

Original Article

A comparative study of the culture of thinness and nutrition transition in university females in four countries

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The purpose of this study was to examine the nutrition transition in four countries with respect to body dissatisfaction and eating styles. The target population for this study was college students in China (n=207), Japan (n=865), Jordan (n=322), and the United States (n=432). A cross-sectional survey was used to assess eating styles, disordered eating attitudes and behaviors, body esteem and dissatisfaction, and media influence. Results indicated that the Chinese sample was in an earlier stage of the nutrition transition, followed by Japan, Jordan, and the US. Interestingly, Jordanian and Chinese students exhibited the lowest level of body dissatisfaction. However, Jordanian students exhibited high levels of restrained eating similar to those seen in the Japanese and American students. The Japanese sample demonstrated a complex relationship between the culture of thinness, body dissatisfaction and eating styles. However the US sample reflected the expected levels of body dissatisfaction, high levels of restrained eating, emotional eating, and disordered eating attitudes and behaviors. Implications and suggestions for further research are discussed.

Key Words: Asia, eating behavior, body image, overweight, nutrition

INTRODUCTION

The nutrition transition focuses on macroscale shifts from traditional diets to modern diets, which are high in fat, sugar, and animal proteins, and low in fruits, vegetables and grains.^{1,2} In the past few decades, the nutrition transition has accelerated, especially in developing countries.³ Such large shifts in dietary patterns have led to increasing rate of non-communicable diseases worldwide, such as hypertension, diabetes, and cardiovascular disease.^{1,4} The global nutrition transition is further associated with demographic and socioeconomic transitions characterized by economic development, urbanization and westernization.^{3,5,6}

Nutrition Transition Model

The nutrition transition model (see Figure 1) proposed by Hawks and colleagues⁷ involves different transitional phases, as a result of demographic, economic, and cultural influences. The phase prior to the start of the nutrition transition is intuitive eating, when food intake is for the primary purpose of satisfying hunger. Typical diets for intuitive eating include traditional foods, which are generally healthy.⁷ Often during this stage there is a general preference for larger body sizes as a sign of prosperity.⁸ The second phase is external/social eating, where indi-

viduals eat due to surrounding environmental cues, and for a broader range of purposes, such as socializing.^{7,9} External eating involves more opportunities for eating out and consuming foods high in fat, animal products and calories. As a consequence of external eating, a population's body mass index (BMI) increases. Meanwhile, western media, fashion, and advertising promote thinness as the most desirable appearance, which leads to the pursuit of slimness among populations. Under this cultural influence, societies experience the next phase in the nutrition transition, restrained eating, which features the purposeful restriction of food intake and denial of hunger.⁷ Eventually, food deprivation may lead to binge eating and other eating disorders (e.g. emotional eating).^{10,11} In

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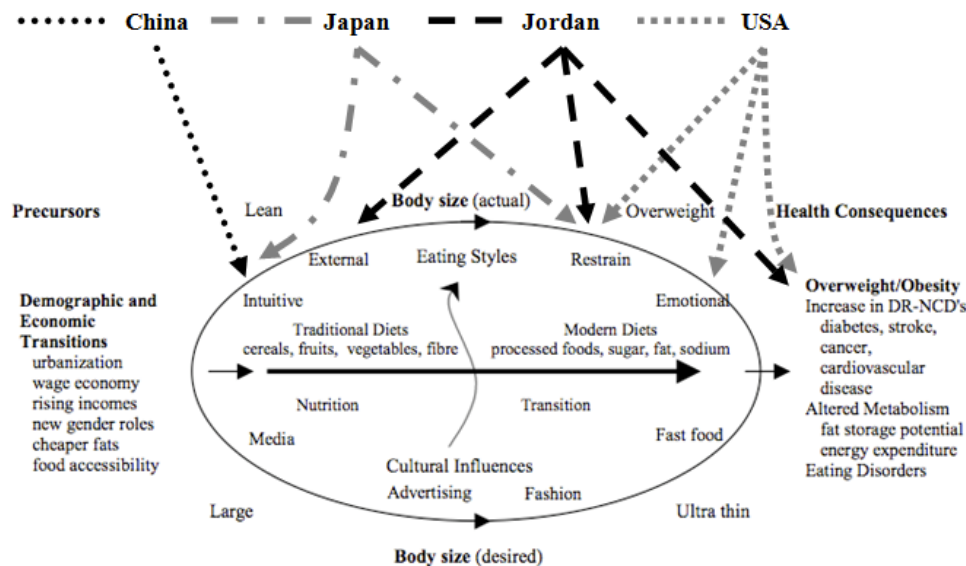


Figure 1. Nutrition transition model pinpointing nutrition transition stage in China, Japan, Jordan and US. The nutrition transition model taken from Hawks et al. (2004). *Asia Pacific Journal Clinical Nutrition* 13(2):194-203 and is reprinted with permission from APJCN.

the nutrition transition model, the replacement of intuitive eating with external, restrained, and emotional eating is associated with negative health outcomes often referred to as nutrition-related non-communicable diseases (NR-NCDs), including obesity, cardiovascular diseases, altered metabolism, and eating disorders.⁷

Transitions within the model may not occur linearly. Countries can have different eating styles, desired body types, and preferred diets, all of which influence their position in the nutrition transition. Thus desired versus actual body sizes and characteristic eating styles provide further insight into where a population is located within the nutrition transition model.

Too often the public health response to high levels of overweight and obesity triggered by nutrition transition is the promotion of dietary restraint.^{12,13} However, the promotion of dietary restraint by public health officials fails to take into account possible interactions with existing cultural influences that advocate thinness regardless of health considerations, and that promote unhealthy levels and types of dietary restraint as preferred means for achieving thinness.^{14,15} As such, public health messages may unwittingly become complicit in justifying and reinforcing harmful cultural standards of beauty and negative dietary practices for some groups. Thus, the current study aims to examine the nutrition transition in four countries: China, Japan, Jordan, and United States, with respect to body dissatisfaction and eating styles.

MATERIALS AND METHODS

Population and sample

The target population was college students in China, Japan, Jordan, and the United States. The selection of countries enabled us to represent populations at various stages of the nutrition transition. The sample from China was from students attending a university in urban area of Xi'an, one of the ancient capitals of China. Since the early 1990s, it has become an important center for culture, education, and industry, but this area still has limited access to Western advertising and media. The sample for

Japan was taken from students attending a university in Tokyo and one in Osaka, both of which are quite Westernized. The Jordanian sample was taken from two Jordanian universities in the capital city of Amman which has had much exposure to Western influences since the mid 1990s. The US sample was taken from students attending two Western universities.

Procedures

This study utilized a cross-sectional survey design with female college students in four different countries. Data were collected during the summer of 2006. Ethical approval was obtained prior to data collection from Institutional Review Board (IRB) at the two US institutions, and from all responsible entities in each of the countries where data were collected. Trained research assistants recruited students in the student center on each of the campuses. All female students entering the student center were approached to participate. First, research assistants started by explaining the purpose of the study. If the student indicated interest in participation, she was then assessed for participation eligibility. Inclusion criteria were: 1) female; 2) enrolled in the university where data were collected; and 3) 18 years of age or older. Those who were eligible to participate, were then provided with an informed consent form explaining the purpose of the study, the voluntary nature of participation, and that personal identifying information was not requested. Research assistants were trained to maintain records of the number of students approached to participate and the number of students who agreed to participate. On all campuses, the response rates were 90% or higher. Once eligibility was determined and the informed consent was signed, participants were asked to complete the self-administered survey in paper-pencil format.

Instrumentation

Data collection instruments were previously validated, including: 1) Motivation for Eating Scale (MFES); 2) Restraint Scale (RS); 3) Eating Attitudes Test (EAT-26);

4) Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ-3); 5) Body Esteem Scale (BES); and 6) Stunkard's et al.'s body silhouettes.¹⁶ In addition to these instruments, participants were asked to indicate their age, and self-reported height and weight to calculate BMI. The instruments were translated into Chinese, Japanese, and Arabic by a native speaker of each language and then independently back translated to ensure accuracy. A focus group was also held in each country to assess face validity of the translated instruments and ensure interpretation of the survey in its intended format. All focus groups suggested accuracy in translation and no change was necessary.

The Motivation for Eating Scale (MFES)

The MFES is a Likert-type scale with 43 items that measure the participant's degree of agreement with various statements related to motivations for eating. It has four subscales: physical or intuitive eating, emotional eating, social eating, and environmental eating with higher scores on each subscales indicating higher levels of that eating style.¹⁵ For this study, scores from two subscales, social and environmental eating, were combined to measure the broader construct of external eating. The Cronbach alphas for the subscales ranged from 0.712 to 0.890 in all the four countries.

Restraint Scale (RS)

The Restraint Scale, also known as the Eating Habits Questionnaire, is a 10-item scale that measures restrictive dieting. The cut-off point is usually set at a score of 10. Thus, individuals scoring at 10 or higher are considered restrained eaters.^{17,18} In this study, the Cronbach alphas for this scale ranged from 0.742 to 0.782.

Eating Attitudes Test (EAT-26)

This 26-item Likert scale was used to measure disordered eating attitudes and behaviors. Scoring 20 or more on this scale indicates that an individual may have disordered eating attitudes and behaviors.^{19,20} In this study, the Cronbach alphas for this scale ranged from 0.621 to 0.868.

Sociocultural Attitudes Towards Appearance Scale (SATAQ-3)

SATAQ-3 was used to assess the impact of societal and media influences on body image and eating disturbances. It is a 30-item scale that includes four subscales: information, pressures, internalization-general, and internalization athlete that measure the societal and media impact on body image.²¹ Higher scores indicate higher levels of influence from social and media messages. The Cronbach alphas for the subscales ranged from 0.741 to 0.896 in all the four countries.

Body Esteem Scale (BES)

BES is a 23-item Likert-type scale with three subscales: BE-Appearance, BE-Weight, and BE-Attribution. These subscales, respectively, assess general feelings about appearance, weight satisfaction, and evaluations attributed to others about one's body and appearance.²² The Cronbach alphas for the subscales ranged from 0.695 to 0.872 in all the four countries.

Body silhouettes

Body size preferences were measured using Stunkard's silhouettes.¹⁶ Participants were asked two questions: (1) which figure represents your current size? (2) which figure represents your ideal size? These questions were used to develop two new variables "perceived BMI" and "desired BMI". This was achieved by recoding body silhouettes according to Bulik et al.'s²³ BMI associations for body silhouettes with the first question representing perceived BMI and the second question representing desired BMI.

Body mass index (BMI)

Based on the World Health Organization (WHO)'s guidelines, BMI was categorized as: underweight (BMI < 18.5), normal (18.5 < BMI < 24.9), overweight (24.9 < BMI < 29.9), and obese (BMI > 29.9). Due to low numbers in the overweight and obese categories, these two groups were combined as "overweight or obese". While some studies have suggested lower BMI cut-off points for Asians,^{24,25} a WHO review article indicated that these international standards remain the best method for cross-cultural comparison.²⁶

Data analysis

Data were analyzed using SPSS release 16.0. Mean scores and standard deviation were calculated for age, each of the subscales and for current, perceived, and desired BMI. ANOVA was used to compare means among countries. To adjust for an inflated probability of committing a type 1 error because of multiple comparisons, the Bonferonni correction was used to adjust the level of significance. Chi-squares were used to compare categorical distributions of BMI, desired change, disordered eating attitudes and behaviors by country.

RESULTS

A total of 1,826 students completed the questionnaire: 207 students from China, 865 students from Japan, 322 students from Jordan, and 432 from the US. Table 1 presents the demographic characteristics and mean scale scores for respondents by country. American (20.7) and Japanese (20.5) students were significantly younger than the Chinese students (21.8).

The mean scores of the participants on the SATAQ-3 indicated significant differences across the four countries in the impact of societal and media influences on body image. American female students (3.46) scored significantly higher than students in all other countries with regard to using media as a source of information for body image. Chinese and Jordanian (2.59 and 2.49, respectively) students scored significantly lower than the Japanese students (2.81). On the other hand, Chinese students scored highest in pressure from media images to look a certain way (3.35) and internalized general images (3.15) compared with Japanese, Jordanian, and American students (2.73, 2.92, and 2.85 for pressures; and 2.57, 2.90, and 2.92 for internalization of general images; respectively). Japanese female students scored the lowest in media pressures and internalization of general media messages, but had the highest internalization of athlete images of all groups. Furthermore, the mean BES sub-

Table 1. Mean and standard deviation and distribution for select variables by country

Variable	China (n=207)	Japan (n=865)	Jordan (n=322)	US (n=432)
Age	21.83 (4.88)	20.54 (3.41) †	21.22 (3.18)	20.72 (3.85) †
BMI, % ††				
Underweight	33.0	17.7%	16.1%	6.6%
Normal weight	59.7	78.4%	70.6%	74.2%
Overweight	0.5	3.4%	7.7%	12.3%
Obese	6.8	0.5%	5.6%	6.9%
Information	2.59 (0.69) †§	2.81 (1.00) †§	2.49 (1.12) †§	3.46 (1.03) ††
Pressures	3.35 (0.74) †§	2.73 (1.10) †	2.92 (1.24) †	2.85 (1.06) †
Internalization-General	3.15 (0.83) †§	2.57 (1.10) †§	2.90 (1.24) †	2.92 (1.04) ††
Internalization- Athlete	3.05 (0.79) †§	3.16 (1.01) †§	2.67 (1.21) ††	2.65 (0.97) ††
BE-Weight	2.21 (0.83) †	1.67 (0.92) †§	2.34 (1.04) †§	2.12 (0.94) †
BE-Attribution	2.01 (0.74) †§	0.98 (0.68) †§	2.21 (0.99) †	2.29 (0.72) ††
BE-Appearance	2.92 (0.71) †§	1.53 (0.60) †§	2.25 (0.97) ††	2.26 (0.77) ††
Desired change, % ††				
No change	13.4%	9.6%	37.4%	24.3%
Weight loss	69.3%	82.3%	48.2%	72.3%
Weight gain	17.3%	8.1%	14.4%	3.5%
Restraint	9.80 (4.09) †§	22.3 (6.16) †	24.3 (4.24) ††	23.1 (5.86) ††
Physical	3.55 (0.79) †§	3.68 (0.72) †§	2.83 (0.70) ††§	2.51 (0.94) ††
External	3.12(0.71) †§	3.22 (0.58) †§	2.91 (0.81) ††	2.83 (0.55) ††
Emotional	2.51 (0.74) †§	2.52 (0.74) †§	2.34 (0.76) ††	3.13 (0.78) ††
Dieting	7.16 (6.31)	7.99 (6.50)	10.8 (8.86) ††§	8.58 (8.21)
Bulimia	2.33 (2.19) †	3.62 (2.75) †§	4.65 (3.42) ††§	2.78 (3.07) †
Oral control	2.94 (2.95)	2.76 (2.67)	5.15 (4.99) ††§	3.14 (2.95)
EAT-Total ††	16.0 (9.25)	14.4 (9.43)	20.8 (15.7) ††§	15.2 (12.6)
Disordered eating	27.3%	23.4%	45.2%	30.0%
No disordered eating	72.7%	76.6%	54.8%	70.0%

†Significantly different from China at the 0.008 level of significance, based on a Bonferonni correction

‡Significantly different from Japan at the 0.008level of significance, based on a Bonferonni correction

§Significantly different from US at the 0.008 level of significance, based on a Bonferonni correction

††Significantly different based on Chi-square at the 0.01 level of significance.

Table 2. Mean and standard deviation for actual, perceived, and desired BMI among female college students by country

	China	Japan	Jordan	US
Current BMI	20.57 (5.40)	20.48 (2.37)	22.79 (4.20) ††	22.37 (6.11) ††
Perceived BMI	21.82 (2.24) †	24.14 (3.12) †	23.30 (3.47) ††	23.68 (3.39) †
Difference between current and perceived BMI	- 1.32 (5.25) †	-3.60 (2.34) †§	-0.59 (4.22) †	-0.86 (2.87) †
Desired BMI	20.23 (1.20)	20.99 (1.45) †	21.83 (1.67) ††	20.96 (1.49) †
Difference between perceived and desired BMI	1.59 (2.36) †§	3.16 (3.04) †§	1.48 (3.08) †§	2.68 (2.88) ††

†Significantly different from China at the 0.008 level of significance, based on a Bonferonni correction

‡Significantly different from Japan at the 0.008level of significance, based on a Bonferonni correction

§Significantly different from US at the 0.008 level of significance, based on a Bonferonni correction

scale scores indicate that Japanese students had the lowest level of body esteem with mean scores well under 2 (disagree) for all three subscales.

In regard to the motivations for eating, the Chinese sample had by far the lowest levels of restrained eating, while - Jordanian and American students had the highest levels. Overall, the motivation for eating was significantly different for the samples. For example, Japanese and Chinese scored highest on the physical eating subscale compared with external and emotional eating. While Jordanian students scored significantly higher on external eating and American students scored highest on emotional eating. In terms of disordered eating attitudes and behaviors, Jordanians (20.83) had a significantly higher mean score than China (15.95), Japan (14.38), and the US (15.17).

Figure 1 presents where each of the four samples fall in the nutrition transition model, based on results from

Table 1 As expected, students from these countries fell in the following order regarding their advancement through the nutrition transition (from least to most advanced): China, Japan, Jordan, and US.

Using the recoded Stunkard’s body silhouettes and calculated BMI, we present the mean current BMI, perceived BMI, desired BMI, and the differences between current and perceived BMI, as well as perceived and desired BMI by country in Table 2. Results indicate that the Jordanian and American samples had significantly higher mean BMI than Chinese and Japanese samples. However, Chinese students had the lowest perceived BMI and Japanese had significantly higher perceived BMI than both Chinese and Jordanian students. Students in all four samples had negative differences between current and perceived BMI. However, Japanese students had much higher mean difference scores than other samples, suggesting a strong disconnect between actual and perceived

body size. Japanese students also had the highest mean difference between their perceived and desired BMI.

DISCUSSION

The nutrition transition reflects a global trend, however each country experiences the transition at a different pace due to variability in socio-cultural contexts and the influence of Western media. The Chinese sample reflected an early stage in the nutrition transition with traditional diets, high levels of intuitive eating and low media influence. This phase of the nutrition transition typically correlates with low levels of overweight and obese among women. However, other samples of more urbanized areas in China have yielded different results where exposure to Western influences was greater and advancement in the nutrition transition was further along.²⁷ Though both Japanese and Jordanian students demonstrated restrained eating, Japanese female students had more intuitive eating and less overweight or obesity compared to Jordanians. The Jordan sample had more external eating with a higher prevalence of overweight or obesity placing this sample in a more advanced position in the nutrition transition (Figure 1). The American sample represents the furthest advancement in the nutrition transition with high levels of emotional and restrained eating corresponding with high levels of overweight and obesity in the sample.

College women in China did not report using Western images as a source of information regarding body image even though they felt some pressure from these sources regarding their body size. Like Japan, China has some traditional preference for thinness over plumpness.²⁸ However, Western media promoting ideal body size has had less influence in China than Taiwan or Japan.²⁹ This may explain why college females in China scored relatively low in body dissatisfaction scores when compared with the US and other Asian populations.²⁹ The results of the Chinese sample highlight the needs to better understand the cultural influences that promote a healthy body size without increasing unhealthy restraint or disordered eating attitudes and behaviors.

In our study Japanese women exhibited high levels of restrained eating and body dissatisfaction. Interestingly, the desired change in BMI for Japanese was double that of Jordanian college women even though Japanese women had significantly lower BMI to begin with, thus illustrating how the socio-cultural context of body dissatisfaction varies worldwide. Also, Japanese women perceived their body size to be much larger than it actually is, which was distinctively different from other samples. The combination of high levels of both intuitive and restrained eating among already thin Japanese women may help explain the low prevalence of obesity in Japan, and consequently a slower progression through the nutrition transition. Among Japanese there has been a documented preference for cuteness (*kawaii*) among young women that accentuates thinness.³⁰ This preference among women in Japan has cultural roots and has been reinforced by Western media. The pursuit of thinness may explain high levels of body dissatisfaction and disordered eating.^{14,30-34} Japan has higher rates of body dissatisfaction than their East Asian counterparts in Taiwan, Korea and mainland China.^{35,36} Even though weight gain may be

postponed or prevented in Japan, it may come at the cost of preoccupation with body image and subsequent body dissatisfaction.

College women in Jordan have reported relatively lower levels of body dissatisfaction in part as a result of a cultural and more traditional preference for plumpness in body size.^{9,37} Therefore, Jordan's high rates of restraint and disordered eating attitudes and behaviors are concerning especially in a population with no real desire for weight loss. Our study showed that Jordanian college women had the lowest proportion of desiring to lose weight (48.2%) yet high levels of restrained eating (mean RS score=24.28). Thus, Jordanian women seem to have widespread dieting without real intent to lose weight. Jordanian women more accurately perceived their actual body size which is consistent with previous studies on the general Jordanian population.³⁷

American students used forms of mass media more as a source of information regarding body image than Japanese, Chinese or Jordanian students. The constant media messages with regards to body image and the subsequent internalization of media images has existed for decades in the US, creating a culture of thinness and promoting body dissatisfaction among women.³⁸ Perceived pressure to be thin and internalization of thin-ideals predict body dissatisfaction among female adolescents in the US.³⁹ Furthermore, the placement of the college women in the US in advanced stages of the nutrition transition is consistent with a previous comparative study that showed significantly less intuitive eating, and more external eating in US college-aged women when compared with China, Japan, Philippines, and Thailand.⁷

Low levels of overweight and obese college students compared to the general adult population in all of these countries may be explained by the relatively young age of the college population. However, given low levels of overweight and obesity, the desired weight loss and disordered eating among young adults at normal weight or underweight is even more intriguing. The desire for weight loss in the absence of being overweight or obese among young adults in these countries highlights the needs to address body dissatisfaction. By focusing upstream from treating problematic behaviors such as restrained and disordered eating, public health strategies can address body dissatisfaction by emphasizing traditional diets and healthy weight.

While this study provides important information regarding the differences in the nutrition transition across four different populations, limitations exist. Sampling in all four countries was non-random, limiting the extent to which our results can be generalized. However, randomized sampling technique would have been hard to do in the college population given that databases of student population may be hard to obtain. Furthermore, samples taken from one or two universities within a country may exhibit regional attributes and may not be representative of entire countries. Furthermore, the fact that there were no differences in disordered eating attitudes and behaviors other than Jordanians scoring significantly higher than the other three countries, may indicate that the disordered eating scale (EAT-26) is not appropriate in places where behaviors such as food purging are known to have a

negative connotation and may bias responses. Thus, future research needs to assess how to better measure disordered eating attitudes and behaviors.

Additionally, research needs to be extended to understand how to maintain cultural influences that promote a healthy body size while avoiding messages that promote restrained eating and disordered eating attitudes and behaviors. Such information may help develop nutrition education interventions that aim at improve the perceptions of ideal body size and curb overweight and obesity rates.

AUTHOR DISCLOSURES

Authors have no conflict of interest.

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Original Article

A comparative study of the culture of thinness and nutrition transition in university females in four countries

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比較四個國家的大學女學生對體型的看法及營養轉變

本研究的目的是探討四個國家攸關體型不滿意及飲食型態而致的營養轉變。目標族群為中國、日本、約旦及美國的大學學生，分別有 207 人、865 人、322 人及 432 人。以橫斷性調查評估飲食型態、不當的飲食態度及行為、體型自覺良好及不滿、媒體影響程度。研究結果指出，中國學生處於營養轉變的早期階段，接著是日本、約旦及美國。有趣的是，約旦和中國的學生對體型的不滿意程度最低。然而，約旦的學生在飲食克制程度與日本及美國一樣高。日本學生則顯示出偏好纖瘦的文化與體型不滿意、飲食型態的複雜關係。然而，美國學生反映出如預期的體型不滿意程度、高度的飲食克制、情緒化的進食及不當的飲食態度及行為。本研究結果的啟示與進一步研究的建議亦在本文中加以討論。

關鍵字：亞洲、飲食行為、身體形象、過重、營養