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Overweight perception: associations with weight control goals, attempts and practices among Chinese female college students

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Abstract

Background—Concurrent with the dramatic cultural and economic shifts occurring as Mainland China becomes increasingly “Westernized,” the weight perceptions, ideal body weight, and weight management goals and practices of Chinese females have also undergone significant changes.

Objective—To investigate relationships between overweight status, weight perception patterns, and weight management goals and practices in Chinese female college students.

Design/Participants/Setting—A cross-sectional analysis was conducted with data from 902 female subjects aged 18 to 25 years participating in the China Seven Cities Study, a health promotion and smoking prevention study conducted in Mainland China in 2003.

Main Outcome Measures/ Statistical Analyses—Logistic regression models were used to explore associations between overweight status, weight perception, specific weight management

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goals and practices, and current levels of vigorous-intensity physical activity and food consumption.

Results—Based on World Health Organization standards for Asian adults, 16.7% of college females were overweight or obese, although 50.8% considered themselves to be “too heavy.” Among participants perceiving themselves as overweight (n=458), 69.2% (n=371) were inaccurate, and did not meet criteria for overweight or obese. The percentage of participants attempting weight loss was 48.2%, and 33.1% wanted to maintain their current weight. Attempts to lose or maintain weight were related to actual and perceived weight status, but not to increased vigorous-intensity physical activity or fruit and vegetable intake, nor to decreased consumption of sweets, soda, Western fast foods and fried foods. Only 21.5% of participants desiring weight loss or maintenance reported using a combination of vigorous-intensity physical activity and a reduced fat and calorie diet, while 20.2% tried extreme methods such as fasting, using diet pills, vomiting, or smoking.

Conclusions—Our findings underscore the need to promote healthy weight management practices among Chinese female college students, with an emphasis on diet and physical activity strategies that encourage balance rather than extremes.

Keywords

Weight perception; Weight control practices

INTRODUCTION

While obesity was once prominent solely in Western countries, it has become an increasing problem across the globe.¹ China now finds itself among the nations greatly affected by the growing population of overweight or obese individuals, with an estimated one in six Chinese adults falling into these BMI classifications and childhood and adolescent obesity rates rising over the past several decades.^{2,3} In Mainland China, by the end of the 20th century, cardiovascular disease had emerged as the leading cause of death, an unfortunate consequence of diet and physical activity changes that occurred as a result of rapid economic growth and industrialization.^{4,5} The sudden rise in obesity and related diseases among the Chinese population has been specifically attributed to increased accessibility of fast foods, increased exposure to Western media, increased sedentary levels, and decreased physical activity levels.^{4,6,7}

At the same time, the Chinese population has undergone a substantial transformation in its views about ideal body image. Standards of body weight, shape, and weight management practices have shifted to be in line with the increasingly Westernized sociocultural values they encounter through media exposure and peer and familial sources.⁸⁻¹¹ Embedded in this shift of ideals is the pursuit of a thin, or slim, body image for females. While a thin figure has long been sought after in American culture, it is now also considered desirable among Chinese female youth.^{9,12,13} During adolescence and early adulthood, the dedication to pursue this ideal body shape tends to be even more pronounced.^{8,14} Previous research has suggested that newfound freedom and increasing social pressures can lead to unhealthy weight management practices during adolescence,⁶ and this may be exacerbated during the

college years as both independence and stress continue to increase.¹⁵ The rate of eating disorders is lower in non-Western countries, but this number appears to be rising, and has already equalized in some regions.^{16,17} A study published in 2014 examined eating disorder occurrences in female college students in the rapidly modernized city of Wuhan, China, and found that the prevalence was comparable to Western nations.¹⁶

Findings of “Westernized” body dissatisfaction have been previously reported in regions of Asia that experienced earlier exposure to Western culture, and this trend appears to be spreading into Mainland China as well. A 1996 study in Hong Kong found that among 812 female undergraduate university students, 42.3% were unhappy about their body shape despite only 1.2% of respondents having a BMI over 25.⁹ Similarly, a study of Taiwanese female college students in 1999 found that 60% of participants who did not fall into an overweight or obese category wanted to lose weight.¹⁸ More recently, reports have emerged indicating that normal weight and underweight individuals residing in urban areas of Mainland China desire weight loss as well. A study examining food-related attitudes and behaviors of medical students in both northern and southern Mainland Chinese cities in 2005 found that 65% of females with a BMI under 20 expressed a desire to be thin.¹⁹

While there is a growing body of research examining the impact that overweight self-perception has on eating behaviors, little is known about how these factors affect Chinese female college students. The limited existing literature consistently shows the presence of inaccurate self-perception of weight among female college students in both Asian and Western nations.^{9,17,18,20,21} This population often incorrectly categorizes themselves as overweight, and shows higher levels of body dissatisfaction if they consider themselves to be overweight or obese.²⁰ The emergence of weight misperception during these years may be due to media or social sources influencing their opinions of what defines a normal weight status.^{10,22} In Taiwan, a study reported that although only 16.2% of participants (n=1057) could be classified as overweight or obese based on their actual BMI, over 51% identified themselves as such.¹⁸

Studies have also shown significant gender differences regarding weight-related beliefs and behaviors, reporting females are more likely than males to desire weight loss,¹⁹ describe themselves as heavy or overweight when actually normal or underweight,^{10,18-20} and be preoccupied with losing weight in order to achieve a slim figure.¹⁸ Chinese females appear to have greater concern with body image and weight,^{6,12} and an increased likelihood of disordered eating attitudes and behaviors than males.¹³ Sakamaki et al. found that more than twice the number of female students (29.8%) have engaged in some form of dieting experience compared to male students (12.7%).¹⁹ As such, an investigation of this specific set of issues among the female population is warranted.

Despite the focus on weight status and the desire to be thin, there is some concern that this may not translate into healthy weight management behaviors such as eating a balanced diet and exercising regularly. A study that examined food habits, health attitude, and nutritional knowledge among 540 Chinese university students found that while over 85% of students of both genders reported being aware of the concept of healthy food (described as “nutritionally balanced food”), only 7% reported actually applying this knowledge when

choosing foods from a menu.¹⁹ Findings from a study of Spanish university students suggested that although 47.9% of participants desired weight loss, there were no significant dietary differences between those who wanted to lose weight and those who did not.²³ A further exploration of whether actions to achieve weight loss goals are actually implemented may provide insight into the dynamic relationship of weight perception, weight goals, and weight management behaviors.

The main focus of this study was to identify associations among overweight status, weight perception, and specific weight management goals and practices among Chinese female college students. A secondary objective was to examine if specific healthy behaviors for weight management—vigorous-intensity physical activity and a nutritionally balanced diet—were consistent with their weight goals.

MATERIALS AND METHODS

Sample Selection

Data used in this cross-sectional analysis were retrieved from the second wave of a longitudinal smoking prevention and health promotion study, the China Seven Cities Study, which collected data from seven of China's most populated urban areas from November 2003 to January 2004. The seven cities represent a spectrum of economic developmental stages occurring through the country, providing a unique opportunity to examine regional variations of the impact of Westernization and modernization. Design and sampling procedures are reported in detail elsewhere.^{6,24,25} The study was approved by the Institutional Review Boards (IRB) of China Seven Cities' Health Bureaus and University of Southern California/Claremont Graduate University. Informed consent was obtained from participants in each city prior to data collection. Students in all cities except Wuhan participated in the second wave survey.

The sample population used in this analysis was selected using the following protocol: one three-year and one four-year college in each city were selected from a city-level comprehensive university. Two academic majors were then randomly drawn from each of the chosen three- and four-year colleges. From those, one class was randomly selected from each grade (i.e. first-third years and first-fourth years in the three- and four-year colleges, respectively) in the selected major. The surveyed sample included 957 randomly selected females, of which 902 provided valid weight and height measures and were used in this analysis. Participants' ages ranged from 18 to 25 years old, with an average age of 20.8 years old (SD of 1.4). All of the participants resided in urban areas.

Survey Development

Questions from the US Youth Risk Behavior Surveillance System²⁶ were adapted to assess self-perception of weight status, weight management goals and practices, dietary behaviors, and physical activity among the sample population. The content of the questions was first reviewed by bilingual investigators and Chinese students to ensure cultural appropriateness. The questions were then translated and back-translated between English and Chinese.

Finally, a pilot study (n=1380) was implemented to confirm that the adapted questions remained valid in the sample population.²⁷

Survey Administration

The surveys were administered to the students in their classrooms at the school site. Supervised by a trained data collector, the participants were asked to complete the paper-and-pen questionnaire independently.

Measures

BMI and Actual Weight Status—Height and weight were measured using a standard calibrated scale and stadiometer, with subjects wearing light clothes with either thin socks or no shoes. The measurements were obtained in specifically designated rooms at the school sites, either immediately pre- or post- survey administration. Body mass index (BMI) - weight in kilograms divided by height in meters squared - was used to quantify overweight and obesity status. The standard calibrated scale (Tanita BWB-800 Series) and stadiometer (Perspective Enterprises PE-AIM-101 Portable Measuring Board) were purchased in the US and shipped to China by the research team at University of Southern California. The data collection protocol was developed and was approved by the Institutional Review Boards (IRB) of China Seven Cities' Health Bureaus and University of Southern California/ Claremont Graduate University. Quality control procedures were in place at all data collection sites to ensure that scales were calibrated accurately and measurement techniques were consistent. The World Health Organization weight standards for the Asian adult population were used to classify the weight categories, with overweight defined as BMI between 23-24.9 kg/m² and obese defined as BMI ≥ 25 kg/m².^{2,28} The categories of overweight and obesity were further collapsed in the analysis to ensure adequate cell frequencies for statistical analysis.

Self-Perception of Weight Status—Questions were adapted from the Youth Risk Behavior Surveillance System (YRBSS).^{26,29,30} Subjects were asked to describe if they thought their body shape was “too thin,” “relatively thin,” “alright,” “relatively heavy,” and “too heavy.” Categories of perceived weight status were further collapsed into a dichotomized variable with categories of perceived overweight (combining “relatively heavy” and “too heavy”) and perceived not overweight (combining “too thin,” “relatively thin,” and “alright”) to ensure adequate cell frequencies for statistical analysis. Compared with actual weight status, the subjects were then classified into one of four categories: “correct perception,” “misconception of underweight,” “misconception of overweight,” or “misconception of normal weight.” Categories of misconception of weight status were further collapsed into a dichotomized variable with categories of misperception of overweight (“misconception of overweight”) and other weight perception (combining variables of “correct perception,” “misconception of underweight,” and “misconception of normal weight”) to ensure adequate cell frequencies for statistical analysis.

Weight Management Goals and Practices—Participants were asked to reflect on their current goals regarding their weight status. They were asked, “What do you think about your weight?,” with response options of “stay the same weight,” “gain weight,” “lose weight,” or

“not trying to do anything.” An additional question identified which weight-related behaviors they had engaged in within the past year, and participants were able to select all applicable responses from the following options: “no action,” “ate little staple food,” “avoided high fat or high energy food,” “skipped meals,” “made myself vomit, used laxatives, or diuretics,” “took diet pills or other functional food or supplements,” “smoked cigarettes,” “exercised,” or they could complete an additional write-in response for “other.” These questions were adapted from the YRBSS and were pilot tested during the survey development.²⁵

Dietary Behaviors—Questions on food consumption, adapted from the US Youth Risk Behavior Surveillance System,²⁶ were used to assess dietary behaviors. Participants were asked to recall how frequently they had consumed certain foods during the past 30 days. The selected foods included fresh or cooked vegetables, fresh fruits and fruit juice, Western fast food, sweets, fried food, and sodas. The response scale ranged from “less than once a week” to “two or more times per day” and was collapsed into “greater than three times a week” and “less than two to three times a week” to ensure adequate cell frequencies for statistical analysis.

Vigorous-intensity physical activity—The item on exercise was adapted from the US Youth Risk Behavior Surveillance System,²⁶ which asked participants “How many times a week do you breathe hard and sweat for over 20 minutes while riding a bicycle, walking fast, jogging, dancing, or doing other exercise or hard physical labor?” The response scale ranged from “none” to “eight or more times” and was dichotomized as “less than three times a week” and “three times a week or more” based on the frequency distribution in order to ensure adequate cell frequencies for statistical analysis.

Data Analysis

Logistic regression models were used to explore the associations between overweight status, weight perception patterns (i.e. perceived overweight vs. not overweight, and misconception overweight vs. not overweight), specific weight management goals and practices, and current levels of vigorous-intensity physical activity and food consumption. Covariates of age and residence (city) were adjusted based on our previous studies.^{6,12} The level of significance was set at 0.05. Model fit indices including -2Log Likelihood and information criteria (e.g. AIC and BIC) were used for model evaluation. Statistical analyses were executed using SAS (version 8.0, 1999, SAS Institute, Inc).

RESULTS

Based on the World Health Organization weight standards for Asian adult population, Table 1 shows that 10.5% of college females were classified as overweight (BMI between 23-24.9 kg/m²) and 6.2% were classified as obese (BMI ≥ 25 kg/m²), although slightly more than half (50.8%) of all participants perceived themselves as either “relatively heavy” or “too heavy.” Approximately 46% of the total number of participants misperceived their weight status, regardless of their actual weight, and of those misperceiving their weight, 35.1% inaccurately considered themselves to be overweight. Among the entire sample population,

48.2% were attempting to lose weight and 33.1% were aiming to maintain their current weight.

Table 2 presents the frequency distribution of vigorous-intensity physical activity, consumption of fruits, vegetables and snack food intake, and weight control behaviors in both the overall sample and among those trying to lose or maintain weight. Among the students trying to either lose or maintain weight, 21.5% reported a combined method of vigorous-intensity physical activity with a reduced fat and calorie diet to achieve this, and a nearly equivalent percentage (20.2%) reported trying extreme methods such as fasting, using diet pills or laxatives, inducing vomiting, or smoking cigarettes to control weight.

Actual weight status, perceived weight status (regardless of accuracy of perception), or misperceived overweight status were associated with attempts to lose or maintain weight (Table 3), with adjusted odds ratio (OR) with 95% CI of 2.31 (1.45-3.67) for misperception of overweight, 3.05 (1.44-6.44) for actual overweight, and 3.24 (2.11-4.98) for perceived overweight. Moreover, actual, perceived, or misperceived overweight status were each related to the adoption of various weight management practices including dieting, fasting, vigorous-intensity physical activity, and other extreme methods (adjusted OR=1.62-5.19) (Table 4).

Attempts to lose or maintain weight were not related to increased vigorous-intensity physical activity, increased fruit and vegetable intake, or lower levels of sweets, soda, Western fast food, or fried food consumption (Table 5). However, students who reported using vigorous-intensity physical activity as a tool to control body weight had greater odds of participating in vigorous-intensity physical activity than those who did not report vigorous-intensity physical activity for weight management (adjusted OR=2.39, 95% CI=1.63-3.50). Additionally, adopting either dieting or vigorous-intensity physical activity as a weight control strategy was related to greater odds of fruit consumption (adjusted OR=1.45 for dieting and 1.62 for vigorous-intensity physical activity). Finally, engagement of other extreme weight control methods was related to greater odds of Western/unhealthy food intake (adjusted OR=2.04 (95% CI=1.06-3.92)

DISCUSSION

This study examined the associations among actual weight status, weight self-perception, and weight control goals and behaviors. Our findings suggest that weight misperceptions exist in a considerable proportion of our sample, and that self-perception of weight status may have a greater impact on weight control behaviors than actual weight status. We also found that despite the desire for weight loss or maintenance, the behaviors undertaken to achieve these goals were inconsistent or unhealthy.

In our sample, there was a relatively even split between Chinese female college students who had an inaccurate perception of their current weight status (46%), and those who had an accurate perception (54%). Similar observations have been reported among youth in Mainland China,²² as well as for Chinese populations in Taiwan, Hong Kong, and other neighboring countries.¹⁸⁻²⁰ These proportions were also similar to results from prior

analyses of data from the China Seven Cities Study that focused on weight perception among female adolescents.^{6,12,31} Our study also revealed a relationship between overweight self-perception—regardless of the accuracy of that perception—and weight loss goals. The association of weight perception and weight control behaviors has previously been seen among adolescents in other Asian regions^{32,33} as well as in college age females in the United States.¹⁵ A study in Hong Kong found no association between actual overweight status and weight control behaviors, but rather, a relationship between overweight perception and weight control behaviors.³²

Our findings suggest that not only is there a gap between actual weight status and perception, but also between weight goals and the actions undertaken to achieve those goals. Compared to participants without specific weight goals, those who desired weight loss or maintenance were not more likely to have increased fruit and vegetable intake, or decreased consumption of sweets, soda, Western fast food, or fried food. Other research has found similar inconsistencies between weight goals and weight control behaviors. Also in Mainland China, a recent study identified a relationship between perceived overweight and higher protein, fat, and overall caloric intake among 6-11 year olds in Mainland China.²² An earlier analysis using data from the China Seven Cities Study found that adolescent females who considered themselves to be overweight were more likely to increase their intake of both fruit and snack foods.⁶ Additionally, a study in the United States identified an association between weight loss intention and a variety of unhealthy behaviors, including smoking, consuming high calorie foods, and eating while watching television among college students.³⁴

Also among the participants desiring weight loss or maintenance in our study, nearly equal proportions had used extreme methods compared to a combination of a healthy diet and increased vigorous-intensity physical activity to achieve their weight goals. Even higher percentages of individuals using concerning behaviors for weight control have been reported in South Korea, a nation that has traditionally held a thin figure as the ideal of feminine beauty and has similarly undergone a Westernization of their diet.³⁵ An analysis of the 2009 Korea Youth Risk Behaviors web-based survey found that among high school girls who had pursued any weight loss or maintenance actions, only 3.3% had used exercise, whereas 41.9% had used less extreme weight control behaviors (defined as eating less, eating a one-food diet, or consuming food substitutes), and 8.8% had used extreme behaviors (defined as fasting for more than 24 hours, taking diet pills, using laxatives or diuretics, or vomiting). In addition, we found that those who used extreme methods for weight control were also more likely to consume Western/unhealthy food.

The findings presented here illustrate the coexistence of weight misperception, excessive focus on body image and weight, and the prevalence of extreme weight loss methods, which have evolved with the increased rate of overweight and obesity in the Chinese population. While research has shown the need for obesity prevention and intervention programs in Mainland China, our analysis suggests that it may be important to address this problem by focusing on the adoption of healthy food and exercise-related behaviors and appropriate weight goals, while maintaining an awareness of the susceptibility of this population to use extreme methods.^{36,37} Research in Western countries has begun to point in this direction,

with efforts focused on creating integrated prevention programs for obesity and disordered eating underway.³⁸⁻⁴⁰ A recent review article on the topic of integrated prevention highlights the importance of examining potential shared risk factors.⁴¹ Future studies aimed at further elucidating shared risk for obesity and disordered eating behaviors in the Chinese population may provide helpful insight for prevention and intervention design.

The present study has several limitations that should be considered when interpreting the results. First, the cross-sectional study design cannot be used to understand the direction of causal relationships. Second, the use of measures to assess overall weight loss intention provided limited information on the desire for weight loss in particular areas of the body. Subjects who felt that a specific body part was too large may have reported a self-perception of overweight or obese, despite knowing that overall, they would not fall in those categories. Third, although these findings are consistent with outcomes of studies conducted in similar populations in other Asian nations, the generalizability of results may be limited due to innate cultural differences and the varying impact of Westernization on different societies. Finally, the need to collapse response groups in the categories of self-perception of weight status, dietary intake, and vigorous-intensity physical activity should be acknowledged as a limitation. Although we determined that the collapsed categories did not deviate from our research question, this strategy has the potential to obscure findings. More specifically, the cut-off point used to dichotomize the fruit and vegetable intake variables (greater than three servings per week) is quite low compared to US CDC recommendations for Healthy People 2010, which suggests fruit intake of at least two daily servings and vegetable intake of at least three daily servings.⁴² A healthy, balanced diet promoted as a component of weight management in the female college student population would likely include recommendations that would be substantially higher than the cut-off point used in this analysis.

An additional point to consider is that this data was collected in 2003 and was retrieved only from urban areas. Studies have shown that although the initial impact of Westernization and modernization primarily affected city-dwellers, by 2005, obesity rates were increasing in rural regions as well. Additionally, the improved access to Western media in these areas may result in a rise in unhealthy eating and weight loss behaviors, as exposure to Western media has been associated with eating disorders among 12-17 year olds in China.⁴³ Therefore, the information presented in this analysis may provide an initial insight into regions that are experiencing the earlier stages of this transition, and more recent data are needed to track the developmental course of this transition.

CONCLUSIONS

As prior efforts examining associations among weight status, perceptions, goals, and management practices in college-age females in non-Western countries are limited, the findings of this study contribute to international obesity and body image concern research. The results presented here indicate that Chinese female college students not only tend to have skewed perceptions of their weight status and weight goals, but also appear to rely on ineffective methods to attain their ideal body. As efforts to curb obesity in China increase, there may be value in designing interventions that are sensitive to these issues and integrate

topics pertaining to healthy weight management behaviors and body image. Additionally, initiating early prevention programs in regions that have not yet experienced the concurrent rise of obesity and eating disorders seen in more Westernized regions may be possible.

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Table 1

General characteristics and patterns of weight status and weight perception among 902 Chinese female college students participating in Wave 2 of the China Seven Cities Study

Total Sample (n=902)		
	n	%
General characteristics		
Age		
18-19	160	17.7
20	209	23.2
21	247	27.4
22	194	21.5
23+	92	10.2
Parental education		
Below high school	377	41.8
High school	333	36.9
College or above	192	21.3
City residence		
Cheng Du	73	8.1
Hang Zhou	34	3.8
Shen Yang	242	26.8
Harbin	209	23.2
Kun Ming	168	18.6
Qing Dao	176	19.5
Weight-related characteristics		
Actual weight status		
Normal/Underweight	751	83.3
Overweight ^a	95	10.5
Obese ^b	56	6.2
Perceived weight status		
Too thin	32	3.6
Relatively thin	127	14.1
Alright	285	31.6
Relatively heavy	393	43.6
Too heavy	65	7.2
Accuracy of Weight Perception		
Correct perception	486	54
Incorrect perception	416	46
Misperception of underweight	59	6.5
Misperception of overweight	317	35.1
Misperception of normal weight	40	4.4
Weight management goal		

Total Sample (n=902)		
	n	%
Stay the same weight	298	33.1
Gain weight	55	6.1
Lose weight	435	48.2
Not trying to do anything	114	12.7

^aOverweight (BMI 23-24.9 kg/m²)

^bObese (BMI ≥ 25 kg/m²)

Table 2

Vigorous-intensity physical activity participation, consumption of fruits, vegetables, and unhealthy foods, and weight management practices among 902 Chinese female college students participating in Wave 2 of the China Seven Cities Study

	n	%
Physical Activity ^a	151	19.3
Food consumption		
Vegetables (>3 times/week)	585	65.0
Fruit (>3 times/week)	515	57.2
Other foods (< 3 times/week)		
Soda drinking	67	7.5
Western fast food	11	1.2
Sweets	195	21.7
Fried foods	59	6.6
Combination ^b	261	29.2
Weight management practices		
(1) <i>In overall sample</i>	902	100
No action	413	46.5
Behaviors		
Dieting ^c and physical activity	159	17.9
Dieting only	208	23.4
Physical activity only	69	7.8
Neither	41	4.6
Extreme Methods		
Yes	146	16.4
Fasting ^d	107	12.0
Other extreme methods ^e	39	4.4
No	330	37.1
(2) <i>Among those trying to lose or maintain weight</i>	733	81.3
No action	276	38.1
Behaviors		
Dieting and physical activity	156	21.5
Dieting only	200	27.6
Physical activity only	59	8.1
Neither	34	4.7
Extreme methods		
Yes	146	20.2
Fasting	107	14.8
Other extreme methods	58	8.0
No	302	41.7

^a Defined as breathing hard and sweating for >20 minutes while bicycling, jogging, walking fast, dancing, or doing other exercise or hard labor; variable was dichotomized into Yes (≥ 3 times per week) and No (<3 times per week).

^b Defined as any combination of soda drinking, Western fast food, sweets, and fried food intake ≥ 3 times/week.

^c Defined as eating little staple food and avoiding high fat or energy foods.

^d Defined as skipping meals.

^e Defined as inducing vomiting, using laxatives or diuretics, taking diet pills or other functional foods or supplements, or smoking cigarettes.

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Table 3

Adjusted odds ratios for self-perception and misperception of overweight status among female Chinese female college students participating in Wave 2 of the China Seven Cities Study who were trying to lose or maintain weight^a

Independent Variables	Outcome Variable		
	OR	95% CI	P
Self-perception of being overweight			
Weight status			
Normal/Underweight	Ref		
Overweight	19.85	10.24-38.47	<0.0001
Trying to lose or maintain weight^b			
Weight status			
Normal/Underweight	Ref		
Overweight	3.05	1.44-6.44	<0.0001
Self-perception of being overweight ^c			
Not overweight	Ref		
Overweight	3.24	2.11-4.98	<0.0001
Misperception of being overweight ^d			
Not overweight	Ref		
Overweight	2.31	1.45-3.67	0.0004

^a All models were adjusted for age and city of residence; models for Self-perception of weight status and Misperception of weight status were additionally adjusted for actual overweight status. In each logistic regression model, weight status and/or perception were independent variables, and the following weight management practices: dieting (defined as eating little staple food and avoiding high fat or energy foods), physical activity (defined as breathing hard and sweating for >20 minutes while bicycling, jogging, walking fast, dancing, or doing other exercise or hard labor; variable was dichotomized into Yes (≥ 3 times per week) and No (<3 times per week)), fasting (defined as skipping meals), and other extreme methods (defined as inducing vomiting, using laxatives or diuretics, taking diet pills or other functional foods or supplements, or smoking cigarettes).

^b Responses of “gain weight” were set as missing.

^c Categories of perceived weight status were further collapsed into a dichotomized variable with categories of perceived overweight (combining “relatively heavy” and “too heavy”) and perceived not overweight (combining “too thin,” “relatively thin,” and “alright”) to ensure adequate cell frequencies for statistical analysis.

^d Categories of misconception of weight status were collapsed into a dichotomized variable with categories of misperception of overweight (“misconception of overweight”) and other weight perception (combining variables of “correct perception,” “misconception of underweight,” and “misconception of normal weight”).

Associations of weight management practices with weight status and weight perception among 902 Chinese female college students participating in Wave 2 of the China Seven Cities Study^a

Table 4

	Dieting ^b			Physical activity ^c			Fasting ^d			Other extreme methods ^e		
	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Actual weight status												
Normal/Underweight	Ref			Ref			Ref			Ref		
Overweight	2.04	1.42-2.93	0.0001	1.62	1.10-2.39	0.015	1.65	1.00-2.70	.05	3.02	1.48-6.18	0.0025
Self-perception of weight status												
Not overweight	Ref			Ref			Ref			Ref		
Overweight	3.06	2.26-4.15	<0.0001	2.24	1.6-3.14	<0.0001	3.33	2.04-5.43	<0.0001	5.19	2.07-13.07	0.0005
Misperception of weight status												
Not overweight	Ref			Ref			Ref			Ref		
Overweight	3.15	2.31-4.30	<0.0001	2.19	1.55-3.09	<0.0001	3.23	1.97-5.30	<0.0001	4.99	1.97-12.68	0.0007

^a All models were adjusted for age and city of residence; models for Self-perception of weight status and Misperception of weight status were additionally adjusted for actual overweight status. In each logistic regression model, weight status and/or perception were independent variables, and weight management practices (i.e. dieting, physical activity, fasting and other extreme methods) were dependent variables.

^b Defined as eating little staple food and avoiding high fat or energy foods.

^c Defined as breathing hard and sweating for >20 minutes while bicycling, jogging, walking fast, dancing, or doing other exercise or hard labor; variable was dichotomized into Yes (3 times per week) and No (<3 times per week).

^d Defined as skipping meals.

^e Defined as inducing vomiting, using laxatives or diuretics, taking diet pills or other functional foods or supplements, or smoking cigarettes.

Table 5

Relationships of physical activity and food consumption behaviors to weight management goals and practices among 902 Chinese female college students participating in Wave 2 of the China Seven Cities Study^a

	Physical activity			Vegetables			Fruits			Sweets, soda, fried or Western fast foods		
	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
Weight goals^b												
None	Ref			Ref			Ref			Ref		
Maintain	1.44	0.78-2.66	0.25	0.67	0.41-1.08	1.00	1.04	0.66-1.63	0.68	0.76	0.47-1.23	0.27
Lose	1.09	0.60-1.99	0.77	0.62	0.39-0.99	0.05	1.45	0.94-2.24	0.87	0.97	0.62-1.52	0.90
Weight management practices												
Dieting^c												
No	Ref			Ref			Ref			Ref		
Yes	1.23	0.86-1.77	0.27	1.09	0.82-1.45	0.54	1.45	1.09-1.92	0.01	1.02	0.75-1.37	0.92
Physical activity^d												
No	Ref			Ref			Ref			Ref		
Yes	2.39	1.63-3.50	<0.01	1.33	0.96-1.85	0.09	1.62	1.17-2.25	<0.01	0.78	0.55-1.10	0.16
Fasting^e												
No	Ref			Ref			Ref			Ref		
Yes	0.90	0.51-1.57	0.71	1.02	0.67-1.57	0.91	1.30	0.84-2.02	0.24	1.35	0.87-2.08	0.18
Extreme methods^f												
No	Ref			Ref			Ref			Ref		
Yes	0.73	0.25-2.13	0.56	1.81	0.84-3.87	0.13	1.11	0.56-2.19	0.77	2.04	1.06-3.92	0.03

^a In these logistic regression models, weight goals and practices were independent variables, and variables of exercise and food consumption behaviors were dependent variables; models were adjusted for age and city of residence.

^b Responses of "gain weight" were set as missing.

^c Defined as eating little staple food and avoiding high fat or energy foods.

^d Defined as breathing hard and sweating for >20 minutes while bicycling, jogging, walking fast, dancing, or doing other exercise or hard labor; variable was dichotomized into Yes (3 times per week) and No (<3 times per week).

^e Defined as skipping meals.

Defined as inducing vomiting, using laxatives or diuretics, taking diet pills or other functional foods or supplements, or smoking cigarettes

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