

# Obesity, Body Image, Depression, and Weight-control Behaviour Among Female University Students in Korea

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**Background:** Obesity has become epidemic worldwide and 31.0% of Korean adults are obese. Obesity is the main cause of chronic diseases, such as diabetes, hypertension, cardiac disease, and cancer. The purpose of the study was to examine obesity, body image, depression, and weight-control behaviour among Korean female university students and investigate the differences in body image, depression, and weight-control behaviour with respect to obesity.

**Methods:** This study examined obesity, body image, depression, and weight control in 700 female university students from 4 universities in South Korea. To evaluate obesity, both objective obesity (body mass index [BMI]) and subjective obesity (subjectively perceived) were measured.

**Results:** There was a significant difference between objective and subjective obesity ( $\chi^2 = 231.280, P < 0.001$ ). In addition, the objective obesity group had the lowest body image score ( $F = 19.867, P < 0.001$ ) and difference in weight-control behaviour ( $F = 3.145, P = 0.045$ ). Further, the subjective obesity group had the lowest body image score ( $F = 58.281, P < 0.001$ ). The results revealed a statistically significant difference in body image and weight-control behaviour with respect to objective obesity.

**Conclusion:** Objective and subjective obesity was negatively associated with body image, and no relationships between objective or subjective obesity and depression.

(*J Cancer Prev* 2014;19:240-246)

**Key Words:** Body image, Depression, Obesity

## INTRODUCTION

Severe obesity, one of the most common chronic diseases worldwide, is an independent risk factor that induces cardiovascular diseases.<sup>1</sup> The obesity rate in Korea is substantially lower than the average obesity rate of 56.7% in Organization of Economic Cooperation and Development countries.<sup>2</sup> Nevertheless, the obesity rate in Korea has been increasing steadily over the last decade, reaching 31.4% in men and 27.1% in women.<sup>3</sup> Excessive weight control has simultaneously become a problem among women. There is a widespread preference for skinny body types in popular culture. Even women who are not obese tend to maintain thin body shapes through dieting. Because the mass media and social trends promote thinner body shapes, outward

appearance has become a key component of social life. Consequently, many Korean women seeking jobs or expecting to graduate university in the near future readily accept cosmetic surgery to improve their employment and career opportunities. According to the Korean National Health and Nutrition Examination Survey (2011), 21.0% of women between the ages of 19 and 29 years had low body weight.<sup>4</sup> Most female university students considered unusually thin body shapes desirable and had a distorted perspective towards body image overall. As a result, many such women practiced undesirable weight-control behaviours.<sup>5</sup> However, female university students also belong to the age group that will soon experience pregnancy and childbirth. This is especially concerning, because undesirable weight-control behaviour can seriously affect the health of the fetus and mother,

Received August 19, 2014, Revised September 10, 2014, Accepted September 10, 2014

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both before and after childbirth. Such health problems can also contribute to societal problems. Indeed, health problems experienced during early adulthood may affect life in later years and negatively affect women's overall quality of life.

Female university students are transitioning from puberty to adulthood and generally range from 19 to 22 years in age. This period of later youth and early adulthood is important for establishing one's sense of self-value as well as developing the maturity, intimacy, identity, and decision-making skills that are necessary components of adult life. Female university students think deeply about the features that define themselves, including outward appearance, abilities, roles, and responsibilities. This self-reflection is influenced by a variety of internal and external factors. Previous study shows that obesity or failure in weight control often erode self-esteem and lead to a negative body image; this results in the avoidance of interpersonal relationships, general inactivity, or a sense of inferiority, which might result in depression.<sup>6</sup> In addition, it has been observed that both women and men have misconceptions towards their body weight. A previous study showed that of all female subjects with a normal body mass index (BMI), 32.8% thought they were overweight, and of all male subjects who were overweight, 32.0% thought that they had a normal weight or were underweight.<sup>7</sup>

A study of body and weight-control satisfaction found that 79.4% of female university students reported being unsatisfied with their own bodies.<sup>8</sup> Certainly, such misconceptions can give rise to behaviours that can cause harm to health, such as eating disorders, drug abuse, excessive dieting, and cosmetic surgery. Furthermore, previous studies suggest misconceptions regarding body image increase stress, reduce self-esteem, contribute to depression, and result in mental health problems.<sup>9-11</sup> A study that investigated female university students in 22 countries reported that 77% of female university students in Korea strived for weight loss (the highest percentage of any nation), but had an average BMI of 19.3 (the lowest of any nation). Compared with the female university students of other countries, Korean female university students have much greater misconceptions regarding obesity and preference for lower body weights.<sup>12</sup> Indeed, excessive body weight control is resulting in a variety of serious side effects. According to a statistical analysis conducted by the Blood Management Division of the Korean Red Cross in 2012,<sup>13</sup> 30.9% of female blood donation volunteers were found to be unfit for blood donation—a troubling statistic attributable to iron-deficiency anaemia, a lack of hemoglobin, low blood pressure, low body weight, and related factors.

Although several previous studies have investigated obesity

and body image among female university students,<sup>14,15</sup> comparatively little is known about the associations of obesity and body image with mental health and weight-control behaviours. In particular, few studies have evaluated the obesity of female university students in both objective and subjective terms, which is necessary to investigate the relationship between these variables. The purpose of the study was to examine obesity, body image, depression, and weight-control behaviour among Korean female university students and investigate the differences in body image, depression, and weight-control behaviour with respect to obesity. This study particularly aimed to help female university students adopt more objective perspective regarding body image and maintain desirable health behaviours. The specific objectives are as follows: (a) identify obesity, body image, depression, and weight-control behaviours; (b) identify discrepancies between objective and subjective obesity; (c) identify differences in body image, depression, and weight-control behaviour according to objective and subjective obesity.

## MATERIALS AND METHODS

### 1. Design, setting, and participants

This is a descriptive study aimed at investigating obesity, body image, depression, and weight-control behaviour among female university students. Female students from four universities in B City who agreed to participate in the study were enrolled from April 23 to June 25, 2012. The researcher and research assistants explained the study aims to the participants. Seven hundred fifty questionnaires were distributed, 718 of which were returned. Eighteen questionnaires with incomplete or missing answers were excluded. The remaining 700 questionnaires were processed for analysis.

### 2. Ethical considerations

Approval for our study was obtained from the Female Student Career Centers of the respective universities. Each subject participated in the study voluntarily and provided written informed consent. The subjects were able to understand the contents of the questionnaires, provide responses, and fully understand the purpose of the study.

### 3. Measurements

#### 1) Obesity

Obesity was assessed separately as objective obesity and subjective obesity. Objective obesity was defined as the participants' BMI ( $\text{kg}/\text{m}^2$ ) using self-reported weight and height.

To select a threshold of obesity, the Asian criteria of the World Health Organization, International Association for the Study of Obesity and International Obesity Task force were used (2000).<sup>16</sup> BMI was classified into three categories: underweight (BMI < 18 kg/m<sup>2</sup>), normal (18 ≤ BMI < 25 kg/m<sup>2</sup>), and obese (BMI ≥ 25 kg/m<sup>2</sup>). Subjective obesity was based on the state of obesity subjectively assessed by the subjects and classified as underweight, normal, or obese.

## 2) Body image

The questionnaire of Mendelson et al. (2001)<sup>17</sup> Body Esteem Scale for Adolescents and Adults was used to assess body image in this study; this 12-question 4-point Likert scale is designed to measure individuals' subjective feelings about their own body and appearance. Higher scores reflect a more positive body image. The Cronbach's  $\alpha$ , an indicator of reliability, was 0.72 in this study.

## 3) Depression

The depression tool of Zung (1965)<sup>18</sup> Self-Rating Depression Scale was used to assess depression. This self-reported depression measure consists of 20 questions including 10 positive and negative questions each. Higher scores indicate a higher degree of depression. In this study, Cronbach's  $\alpha$  was 0.77.

## 4) Weight-control behaviour

Weight-control behaviour was defined as acts intentionally undertaken by subjects to decrease their body weight. In this study, we used a 5-point Likert scale tool devised by Jung (1989)<sup>19</sup> that consisted of 15 questions designed to determine the extent of dietary therapy, exercise therapy, behaviour modification therapy, drug therapy, and other activities undertaken to maintain normal weight. Point 5 was given for the response

'Doing well' and point 1 for 'Not doing at all'. Higher scores reflect a greater extent of weight-control behaviour. In the original study by Jung (1989), the Cronbach's  $\alpha$  was 0.75; in the present study, a reliability of 0.80 was achieved.

## 4. Statistical analyses

Data were analysed by PASW 18.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics including means, standard deviations, and percentages were used to describe the general characteristics of subjects, obesity, body image, depression, and weight control. Differences in general characteristics were evaluated by analysis of variance (ANOVA) and independent sample *t*-tests. Differences between objective or subjective obesity were assessed using the McNemar-Browker test. In addition, ANOVA was used to analyses differences in body image, depression, and weight-control behaviour according to the type of obesity. Moreover, the Scheffe test was used for the post-verification of differences in groups analysed by ANOVA. All analyses were two-tailed, and the level of significance was set at 0.05.

## RESULTS

### 1. General characteristics, body mass index, body image, depression, and weight-control behaviour

The BMI, body image, depression, weight-control activities, and general characteristics of the subjects are presented in Table 1. The mean age of the subjects was 20.22 ± 1.90 years, and mean BMI was 20.33 kg/m<sup>2</sup>. Freshmen, sophomores, juniors, and seniors accounted for 35.1%, 32.8%, 23.4%, and 8.6% of subjects, respectively. Of all the subjects, 42.3% were living with family.

**Table 1.** General characteristics of participants, BMI, body image, depression, and weight-control behaviour (N = 700)

Variables	n (%) <sup>*</sup>	BMI		Body image		Depression		Weight-control behaviour	
		Mean (SD)	<sup>†</sup> F or <i>t</i> (p)	Mean (SD) (range 12-48)	F or <i>t</i> (p)	Mean (SD) (range 20-80)	F or <i>t</i> (p)	Mean (SD) (range 15-75)	F or <i>t</i> (p)
Total score (mean ± SD)		20.33 (2.57)		29.30 (4.62)		45.49 (7.00)		36.97 (7.96)	
Grade									
<sup>a</sup> Freshman	242 (35.1)	20.42 (2.18)	3.267	28.39 (4.54)	7.436	45.83 (7.12)	1.324	36.01 (8.70)	2.072
<sup>b</sup> Sophomore	226 (32.8)	20.36 (2.47)	(0.021)	29.14 (4.97)	(< 0.001)	45.81 (6.86)	(0.266)	37.49 (7.78)	(0.103)
<sup>c</sup> Junior	161 (23.4)	19.89 (2.38)	<sup>†</sup> c < d	30.47 (4.28)	<sup>†</sup> a < c	45.18 (7.26)		36.97 (7.03)	
<sup>d</sup> Senior	59 (8.6)	21.09 (4.26)		30.17 (3.77)		43.92 (5.93)		38.36 (6.93)	
Living with family									
Yes	295 (42.3)	20.16 (2.89)	-1.283	30.05 (4.35)	3.711	44.78 (6.89)	-2.206	37.45 (7.39)	1.420
No	402 (57.7)	20.42 (2.28)	(0.200)	28.74 (4.76)	(< 0.001)	45.99 (7.06)	(0.028)	36.59 (8.37)	(0.156)
Weight control experience									
Yes	170 (24.4)	20.95 (2.62)	3.586	29.72 (4.66)	1.334	43.75 (6.88)	-3.652	41.76 (7.83)	9.560
No	526 (75.6)	20.12 (2.51)	(< 0.001)	29.17 (4.63)	(0.183)	46.04 (6.98)	(< 0.001)	35.40 (7.39)	(< 0.001)

SD, standard deviation; BMI, body mass index. <sup>\*</sup>Except for non-response. <sup>†</sup>Scheffe test.

**Table 1.** General characteristics of participants, BMI, body image, depression, and weight-control behaviour (continued)

Variables	n (%) <sup>*</sup>	BMI		Body image		Depression		Weight-control behaviour	
		Mean (SD)	F or <i>t</i> ( <i>p</i> )	Mean (SD) (range 12-48)	<sup>†</sup> F or <i>t</i> ( <i>p</i> )	Mean (SD) (range 20-80)	F or <i>t</i> ( <i>p</i> )	Mean (SD) (range 15-75)	F or <i>t</i> ( <i>p</i> )
Perceived health status									
<sup>a</sup> Good	77 (11.1)	20.55 (3.32)	0.369	29.95 (4.92)	8.086	41.07 (6.12)	51.383	39.40 (7.70)	14.021
<sup>b</sup> Not bad	490 (70.4)	20.28 (2.42)	(0.691)	29.72 (4.51)	(< 0.001)	44.75 (6.47)	(< 0.001)	37.52 (7.89)	(< 0.001)
<sup>c</sup> Bad	129 (18.5)	20.36 (2.54)		27.84 (4.47)	<sup>†</sup> a, b > c	50.21 (6.76)	<sup>†</sup> a < b < c	33.93 (7.50)	<sup>†</sup> a, b > c
Satisfaction with college life									
<sup>a</sup> Satisfied	202 (29.0)	20.05 (2.33)	1.573	30.81 (4.82)	16.500	42.07 (6.66)	52.533	37.38 (8.36)	8.200
<sup>b</sup> Not bad	406 (58.2)	20.43 (2.54)	(0.208)	28.84 (4.27)	(< 0.001)	46.02 (6.13)	(< 0.001)	37.48 (7.60)	(< 0.001)
<sup>c</sup> Not satisfied	88 (12.6)	20.48 (3.06)		28.05 (5.06)	<sup>†</sup> a > b, c	50.44 (7.67)	<sup>†</sup> a < b < c	33.77 (7.99)	<sup>†</sup> a, b > c
Interest in weight control									
Yes	624 (89.4)	20.57 (2.52)	7.448	29.14 (4.86)	-3.597	45.35 (7.22)	-1.415	37.31 (7.91)	4.155
No	74 (10.6)	18.28 (1.88)	(< 0.001)	30.87 (5.24)	(< 0.001)	48.03 (7.87)	(0.158)	31.29 (5.89)	(< 0.001)

SD, standard deviation; BMI, body mass index. <sup>\*</sup>Except for non-response. <sup>†</sup>Scheffe test.

**Table 2.** Objective and subjective obesity among participants (N = 658)

Variables	Subjective obesity			Total	McNemar-Browker test ( <i>p</i> )
	Underweight	Normal	Obese		
	n	n	n		
Objective obesity	Underweight	46	57	0	231.280 (< 0.001)
	Normal	4	334	190	
	Obese	0	0	25	
Total	52	391	215	658	

Further, 24.4% of the subjects had experience with weight control, and 70.4% reported that their own health was 'not bad', and 58.2% reported being 'moderately satisfied' with college life. Furthermore, 89.4% indicated interest in weight control. The mean body image score was 29.30 (range, 12-48), the mean depression score was 45.49 (range, 20-80), and the mean score for weight-control behaviour was 36.97 ± 7.96 (range, 15-75).

We investigated differences in BMI, body image, depression, and weight-control behaviour according to the participants' general characteristics. A significant difference in BMI was observed between participants in different years of study; BMI of juniors was lower than that of seniors ( $F = 3.267, P = 0.021$ ). In addition, BMI was typically high among the subjects who had experience of weight control ( $t = 3.586, P < 0.001$ ) as well as the subjects who were interested in weight control ( $t = 7.448, P < 0.001$ ).

Body image was observed to be more positive among freshmen than juniors ( $F = 7.436, P < 0.001$ ), among participants who were living with their families ( $t = 3.711, P < 0.001$ ), among participants who were satisfied with campus life ( $F = 16.500, P < 0.001$ ), and among participants who were not interested in weight control ( $t = -3.597, P < 0.001$ ). In addition, body image was more

positive among participants who reported good or moderate health than those who reported poor health ( $F = 8.086, P < 0.001$ ).

There was a lesser extent of depression among students who were living with family ( $t = -2.206, P = 0.028$ ) and among students who had experience with weight control ( $t = -3.652, P < 0.001$ ). In contrast, depression scores were greatest among those who reported poor health ( $F = 51.383, P < 0.001$ ) as well as among those who were not satisfied with campus life ( $F = 52.533, P < 0.001$ ).

Weight-control behaviour was most common among participants who had experience with weight control ( $t = -9.560, P < 0.001$ ), among participants who reported good or moderate health ( $F = 14.021, P < 0.001$ ), and among participants who were interested in weight control ( $t = -4.155, P < 0.001$ ). Weight-control behaviour was least common among those who were unsatisfied with campus life ( $F = 8.200, P < 0.001$ ).

## 2. Objective and subjective obesity

The obesity of the subjects was evaluated objectively and subjectively. Regarding objective obesity, 103, 530, and 25 of participants were underweight (BMI < 18 kg/m<sup>2</sup>), normal weight

( $18 \leq \text{BMI} < 25 \text{ kg/m}^2$ ), and obese ( $\text{BMI} \geq 25 \text{ kg/m}^2$ ). In contrast, regarding subjective obesity perceived by the subjects themselves, 52, 391, and 215 of participants perceived themselves as being underweight, normal weight, and obese, respectively. One hundred three subjects were measured to be underweight objectively. However, only did 46 of subjects consider themselves as being underweight and the other 57 subjects as being normal. A significant difference was found between the distributions of objective and subjective obesity ( $\chi^2 = 231.280$ ,  $P < 0.001$ ) (Table 2).

### 3. Body image, depression, and weight-control behaviour with respect to obesity

Body image, depression, and weight-control behaviour were analysed with respect to objective and subjective obesity status.

The results revealed a statistically significant difference in body image ( $F = 19.867$ ,  $P < 0.001$ ) and weight-control behaviour ( $F = 3.145$ ,  $P = 0.044$ ) with respect to objective obesity. Regarding the difference in body image and weight-control behaviour between groups, the high BMI group (i.e., obese group) had the lowest body image score among the three groups. The weight-control behaviour score was higher in the normal group than the underweight group. However, no difference was found in depression with respect to objective obesity.

A significant difference in body image was found with respect to subjective obesity ( $F = 58.281$ ,  $P < 0.001$ ). The obese group had the lowest body image score among all groups. No difference was found in depression or weight-control behaviour with respect to subjective obesity (Table 3).

## DISCUSSION

This study examined obesity, body image, depression, and weight-control behaviour among female university students in Korea. The study was designed to yield baseline data that will

ultimately be used to establish basic health management policies for promoting healthy body image and desirable health behaviours among female university students.

The mean BMI of the female university students who participated in this study was  $20.33 \text{ kg/m}^2$ , which is lower than  $21.6 \text{ kg/m}^2$  of 19- to 29-year-old women in a National Health and Nutrition Examination Survey conducted in Korea in 2011.<sup>3</sup> In the present study, the average scores for body image, depression, and weight-control behaviour were 29.30 points (range, 12-48), 45.49 points (range, 20-80), and 36.97 points (range 15-75), respectively, representing values that are fairly moderate. The average depression score was 45.49 points (range, 20-80), which is lower than 50—the general reference score for depression,<sup>20</sup> and 27.5% of subjects scored more than 50 points for depression score.

Regarding the results of differences according to the general characteristics of participants, various external and internal factors were associated with obesity, body image, depression, and weight-control behaviour. Social factors such as family and satisfaction with campus life were particularly associated with body image among female university students. These results are consistent with the previous suggestion that interpersonal factors such as family and friends may strongly influence body image during the adolescent period and early adulthood.<sup>21</sup> Moreover, the extent to which the subjects reported good health was positively associated with body image. This result is consistent with that of a previous study in which university students who reported being in better health also had a better body image.<sup>22</sup>

Significant differences were observed between the distributions of objective and subjective obesity. Although only 3.8% of the subjects were objectively obese, 32.7% of the subjects thought that they were obese, which suggests they did not evaluate their weight correctly. This result is consistent with those of previous studies,<sup>7,23,24</sup> suggesting that a higher number of women believe

**Table 3.** Body image, depression, and weight-control behaviour with respect to objective and subjective obesity

Variables/group	Body image		Depression		Weight-control behaviour				
	Mean (SD)	*F ( <i>p</i> )	Mean (SD)	F ( <i>p</i> )	Mean (SD)	F ( <i>p</i> )			
Objective obesity	<sup>a</sup> Underweight	31.70 (4.07)	19.867 (< 0.001)	46.91 (7.11)	2.179 (0.114)	35.19 (7.96)	3.145 (0.044)		
	<sup>b</sup> Normal	28.98 (4.61)		*c < b < a		45.31 (6.92)		37.34 (7.90)	*a < b
	<sup>c</sup> Obese	26.72 (4.52)		45.92 (7.34)		37.08 (8.21)			
Subjective obesity	<sup>a</sup> Underweight	32.98 (3.16)	58.281 (< 0.001)	46.13 (6.45)	0.383 (0.682)	35.03 (7.43)	1.811 (0.163)		
	<sup>b</sup> Normal	30.09 (4.26)		*c < b < a		45.33 (6.82)		37.24 (8.16)	
	<sup>c</sup> Obese	27.08 (4.48)		45.67 (7.47)		36.85 (7.61)			

SD, standard deviation. \*Scheffe test.

they are obese as compared to those who are actually obese from an objective standpoint. However, the present study demonstrates a more significant difference between objective and subjective obesity ( $\chi^2 = 296.964$ ,  $P < 0.001$ ) than has previously been reported. The subjective obesity of women may have a greater influence on their body image than any objective physical criterion such as BMI. This tendency may lead women to attempt excessive weight control that harms health. To address this tendency, educational information and programs are necessary—specifically those that can make women and men more aware of women's natural and healthy BMI. Although obesity control measures for young women need to be designed to help obese women achieve a healthier weight, they should also aim to induce a positive attitude towards the natural variation in women's bodies, thereby preventing students with thin or standard body shape from excessively reducing their body weight and consequently placing their health at risk.

In the present study, we found that objective and subjective obesity was negatively associated with body image. These results are consistent with those of previous studies<sup>14,25</sup> reporting inverse relationships between obesity and body image among female university students. Although it has been reported that a high degree of obesity increases the risk of depression,<sup>26</sup> we found no relationships between objective or subjective obesity and depression. It has also been suggested that the relationship between obesity and depression might differ by gender; consequently, obese women are not likely to be at an excess risk of depression.<sup>27</sup> Because participants in the present study had a relatively low mean BMI of 20.3 kg/m<sup>2</sup>, no association between BMI and depression was founded.

We additionally observed no significant difference in weight-control behaviour with respect to subjective obesity, even though there was a significant difference in this behaviour with respect to objective obesity. These findings are inconsistent with those of a previous study of female university students that found self-assessed obesity had a greater effect on weight control-behaviour than BMI.<sup>8</sup> Although BMI may be associated with weight-control behaviour, body dissatisfaction and body weight perception would be the mediators of BMI and weight-control behaviour.<sup>28,29</sup> Therefore, the exact relationships among objective obesity, subjective obesity, body image, and weight-control behaviour will become clearer if future studies analyses the causal pathways among these variables.

### Study limitations

This study included only nursing students from some of the

universities in Korea; therefore, the generalization of research findings is limited and care must be taken in the interpretation of results. BMI was based on self-reported data; in future studies, the accuracy of BMI values may improve if height and weight are directly measured. Further, we recommend that future studies should investigate how Korean cultural factors and gender difference affect obesity and body image.

## ACKNOWLEDGEMENTS

This work was supported by Dong-eui University Foundation Grant (2014AA301). Authors thank Diana Jere for his editorial assistance.

## CONFLICTS OF INTEREST

The authors declare that they have no conflict of interest.

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