



Body-related Perspectives and Weight Control Methods of Korean-Chinese Nursing School Students in Yanbian, China: A Pilot Study

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Objectives: This study aimed at identifying the current nutrition knowledge, body-related perspectives, and weight control behaviors of Korean-Chinese college students.

Methods: We conducted a pilot study by employing a healthy weight education program targeting Korean-Chinese nursing school students at the Yanbian University of Science and Technology in Yanbian, China.

Results: This pilot study included 40 participants (38 women and 2 men; mean age, 20.5 years). The current weight status of the participants was as follows: 7.9% underweight, 78.9% normal weight, 7.9% overweight, and 5.3% obese. However, nearly two-thirds of the participants were dissatisfied with their current body size (43.6% a little dissatisfied; 20.5% very dissatisfied). Fifty percent of the participants perceived their current body size as being either slightly fat (35.0%) or very fat (15.0%). The following unhealthy weight control methods were commonly used among the 24 participants who practiced weight control: (1) laxatives or diuretics (91.7%), (2) saunas or spas (87.5%), and (3) a one-food diet (79.2%). In addition, the nutrition knowledge of the participants increased by 24 points from 117 points (pretest) to 141 points (posttest) through the healthy weight education program.

Conclusion: The findings of this study indicate an urgent need to educate Korean-Chinese college students on healthy weight control methods and body-related perspectives.

Key Words: body weight, weight loss, weight perception, college students, China

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Received March 6, 2017.

Revised May 8, 2017.

Accepted August 21, 2017.

INTRODUCTION

The growing problem of obesity in China has been accompanied by considerable changes in perspectives regarding the ideal body image [1,2]. In particular, more Chinese women than men exhibit body dissatisfaction in their pursuit of an “ideal” thin body under the influence of the media, their peers, and familial pressures [3]. Body dissatisfaction can lead to risky weight loss behaviors and eating disorders [4]. Although a few studies have assessed the weight control behaviors of Chinese students in China [5,6], research targeting Korean-Chinese college students, China’s 13th largest ethnic minority population, is limited [7].

People seek health information from diverse sources. Chinese people obtain such information from sources such as health professionals, mass media, the Internet, and personal relationships (e.g., friends and family) [8]. However, information sources differ in their level of cred-



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ibility and reliability. One study revealed that approximately 90% of pregnant Chinese women have Internet access, and most of them (89%) obtain pregnancy-related information during the early stages of their pregnancies [9]. However, a meta-analysis indicated that 70% of on-line sources have problems pertaining to information quality, such as accuracy, completeness, and the availability of references [10]. To develop an effective weight control education program, it is critical to examine the sources of information on weight control methods that Korean-Chinese students use.

Since nursing school students are expected to work as health professionals in the near future, a nutrition education program would assist them in building their professional capacities. We found that the Yanbian University of Science and Technology offered only a two-credit summer course in a nutrition-related subject (i.e., nutrition and metabolism) in its four-year nursing school curriculum [11]. Considering the critical future community role of nursing students, it is crucial to identify their level of body size dissatisfaction, weight control methods, and body size perceptions. In addition, this information may facilitate offering more practical and applied nutrition courses such as healthy weight control programs.

Body size distortion leads to people adopting unhealthy weight control methods. Compared to people who can correctly estimate their body weight status, those who overestimate their body weight status are significantly more likely to practice risky weight control behaviors such as using laxatives or diuretics, inducing vomiting, and adopting a one-food diet [12]. Although these unhealthy options are easy and simple methods for weight control, they can have various side effects such as dehydration and muscle loss, nutritional imbalance, and drastic fluctuations in weight. These harmful effects are particularly hazardous for women of childbearing age because they can have adverse effects on pregnancy and the health of the child.

Information on body size dissatisfaction, weight control methods, and body size perceptions of Korean-Chinese nursing school students is limited. Therefore, the present study assessed the current status of body-related perspectives and weight control practices employed by this population. In addition, we conducted a training program for nursing school students as a pilot study to help them achieve an overall healthy body image and to demonstrate how to lose weight through diet and exercise, without any adverse side effects. Although this pilot study did not follow an experimental design, the findings may serve as a reference for future studies to test the feasibility of large-scale intervention programs [13].

MATERIALS AND METHODS

We received approval from the institutional review board for this research at Kyonggi University in 2017. We implemented a one-day healthy weight control education program for Korean-Chinese nursing school students at the Yanbian University of Science and Technology in Yanbian, China, as a pilot study. The nursing school students received training on healthy eating practices and the basics of nutrition for healthy weight control. Microsoft PowerPoint® slides and lecture notes were used in this lecture-type training. Specifically, the lecture included information on the following sections: (1) healthy weight and obesity; (2) principles of healthy weight control; (3) how to reduce weight through diet and exercise; and (4) unhealthy fad diets and their side effects.

The general characteristics of the participants including their age, gender, college year, living conditions, height, weight, and body mass index (BMI) were recorded. BMI was calculated by dividing the participants' weight in kilograms by the square of their height in meters. The participants were then categorized into four groups according to their current weight status: (1) underweight ($< 18.5 \text{ kg/m}^2$), (2) normal weight ($18.5 \text{ to } < 23.0 \text{ kg/m}^2$), (3) overweight ($23.0 \text{ to } < 25.0 \text{ kg/m}^2$), and (4) obese ($\geq 25.0 \text{ kg/m}^2$) [14]. We also recorded the average monthly living expenses in Renminbi (RMB) and converted those amounts to US dollar (USD).

The resources participants used for information on weight control were assessed through multiple choice questions with the following answer options: (1) newspapers, magazines, and television; (2) friends; (3) health professionals; and (4) the internet. The participants described their current body size perception by choosing one of the following options: very thin, slightly thin, normal, slightly fat, and very fat. Current body size satisfaction was scored using a five-point Likert scale ranging from 1 (*very dissatisfied*) to 5 (*very satisfied*). Ideal body size was categorized into one of three categories: slightly thin, normal, and slightly fat. Ideal BMI was also calculated on the basis of the ideal weight and height reported by the participants.

The participants' self-reported weight control attempts during the past one year were coded into four categories: making no effort to control weight, making an effort to lose weight, making an effort to gain weight, and making an effort to maintain weight. The participants who reported making an effort to control their weight also reported their weight control methods through multiple choice questions on various methods such as exercise, reducing food intake, taking Chinese medicine, and other unhealthy weight control methods (e.g., fasting, using laxatives or diuretics, inducing vomiting, and a one-food diet). The question-

naire also included the following three parts to test the participants' nutrition knowledge on weight control methods: (1) diet therapy for weight control (six items), (2) exercise therapy for weight control (four items), and (3) principles of weight control (six items). The participants selected either "yes," "no," or "don't know" for each question. Because this pilot test included a small number of participants, we used descriptive statistics to derive findings according to the number and percentage of participants (e.g., the number and percentage of those who practiced each weight control method), the means, and standard deviations of the outcomes of interest.

Table 1. Participant characteristics (n = 40)

Characteristic	Data
Age (y)	20.5 ± 1.2
Gender	
Male	2 (5.0)
Female	38 (95.0)
Year of college	
Freshman	1 (2.5)
Sophomore	18 (45.0)
Junior	18 (45.0)
Senior	1 (2.5)
Graduate	2 (5.0)
Living conditions (n = 39)	
Family house	13 (33.3)
Rented room	4 (10.3)
Dormitory	20 (51.3)
Homestay	1 (2.6)
Friend's house	1 (2.6)
Average monthly living expense (RMB) (n = 35)	2,007.1 ± 544.8
Current height (cm) (n = 38)	160.2 ± 6.6
Current weight (kg) (n = 38)	53.5 ± 6.5
Current body mass index (kg/m ²)	20.9 ± 2.4
Current weight status (n = 38)	
Underweight	3 (7.9)
Normal weight	30 (78.9)
Overweight	3 (7.9)
Obese	2 (5.3)

The number of subjects was indicated inside the table if there was any subject with missing data on each variable. Values are presented as mean ± standard deviation or number (%). RMB, Renminbi.

RESULTS

1. Participant characteristics

This pilot study included 40 nursing school students and graduates as participants. The sample comprised 38 women and 2 men (mean age, 20.5 ± 1.2 years) (Table 1). Most participants were in their sophomore (45.0%) or junior (45.0%) year at university. A little more than half of them lived in the dormitory (51.3%), followed by family houses (33.3%) and rented rooms (10.3%). The mean monthly living expense was RMB 2,007.1 ± 544.8 (USD 302.3). The mean height, weight, and BMI of the participants were 160.2 ± 6.6 cm, 53.5 ± 6.5 kg, and 20.9 ± 2.4

Table 2. Resources for weight control and body size perception (n = 40)

Variable	Data
Resources for weight control (multiple choice)	
Newspapers, magazines, television	17 (42.5)
Family	2 (5.0)
Friends	6 (15.0)
Health professionals	1 (2.5)
Internet	34 (85.0)
Perception of current body size	
Very thin	0 (0)
Slightly thin	4 (10.0)
Normal	16 (40.0)
Slightly fat	14 (35.0)
Very fat	6 (15.0)
Satisfaction with current body size (n = 39)	
Very satisfied	1 (2.6)
A little satisfied	5 (12.8)
Neutral	8 (20.5)
A little dissatisfied	17 (43.6)
Very dissatisfied	8 (20.5)
Ideal body size (n = 39)	
Slightly thin	23 (59.0)
Normal	15 (38.5)
Slightly fat	1 (2.6)
Ideal height (cm)	163.5 ± 4.8
Ideal weight (kg)	51.9 ± 7.0
Ideal body mass index (kg/m ²)	19.4 ± 2.5

The number of subjects was indicated inside the table if there was any subject with missing data on each variable. Values are presented as number (%) or mean ± standard deviation.

kg/m², respectively. Regarding the current nutritional status of the participants, 78.9% were of normal weight, 7.9% were underweight, 7.9% were overweight, and 5.3% were obese.

2. Resources for weight control and body size perception

According to the participants' responses to the multiple choice questions on resources for weight control methods, most of them used the internet to obtain information (85.0%) on weight control methods, followed by newspapers, magazines, or television (42.5%) and friends (15.0%) (Table 2). Half of the participants perceived their current body size to be either slightly fat (35.0%) or very fat (15.0%). Approximately two-thirds of the participants were dissatisfied with their current body size (43.6%, a little dissatisfied; 20.5%, very dissatisfied). More than half of the participants responded that their ideal body size would be slightly thin (59.0%). Their ideal height, weight, and BMI were 163.5 cm, 51.9 kg, and 19.4 kg/m², respectively.

3. Self-reported weight control attempts and methods

Nearly two-thirds of the participants responded that they had

Table 3. Self-reported weight control attempts and weight control methods

Variable	Data
Self-reported weight control attempts during the past 1 year (n = 40)	
Making no effort to control weight	16 (40.0)
Making an effort to lose weight	18 (45.0)
Making an effort to gain weight	1 (2.5)
Making an effort to maintain weight	5 (12.5)
Weight control methods (n = 24)	
Exercise	4 (16.7)
Fasting (≥ 24 h)	14 (58.3)
Eating less	3 (12.5)
Taking prescription weight loss medication	24 (100.0)
Taking non-prescription weight loss medication	17 (70.8)
Taking laxatives or diuretics	22 (91.7)
Vomiting	17 (70.8)
One-food diet	19 (79.2)
Taking Chinese medicine	23 (95.8)
Using the fitness center	21 (87.5)
Eating food substitutes	15 (62.5)
Using the sauna or spa	21 (87.5)
High protein, low carbohydrate diets	17 (70.8)

Values are presented as number (%).

made an effort to control their weight during the last year (45.0%, made an effort to lose weight; 12.5%, made an effort to maintain their weight; 2.5%, made an effort to gain weight) (Table 3). The 24 participants who reported attempting to control their weight engaged in the following unhealthy weight control methods: (1) laxatives or diuretics (91.7%), (2) saunas or spas (87.5%), (3) a one-food diet (79.2%), (4) nonprescription weight loss medication (70.8%), (5) induced vomiting (70.8%), (6) a high-protein, low-carbohydrate diet (70.8%), and (7) fasting for ≥ 24 hours (58.3%).

4. Nutrition knowledge regarding weight control methods

The results of this study revealed that the nutrition education program improved the participants' nutrition knowledge on weight control methods (Table 4). The total score of participants' nutrition knowledge increased considerably from 117 points in the pretest to 141 points in the posttest (range, 0–160), particularly with regard to six items: (1) rate of safe weight loss (from 25.0% to 82.5%), (2) risks involved in very low-calorie diets (from 30.8% to 67.5%), (3) side effects of fasting (from 65.0% to 92.5%), (4) duration of meal time (from 53.8% to 89.7%), (5) frequency of exercise (from 55.0% to 90.0%), and (6) recommended type of food for weight control (from 65.0% to 85.0%).

DISCUSSION

We conducted a healthy weight control program as a small-scale pilot study. In addition, we assessed body-related perspectives, information sources for weight control methods, and weight control behaviors of Korean-Chinese nursing school students. The results of this pilot study revealed an urgent need to educate nursing school students on healthy weight control methods and body-related perspectives and to implement a scale-up program for college students.

On the basis of the findings of this study, we offer suggestions for developing nutrition education programs. We observed that female nursing students commonly engaged in the following unhealthy weight control methods over the past year: (1) laxatives or diuretics (91.7%), (2) saunas or spas (87.5%), (3) a one-food diet (79.2%), (4) nonprescription weight loss medication (70.8%), (5) induced vomiting (70.8%), (6) a high-protein, low-carbohydrate diet (70.8%), and (7) fasting for ≥ 24 hours (58.3%). In addition, although approximately 13% of the participants were either overweight or obese, 50% considered themselves as being slightly fat or very fat. A previous study involving Chinese female college students reported similar results; nearly 17% of the women in that study were overweight or obese but 51% perceived

Table 4. Nutrition knowledge on weight control methods

Nutrition knowledge survey questions	Options	Subjects (n = 40)	
		Pretest	Posttest
1. Diet therapy for weight control			
1-1. We need to limit carbohydrate consumption as much as we can and mainly consume the meat group for weight control.	Yes	5 (12.5)	1 (2.5)
	No ^a	33 (82.5)	39 (97.5)
	DK	2 (5.0)	0 (0)
1-2. It is recommended to limit alcohol consumption for weight control, because alcohol contains 7 kcal per gram.	Yes ^a	34 (85.0)	28 (70.0)
	No	3 (7.5)	10 (25.0)
	DK	3 (7.5)	2 (5.0)
1-3. Although we eat the same amount of food, it is helpful to consume a big portion of food all at once than small portions of food several times for weight control.	Yes	1 (2.5)	11 (27.5)
	No ^a	37 (92.5)	29 (72.5)
	DK	2 (5.0)	0 (0)
1-4. It is recommended to eat an apple instead of drinking apple juice because solid food makes people feel fuller than does liquid food.	Yes ^a	26 (65.0)	34 (85.0)
	No	8 (20.0)	5 (12.5)
	DK	6 (15.0)	1 (2.5)
1-5. People can eat fruits as much as they want because fruits are low in calories.	Yes	2 (5.0)	0 (0)
	No ^a	38 (95.0)	40 (100.0)
	DK	0 (0)	0 (0)
1-6. Meal times should last at least 20 minutes to prevent overeating. (n = 39)	Yes ^a	21 (53.8)	35 (89.7)
	No	11 (28.2)	1 (2.6)
	DK	7 (17.9)	3 (7.7)
2. Exercise therapy for weight control			
2-1. It is recommended to practice aerobic exercises 5 times and muscle exercises 3 times per week for weight control.	Yes ^a	22 (55.0)	36 (90.0)
	No	4 (10.0)	3 (7.5)
	DK	14 (35.0)	1 (2.5)
2-2. Exercise intensity should be as high as possible for weight control.	Yes	1 (2.5)	1 (2.5)
	No ^a	38 (95.0)	39 (97.5)
	DK	1 (2.5)	0 (0)
2-3. To effectively burn body fat, people should exercise for at least 20 minutes.	Yes ^a	34 (85.0)	37 (92.5)
	No	3 (7.5)	2 (5.0)
	DK	3 (7.5)	1 (2.5)
2-4. It is recommended to practice both aerobic exercises and muscle exercises for a healthy weight.	Yes ^a	37 (92.5)	37 (92.5)
	No	1 (2.5)	1 (2.5)
	DK	2 (5.0)	2 (5.0)
3. Principles of weight control			
3-1. It is recommended to lose 1 kg per week for safe weight loss.	Yes	14 (35.0)	6 (15.0)
	No ^a	10 (25.0)	33 (82.5)
	DK	16 (40.0)	1 (2.5)
3-2. It is recommended to undergo both diet therapy and exercise therapy for weight control to prevent a yo-yo effect.	Yes ^a	36 (90.0)	38 (95.0)
	No	2 (5.0)	1 (2.5)
	DK	2 (5.0)	1 (2.5)
3-3. For weight control, we need to have a very low-calorie diet by limiting calories to 200–800 kcal per day. (n = 39)	Yes	10 (25.6)	10 (25.0)
	No ^a	12 (30.8)	27 (67.5)
	DK	17 (43.6)	3 (7.5)
3-4. Because fasting would lead to dehydration as well as muscle loss, it could result in fat increase afterwards.	Yes ^a	26 (65.0)	37 (92.5)
	No	1 (2.5)	3 (7.5)
	DK	13 (32.5)	0 (0)
3-5. The one-food diet is a simple and effective weight loss method without side effects.	Yes	4 (10.0)	2 (5.0)
	No ^a	32 (80.0)	38 (95.0)
	DK	4 (10.0)	0 (0)
3-6. High-protein, low carbohydrate diets are the methods by which people significantly limit carbohydrate consumption and consume as much protein and fat foods as they can without side effects.	Yes	2 (5.0)	2 (5.0)
	No ^a	32 (80.0)	37 (92.5)
	DK	6 (15.0)	1 (2.5)
Total score of nutrition knowledge (0–160)		117.0 ± 22.3	141.0 ± 21.3

Values are presented as number (%) or mean ± standard deviation.

^aCells with the correct answers to each question.

DK, “don’t know”.

themselves as being too fat [2]. Additionally, this study reported a relatively lower proportion of Chinese students (20.2%) who used extreme weight control methods (e.g., inducing vomiting, using laxatives or diuretics, and taking diet pills) among participants making an effort to lose or maintain their weight [2]. Considering the adverse side effects and widespread practice of unhealthy weight control methods among the students in the present study, educating them on healthy weight control methods is an urgent requirement. In addition, educating them about healthy body-related perspectives and the prevention of eating disorders resulting from high dissatisfaction with or distortion of body size is essential.

Our findings reveal that most nursing school students obtain weight control information through the internet (85.0%), followed by newspapers, magazines, and television (42.5%). However, the media could be held responsible for providing misinformation or poor information regarding weight loss through commercial advertisements, insufficient context, or inexperienced reporters [15,16]. The quality of weight control information would considerably vary by source [17]. Modave et al. [18] found that the content quality of 103 websites providing weight loss information was generally very poor (average score, 3.8; range, 0–16) in the United States. Additionally, only < 5% of websites obtained a content quality score ≥ 8 scoring up to 16 points [18]. The media would often advertise commercial weight loss products claiming quick results [15]. When Ethan et al. [15] analyzed weight loss advertisements in mainstream women's health and fitness magazines, they found that the most common items advertised were weight loss pills. In the media, although nutrition messages would emphasize certain types of foods to eat or avoid, they often failed to mention the amount or frequency of food consumption [19]. Additionally, some inexperienced journalists would state new research results without providing a clear explanation of their limitations or uncertainties [16]. Therefore, guidance on information use is critical, and this can be provided by conducting an information quality assessment of each information source.

Most Korean-Chinese college students watch Korean satellite television in China [20]. Unlike Chinese students, Korean-Chinese college students are exposed to a unique media environment because they can access media from both Korea and China. One study reported that longer television viewing could result in body dissatisfaction [21]. Another study revealed that among Chinese students studying in South Korea, the watching of Korean television entertainment programs would increase the body image dissatisfaction [22]. Most women are very slim in the Korean mass media, which might promote unrealistic body standards and risky weight control practices among the female viewers. The effect of media use (e.g., types of media or programs including advertisements) on the body size distortion of Korean-Chinese students must be investigated to facilitate the effective design of components for future nutrition intervention programs.

We offer a few recommendations for future studies. First, a nutritional assessment of factors such as food consumption and physical activity levels in this understudied, nutritionally vulnerable Korean-Chinese student population is essential. Second, a pretest and posttest must be conducted based on an experimental design to measure any changes in knowledge, attitude, and behaviors. By following these suggestions, the real effectiveness of the nutrition intervention program can be properly assessed. This pilot study provides a snapshot of the current status regarding body size perceptions, weight control methods, and body size dissatisfaction among Korean-Chinese nursing school students in Yanbian, China. The findings of this study contribute to developing the targeted message of nutrition education programs, which covers a wide array of subjects such as distorted body size, side effects of fad diets, and healthy weight control methods.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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