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Understanding the Turkish adolescents' weight perception: A cross-sectional study

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Abstract

Problem: Adolescence is regarded as a period in which adolescents go through a number of physical changes in appearance and a transition from childhood to adulthood. Throughout this transitional period, adolescents become more concerned with their size and weight. The aim of this study was to determine the self-perceived weights status of adolescents 11–19 years old.

Methods: A cross-sectional study was conducted with a sample of 1459 students, aged 11–19 years, in Turkey. Anthropometric measurements of weight and height were measured with appropriate tools and adolescents' self-perception of weight status was assessed by the Figure Rating Scale.

Findings: Nearly half of the adolescents had misperceptions about their weight status (49.6%). There was a significant association between body mass index (BMI) *z*-score categories and weight status misperception. Overall, the weight status misperception was more common among the girls than boys.

Conclusion: Misperception of weight status in adolescent should take into account the following: development of intervention programs aimed at screening weight and weight perception, empowering young people to have accurate weight status perception, and raising awareness of the issue in school health professionals.

KEYWORDS

adolescents, body image, body mass index, misperception

1 | INTRODUCTION

Adolescence is regarded as a period in which individuals go through a certain number of physical changes in appearance and a transition from childhood to adulthood (Qin et al., 2019). Throughout this transitional period, adolescents become more concerned about their weight and size (Isomaa et al., 2011). These concerns affect their perception of their weight status. Perception of weight status is associated with the way a person identifies themselves as underweight, normal, or overweight (Frayon et al., 2017). Weight perception is interrelated with a certain number of factors such as one's self-esteem (Isomaa et al., 2011), body image (Bodde et al., 2014), and healthy behaviors (Almenara et al., 2014). Previous studies have pointed out that there is often a discrepancy between actual and perceived weight status. Moehlecke et al. (2020) in their study has shown approximately 20.0% of the adolescents overestimated and 13.5% underestimated their actual weight status.

It has been reported that adolescents' perceptions of their weight are associated with the factors of emotional distress, physical issues, school issues, suicidal thoughts, developing emotions and social health related to the quality of life, depression/depressive symptoms and social anxiety (Isomaa et al., 2011; Raihi et al., 2019) as well as eating disorders and dieting (Martin et al., 2014). There are also several different factors which can contribute to weight

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misperception including BMI, adolescence periods (early, middle, and late), socioeconomic status, and sex (Frayon et al., 2017; Fredrickson et al., 2013; Hatami et al., 2015; Kim & Kawachi, 2016; Lim & Wang, 2013; Moehlecke et al., 2020; Sarafrazi et al., 2014). In previous studies, BMI differences in weight misperception in different cultures have been more common in girls (Isomaa et al., 2011; Jackson et al., 2015; Lim & Wang, 2013; Martin et al., 2014) and in late adolescence period (Almenara et al., 2014; Fredrickson et al., 2013; Sarafrazi et al., 2014; Yang et al., 2014). Understanding the culture-specific differences in weight/body perception is important for developing intercultural understanding and approach. This study aimed to evaluate all these variables (sex, BMI, adolescent periods, and socioeconomic status) together and to identify culture-specific features.

Adolescence is a developmental period so using an age and sex-specific scale is important. There is a limited number of scales suitable for adolescents (Hatami et al., 2015; Standley et al., 2009). One of these scales, Figure Rating Scale (FRS) has been used in previous studies (Adami et al., 2012; Hatami et al., 2015). It has some benefits over other figure scales. As well as being a simple visual scale to assess perceived body size and image, its psychometric properties are better understood and it has been used in a wider age range of subjects (Sherman et al., 1995; Stunkard et al., 1983). Moreover, instead of Likert-type scales to measure latent traits, visual scales are more interactive and include more visually appealing and/or engaging elements and to obtain measurements with more variability (Sung & Wu, 2018).

In literature, there are no adequate data about Turkish adolescents' weight perceptions and all data in existing studies were collected verbally (Çetinkaya et al., 2017; Hisar & Toruner, 2013; Taş et al., 2017; The Ministry of Health Body weight perception survey in Turkey, 2012). In this regard, the main purpose of this study was to investigate weight perceptions and misperceptions of weight in adolescents by FRS in Ankara, the capital city of Turkey. This study was the first to use a visual scale which examined the weight perceptions of Turkish adolescents in Ankara.

Research questions

1. 1. What are the weight perceptions of adolescents?
2. How do perceptions of weight differ from actual weight in adolescence?
3. Do adolescents' body weight perceptions differ according to gender, BMI, and adolescent period?

2 | METHODS

2.1 | Design and participants

This cross-sectional descriptive study was carried out at seven middle and high schools in Ankara in the city center of Turkey during the academic year of 2016–2017. The population of the study included all of the middle and high school students ($N = 7511$) in Ankara. The suitable sample size was determined as needing to be at least 1386 by using the "number of distinct individuals in population," which is known as sample size formula (Wayne, 1999). The sample of the study comprised students from seven schools which chosen by simple random sampling. The number of students from each school to participate in the sampling was calculated using stratified sampling (layer name/layer size) x sample size) formula. Students in the layers were chosen with basic random sampling. Finally, the study was carried out with 1459 students aged between 11 and 19 from the selected schools who volunteered to participate in the study.

2.2 | Instruments

The adolescents' descriptive characteristics were evaluated with a demographics questionnaire (age, gender, and socioeconomic status), current weight status was evaluated with anthropometric measurements, and weight perceptions were assessed with the FRS.

2.2.1 | FRS

FRS determines how an individual perceives their own body weight (Stunkard et al., 1983). FRS is a psychometric measurement instrument developed in 1983. FRS, which consists of two sets of sex-specific nine silhouettes presents body shapes ranging in one to nine, where one is the thinnest and nine is the largest and the most obese type. FRS has a test–retest reliability C = 0.87 and concurrent validity CO = 0.61 (Stunkard et al., 1983). In this study, the Cronbach's *a* internal consistency coefficient of the scale was 0.67, and the Spearman Correlations between FRS and BMI-z scores were found to be 0.491 ($p < 0.000$). The scale takes about 1–2 min to be answered. The participants in this study were asked to select a figure which was the most similar to their body image (perceived weight status). The points on the images were classified into four weight status groups based on standard procedures: 1–2 underweight, 3–4 normal, 5–7 overweight, and 8–9 obese (Bhuiyan et al., 2003; Stunkard et al., 1983).

2.2.2 | Anthropometric assessments

Anthropometric assessments were measured by the same researcher according to the standard procedures based on the regulations by the Ministry of Health (The Ministry of Health Turkish Public Health Institution, 2015). The heights were measured by a stadiometer fixed on a wall, to the nearest 0.1 cm with barefoot, standing with heels together and in a normal standing position. Weight was measured by a portable digital scale (Jowoo-JW-3331) with light clothing (~100 gr) and without shoes. For the validity and reliability of the measurements, the equipment was regularly calibrated before and during the

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study. Body mass index (BMI) was calculated by dividing the weight (kg) by the square of the height (m). Those with BMI< 18.5 kg/m^2 were recorded as underweight, while those at 18.5–24.9 kg/m^2 were recorded as normal weight, 25–29.9 kg/m^2 were recorded as overweight, and >30 kg/m^2 were recorded as obese. Fredrickson et al. (2014) have pointed out that BMI-*z* has the best correlation of perceived weight for sex in their study in accordance with anthropometric measurements. Considering the age and sex, adolescents' BMIs were assessed according to age- and sex-specific standard deviation (SD) scores (BMI-*z* scores) were used (World Health Organization, 2007). The BMI-*z* scores include "severely thin" (< −3 SD), "thin" (> −3 SD and < −2 SD), "normal weight" (> −2 SD and < +1 SD), "overweight" (> +1 SD and < +2 SD), and "obese" (> +2 SD) specified for sex (Hatami et al., 2015).

2.3 | Data collection

After the school administrations permissions, adolescents' informed assents and parents' informed consents were obtained, the data were obtained in a classroom setting by a trained researcher. At times determined by the class teacher, the adolescents first completed a short demographics questionnaire and FRS in their classrooms. They answered the multiple choice demographic questions (age, sex, socio-economic status). The adolescents selected and circled a figure on FRS in the classroom after responding to the demographics questionnaire. After this, all adolescents were taken into the measurement room one-by-one and their weight and height were measured. This room was allocated to the researchers by the school management for the privacy of the measurements.

2.4 | Data analysis

All analyses were carried out by using the Statistical Package for the Social Sciences (Version 20.0), a p value of < 0.05 was considered statistically significant. All data were included with their frequencies, percentages, means, and standard deviations. χ^2 tests were implemented for bivariate categorical comparisons. Based on the measured height and weight, weight status was classified as underweight, normal weight, overweight or obese according to the International Obesity Task Force age- and sex-specific BMI cut-off points (World Health Organization, 2007). The data were analyzed by the distribution of BMI-*z* score frequency according to the perceived body sizes for sex. Given the non-normality of the data for correlation between BMI-*z* scores and FRS scores, Spearman's correlation coefficient was calculated.

2.5 | Ethical consideration

Ethical approval was provided by the Ankara University Ethics Committee (Decision dated: 26.12.2016, Numbered: 82413), and institutional approval was obtained from the Ministry of National Education. This study was conducted in accordance with the Declaration of Helsinki. Written consent was obtained from each of the participants and their parents.

3 | RESULTS

The sample consisted of 611 boys (41.9%) and 848 girls (58.1%) from 11–19 years old (14.72 ± 2.00 years) (Table 1). Boys were on average slightly taller and heavier than the girls (respectively, 165.91 cm/58.29 kg vs. 161.28 cm/56.29 kg). The mean BMI for the whole sample was 21.26 (SD = 4.06), which was in the normal range. According to the BMI-*z* scores, three groups of subjects were investigated; normal, overweight, and obese adolescents. The majority of the adolescents (85.6%) had a BMI-z score that placed them in the normal weight category (Figure 1).

Weight status misperception varied by the BMI-*z* scores; 53% of the normally weighted, 41.6% of the overweight, and 19.7% of the obese adolescents considered themselves to be about the right weight. About 57.6% of the normal weight boys, 54.4% of the overweight boys, and 33.3% of the obese boys believed that they were about the right weight, while about 49.5% of the healthily weighted girls, 33.7% of the overweight girls, and 14% of the obese girls considered themselves to be about the right weight. There was a significant association between the BMI-z score categories and weight status misperceptions (all groups: χ^2 (1, N = 1459)=437.57; p < 0.001; boys χ^2 (1, N = 1459)=211.18; p < 0.001; girls χ^2 (1, N = 1459)=287.64; p < 0.001) (Figure 2).

Overall, the weight status misperceptions were more common among the girls (54.0%) than the boys in this study (43.4%), (χ^2 (1, N = 1459)=16.076; p < 0.001). The weight status misperceptions were significantly higher in the overweight and obese categories in comparison to the normal weight category (χ^2 (1, N = 1459) = 31.027; p < 0.001). There was no significant difference in the adolescent periods (χ^2 (1, N = 1459)=2.653; p = 0.265) or the socio-economic status of each participant (χ^2 (1, N = 1459)= 4.893; p = 0.087) according to their weight status misperceptions (Table 1).

4 | DISCUSSION

The aim of this study was to investigate the weight perceptions of Turkish adolescents aged 11–19 years. It was found that nearly half of the adolescents had misperceptions about their weight status (49.6%). This finding was consistent with the results of several previous studies on adolescent weight perceptions (Almenara et al., 2014; Bodde et al., 2014; Cai et al., 2017; Chen et al., 2014; Frayon et al., 2017; Hisar & Toruner, 2013; Jackson et al., 2015; Lim & Wang, 2013; Qin et al., 2019). Studies in the United States (US) have reported that weight status misperception rates varies between 30% and 46%, depending on sex, age, and populations (Edwards et al., 2010; Sarafrazi et al., 2014). These figures

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Variables	Accurate perceive *N* (%*)	Misperception *N* (%*)	*p* value
Gender			**0.000***
Girls	390 (46.0)	458 (54.0)	
Boys	346 (56.6)	265 (43.4)	
Adolescence period			0.265
Early adolescent (10–13)	198 (48.9)	207 (51.1)	
Middle adolescent (14–16)	402 (52.4)	365 (47.6)	
Late adolescent (17–19)	136 (47.4)	151 (52.6)	
BMI *z* score			**0.000***
Healthy weight	662 (53.0)	587 (47.0)	
Overweight	62 (41.6)	87 (58.4)	
Obese	12 (19.7)	49 (80.3)	
SES			0.087
Lower	48 (42.1)	66 (57.9)	
Intermediate	599 (51.8)	557 (48.2)	
Higher	89 (47.1)	100 (52.9)	
Total	736 (50.4)	723 (49.6)	

TABLE 1 Sociodemographic characteristics of adolescent's within weight status misperception

Note: Statistical test is used *t*-test and ANOVA.

Abbreviations: BMI, body mass index; SES, socio-economic status.

**p values* are for the association between each variable and whole sample, **p* < 0.001.

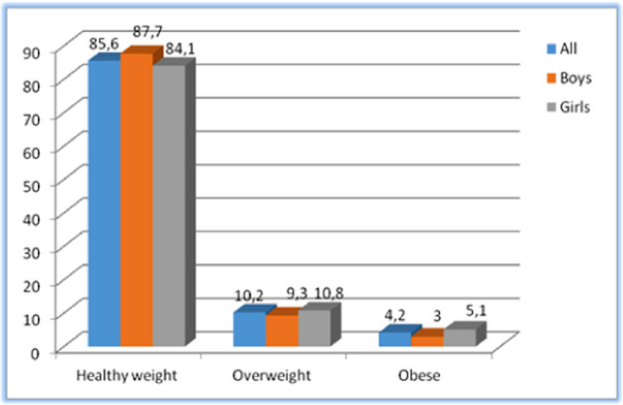


FIGURE 1 Weight status versus measured BMI *Z*-Score by gender.

(adolescents who had misperception) compare to 64%–70% in Australian adolescents (Fredrickson et al., 2013; O'Dea & Amy, 2011), 35.2% in New Caledonia adolescents (Frayon et al., 2017), and 34% (girls)–36% (boys) in Israel in 15-year-old adolescents (Zach et al., 2013), 44.49% of the adolescents in Chinese misperceived their body weight, of which 43.20% were boys and 45.98% were girls (Qin et al., 2019).

In studies conducted in our country, it was found that 34.3% of adolescents (Çetinkaya et al., 2017), 35% of adolescents (Hisar & Toruner, 2013), 45.1% of adolescents (Taş et al., 2017), 41.5% of girls and 23.7% of boys (Önal et al., 2019) had body weight misperceptions. A previous study on adolescents aged 15–24 showed a misperception rate of 37.2% about weight status (The Ministry of Health Body weight perception survey in Turkey, 2012). When we examined these studies, the perception of body weight of adolescents was determined by asking how they perceived themselves verbally/how they perceived their own body (Çetinkaya et al., 2017; Taş et al., 2017) or how low or high they felt from healthy weight (Hisar & Toruner, 2013). Although the results are similar to our study, they report a slightly lower rate body weight misperception than our results. In our study, this difference in the evaluation of adolescents is thought to result from the choices in body figures, namely visual scale. It is thought that when adolescents choose one of the nine pictures in the image, they reveal their own perception of their own body. However, when expressed verbally they can express themselves only in three categories as "healthy weight, underweight or overweight."

The results of this study and its analyses revealed that the majority of the adolescents (85.6%) had a BMI-*z* score that placed them in the normal weight category. It was also discovered through the analyses that in the other studies carried out in Turkey the majority of the adolescents were in the normal category (Çetinkaya et al., 2017; Hisar & Toruner, 2013) as was true in other countries (Bodde et al., 2014; Frayon et al., 2017; Jackson et al., 2015). The rate of overweight (10.2%) and obesity (4.2%) was 14.4% in our study. In a literature review study, the prevalence of overweight and obesity in Turkish children and adolescents were found to be between 10.3% and 17.6% (Bereket & Atay, 2012). The rates of

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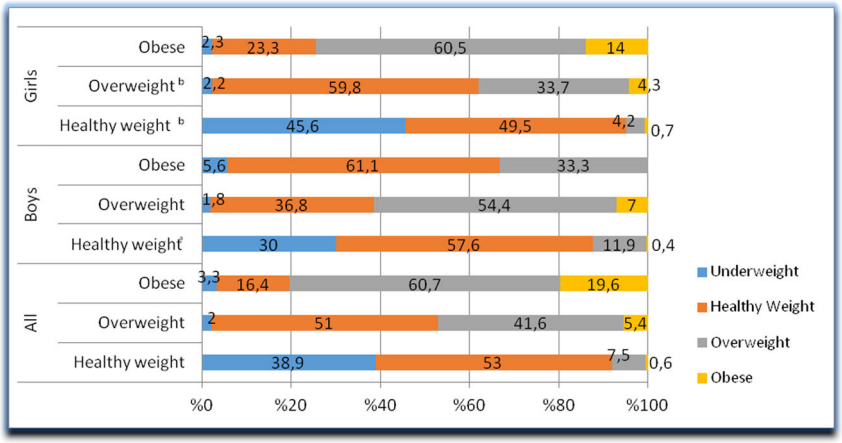


FIGURE 2 Weight status misperception among adolescents by gender and body mass index (BMI) Z-score category. [a] Significantly different than girls. [b] Significantly different than healthy, overweight, obese.

overweight and obesity in girls (10.8–5.1) and boys (9.3–3.0) were similar to those in European regions (OECD, 2012).

The overweight and obese adolescents in this study had the highest prevalence of inaccurate perceptions. Many studies have reported that adolescents in the overweight or obese category showed a higher rate of weight status misperceptions (Almenara et al., 2014; Fredrickson et al., 2013; Sarafrazi et al., 2014; Yang et al., 2014). Weight status misperceptions may cause unhealthy eating behaviors and insufficient physical exercise among overweight and obese adolescents (Almenara et al., 2014; Qin et al., 2019; The Ministry of Health Body weight perception survey in Turkey, 2012). This study demonstrates the importance of raising awareness on the weight statuses of overweight and obese adolescents.

On the other hand, almost 47% of the adolescents with normal weight in this study also had misperceptions about their actual weight status. The results were in parallel with those found which reported that normal-weight children misperceived their body weight (34.1%) (Cai et al., 2017). In the study on Raihi et al. (2019) it was found 59.1% of students misperceived their weight. In a study conducted in Turkey, 26.1% of adolescents with normal weight were found to misperceive their weight status (Hisar & Toruner, 2013). In this study, nearly half of the normal-weight adolescents appeared to misperceive their body weight status. The reason for this might be related to their concern/s with their bodies and appearance because of their developmental period. This aesthetic concern relates to a tendency of adolescents to perceive their weight as either below or above the normal weight.

In this study, underestimation of body weight status was much more common than overestimation. The results of this study were consistent with those reported in the literature (Cai et al., 2017; Chung et al., 2013; Fredrickson et al., 2013; Kim & Kawachi, 2016; Martin et al., 2014; Raihi et al., 2019). However, many other studies have shown that adolescents overestimate their weight (Isomaa et al., 2011; Jackson et al., 2015). In connection with a limited number of studies conducted in Turkey, it may be assumed that adolescents regard themselves as overweight (Çetinkaya et al., 2017; Hisar & Toruner, 2013; Taş et al., 2017). Overestimation and underestimation are associated with the physical development during adolescence but might also be an impact of the inconsistency between actual and ideal body. By this assumption, many adolescents who were classified as overweight or obese, but belonged to a lower weight category, could be at risk of developing chronic diseases in the future as it is difficult for them to realize their actual weight status.

It is common for all socioeconomic groups to underestimate the weight status of overweight and obese individuals (Fredrickson et al., 2013; Lim & Wang, 2013). In this study, it was found that there was no significant relationship between socioeconomic status and misperception of weight status ($p > 0.05$).

Weight perception varied between the sexes in this study. More of the girls seemed to misperceive their weight statuses than the boys. These findings were consistent with previous studies in which females responded with more innacurate descriptions of their weight than males (Isomaa et al., 2011; Jackson et al., 2015; Lim & Wang, 2013; Martin et al., 2014; Önal et al., 2019). Comparison to the boys, girls appeared to have a tendency to define themselves with a sense of misperception. A study in the literature reported that girls who misperceive their weight experience more depressive feelings and have more social anxiety. Similarly, the authors reported that it is more common for women with eating disorders to misperceive their weight than men (Isomaa et al., 2011). Recent studies have reported that women probably have expectations for greater societal pressure and weakness (Jackson et al., 2015; Lim & Wang, 2013). These findings are consistent with literature reporting greater pressure to be thinner among girls, which may explain their overestimation of weight. This may be due to girls' higher interest in their body appearance than boys, or because of the influence of social media on their physical appearance which may be due to frequent exposure to fashion and advertisements of slimming products targeted at girls.

4.1 | Limitations of the research

First, this study was cross-sectional. The discussion was limited as the study was the only one that used a visual scale in a culturally similar population. Our sample was very broad and represented the capital of the country. However, it still could not be applied to all

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adolescents of this age-group in general. Generalizability of the results to groups of children of different ages and to other cultural backgrounds may be limited. Hence, similar studies need to be conducted with a more culturally diverse sample.

Besides all these limitations, the use of a visual scale in the assessment of body weight perception and the interpretation of the data/outputs obtained by simultaneously measuring the anthropometric measurements of adolescents is one of the strengths of the study.

4.2 | Clinical implications

A previous study reported that adolescents' body weight misperceptions might lead to unhealthy weight control behaviors such as fasting, eating less and skipping meals, using diuretics and laxatives (Almenara et al., 2014) and these adolescents may tend to be unhealthier in certain weight-related behaviors (Yang et al., 2014). As adolescence is a risky period in terms of weight perception and health behaviors, it is important to evaluate misconceptions of weight status and promote healthy behaviors. Schools are important environments where adolescents can be closely monitored. School nurses can monitor adolescents closely and conduct practices and trainings that can lead to healthy behaviors. In particular, periodic physical examinations can help adolescents learn about body weight and prevent them from unhealthy behaviors. Determining how adolescents perceive body weights can play a key role. With this informations school nurses can develop healthy behavior programs and provide adolescents with the right nutritional approaches. However, school health services are not at the desired level in our country and there is no school nurse in every school, especially in public schools. Primary healthcare personnel can raise awareness of adolescents on the subject with field studies and contribute to the development of school health policies and positively affect public health.

5 | CONCLUSION

In summary, weight status misperceptions were common in adolescents in Turkey. This finding highlights the importance of screening for weight misperceptions in boys and girls. Especially in this period, girls' weight misperception is an important risk factor in terms of gaining unhealthy behaviors and/or psychological problems. Because of the fact that girls are more interested in their appearance, comparing themselves to peers, and social acceptance of being underweight, this results may be caused by individual and cultural differences. These findings may be used to promote adolescent health and prevent obesity. As this study suggests obesity in adolescents should be considered, all components of intervention programs aimed at screening weight and weight perception need to support adolescents in having an accurate perception of their weight status, and awareness should be raised in school and healthcare professionals.

According to the results of this study, we think weight status misperception may be common in adolescents within 11–19 years of age. School nurses should develop healthy behavior development programs for adolescent students. Here they might explore body weight misperception and teach about an accurate perception of BMI. With these programs, there may be an opportunity for students to change their perceptions on their body weight status. Additionally, routine physical examination can help adolescents get informed about body weight and prevent them from taking part in unhealthy behaviors. This is why it is important for school nurses to communicate clearly work closely with adolescents.

AUTHOR CONTRIBUTIONS

All authors contributed to study design, data collection and analysis, and manuscript preparation. All authors read and approved the final manuscript.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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