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Comparative study on body shape satisfaction and body weight control between Korean and Chinese female high school students

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Abstract

This study was conducted to compare body shape satisfaction, body image perception, weight control status, and dietary habits of Korean and Chinese female high school students in order to provide information for proper body image perception of adolescents. 221 students in Yongin, a city in Korea, and 227 students in Weihai, a city in China, were surveyed using questionnaires. Body shape satisfaction was significantly higher in Chinese students ($P < 0.001$) compared to Korean students. 76.2% of Korean students and 72.7% of Chinese students wanted a thinner body shape than their present body shapes. Experiences of weight control, laxative or diuretics uses, eating during weight control, and vomiting after eating were significantly higher in Korean students ($P < 0.05$-$P < 0.001$) compared to Chinese students. The score for dietary habits was significantly higher in Chinese students ($P < 0.001$) compared to Korean students, suggesting a more desirable dietary habit among Chinese students. Students of both countries showed a significantly positive correlation between body shape satisfaction and dietary habits, suggesting that as body shape satisfaction increases, dietary habits become more desirable. In conclusion, Korean female students showed a more distorted body image perception and had more poor dietary habits than Chinese students. Nutritional education for the establishment of normal body weight, proper body image perception, and healthy dietary habits are needed.

Key Words: Body image, weight control behavior, female high school students, Korea, China

Introduction

Adolescence is a period of rapid growth and sexual maturity, as well as a period of a transition from childhood to adulthood. The nutritional status during this period is closely related to growth rate, degree of sexual maturity, and learning ability. Poor dietary behaviors and nutritional imbalance can affect adolescents even after they become adults. However, adolescents cannot properly perceive nutritional knowledge and therefore, suffer many dietary problems, such as breakfast skipping, imbalanced diet, irregular meals, frequent intake of processed foods and fast foods, and late-night snacks, due to the excessive study burden and stress about the future [1,2].

Most adolescents are very sensitive to their body weight, body shape, and other people's perception on their body shapes [3]. Thus, it has been known that dietary habits and trials for weight control among adolescents are greatly influenced by the perception on their body shape and body weight [4]. Furthermore, through a survey, it became known that the primary factor for the actual decision of attempting weight control in high school students was not the actual body weight but the perception on the body weight of the self [5].

In Korea, interest for appearance has been increasing, and the extremely slim body shape has been excessively favored since the 1970s. Body image perception of adolescents is seriously distorted due to personal desire for a slim body shape, social tendency, and the influence of mass media. Even normal weight or underweight high school girls, in addition to overweight high school girls, have tried weight control due to their dissatisfaction for their body shapes [6,7]. As a result, dietary habits and dietary behaviors have been widely influenced, and frequent meal skipping and irregular meals have been observed [8]. Moreover, in China, the changes in dietary patterns have been accelerated due to the recent rapid economic development. Cultural belief and the norm for beauty in China have been drastically changed along with the increase of overweight and obese population [9], and the pursuit for the ideal slim body shape has been a social phenomenon among female adolescents in big cities [10].

China and Korea are geographically close, and both countries share the oriental culture and show similarities in social changes. However, it is believed that a cultural difference exists between Chinese students and Korean students due to the different social systems, such as capitalism and socialism, and the difference in the degree of social changes. We compared the relationship

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between body image perception, weight control status, and dietary habits in female high school students in Korea and China in order to offer information for proper body image perception of adolescents. We would like to utilize the data as an educational resource for the establishment of proper body shape perception and dietary habits among female high school students.

Subjects and Methods

Subjects

For our study, subjects were female students from three high schools in each country, Yongin, Korea and Weihai, China, respectively. The survey was conducted from December 19, 2011 to January 1, 2012. The survey questionnaires, collected from 221 Korean students and 227 Chinese students, were used in the primary study after discarding the incomplete answers.

Survey content and methods

The questionnaire was distributed throughout high schools, and students directly answered the questions using the instructed methods. The survey contents included height, weight, body shape satisfaction, current body image, ideal body image, experience, and methods and symptoms of weight control, and dietary habits.

The BMI (body mass index, kg/m^2) was calculated from the reported height and weight, and BMI less than 18.5 was classified as underweight , BMI between 18.5 and 22.9 as normal weight, and BMI over 23 as overweight, according to The Asia-Pacific Perspective (2000) selected by the Korean Society for the Study of Obesity. The degree of body shape satisfaction was calculated using the Likert-5-point scale: 'very satisfied' 5 points, 'satisfied' 4 points, 'so-so' 3 points, 'unsatisfied' 2 points, and 'very unsatisfied' 1 point. The current body image (CBI) and the ideal body image (IBI), perceived by an individual student, were surveyed by using the pictures[11] developed with 9 stages, from the most lean shape (1) to the most obese shape (9), and asking the students to select the number. The difference between the CBI and IBI was calculated. The survey for dietary habits was made of 9 questions, including the regularity of breakfast consumption, adequate amount of intake during meals, balance of meals, and the intake of green-orange colored vegetables, fruits, vegetables, protein foods, milk, laver, and kelp. Each question was scored by the Likert-5-point scale: 'always' 5 points, 'almost always' 4 points, 'so-so' 3 points, 'seldom' 2 points, and 'never' 1 point. The score for dietary habits was calculated by averaging the points from the 9 questions.

Statistical analysis

Data were analyzed using the SPSS (Statistical Package for the Social Science) WIN 15.0 program. The analytical methods included χ^2 (Chi-square) verification through the calculation of frequency and percentage in order to find out the characteristics and weight control status of the subjects, and the t-test for body image perception and dietary habits in Korean and Chinese students. In addition, the Pearson's correlation analysis was performed in order to examine the relationship between body shape satisfaction and dietary habits.

Results

Anthropometric measurements

The age, height, and weight, and the BMI of Korean and Chinese students are shown in Table 1. For the age distribution, 53.8% of Korean students and 61.7% of Chinese students were 16 years old.

The average height was 161.3 cm and 165.4 cm in Korean students and Chinese students, respectively. The average height in Chinese students was significantly higher than that in Korean

Table 1. Anthropometric characteristics of Korean and Chinese subjects N (%)

Classification		Korean (n = 221)	Chinese (n = 227)	Total (n = 448)	t or χ^2 (df)	*P*
Age (yrs)	15	20 (9.0)	14 (6.2)	34 (7.6)		
	16	119 (53.8)	140 (61.7)	259 (57.8)		
	17	63 (28.5)	60 (26.4)	123 (27.5)		
	18	19 (8.6)	13 (5.7)	32 (7.1)		
Height (cm)		161.3 ± 5.3[1)]	165.4 ± 4.9	163.4 ± 5.5	-8.62***[3)]	0.000
Weight (kg)		52.2 ± 7.1	53.1 ± 7.8	52.7 ± 7.5	-1.23	0.219
BMI (kg/m^2)		20.1 ± 2.6	19.4 ± 2.6	19.7 ± 2.6	2.87**	0.004
BMI classification[2)]	Underweight	28 (12.7)	49 (21.6)	77 (17.2)		
	Normal weight	180 (81.4)	166 (73.1)	346 (77.2)	6.26 (2)*[4)]	0.044
	Overweight	13 (5.9)	12 (5.3)	25 (5.6)		

[1)] Mean ± SD
[2)] Underweight : < 18.5, Normal weight: 18.5-22.9, Overweight : ≥ 23
[3)] ** $P < 0.01$, *** $P < 0.001$ by t-test
[4)] * $P < 0.05$ by χ^2 test

Table 2. Body shape satisfaction by Korean and Chinese students

Classification	Korean (n = 221)	Chinese (n = 227)	Total (n = 448)	t	*P*
Satisfaction of body shape[2)]	3.24 ± 0.80[1)]	3.64 ± 0.77	3.45 ± 0.81	-5.40***	0.000

[1)] Mean + SD
[2)] 5: very satisfied, 4: satisfied, 3: so-so, 2: unsatisfied, 1: very unsatisfied
*** $P < 0.001$ by t-test

Table 3. Perceptions of current body image and ideal body image by Korean and Chinese subjects

Classification	Korean (n = 221)	Chinese (n = 227)	Total (n = 448)	t	*P*
IBI	2.60 ± 1.16[1)]	2.56 ± 1.12	2.58 ± 1.14	0.35 NS	0.726
CBI	4.14 ± 1.70	3.84 ± 1.75	3.99 ± 1.73	1.86 NS	0.063
CBI-IBI	1.55 ± 1.95	1.28 ± 1.75	1.41 ± 1.85	1.52 NS	0.129

[1)] Mean + SD
IBI, Ideal body image; CBI, Current body image; NS, not significant by t-test

Table 4. Experience and methods of body weight control between Korean and Chinese subjects N (%)

Classification		Korean	Chinese	Total	χ^2 (df)	*P*
Trial of weight control (times)	Never	57 (25.8)	119 (52.4)	176 (39.3)	34.45 (4)***	0.000
	1-2	92 (41.6)	64 (28.2)	156 (34.8)		
	3-4	36 (16.3)	21 (9.3)	57 (12.7)		
	5-6	17 (7.7)	8 (3.5)	25 (5.6)		
	7 ≤	19 (8.6)	15 (6.6)	34 (7.6)		
	Subtotal	221 (49.3)	227 (50.7)	448 (100.0)		
Methods of weight control (multiple choice)	Fasting	39 (17.0)	24 (15.8)	63 (16.5)	-	-
	Dietary restriction	79 (34.3)	58 (38.2)	137 (35.9)		
	Exercise	102 (44.3)	62 (40.8)	164 (42.9)		
	Medication	6 (2.6)	5 (3.3)	11 (2.9)		
	Others	4 (1.7)	3 (2.0)	7 (1.8)		
	Subtotal	230 (60.2)	152 (39.8)	382 (100.0)		
Experience of laxative or diuretics use	Yes	12 (6.7)	1 (0.9)	12 (4.4)	5.16 (1)*	0.023
	No	153 (93.3)	107 (99.1)	260 (95.6)		
	Subtotal	164 (60.3)	108 (39.7)	272		
Experience of overeating	Yes	68 (41.5)	12 (11.1)	80 (29.4)	28.90 (1)***	0.000
	No	96 (58.5)	96 (88.9)	192 (70.6)		
	Subtotal	164 (60.3)	108 (39.7)	272		
Experience of vomiting	Yes	15 (9.1)	2 (1.9)	17 (6.2)	5.91 (1)*	0.015
	No	149 (90.9)	106 (98.1)	255 (93.8)		
	Subtotal	164 (60.3)	108 (39.7)	272 (100.0)		

* $P < 0.05$, *** $P < 0.001$ by χ^2-test

students ($P < 0.001$). The average weight was 52.2 kg and 53.1 kg among Korean students and Chinese students, respectively. There were no significant differences. The average BMI was 20.08 ± 2.58 in Korean students and 19.38 ± 2.57 in Chinese students; both were in the normal range. The BMI in Korean students was significantly higher than that in Chinese students ($P < 0.01$). The BMI was classified according to The Asia-Pacific Perspective (2000) of the Korean Society for the Study of Obesity. 81.4% of Korean students and 73.1% of Chinese students were normal weight, and 12.7% of Korean students and 21.6% of Chinese students were underweight.

Body shape satisfaction and body image perception

The results of body shape satisfaction and body image perception in Korean students and Chinese students are shown in Tables 2 and 3. Body shape satisfaction (Table 2) was higher in Chinese students compared to Korean students, which was significantly different (t = -5.40, $P < 0.001$).

For body image perception (Table 2, 3), there was no significant difference in both the ideal body image and the current body image of Korean and Chinese students. Also, the difference between CBI and IBI did not significantly differ between students from both countries. The distribution of the difference scores obtained by subtracting IBI from CBI showed that only 10.9% of Korean students and 13.2% of Chinese students had the same CBI and IBI. Moreover, 76.2% of Korean students and 72.7% of Chinese students wanted to be thinner than the present.

Weight control status

The results of weight control experiences, methods, and conditions in Korean students and Chinese students are shown in Table 4. For weight control experience, 74.2% of Korean students experienced weight control, and of these students, 16.3% tried weight control more than 5 times, whereas 52.4% of Chinese

Table 5. Comparison of dietary habit score between Korean and Chinese subjects

Classification	Korea (n = 221)	China (n = 227)	Total (n = 448)	t	*P*
	M ± SD	M ± SD	M ± SD		
How often do you eat breakfast?	3.79 ± 1.37	4.23 ± 1.13	4.01 ± 1.27	-3.71***	0.000
How often do you eat adequate amount of food for each meal?	3.53 ± 0.95	4.00 ± 1.14	3.77 ± 1.07	-4.67***	0.000
How often do you consider combination of food groups at each meal?	2.58 ± 0.98	3.54 ± 1.28	3.07 ± 1.24	-8.87***	0.000
How often do you eat green and orange vegetables?	2.80 ± 1.04	3.27 ± 1.42	3.04 ± 1.26	-4.03***	0.000
How often do you eat fruits?	3.32 ± 1.07	4.44 ± 1.05	3.89 ± 1.19	-11.16***	0.000
How often do you eat vegetables?	3.29 ± 1.03	4.45 ± 0.95	3.88 ± 1.15	-12.42***	0.000
Is meat, fish, egg or beans included in at least 2 meals a day?	3.37 ± 0.99	3.67 ± 1.32	3.52 ± 1.18	-2.67**	0.008
How often do you drink milk?	2.77 ± 1.21	3.60 ± 1.55	3.19 ± 1.45	-6.33***	0.000
How often do you eat seaweed such as laver and kelp?	2.58 ± 0.94	2.49 ± 1.25	2.53 ± 1.11	0.86	0.388
Dietary habit score	3.12 ± 0.64	3.74 ± 0.78	3.43 ± 0.78	-9.31***	0.000

** $P < 0.01$, *** $P < 0.001$ by t-test
5: always, 4: almost always, 3: so-so, 2: seldom, 1: never

students never tried weight control, which was statistically significant ($\chi^2 = 34.45$, $P < 0.001$). The experience of using laxative or diuretics was 6.7% in Korean students, which was higher compared to 0.9% in Chinese students, showing a significant difference by country ($\chi^2 = 5.16$, $P < 0.05$). The experience of binge eating during the weight control period was 41.5% in Korean students, which was higher compared to 11.1% in Chinese students; this factor also showed a statistically significant difference ($\chi^2 = 28.90$, $P < 0.001$). The experience of vomiting after food intake for weight control was 9.1% in Korean students, which was higher compared to 1.9% in Chinese students, showing a significant difference by country ($\chi^2 = 5.91$, $P < 0.05$).

Dietary habits

Dietary habits of Korean students and Chinese students are shown in Table 5. 'How often do you eat breakfast' (t = -3.71, $P < 0.001$) and 'How often do you eat an adequate amount of food for each meal' (t = -4.67, $P < 0.001$), 'How often do you consider combination of food groups at each meal' (t = -8.87, $P < 0.001$), 'How often do you eat green and orange vegetables, such as carrots and spinach' (t = -8.87, $P < 0.001$), 'How often do you eat fruits' (t = -4.03, $P < 0.001$), 'How often do you eat vegetables'(t = -1 $P < 2$, $P < 0.001$), 'Is meat, fish, egg, or beans included in at least 2 meals a day' (t = -2.67, $P < 0.01$), 'How often do you drink milk' (t = -6.333, $P < 0.001$) all showed lower scores in Korean students compared to Chinese students, with statistically significant differences. While the score of 'How often do you eat seaweed, such as laver and kelp' did not result in significantly differences between students from both countries. Overall, dietary habits were more desirable in Chinese students compared to Korean students, with statistically significant differences (t = -9.31, $P < 0.001$).

Table 6. Pearson's correlation coefficient between body shape satisfaction and dietary habits by country

Classification		Dietary habits
Korean	Body shape satisfaction	0.142 (0.035)*
Chinese		0.217 (0.001)**

* $P < 0.05$, ** $P < 0.01$

Relationship between body shape satisfaction and dietary habits

The relationship between body shape satisfaction and dietary habits in Korean students and Chinese students is shown in Table 6. In both Korean students (r = 0.142, $P < 0.05$) and Chinese students (r = 0.217, $P < 0.01$), body shape satisfaction showed a statistically significant positive correlation with dietary habits. Thus, as body shape satisfaction increases, dietary habits become more desirable, in both Korean and Chinese students.

Discussion

In this study, body shape satisfaction, body image perception, weight control status, and dietary habits among female high school students in Korea and China were compared. The average BMIs of Korean students and Chinese students were within the normal range.

The average value of body shape satisfaction among students from both countries was slightly above normal. However, Chinese students showed a significantly higher level of satisfaction compared to Korean students. This result can be interpreted as follows: the pursuit for the ideal body shape in Korean students is greater because body shape dissatisfaction can be caused by an excessive pursuit of the ideal body shape. It can be related to the result of the actual weight, in which the BMI of Korean students was slightly higher than that of Chinese students.

The ideal body image (IBI) and the current body image (CBI) perceived by students as well as the difference obtained by subtracting IBI from CBI were not significantly different between students from both countries. In addition, 76.2% of Korean

students and 72.7% of Chinese students wanted a thinner body shape as their ideal body shape. This result was similar to those from previous studies, which reported that female students consider thin body shape as being ideal [12,13]. Also, the difference between the current body shape perception and ideal body shape perception in female college students [14] was surveyed using the same scale as this study; the results were similar to the results of this study, and the difference between the current body shape and ideal body shape was greater. Thus, it is urgent to remind high school girls with the proper body shape perception. The dissatisfaction for body weight and the fear of fatness in adolescents were major risk factors for abnormal dietary behaviors [15]. In addition, negative psychological influences of body shape dissatisfaction and distorted body weight perception, such as low self-esteem, anxiety, and depression, have been reported [16].

The perception and attitudes for body weight and body shape dissatisfaction were related to weight control behaviors [17]. Bellisle *et al.* [18] suggested that proper perception of self body shape was a major factor for healthy dietary behaviors because the perceived body shape was highly related to the behavior of attempting weight control. The proportion of students with weight control experience was significantly higher among Korean students compared to Chinese students, which was higher than those reported previously in high school girls in the Seoul area [19] and Incheon area [20].

Experiences of using laxative or diuretics, binge eating during the weight control period, and vomiting after eating for weight control were significantly higher in Korean students compared to Chinese students. The reason for such higher proportion of using extreme and unhealthy weight control methods in Korean students can be interpreted in the context of the results that their body shape satisfaction was lower than Chinese students, and the proportion of weight control experience was also higher. The proportion of students using laxative or diuretics among Korean students was only 6.8% in this study, suggesting that the use of medication for weight loss is still very limited in Korea. The proportion of middle school students using medication was 3.8% [21]. In the USA and Caribbean countries, it has been reported that many adolescents showed excessive weight control behaviors including vomiting, use of diet pills and laxative, and diuretics [22,23].

For weight reduction, female college students might practice undesirable dietary behaviors, such as reducing food intake, eating irregular meals, and practicing an imbalanced diet [24]. The dietary habits of Korean students and Chinese students showed that among 9 survey questionnaire items, the regularity of breakfast consumption, adequate amount of intake during meals, balance of meals, and the intake of green-orange colored vegetables, fruits, vegetables, protein foods, and milk showed significantly higher scores in Chinese students. In addition, the score of the overall dietary habits was also higher in Chinese students compared to Korean students. In particular, the frequency of skipping breakfast, which has become a major nutritional problem of adolescents, was high in Korean students compared to Chinese students, which was similar to the other results on the proportion of breakfast eating in Korean and Chinese students [25,26].

In both Korean and Chinese students, body shape satisfaction showed a significantly positive correlation with dietary habits. Thus, the higher the body shape satisfaction, the more desirable dietary habits become in both Korean and Chinese students. The result, which showed that dietary habits of students with higher body shape dissatisfaction were not desirable, suggested that the nutritional status of these students could be also poor. It has been reported that calcium intake of high school girls with higher interest in weight control was significantly lower compared to those without interest in weight control [7].

Based on the results from this study, body weight perception of female Korean students were more seriously distorted than that of Chinese students. Therefore, it is necessary for students to establish a proper perception for normal body weight as well as a proper body image. Nutritional education is essential in order to provide accurate nutrition information on scientific weight control methods and to establish proper dietary habits.

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