

# Prevalence of distorted body image in young Koreans and its association with age, sex, body weight status, and disordered eating behaviors

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**Purpose:** To define the prevalence of distorted body image in 10–24-year-old Koreans and determine its relationship with sex, age, body weight status, and disordered eating behaviors.

**Methods:** A total of 3,227 young Koreans were recruited from elementary, middle, and high schools, as well as from universities. The participants completed a self-reported questionnaire on body image, eating behaviors (Eating Attitude Test-26), and body weight status.

**Results:** The prevalence of a distorted body image in males was 49.7% and that in females was 51.2%. Distorted body image was more frequent in adolescents (age, 10–17 years) than in young adults (age, 18–24 years). The highest prevalence (55.3%) was reported in female elementary school students (age, 10–12 years). Distorted body image was associated with disordered eating behaviors and abnormal body weight status.

**Conclusion:** These results suggest that distorted body image is a public health problem, given its high frequency in young Koreans, and that it is associated with abnormal body weight status and disordered eating behaviors.

**Keywords:** distorted body image, weight status, disordered eating behaviors, young Koreans, Eating Attitude Test, BMI

## Introduction

Distorted body image includes several psychopathological dimensions relating to one's own body experience, including cognitive (disturbed perceptual and visuospatial abilities to evaluate body weight and shape), affective (concerns and unhappy feelings about the body), and behavioral components (body weight control and checking behaviors, denial of weight change consequences).<sup>1</sup> As confirmed by DSM-5 (the *Diagnostic and Statistical Manual of Mental Disorders*, 5th ed) criteria, distorted body image is a core and often persistent symptom in eating disorders.<sup>2</sup> It may play a crucial role in the development of disordered eating behaviors (excess dieting, purging, and binge eating) and lead to serious psychological and medical conditions. Distorted body image has particularly detrimental impacts on the physical, psychological, and social maturation of adolescents and young adults.<sup>3,4</sup>

Although a wide range of estimates of the prevalence of distorted body image (24%–62%) has been reported based on studies using different methods in different settings,<sup>5–8</sup> it is clear that body image distortion is a common problem among adolescents. The development of distorted body image may differ according to age, sex, and cognitive developmental status, and these differences may reflect age- and sex-related developmental processes.<sup>3</sup> According to our knowledge, few studies have examined the difference in the prevalence of body image distortion at the population level

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among any age group. This cross-sectional study focused on distorted body image among young Koreans, who are just beginning to be aware of their body image, as well as disordered eating attitudes and behaviors. This study was designed to assess the prevalence of distorted body image in adolescents and young adults aged 10–24 years and its association with sex and age. We also examined associations among body weight status, disordered eating behaviors, and distorted body image by age group (10–12, 13–14, 15–17, and 18–24 years).

## Materials and methods

### Participants and assessment

Of 2,550 eligible adolescents, 2,342 (91.8%) were recruited from three elementary schools (grades 5–6; age, 10–12 years), three middle schools (grade 8; age, 13–14 years), and three high schools (grade 10; age, 15–17 years) located in Jeju, Korea. The target schools, selected to represent typical Korean urban public schools, volunteered to participate in the study. After gaining approval for this study, researchers visited the schools, explained the purpose of the study to the students and teachers, and obtained their consent. No incentives were provided for participation. The researchers also sent letters to the parents, introducing the study's purpose. The letter included a statement that the parents could freely refuse to respond if they did not agree with the study's purpose. A convenience sample of 942 college students (age, 18–24 years) drawn from two universities located in Jeju, Korea, also participated in this study. Students were enrolled in a variety of settings: university residence halls, classrooms, private residence halls, and athletic team meetings. The research assistants screened participants for eligibility, explained the purpose of the study to the subjects, and obtained informed consent. And they were available to answer questions of clarification. This study was approved by the Jeju National University Hospital Review Board. Fifty-seven subjects were excluded because their responses were incomplete, leaving 3,227 subjects for analyses.

Distorted body image was assessed using somatotype drawings, which typically consist of a set of discrete schematic figures (nine men and nine women) that range from emaciated (1) to obese (9). The validity of somatotype drawing is well established (current effect size = 0.87, concurrent validity = 0.61–0.75).<sup>9</sup> The participants were asked to select the body shape that represented their current body size based on a series of nine somatotype drawings. Numbers (1–9) were assigned to subjects based on their self-reported body mass index (BMI) values. Distorted body image was defined as

a difference of  $\geq 2$  between the subject's choice and his or her actual classification.<sup>10,11</sup>

Eating attitudes and behaviors were assessed using the Eating Attitudes Test-26 (EAT-26). The EAT-26 is a widely used measure to screen subjects for disordered attitudes and behaviors related to eating.<sup>12,13</sup> It is a self-reported measure, and scores are ranked on a 6-point Likert scale. It includes three subscales: dieting, bulimia, and food preoccupation and oral control. The reliability and validity of the Korean form of the EAT-26 have been found to be acceptable (Cronbach's  $\alpha = 0.83$ ).<sup>14</sup> The EAT-26 cutoff point to identify the presence of disordered eating attitudes and behaviors was a score  $\geq 20$ , following a previous validation study conducted in Korean adolescents.<sup>14</sup>

The study participants completed a questionnaire regarding sociodemographic and clinical characteristics, including age, sex, school grade, parental marital status, parental education level, and subjective socioeconomic status. BMI (weight [kg]/height [m]<sup>2</sup>) was calculated based on self-reported weight and height. Adolescents were classified based on BMI data from the 2007 Korean National Growth Charts by age and sex as underweight (BMI <15th percentile), normal weight (15th percentile  $\leq$  BMI <85th percentile), overweight (85th percentile  $\leq$  BMI <95th percentile), or obese (BMI  $\geq$  95th percentile).<sup>15</sup> For participants who were 18 years of age or older, the following categories were created: underweight (BMI <18.5), average (BMI  $\geq$  18.5 and <25), overweight (BMI  $\geq$  25 and <30), and obese (BMI  $\geq$  30).

### Data analysis

Pearson's chi-square test was used to compare categorical data for the independent variables vs the dependent variables. Correlations between independent variables and distorted body image were investigated. Factors potentially associated with a distorted body image identified in univariate analyses were entered into a logistic regression model to assess independence. Odds ratios (ORs) and 95% confidence intervals (CIs) were derived from a series of logistic regression analyses. All statistical analyses were performed using the SPSS version 18.0 software (SPSS, Inc., Chicago, IL, USA), and a two-tailed *P*-value <0.05 was considered significant.

## Results

The 3,227 participants included 536 (16.6%) elementary school students (grades 5–6; age, 10–12 years), 1,098 (34.0%) middle school students (grade 8; age, 13–14 years), 666

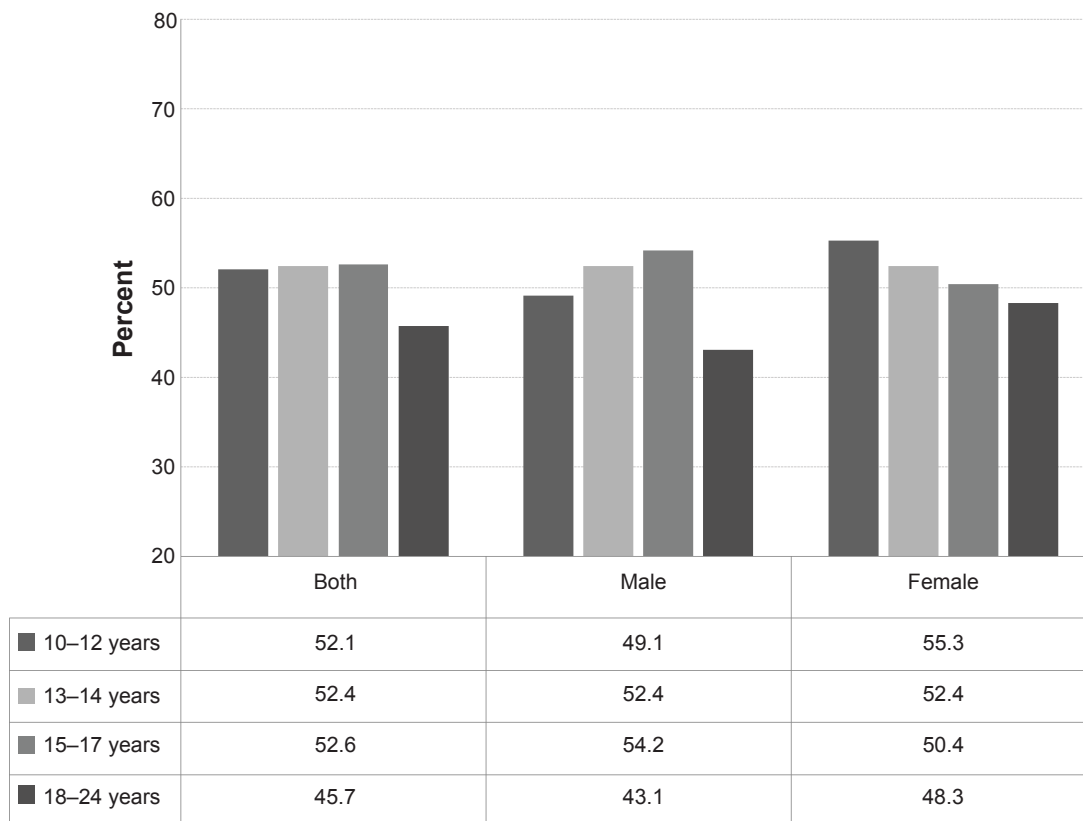
(20.6%) high school students (grade 10; age, 15–17 years), and 927 (28.7%) college students (age, 18–24 years). A total of 1,691 males (52.4%) and 1,536 females (47.6%) were included. The self-reported BMI values were  $19.54 \pm 3.21$  (age, 10–12 years),  $20.52 \pm 3.17$  (age, 13–14 years),  $21.16 \pm 3.03$  (age, 15–17 years), and  $21.42 \pm 2.99$  (age, 18–24 years).

Distorted body image was found in 50.4% of all participants, with no difference observed between males (51.7%) and females (48.3%). The prevalence of distorted body image by age group, shown in Figure 1, was as follows: 10–12 years, 52.1%; 13–14 years, 52.4%; 15–17 years, 52.6%; and 18–24 years, 45.7%. Overall, the prevalence was significantly higher in adolescents and decreased in young adults. These patterns were similar for both sexes; however, the prevalence of distorted body image increased slightly but steadily in males until the age of 15–17 years, whereas it decreased slightly but steadily in females until the age of 15–17 years. The highest prevalence (55.3%) was observed in female elementary school students, and the lowest prevalence (43.1%) was found in male college students (Figure 1). The prevalence of distorted body image in females (48.3%) aged 18–24 years was higher than that in males (43.1%) of the same age range.

Significant associations were detected between distorted body image and age group, maternal educational level, disordered eating behaviors, and body weight status (Table 1). The prevalence of distorted body image by body weight status was as follows: normal weight, 42.8% ( $n=1,041$ , underestimation: 50.2%, overestimation: 49.8%); underweight, 72.9% ( $n=161$ , underestimation: 6.2%, overestimation: 93.8%); overweight, 67.4% ( $n=254$ , underestimation: 44.1%, overestimation: 55.9%); and obesity, 88.7% ( $n=172$ , underestimation: 89.5%, overestimation: 10.5%). The prevalence of distorted body image was higher in the group with abnormal body weight than in the normal weight group (Figure 2).

Disordered eating behaviors were found in 6.2% of all participants. The EAT-26 scores were  $6.72 \pm 6.09$  (age, 10–12 years),  $7.19 \pm 7.10$  (age, 13–14 years),  $7.18 \pm 7.53$  (age, 15–17 years), and  $6.86 \pm 6.13$  (age, 18–24 years). There were no differences in the prevalence of disordered eating behaviors by sex (male: 5.8%, female: 6.6%) or age (10–12 years, 6.2%; 13–14 years, 6.3%; 15–17 years, 7.5%; and 18–24 years, 5.2%).

The presence of abnormal body weight was compared between the controls and subjects with a distorted body



**Figure 1** Prevalence of distorted body image by sex and age group.

**Table 1** Comparisons of characteristics between subjects with and without a distorted body image

	Distorted body image		P
	Yes (n=1,628) <sup>a</sup>	No (n=1,599) <sup>a</sup>	
Age (y)			
10–12	279 (17.1)	257 (16.1)	0.009*
13–14	575 (35.5)	523 (32.7)	
15–17	350 (21.5)	316 (19.8)	
18–24	424 (26.0)	503 (31.5)	
Sex			
Male	841 (51.7)	850 (53.2)	0.394
Female	767 (48.3)	749 (46.8)	
Paternal marital status			
Married	1,408 (87.1)	1,383 (87.3)	0.879
Divorced/separated/widowed	209 (12.9)	202 (12.7)	
Paternal education			
> 12 y	828 (61.0)	864 (63.8)	0.127
≤ 12 y	530 (39.0)	490 (36.2)	
Maternal education			
> 12 y	639 (45.1)	697 (49.5)	0.021*
≤ 12 y	777 (54.9)	712 (50.5)	
Self-reported SES			
High	379 (23.4)	395 (24.9)	0.569
Middle	1,069 (65.9)	1,032 (65.0)	
Low	174 (10.7)	161 (10.1)	
Body weight status <sup>b</sup>			
Normal weight	1,041 (63.9)	1,394 (87.2)	<0.001**
Underweight	61 (9.9)	60 (3.8)	
Overweight	254 (15.6)	123 (7.7)	
Obese	172 (10.6)	22 (1.4)	
Disordered eating behaviors <sup>c</sup>			
Yes	121 (7.4)	79 (4.9)	0.003*
No	1,507 (70.1)	1,520 (95.1)	

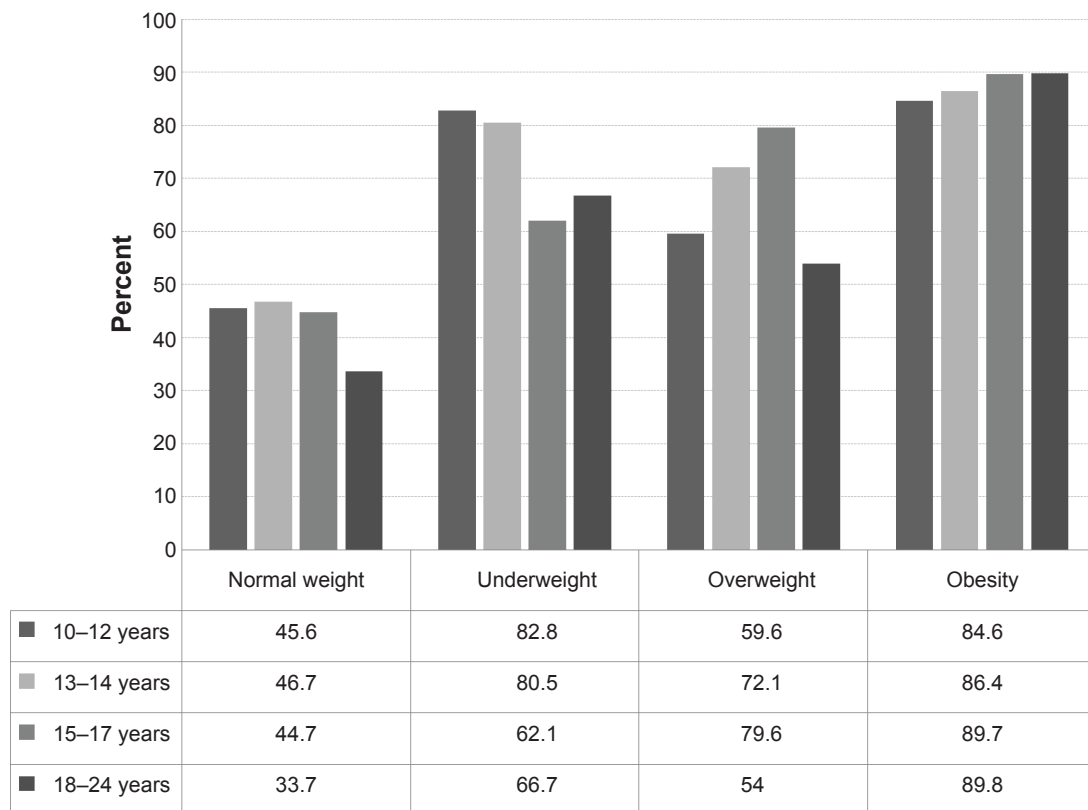
**Notes:** <sup>a</sup>Values are presented as numbers (%). <sup>b</sup>Adolescents were classified based on BMI as underweight (BMI < 15th percentile), normal weight (15th percentile ≤ BMI < 85th percentile), overweight (85th percentile ≤ BMI < 95th percentile), or obese (BMI ≥ 95th percentile). For participants who were 18 years of age or older, the following categories were created: underweight (BMI < 18.5), average (BMI ≥ 18.5 and < 25), overweight (BMI ≥ 25 and < 30), and obese (BMI ≥ 30). <sup>c</sup>The EAT-26 cutoff point to identify the presence of disordered eating behaviors was a score ≥ 20. \*P<0.05; \*\*P<0.001.

**Abbreviations:** BMI, body mass index; EAT-26, Eating Attitudes Test-26; SES, social economic status; y, years.

image by calculating ORs and significance levels (Table 2). The results indicated that underweight (OR, 3.87; 95% CI, 2.83–5.29;  $P<0.001$ ), overweight (OR, 3.03; 95% CI, 2.40–3.84;  $P<0.001$ ), and obese (OR, 13.77; 95% CI, 8.68–21.87;  $P<0.001$ ) statuses were significantly related to distorted body image in all participants after adjusting for sex and age. The patterns were similar for all age groups, and were stronger in early adulthoods than in adolescents. Especially, the highest prevalence of body image distortion was observed in early adulthood with obesity (OR, 13.77). These patterns were similar for all age groups and were stronger in young adults than in adolescents. The highest prevalence of distorted body image was observed in obese young adults (OR, 13.77). Distorted body image was significantly associated with disordered eating behaviors (OR, 1.52; 95% CI, 1.14–2.04;  $P=0.005$ ) after adjusting for age and sex (Table 2).

## Discussion

In this study, distorted body image was common (50.4% in all age groups) in young Koreans (age, 10–24 years). The prevalence of body image distortion in our sample was higher than or similar to that (24%–62%) previously reported for adolescents.<sup>5–8</sup> We found significant differences in the prevalence of distorted body image by age (10–12 years, 52.1%; 13–14 years, 52.4%; 15–17 years, 52.6%; and 18–24 years, 45.7%). Overall, the prevalence was noticeably higher in adolescents, and it decreased in young adults. The highest prevalence (55.3%) was observed in female elementary school students. We discovered that distorted body image peaked during adolescence and that the onset occurred at a younger age among females, specifically, in childhood or early adolescence. Distorted body image may be affected by individual differences in physical and



**Figure 2** Prevalence of distorted body image by age and body weight status group.

cognitive development during childhood and adolescence.<sup>3</sup> Several studies have shown that early puberty is associated with more body image dissatisfaction, particularly among children and adolescent girls.<sup>16–18</sup> They may consider that changes in physical appearance and body shape (eg, body fat accumulation) during puberty deviate from the thin “ideal” body. Messages about a thin body type in the media play a key role in the development of a distorted body image and

dissatisfaction. The media influence the concept of an ideal body shape, which may lead to a distorted body image in children and adolescents regardless of age or sex.<sup>19–21</sup> Adolescence is the peak age for distorted body image; however, age differences in distorted body image are not well understood. Thus, larger-scale surveys that include more subjects from a wide age range are needed to clarify age patterns in body image distortion.

**Table 2** Odd ratios for current weight status and disordered eating behaviors of subjects with a distorted body image

	All ages (n=1,628)		10–12 years (n=279)		13–14 years (n=575)		15–17 years (n=350)		18–24 years (n=424)	
	OR <sup>a</sup>	95% CI	OR <sup>b</sup>	95% CI	OR <sup>b</sup>	95% CI	OR <sup>b</sup>	95% CI	OR <sup>b</sup>	95% CI
Body weight status <sup>c</sup>										
Normal weight	1.00		1.00		1.00		1.00		1.00	
Underweight	3.87**	2.83–5.29	5.73**	2.82–11.64	4.71**	2.15–10.31	2.02	0.94–4.37	3.93**	2.48–6.24
Overweight	3.03**	2.40–3.84	1.76*	1.00–3.10	2.96**	1.95–4.49	4.82**	2.86–8.12	2.31**	1.51–3.54
Obese	13.77**	8.68–21.87	6.57*	1.44–29.9	7.23**	3.03–17.28	10.72**	3.20–35.87	17.34**	9.10–33.06
Disordered eating behaviors <sup>d</sup>										
Yes	1.52*	1.14–2.04	1.66	0.80–3.45	2.03*	1.20–3.41	1.39	0.77–2.50	1.10	0.61–1.96
No	1.00		1.00		1.00		1.00		1.00	

**Notes:** <sup>a</sup>Adjusted for sex and age. <sup>b</sup>Adjusted for sex. <sup>c</sup>Adolescents were classified based on BMI as underweight (BMI <15th percentile), normal weight (15th percentile ≤ BMI <85th percentile), overweight (85th percentile ≤ BMI <95th percentile), or obese (BMI ≥95th percentile). For participants who were 18 years of age or older, the following categories were created: underweight (BMI <18.5), average (BMI ≥18.5 and <25), overweight (BMI ≥25 and <30), and obese (BMI ≥30). <sup>d</sup>The EAT-26 cutoff point to identify the presence of disordered eating behaviors was a score ≥20. \*P<0.05; \*\*P<0.001.

**Abbreviations:** BMI, body mass index; CI, confidence interval; EAT-26, Eating Attitudes Test-26; OR, odds ratio.



Distorted body image is clearly associated with abnormal body weight, regardless of age. Young Koreans with abnormal body weight status tended to over- or underestimate their body size; this pattern was much stronger in young adults aged 18–24 years than in adolescents. These findings suggest that actual abnormal body weight is significantly associated with body image distortion during adolescence and may be a risk factor affecting the persistence of such distortion beyond adolescence. We also found a significant association between distorted body image and disordered eating behaviors, particularly among middle school students aged 13–14 years. Previous studies have reported that adolescents with body image distortion are more likely to develop disordered eating attitudes and behaviors.<sup>22,23</sup> Additionally, body weight status is independently associated with disordered eating behaviors.<sup>24,25</sup> Young people with abnormal body weight may focus on the discrepancy between what is considered to be the “ideal” body shape and their perception of their own “actual” body shape. This thinking may lead to increased vulnerability to social pressure about their body and increased risk for disordered eating attitudes and behaviors. These factors, in turn, may be connected to the high prevalence of distorted body image in this group. Other factors may be involved, and interactions among multiple factors may exist. Further studies are needed to examine the causal relationships between distorted body image and related factors such as age, abnormal body weight status, and disordered eating attitudes and behaviors.

This study had several limitations. The participants comprised a convenience sample selected from several schools in a specific location; therefore, the findings may not represent all young Koreans. Distorted body image was assessed via self-reporting without corroboration by structured clinical measures. Additional studies are needed to develop good assessment measures, given the difficulties of assessing distorted body image in young people. We used self-reported data to assess disordered eating attitudes and behaviors, and it may be associated with underreporting or underestimation of symptoms of eating disorders. The absence of structural clinical interviews precluded the diagnosis of eating disorders and evaluation of comorbid psychiatric conditions. Furthermore, BMI values were also determined from self-reported data. Therefore, considerable self-report bias may have influenced our results. Finally, the cross-sectional nature of the study limited the interpretation of the results and was not optimal for investigating causal inference. These findings should be considered preliminary, and longitudinal research would be valuable to elaborate our findings and examine causality.

## Conclusion

Our results indicate that body image distortion was present in approximately 50% of a sample of young Koreans aged 10–24 years. The prevalence was noticeably higher during adolescence than during early adulthood, and the highest value (55.3%) was reported in female elementary school students. Additionally, more than 40% of young adults aged 18–24 years demonstrated body image distortion; it was particularly common among those with abnormal body weight. Distorted body image was significantly associated with an abnormal body weight status and disordered eating behaviors. These findings emphasize the importance of early intervention to manage and prevent a distorted body image in young people.

## Acknowledgment

This work was supported by the research grant of Jeju National University in 2011.

## Disclosure

The authors report no conflicts of interest in this work.

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