

ORIGINAL PAPER

**Analysis of Mediating effect of Depression on the Association
Between Self-Esteem and Eating Attitude:
A Study Among Female Students**

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Abstract

Objective: Research indicates there is a link between self-esteem, depression and eating disorders. Studies point toward depression as the intervening variable in the relationship between self-esteem and eating disorders. The main objective of this study was to see whether low self-esteem has an impact on eating attitude through the mediator depression among female students. **Method:** Convenience sampling technique was employed in this cross-sectional study wherein bilingual versions of Rosenberg's Self Esteem Scale, Becks Depression Scale, and the Eating Attitude Test were administered to 217 female university students. Before conducting this study written informed consent was taken from the respondents. Participation was voluntary. Statistical analyses were conducted using Path analysis. Sobel test was done to confirm the mediating effect. **Results:** Simple mediation analysis depicted that the association between self-esteem and eating attitude was reduced from total effect ($c; = -.513, p = .008$), but remained significant after including depression into the model ($c'; = -.409, p = .007$), direct effect. This indicates partial mediation of the model. Therefore, it could be inferred that depression partially mediated the relationship between self-esteem and eating attitude. **Conclusion:** The present findings are consistent with extant research literature, in proposing that depression increases the risk for eating disorders. These findings warrant further investigation into the clinical characteristics of eating disorders and therapeutic optimism.

Keywords: Self-esteem, Depression, Eating Attitude, Mediator

Introduction

Individuals with eating disorders may be particularly susceptible to body image related cognitive fusion i.e., excessive

entanglement with one's body image related thoughts such that they unduly influence on behaviour [1]. Body image relates to how people think and feel about their own body [2]. Body image and depressive problems

are common in patients with eating disorders and considered to predict eating pathology [3]. Researchers believe that body image is positively correlated with self-esteem, and body dissatisfaction could significantly predict low self-esteem [4]. Body image misperception is common in the general population and is also a core component of several serious diseases, including body dysmorphic disorder, anorexia nervosa, and bulimia nervosa [5]. Based on ideal and feel body image comparison, women showed higher dissatisfaction than men and preferred slimmer silhouettes [6]. Prior research has also demonstrated implicitly that women are more negatively wedged by body dissatisfaction, and more susceptible to various eating related disorders [5, 7, 8, 9, 10]. Not surprisingly, many contemporary studies have indicated that body dissatisfaction plays an important role in the development, maintenance, and relapse of eating disorders [11, 12].

Self-esteem is reported to have a significant impact on important life outcomes including health and social outcomes during adolescence and adulthood [3]. Cross-sectional studies tend to display a close relationship between self-esteem and eating disorder [13]. In general, high self-esteem refers to favorable evaluations of the self, and low self-esteem refers to unfavorable evaluations of the self [14]. Cognitive behavior theory suggests that low self-esteem may contribute towards restrained eating [15]. Previous research has also demonstrated strong associations between body satisfaction and self-esteem among women [16,17]. Several studies have reported that dissatisfaction with physical appearance may have a negative impact on self-esteem [18, 19]. Correspondingly, it has been suggested that high self-esteem has protective effect on body satisfaction and eating disorder [20], while having low self-

esteem score, significantly increases the likelihood of having a high score on the scale of eating disorder [21].

Research from both clinical and epidemiological studies have documented substantial comorbidity between eating disorders and depression among females [22, 23, 24]. Some studies have likewise found that negative body image could be related to increased depressive symptoms in women [25, 26]. In a study conducted amongst Korean university students, it was demonstrated that individuals with depressive symptoms tended to have disturbed eating behaviors, low body image satisfaction, low self-esteem, and high levels of stress [27]. Another study identified that high levels of depressive symptoms, high levels of body dissatisfaction, poor family cohesion, and low self-esteem contributed significantly to binge eating behavior [28]. Thus, exploring the changes that come along with body dissatisfaction, low self-esteem, and depression reveals a unique pattern of eating disorders [29]. It cannot be denied that body satisfaction is linked to self-esteem, depression, and eating disorders [30, 31, 32].

Eating disorders and eating problems in college students are associated with a range of deleterious consequences for both the individual and society, including lower academic functioning and functional impairment [33]. Despite this, very few studies have examined the risk of eating disorders and body image amongst university students, especially in non-western societies [34]. Given that eating disorders have high rates of comorbidity with mental illnesses such as major depressive disorder [35], and low self-esteem itself may be an important risk factor for the development of eating disorders [36], it becomes essential to explore the

relationship between these three constructs. The current study aims to contribute to existing knowledge on this issue by examining the association of self-esteem, eating attitude and depressive symptoms in a population sample of university students in Malaysia. To this end, the mediating effect of depression on the relationship between self-esteem and eating attitude amongst female students was also investigated.

Method

Procedure

The present study is a cross sectional study design where participants were not exposed to risk of experiment or clinical trials. Therefore, ethical approval was deemed not necessary. However, prior to assessment, students were briefed about the purpose of the study and assured about the anonymity of their responses. Participation was voluntary and signed consent was obtained from the students. Study was conducted among a sample comprising of 217 undergraduate students of University Malaysia Sarawak. A convenience sampling technique was implemented for selecting the participants who belonged to the Faculty of Cognitive Sciences and Human Development. The self-administered questionnaire was distributed during the last 20 minutes of a 2-hour class lecture and applied only to students who were present in class, on the day of assessment. Data was collected between February, 2020 to May 2020.

The self-report bilingual (English and Malay) questionnaire comprised of four sections. Participants completed surveys consisting of Socio-demographic profile, Rosenberg's Self Esteem Scale (RSES-10), The Beck Depression Inventory (BDI), and the Eating Attitude Test (EAT-40). The

English version of each questionnaire was translated into Malay language by using standard guidelines, including independent forward and back translation.

Instruments

Self-esteem was assessed with the 10-item Rosenberg Self-Esteem Scale (RSES) which evaluates global sense of personal worth by measuring both positive and negative feelings about the self [37]. Participants answered the items on a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree), with scores extending from 10 (low level of self-esteem) to 40 (high level of self-esteem). The validity and reliability of RSES has been demonstrated in different cultures and languages [38,39]. Cronbach α of current sample was 0.79.

The Beck Depression Inventory (BDI) [40] which is a 21-item, self-report rating inventory that measures characteristic attitudes and symptoms of depression. Items are presented in a 4-point, forced choice Likert scale. Each answer is scored on a scale value of 0- 4. Internal consistency for the BDI ranges from .73 to .92 with a mean of .86. Measures of 0–10 indicates that a person is not depressed, 11–16 indicates mild depression, 17–20 indicates borderline clinical depression, 21–30 indicates moderate depression, 31–40 severe depression and 41–63 indicates severe depression. Cronbach α of current sample was 0.84.

The Eating Attitude Test (EAT-40) developed by Garner and Garfinkel (1979) [41], is a 40-item multidimensional self-report scale designed to assess the attitudes, behavior and traits present in eating disorders, particularly symptoms of anorexia nervosa and bulimia nervosa. Items are presented in a 6-point, forced choice Likert

scale ranging from 'always' to 'never'. Total scores greater than 30 denotes the existence of disturbed eating attitudes, and possibly indicative of an anorexia-like behavior. Internal consistency of this scale was found to be 0.77 in a previous study [42]. The current sample depicted Cronbach α of 0.80.

Data Analysis

Prior to conducting primary analyses, the data was examined for outliers, and all were found to be within range values. Cronbach's alpha coefficients (α) were computed to evaluate reliability of the questionnaires.

A simple mediation analysis was conducted to assess the effect of depression on the relationship between self-esteem and eating attitude. The analysis was completed in SPSS by utilizing version 23 of the SPSS AMOS [43]. The four steps method put forward by Baron and Kenny (1986) [44] was employed to establish partial or complete mediation. Inferential test was carried out by a non-parametric, bias-corrected (confidence intervals set at 95%)

bootstrapping procedure using 500 resamples from the data set. The indirect effect was quantified as the product of path coefficients a and b ($a*b$). Path a represents the standardized regression coefficient for the path from the predictor variable (self-esteem) to mediating variable (depression); path b is the coefficient for the path from the mediating variable (depression) to the criterion variable (eating attitude), controlling for the predictor variable. Furthermore, by comparing the coefficients for the total effect (path c) with the coefficients for direct effect (path c'), the significance of the indirect effect of the mediator can be determined. Significant mediation is indicated if the $c - c'$ difference is larger than zero.

Results

The relationship between independent variable, mediator and dependent variable has been depicted in the form of a path diagram. Figure 1 represents the results of the four steps method proposed by Baron and Kenny (1986) [44].

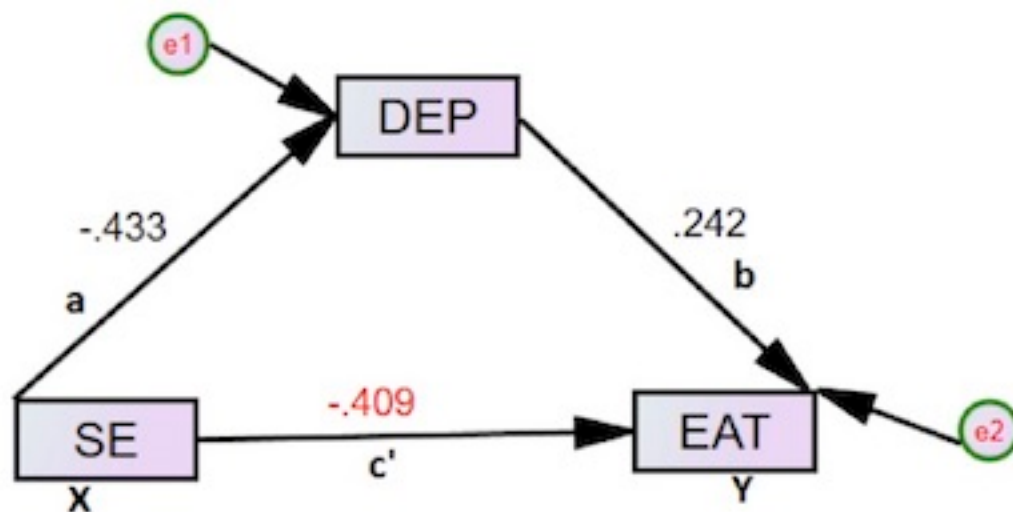


Figure 1. Structural diagram for a model with Depression (DEP) as the mediator on the effect of Self Esteem (SE) and Eating Attitude (EAT)

Mediation analysis

A detailed analysis of the mediation steps which were utilized to establish partial or complete mediation in the present study has been delineated here onwards.

Step 1: The path analysis was performed by utilizing eating attitude (EAT) as the criterion variable (Y) and self-esteem (SE) as the predictor (X), ignoring the mediator (M), showed standardized regression weight of -0.513. (EAT <--- SE). Total effect signifies of the relationship between the two variables was also confirmed with using two tailed bootstrap bias corrected percentile method. (c; = -0.513, p = 0.008).

Step 2: Path a was estimated and tested in this step, wherein the mediator variable was essentially considered as a criterion variable and self-esteem as the predictor, showed standardized regression weight of -0.433. (DEP <--- SE). The regression of self-esteem on the criterion variable (depression), was likewise found to be significant p=0.000.

Step 3: Path b was estimated and tested in

this step, wherein it was demonstrated that the mediator variable affected the outcome variable. In this step, eating attitude was the criterion variable, and depression was the predictors. Thereby, step 3 of the mediation process showed that the mediator, controlling for self-esteem, was significant, 0.419, p=0.006. (EAT <--- DEP).

Step 4: This step basically established that the mediator (depression) mediated the X-Y relationship, wherein the effect of X (self-esteem) on Y (eating attitude), whilst controlling for M (path c') should be zero. Thus, step 4 of the analysis revealed that, controlling for the mediator (depression), self-esteem with eating attitude was statistically significant -0.409, p=0.007. This is shown in Figure 1.

The Total Effect of Self Esteem on EAT without Depression variable was -0.513, p=0.008. In the presence of the mediator where Depression mediates between Self Esteem and EAT, the direct effect was reduced to -0.409, p=0.007. Successively, it was observed that path b also reduced to 0.242, p=0.005.

Table 1. Results from simple mediation analysis

	Standardized Estimates	P-Value
Total Effect	-0.513	0.008
Direct Effect	-0.409	0.007
Indirect Effect	-0.104	0.004

Results from simple mediation analysis (Table 1), depicted that the association between self-esteem and eating attitude in the presence of the mediator Depression was significantly reduced

(c'; = -.409, p = 0.007). Indirect Effect is -0.104, p=0.004. Shows a significant impact. Variance explained was 31%. The overall effect size for this model was 0.689, considered strong.

A Sobel test was conducted to assess the mediating criteria, and to examine whether indirect effects were significant. Results showed that the complete pathway from self-esteem (independent variable) to depression (mediator) to eating attitude (dependent variable) was significant ($z = -3.35$, $p < 0.05$). Thus, findings from the present study indicated that depression partially mediated the effect of low self-esteem on eating attitudes.

Discussion

Eating disorder is highly prevalent among university students worldwide. In a study conducted in Malaysia it was found 13.9% of the university students were at risk of eating disorder [45]. Eating disorders are highly chronic, often lasting for years, and they exact an enormous toll on those who experience them. Eating disorders interfere with interpersonal, occupational, and academic functioning, and they greatly increase the risk of comorbid difficulties, such as anxiety, depression, and suicide [46]. Considering these implications, the main purpose of this study was to identify the underlying pathways between self-esteem and eating attitudes among female students, and to understand whether depression might play a role in mediating this relationship. A simple mediational analysis was implemented in the present study to identify the associations between these three constructs. Therefore, the path analysis which was used to test the direct and indirect relationships among variables, also provided estimates of the magnitude and significance of the causal connections hypothesized between the variables.

Results showed that self-esteem had negatively impacted eating attitudes, as well as depression. Consequently, low self-esteem seems to be a unique factor that

makes female students in this study vulnerable to develop depressive symptoms and eating disorders. These results are consistent with previous research that reported relationships between low self-esteem, depression and harmful eating attitudes. Results from a similar study [47] confirm the role of self-esteem in the development of eating disorders among adolescent females through the mediating action of anxiety and depression. In the same way, a recent study portrayed that having low self-esteem score, significantly increases the likelihood of having a high score on the scale of eating disorder [21].

With respect to the relationship between self-esteem and depression, it is important to note that, several researchers have indicated that low self-esteem might be a crucial risk factor in the etiology of depressive disorders [48, 49]. Prior studies had also conceptualized low self-esteem as a stable personality factor that predisposes the person to experience depression [50]. In order to explain the causal link between the two concepts, the vulnerability model assumes that low self-esteem leads individuals to be more vulnerable to depression [51]. The basic vulnerability effect of low self-esteem on depression has been replicated in many previous studies based on heterogeneous set of samples [52]. Recent empirical studies using longitudinal data and cross-lagged regression models have also consistently supported the idea that self-esteem negatively predicts depression [53], which are relatively analogous to the findings from this study.

The present study also showed that depression partially mediated the effects of self-esteem on eating attitudes. These results suggest that depression contributes directly to explaining the variance in eating attitudes, while low self-esteem might contribute

directly to explaining the variance in eating attitudes and indirectly by increasing feelings of depression. In other words, individuals with low levels of self-esteem are likely to display more depressive symptoms, which in turn contributed to increase in maladaptive eating attitudes. This was corroborated by a recent study conducted among adolescents wherein adolescents and young adults, particularly females, are highly vulnerable to the development of anxiety disorders, depression, and eating disorders [55]. Comorbid anxiety disorder or depression in eating disorders are associated with greater symptom severity, poorer prognosis, and burden of illness [54]. The same study also demonstrated that depressive symptoms moderate the association of low self-esteem with problematic eating behaviors. Likewise, complete mediation between these three variables was demonstrated in another study conducted amongst female college students in Korea [55]. Taken together with the above-mentioned research, it could be acknowledged that low self-esteem might be a key risk factor in both depressive symptoms and disordered eating amid youngsters.

Although the present study offers insights into the link between self-esteem and eating attitudes among female students, several limitations need to be considered. Firstly, as with any study using self-reported measures, findings may be susceptible to selective or erroneous reporting. The inclusion of other assessment methods (e.g., interview) and other-reported measures may be helpful to strengthen validity of the results. Secondly, implementing a cross sectional design makes it difficult to draw any causal relationship among the variables. Experimental or longitudinal studies to inspect the mediation model are recommended in future research. Thirdly,

the sample consisted of only female undergraduate students from just one university in Malaysia, severely limiting the generalizability of results. To be able to draw inferences with certainty, present findings would have to be replicated with other diverse samples. Another limitation is that the relationship between self-esteem and eating attitudes was assessed with depression as the sole mediator in this study. However, there may be other mediator variables that need to be identified and examined, so that in future these associations could be parsed and developed further.

To our knowledge, very few studies have examined the relationship between low self-esteem, depressive symptoms, and eating disorders among female students in a Malaysian context. The mediating role of depression, even if partial, is noteworthy as it revealed possible associations between self-esteem and eating attitude amongst this cohort of students. Although just a postulation, it could be construed that student with low levels of self-esteem are likely to display more depressive symptoms, which in turn contributed to increase in maladaptive eating attitudes. Thus, intervention efforts aimed at increasing self-esteem among female students are worthwhile, and likely to reduce risk for the development of depression and eating disorders.

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