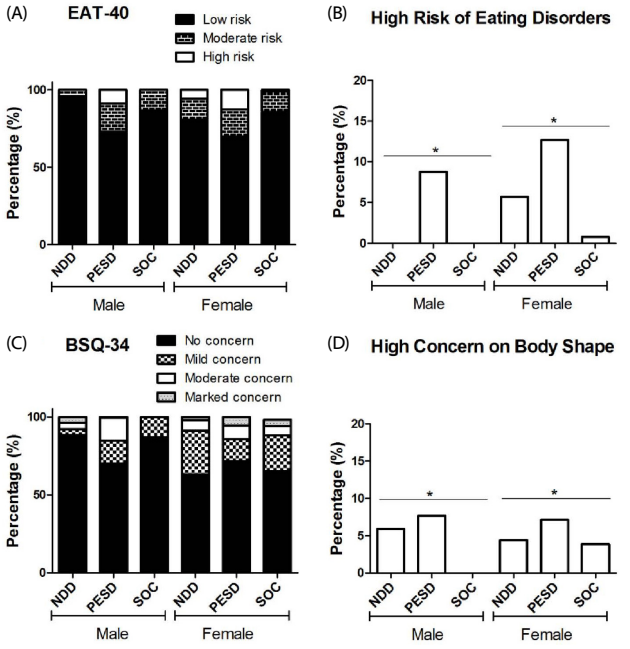

Fig. 1. High risk in abnormal eating behavior and high concern with body shape were estimated in the students of Sport Sciences followed by Nutrition. Comparison of the eating disorders risk estimated from Eating Attitudes Test (EAT-40) (A, B) and concern on body shape estimated from Body Shape Questionnaire (BSQ-34) (C, D). The students showing high risk of eating disorders predicted via EAT-40 (B), high concern on body shape predicted via BSQ-34. Data is presented as percentage (%) of the participants according to the classification with cut offs (*P< 0,05). NDD, Department of Nutrition and Dietetics; PESD, Department of Physical Education and Sports; SOC, Department of Social Sciences.

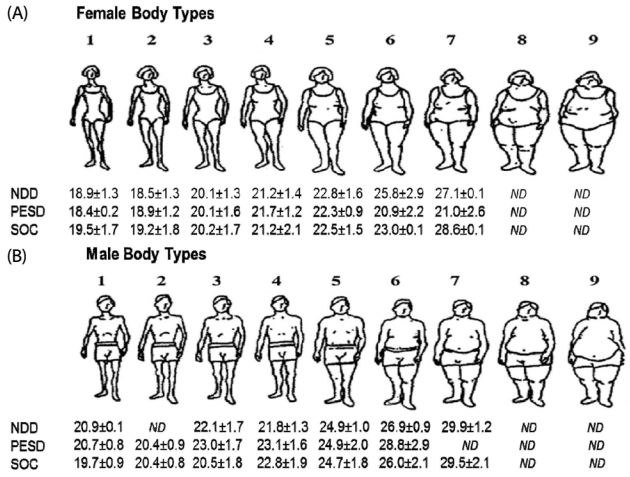

Fig. 2. The Body Mass Index levels were in normal range and consistent with Figure Rating Scale. Mean BMI values (kg/m^2) were calculated and presented for each body imagechosen by participants as they feel about their body sizeand shape [23, 24]. Data are for females (A) and males (B). Images 1&2 represent underweight; images 3&4 appropriate weight; images 5&6 slightly overweight; images 7&8 moderately overweight and image 9 very overweight body size. NDD, Department of Nutrition and Dietetics; PESD, Department of Physical Education and Sports; SOC, Department of Social Sciences; EAT-40, Eating Attitudes Test; BSQ-34, Body Shape Questionnaire; FRS, Perceived Figure Rating Scale; BMI, Body Mass Index; ND, Not Defined.

(64.2 ± 27.5) students (P < 0.05). In male students of PESD (71.9 ± 32.6) showed the highest perception on body shape and the least of SOC students (64.2 ± 27.5) (Table 2). Since, mean scores predicted that none of the group showed marked concern with body shape; we also compared the groups with the classifications made according to the cut-off points (Fig. 1). Considering BSQ-34 classification, high concern (moderate and marked) for body shape were more in PESD (7.4%) (mean score: 133.8 ± 25.3 compared to NDD (5.2%) (mean score: 133.2 ± 23.3) and SOC (1.9%) students (mean score: 135.8 ± 27.5) with higher scores in females (P < 0.05) (Fig, 1C, D).

Therefore, from the idea that a questionnaire that measures eating attitudes would most likely correlate with a questionnaire that measures body shape perception. Since abnormal eating behavior risk and body shape perception were higher in students at PESD, Spearman's rho correlation was performed between BMI and EAT-40 or BSQ-34.Thereafter, weak correlation between the BMI value and EAT-40 or BSQ-34 suggested that other components such as body shape, muscle/fat content of the body, and social pressure etc. might be responsible for the eating behavior and body perception apart from body weight in healthy university students (Table 3).

Figure rating scale versus body mass index

Body fat is often estimated by an objective surrogate measure of BMI which is determined by weight and height measurement. Body fat also can be subjectively assessed by FRS which utilizes gender-specific body figures [24]. Both types of measurements are useful to assess the relationship of body weight to body shape perception. Thus, to determine the relation between BMI and FRS, the Spearman's rho correlation was performed. Positive correlation between the BMI value and FRS indicated that the students in each group had real self-perception of body image and subjective estimation of body fat (Table 3). The strong correlation (r > 0.50) was detected in FRS comparison with BMI in all groups.

Body dissatisfaction is situated in the evaluative and effective components of eating attitudes. From the idea that body dissatisfaction related to the difference between current body size and subjective ideal body size, we were interested to

Table 3. Relationship between Body Mass Index and EAT-40, BSQ-34, or FRS.

	NDD (r, *P*-value)		PESD (r, *P*-value)		SOC (r, *P*-value)	
	Male	Female	Male	Female	Male	Female
EAT-40	0.133 (0.000)	0.185 (0.517)	0.024 (0.778)	0.283 (0.173)	-0.042 (0.635)	-0.014(0.876)
BSQ-34	0.002 (0.993)	0.384 (0.050)	0.229 (0.070)	0.122 (0.001)	0.179 (0.430)	0.242 (0.006)
FRS	0.700 (0.000)	0.537 (0.000)	0.475 (0.000)	0.419 (0.000)	0.588 (0.000)	0.354 (0.000)

Correlation between body mass index and other variables (EAT-40, BSQ-34, FRS) presented for each group expressed as Spearman's rho or Pearson correlation coefficients (r) as required.
NDD, department of nutrition and dietetics; PESD, department of physical education and sports; SOC, department of social sciences; EAT-40, eating attitudes test, BSQ-34, body shape questionnaire; FRS, figure rating scale.

distinguish the real body size compared with subjective body size judgement. As presented in Fig. 2, the body size judgements obtained by the scale were generally correlated with BMI. However, only female PESD students subjectively estimated their body size as moderately overweight (body images of 6 and 7 in Fig. 2), although their BMI was approximately 21 kg/m^2. Other students estimated their body shape comparable with BMI (Fig. 2).

DISCUSSION

The study of European university students from 13 countries indicated that changes over the decade in the attitudes of the young population to the body satisfaction were not toward healthier lifestyles [1]. Accordingly, the students of "NDD" and "PESD" might have high concern on body shape and size due to the education related to their occupation [3,15]. The findings published by others imply that junior and senior majors may be more affected than freshmen as a result of their increased exposure to information about diet and body shape [3,16]. Hence, in this study, juniors and seniors were chosen to reveal the effect of the knowledge exposure on the body shape perception and eating attitudes.

In a study from Turkey, about eating patterns of university students, determined that breakfast and the lunch were the most frequent skipped meals, 48% and 25%, respectively [26]. In parallel, in our study, skipping of breakfast and lunch were two times more frequent in PESD compared with NDD. Since eating attitude is related to the meal skipping, risk of eating disorders was estimated in meal skippers. Students, who skipped meals, of PESD showed higher tendency to the risk of eating disorders. In comparison, Japanese students reported that they eat three main meals regularly as in Turkey, whereas Korean students eat only two main meals [12]. As in Korean students these students skip mostly breakfast [12]. Multivitamin and mineral complex usage was frequent at SOC students, while one third of PESD students were taking protein/amino acid powder to increase muscular body shape. Thus, these results might give a supportive explanation about nutrition education might affect eating attitudes and concern on body shape.

In the NDD students, choosing leaner ideal women figures and larger self-images were the factors that could predict high EAT scale scores [17]. To answer about the question of how prevalent the risk of abnormal eating behavior in NDD and PESD students in Turkey, EAT scores were evaluated. Although, mean scores determined that low risk of abnormal eating behavior was detected in our study, it was shown that the females had the highest scores which might be a predictor of having extra predisposition to abnormal eating behavior than males in this study. Comparable with our results, there was a low risk of eating disorder development among the students from Portuguese. Nevertheless, concerning eating behavior, there was no significant differences between students from NDD and social sciences shown by others [7]. Results of the study from Basque Country showed that, Nutrition knowledge of NDD students affected their food practice, but this was not enough to achieve a healthy diet and to reduce their body dissatisfaction [14]. Therefore, the students of PESD might have high concern on body shape and size due to lack of nutrition knowledge compared to NDD.

To predict the concern on body shape among participants, BSQ score was calculated in this study. Although mean scores predicted that none of the group showed marked concern with body shape, questionnaire classification indicated that, especially PESD showed the highest perception on body shape. As in our study, BSQ scores indicated that the majority of students from Lebanon were not worried about their body image perception [13]. In a study, in which the EAT, BSQ and anthropometry parameters determined, 22% of the NDD students were found to be at high risk in terms of eating disorders, and 14% declared dissatisfaction with their body image [18]. Taken together due to the lack of knowledge about body shape perception of nutrition and sport students, our data establishes a unique data set of showing the high concern on body shape were established in PESD followed by NDD compared to SOC students.

From the idea that body dissatisfaction related to the difference between current body size and subjective ideal body size, the real body size was compared with subjective body size judgement. Positive correlation between the BMI and FRS indicated that the students in each group had real self-perception of body image and subjective estimation of body fat in this study. One study determining relation of dissatisfaction of body shape with unhealthy behaviors among university students reported that students choose silhouettes that were underweight to represent their current or desired body sizes and to engage in dieting behaviors [27]. Recent studies estimated the BMI associated with FRS figures, subjective perception of the own body image scale, establishing normative data for adults [4,24,28]. This is an important feature of the scale, since it can now be used to estimate the BMI in situations where weight and height are not available and also to empirically evaluate if a person distorted body image [28-30].

With another point of view, it is important to note that body dissatisfaction differences might be related to the cultural values in healthy young population. In a study comparing American and Bosnian women revealed that American women demonstrated more body dissatisfaction and chose smaller cultural ideal body sizes than Bosnian women [29]. In a study of university students from Korea and Japan, significant differences were observed in eating patterns and body shape perception [12]. Study, in which students from Korea were explored, showed that those university students had a desire for a thinner figure similar to that observed in western society as in our study. Since, additional research is needed to further elaborate the body dissatisfaction differences as they relate to cultural values, our results are important to show the data of young people from Turkey as already shown in Korea, China and Japan.

In conclusion, lifestyles and health beliefs appear to be established early in life, setting the pattern for later years [1]. It is important, therefore, to monitor the trends in eating attitudes in young people, and to understand the factors that might impact on the body size dissatisfaction to estimate the risk of eating disorders such as anorexia, blumia or orthorexia nervosa. Body size or shape dissatisfaction is situated in the evaluative and affective components of eating attitudes of sport

sciences and nutrition students. Hence, these students need more nutritional information about healthy nutritional habits and ideal body sizes to protect them having obsession.

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