Original Article

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Body Mass Index and Weight Loss Efforts in Middle-Aged Saudi Women: The Mediating Role of Body Appreciation

Nutrition Section

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ABSTRACT

Introduction: Body Appreciation (BA) is the most widely used measure of positive body image and assesses an overall positive orientation to the body. Little is known about BA among Saudi middle-aged women related to weight status and weight loss efforts. Most published studies in Saudi Arabia have been conducted among college-age females.

Aim: The primary aim was to identify BA, weight status Body Mass Index (BMI), and Weight Loss (WL) efforts among middle-aged Saudi women. The second aim was to test the mediation effect of BA on the association between BMI and WL.

Materials and Methods: A cross-sectional face-to-face interview design study included 326 middle-aged women recruited from all primary health centers in Hofuf city. Correlation analysis was used to describe univariate relationships among BMI, BA, and WL. Hayes tests for mediation were conducted, where BMI was the predictor, the WL score was the outcome, and BA was the mediator under investigation.

Results: Mean age was 49.14±8.35 years, and mean BMI was 29.64±5.82 kg/m^2. The mean BA score was 3.92±2.43. Majority of them (228; 69.9%) were unsatisfied with their body weight; and 256 (78.5%) had made an effort to lose weight. BMI and WL were significant correlates of BA. We found that BA fully mediated the relationship between BMI and WL in women.

Conclusion: BA mediated the relationship between BMI and WL, which can contribute to our understanding of specific factors that can influence body image among middle-aged women.

Keywords: Body weight, Obesity, Self image

INTRODUCTION

Middle age is the period between ages 45 and 65 years; women in this stage of life have already established their family and career roles. They experience complex changes in their lives as they undergo social and biological changes [1]. Women are more likely to be overweight and obese during middle age, which may be in part due to hormonal changes that negatively impact quality of life and increase the risk of developing chronic diseases [2,3]. However, weight losing 5–10% of body weight can decrease these health problems [4]. Augustus-Horvath CL et al., found that middle-aged women had a lower level of positive body image because of the appearance of ageing and were less motivated to diet or reduce their weight [5].

BA is the most widely used measure of positive body image and assesses an overall positive orientation to the body [6]. BA is associated with age, and it usually increases with age [7,8]. On other hand, middle-aged women (ages 45–65 years) had lower levels of BA compared to other age groups [5]. A cross-sectional study, which included 405 women from two races (African-American and Caucasian), found that middle-aged women were dissatisfied with their appearance and with their weight, with no significant differences between races [9]. In an online survey that included 1,800 women and aimed to assess body satisfaction among middle-aged women (ages 50 years and older), researchers found that 71% of women were dissatisfied with their weight and would need to make a major effort to lose weight, especially among women with a higher Body Mass Index (BMI); 64% experienced thoughts about their weight on a daily basis; and 62% reported that weight/shape negatively affected their lives [10]. Additionally, previous studies found the level of BMI significantly correlate with WL efforts, and the relationship between BMI and WL was mediated through BA [7,11,12].

Saudi Arabia has one of the highest prevalence rates of obesity/overweight worldwide, in that seven out of 10 people are overweight or obese; especially among women. List of factors could be attributed to obesity/overweight as age, marriage, low education, and being diagnosed with chronic diseases, consumption energy-dense foods, snacking and sedentary lifestyles [13]. Little is known about BA among Saudi middle-aged women related to weight status and weight loss efforts. However, most published studies in Saudi Arabia have been conducted among college-age females (ages 18–25 years) [14,15]. To our knowledge, there are no studies conducted among middle-aged or older women. The current study aims to identify BA, weight status, and weight loss efforts among middle-aged Saudi women. The second aim was to test the mediation effect of BA on the association between weight status (based on BMI) and WL efforts.

MATERIALS AND METHODS

This was a cross-sectional face-to-face interview design study, with the convenience sampling technique adopted to collect the samples, which included those who were consented to participate in the study. All the primary health centeres (nine) in Hofuf city, Saudi Arabia, were included in the study. Data were collected over a three-month period (October to December 2017). Sample size based on Wang [16] sample size formula ($n=z^2pq/d^2$), the required sample for this study was 207 women, where n is the minimum sample size, z= standard deviation score =1.96, p= prevalence of obesity 84% among Saudi middle-aged women [17], q=1-p, d= 0.05 at the 95% confidence interval. $n= (1.96)^2x\ (0.84)\ x\ (1 - 0.84)/\ (0.05)^2$ =207 women.

Four female student nutritionists attended a cooperative training course and they were trained to assist in the data collection with the researchers (training included interview technique and anthropometric measurements); each woman participating in the study was interviewed individually by one of the nutritionists (took about 10–15 minutes to complete). The inclusion criteria were women living in Hofuf city visiting a health centere for personal

checkups, accompanying a family member, or attending their children's checkups; 45–65-year-old; not pregnant or breastfeeding; and not having any chronic illness or taking any medication. Women meeting the criteria were invited to participate and asked to provide informed consent. Women who did not complete the interview for any reason were excluded to avoid the missing data. Subjects were approached in the waiting rooms of the health centeres. The ethical approval was obtained from the College of Agriculture and Food Science at King Faisal University (#19161) .

Measures

Background Information: This included age, marital status, level of education, work status, household income, and having children.

BA: This was measured by the Body Appreciation Scale (BAS), developed by Avalos L et al., [6]. BAS is a 13-item scale which addresses appreciation, respect, attention given to one's body, and acceptance. The13-item scale was translated from English to Arabic and pretested for clarity of meaning then translated back to ensure validity. Some example items include-I feel good about my body, I respect my body, I feel that my body has at least some good qualities. Responses are on a 5-point Likert scale (1=never, 2=seldom, 3=sometimes, 4=often, and 5=always). The mean score is calculated for all items, the maximum mean score is five and the minimum mean score is one. The total score range from 13 to 65, with higher scores representing more BA or a positive body image. The internal consistency (reliability) of the items was α=0.81, which was deemed acceptable.

BMI: Weight (taken on digital scales) and height (taken on stadiometers) were measured by the trained nutritionists using standardised protocols. BMI was categorised to normal weight (BMI between 18.5 and 24.9), overweight (BMI between 25.0 and 29.9), and obese (BMI 30.0 and more) [18].

Body Weight Satisfaction: Women were asked to respond to the question "How do you feel about your body weight?" with two response options, satisfied and dissatisfied. The question has been previously shown to be an indicator of body weight satisfaction and has been validated in previous study [19].

Weight Loss Efforts (WL): We used the three items of readiness to change and well-being questionnaire for weight control [20]. Items included importance (Rate the importance of reaching and sustaining a healthy weight) and confidence (My confidence level in my ability to reach and sustain a healthy weight); change or improve efforts to reach a healthy weight, women were asked (Are you trying to change or have improvements in your weight during the past 12 months?) responses are on a 10-point Likert scale, with 1 as the lowest and 10 as the highest level, with higher scores representing greater WL efforts. We classified women's responses into two answers according to WL efforts for the last question: from zero to five=not tried to lose weight, and from six to ten =yes tried to lose weight. The mean score was calculated for all items to describe the WL efforts; scores ranged between one to three, with higher scores representing more attention to losing weight. The internal consistency (reliability) of the items was α=0.76, which was deemed acceptable.

Women were also asked on separate question about their reason for weight loss with six options (to look better, for easier movement, to be healthier, to be able to wear a wider range of clothes, because of family or friends' comments, and to be sexier) to know more about the main reason that can influence women to lose weight.

Media Use: Women were asked to respond to the question "Do you browse the internet and social network sites (e.g., Twitter, Facebook, Instagram) or use apps?" with two response options were scored as one for Yes and zero for No.

STATISTICAL ANALYSIS

We used SPSS Statistics (version 23) for data analysis. All study variables were screened for suspected errors, and missing or outliers data. Mean, SD, frequency and percentages were calculated. Correlation analysis was used to describe univariate relationships among BMI, BA, and WL. To test the mediating role of BA, the PROCESS analysis was used by applying Model 4 with 1000 bias-corrected bootstrap samples [21], with BMI as the independent variable (X), BA as the Mediating variable (M), and WL as the dependent variable (Y). A p-value was considered statistically significant at less than 0.05. All the participants in the study included in the analysis.

RESULTS

A total of 326 middle-aged Saudi women were enrolled in this study. All women were married and had children; the mean age was 49.14 years, with 26.14 mean years of marriage. The majority (228; 69.9%) of them were unemployed, 109 (33.4%) had an education level of secondary school or less, and 198 (60.7%) had a monthly household income of 5,000 or more [Table/Fig-1].

Variables	Number %
Age (mean±SD) years.	49.14±8.35
Years of married (mean±SD)	26.14±5.82
Education	
Secondary or less	217(66.6%)
College or higher	109(33.4%)
Work status	
Employed	98(30.1%)
Unemployed	228(69.9%)
Household income (monthly in Saudi Riyals)	
<5000	128(39.3%)
>5000	198(60.7%)

[Table/Fig-1]: Socio-demographic characteristics of middle aged Saudi women (N=326).

Approximately, 46% (149) of the women were overweight, and almost 55% (177) classified as obese, with a high mean BMI of 29.64 kg/m^2 and a low mean BA of 3.92; 228 (69.9%) of the women were unsatisfied with their body weight, and 256 (80%) of the them had made an effort to lose weight. The main reason for weight loss was health (111; 34%), then to look better (67; 20%), and to be sexier (56; 17.2%); the lowest percentage was in response to family or friends' comments (17; 5.2%). A total of 283 (87%) of women browsing the internet and social network sites [Table/Fig-2].

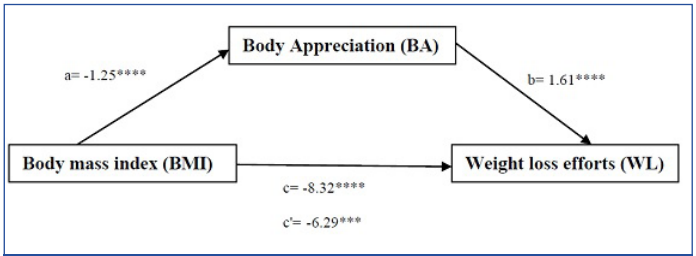
The women's BA was significantly negatively correlated with BMI (r=-0.237, p< 0.01), and BA was positively correlated with WL (r=0.508, p<0.01). In the mediation model, the total effect showed BMI was a significant predictor of WL, controlling for the mediating factor (BA), β=-8.32, t(-8.35), df 324 p≤.00001 (path *c*). BMI was a significant predictor of the mediator BA; β=-1.25, t(-4.39), df 324, p≤.00001 (path *a*). Process analysis showed that the mediation (BA), controlling for BMI, was a significant predictor of WL, β=1.61, t(9.38), df 323, p≤.00001 (path *b*). The analyses revealed that, controlling for the mediation (BA), the direct effect of BMI was a significant predictor of WL, β=-6.29, t(-6.92), df 232, p≤.0001 (path *c'*). The satisfaction of these conditions indicates that there is an indirect (mediating) effect (path *ab*) of BMI on WL through BA, β=-2.02 p≤.0001. A Sobel test was conducted and found full mediation in the model (Z=-3.96, p≤.0001). It was found that BA fully mediated the relationship between BMI and WL [Table/Fig-3].

DISCUSSION

Positive body image is an important factor in weight control practices [22]. This study has assessed BA, body weight satisfaction, and weight loss efforts among 326 middle-aged Saudi women. The

Variables	Number %
Body appreciation score (mean±SD)	3.92±2.43
Body mass index (kg/m²) (mean±SD)	29.64±5.82
Overweight	149(45.7%)
Obese	177(54.3%)
Body weight satisfaction	
Satisfied	98(30.1%)
Dissatisfied	228(69.9%)
Weight loss efforts score (mean±SD)	1.61±0. 21
Yes	256(78.5%)
No	70(21.5%)
Reason for weight loss	
To look better	67(20%)
For easier movement	31(9.5%)
To be healthier	111(34%)
Wider range of cloths	44(13.5%)
Family or friends comments	17(5.2%)
To be more sexy	56(17.2%)
Media use	
Yes	283(86.8%)
No	43(13.2%)

[Table/Fig-2]: Mean, SD, frequency and percentages of study variables.



[Table/Fig-3]: The mediation model, ****p= <.00001, ***p= <.0001

main findings of the study showed that women had a low BA or negative body image (3.92±2.43) which similar to 247 American women who were reported to have a very low mean (3.67) BA [23]. In addition, Tiggemann M et al., found that BA was associated with age and that older women had a higher BA and body satisfaction than young and middle-aged [7]. Older women had less socio-cultural pressures about the ideal of female beauty than young and middle-aged women.

Almost 55% of women were classified obese (29.64±5.82), usually BMI increases over the years in women by 0.25 kg/m^2 after the age of 40, resulting in decrease in metabolic activity and the hormone estrogen; this consequently increases fat deposition [24]. The prevalence of overweight/obesity in the present study was more than that observed in a national study conducted by the Saudi Ministry of Health, which included 10,735 Saudis aged 15 years or older, 51.1% of them women; the reported prevalence of obesity was 33.5%. However, the risk of obesity increased among women with age (55 years or more), being married, and having less than a high school education, and we observed the same results [25]. Eighty percent of unemployed women were concerned about their appearance and weight, which was in accordance with previous work among middle-aged Spanish women, were unemployed women perceived themselves as having bad health and linked to increased health factor risks such as obesity [26].

Losing weight during the menopausal transition is an important problem facing middle-aged women, and many of them describe their weight as a major source of displeasure and a source of greater body dissatisfaction (69.9%). This is consistent with results reported in studies, where a higher BMI is associated with greater body dissatisfaction [26,27]. Almost 80% of women tried to lose weight, which is similar to a cross-sectional study conducted in the United States among 1,571women aged 50 years and more with mean BMI 28.3±6.4; had body size dissatisfaction, 78% of the women tried to lose weight [28]. These results were consistent with those of Lemon SC et al., who found that 65% of the overweight and 78% of the obese employed women who participated in a cross-sectional study reported that they were currently trying to lose weight using different methods (diet or exercise) [29].

Usually, middle and older aged women were more concerned about their health as a result of hormonal changes [30]; likewise, we found that 34% of the women had tried to lose weight to be healthier and to avoid health problems. Twenty percent wanted to look better, and 17.2% wanted to be sexier; these women were likely exposed to media and social media that reminded them how their bodies deviate from the young ideal. Further, 13.5% wanted to lose weight for access to a wide range of clothes, which was similar to another finding that was observed among Gulf Cooperation Council (GCC) women who tried to lose weight for better-fitting clothes [31].

BA was negatively correlated with BMI, similar to results observed in both western and non-western countries. For example, among American women aged between 18 and 58 years, BA was negatively correlated with BMI (r=-0.2, p≤0.05) [23]; findings were similar in 262 Indonesian women [8]. As a result, BA mediated the relationship between BMI and WL in middle-aged women. Therefore, for Saudi women, BA is a very important and modifiable factor in controlling body weight. Notably, low BA can be an incentive for overweight and obese women to lose weight; today's socio-cultural shift to a preference for a thin body size as ideal beauty standard due to recent globalisation and the adoption of a western lifestyle in Saudi Arabia has caused conflict between cultural norms and passed along mixed messages received from global social media about body image and weight control. Additionally, it is possible that women experience heightened cultural pressure to ensure that their weight remains 'proper'. Our findings are consistent with prior research indicating that Polish women facing change in their culture have a more negative body image and low BA, which puts them under pressure to lose weight to be thinner [32].

We already know that body image is a serious issue among young women in Saudi Arabia [14,15], and we found similar results among middle-aged women. There is limited research concerning body image among this age group in Saudi Arabia. This paper identified these gaps and suggests more studies in this age group. Health educators such as dieticians must be aware about BA, body dissatisfaction, weight control, and dieting among middle-aged and older women. More middle-aged women today choose to engage in a variety of weight control methods, some of which can influence their physical health, self-esteem, and overall well-being. Dieticians should develop new strategies, including education and counselling about positive body image, healthy weight loss, and the benefits of physical activity and a balanced diet.

LIMITATION

This study had several limitations. First, this is a cross-sectional study; causality is not implied. Second, the study employed a convenience sample of women in good health with moderate to higher socio-economic status, which limits the generalisability of the results to other groups. Last, we investigated BA, WL, and body dissatisfaction; there are other potential variables not examined, such as social media affect, self-compassion, body weight perception, weight control behaviors, and body acceptance by others, such as husband, friends and family. These can affect body image.

CONCLUSION

BA mediated the relationship between BMI and WL, that can contribute to our understanding of specific factors that can influence

body image among middle-aged women. Future research should consider BA when studying the impact of overweight and obesity on Saudi middle-aged women.

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