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Original Article

Association between Social Anxiety, Body Image, Depression, and Eating Disorders among Female University Students

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Abstract

Background and Objective: Eating disorders can significantly affect young people's health and quality of life (QOL). The present study examined the relationship between social anxiety, body image, depressive symptoms, and eating disorders among female students at Rasht Azad University.

Materials and Methods: A correlational study was conducted using Structural Equation Modeling (SEM). A sample of 200 female students from Rasht Azad University was selected using convenience sampling. The participants completed the Eating Disorder Diagnostic Scale (EDDS), the Body Image Questionnaire (BIQ), the Beck Depression Inventory-II (BDI-II), and the Social Anxiety Questionnaire (SAQ) online. The SPSS (version 23) and AMOS 23 software were used to create correlation matrices and for SEM analysis.

Results: The SEM demonstrated significant associations between the variables examined. Notably, significant direct effects were identified between social anxiety and eating disorders ($p<0.001$), body image and eating disorders ($p=0.006$), the effect of depression on social anxiety ($p<0.001$), as well as body image and social anxiety ($p<0.001$). However, depression and eating disorders did not exhibit a significant association within the structural model ($p=0.170$).

Conclusion: Based on the current findings, social anxiety, poor body image, and depression are significant factors leading to eating disorders. Moreover, social anxiety appears to mediate between poor body image and depression with eating disorder symptoms. Therefore, universities are advised to offer training courses focusing on enhancing students perceived body image and communication skills and provide them with strategies for self-care and anxiety management.

Keywords: Body image, Depression, Eating disorders, Social anxiety

Background

Eating disorders (EDs) are serious mental illnesses manifested by significant impairments in physical health, psychological and social functioning, and quality of life (QoL) [1]. The 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) describes various EDs, such as anorexia nervosa, bulimia nervosa, and binge-eating disorder. These conditions are strongly linked to body image concerns [2].

Body image reflects how individuals think, feel, and perceive their physical appearance, which can range from positive to negative experiences shaped by personal, social, and cultural influences. These perceptions often influence attitudes, self-esteem, and behaviors related to appearance [3]. Body image dissatisfaction, a negative evaluation of one's appearance, is common in adolescence and is linked to increased risk of depression, low self-esteem, EDs, excessive desire for thinness, and unhealthy behaviors such as restrictive dieting [4-5]. Research indicates that EDs are especially prevalent among teenage girls and young adults, making them a particularly vulnerable group for such issues [6, 7].

A systematic review found that EDs affect 3.3–18.6% of young females and 0.8–6.5% of young males [5]. One study reported that 37% of female students experience these disorders [6], while another found that during the COVID-19 pandemic, prevalence rates were 51.6% in females and 31.9% in males [7]. Research also indicates that approximately one-third of girls aged 10–18 are susceptible to developing EDs [8]. Eating disorders are especially common among individuals under 25, driven significantly by dissatisfaction with physical appearance and distorted body perception [4, 8, 9]. Additionally, some studies suggest that university students with negative body image are more likely to experience depression and social anxiety [10, 11].

Depression is characterized by persistent feelings of unhappiness, disinterest, and challenges with

concentration. Individuals may also struggle with low self-worth, disproportionate guilt, and thoughts related to dying or suicide [12]. Rates of depression are increasing among adolescents and young adults, especially in female populations. Unfavorable views of oneself and dissatisfaction with appearance are linked to the emergence and persistence of both EDs and depression [13].

Anxiety disorders constitute a category of mental illnesses featuring persistent and excessive anxiety and fear, leading to substantial functional impairment in social, professional, and personal domains [14, 15]. Evidence suggests that social anxiety may mediate the link among body image disturbances, depression, and the development of EDs [16]. Social anxiety, defined as apprehension or distress in situations involving potential scrutiny by others or interactions with unfamiliar individuals, significantly impedes recovery. Withdrawal from social interactions and apprehension regarding peer judgment hinder treatment adherence and the establishment of effective therapeutic alliances. Furthermore, individuals experiencing social anxiety often encounter intense anxiety or distress during routine activities performed in social settings or in the presence of others, sometimes culminating in panic attacks [17]. A study indicates that approximately 65% of those diagnosed with EDs also present the symptoms of an anxiety disorder [18]. Given Iran's reported obesity prevalence of 59.7% and the increasing focus on mental health, identifying underlying contributing factors to these conditions is crucial [19].

Exploring the co-occurrence of body image concerns, anxiety, and depressive symptoms among female university students is of significant importance. The university years, particularly for women, are marked by identity development and heightened academic and social pressures, which can increase vulnerability to mental health problems. Understanding the interplay of these variables is essential for planning effective interventions to enhance the mental well-being and overall QoL of this population.

Objectives

This study examined the associations between social anxiety, body image, depression, and eating disorders among female university students.

Materials and Methods

Study Design and Participants

This study implemented a correlational methodology, leveraging Structural Equation Modeling (SEM) to investigate inter-variable connections. Data were collected from female students enrolled at the Islamic Azad University of Rasht Branch, Rasht, Iran, in the second semester of the academic year 2023. A convenience sampling approach yielded 200 participants [20], a sample size deemed sufficient for SEM analysis based on established methodological guidelines. Eligibility required current enrollment as a female student at the Islamic Azad University, Rasht Branch. Exclusion was based solely on incomplete questionnaire responses. All participants provided informed consent prior to data collection, with guarantees of confidentiality for personal information and responses. The final dataset comprised 200 fully completed online questionnaires.

Data Collection

Data were collected online using Google Forms. This platform automatically stored and gathered the responses, enabling efficient analysis of the data. Participants were invited to the study via a social media link. The invitation outlined the objectives of the study, the estimated time required to complete the questionnaire, and detailed instructions for its completion. Data collection was conducted between May 2024 and July 2024, during which participants completed the questionnaire.

Instruments

A four-part instrument was administered to collect data: The Eating Disorder Diagnostic Scale (EDDS) to assess symptoms of EDs; the McKinley and Hyde Body Image Questionnaire (BIQ) to evaluate body image concerns; the Beck Depression Inventory-II (BDI-II) to assess symptoms of depression; and the Jerabek Social Anxiety Questionnaire (SAQ) to assess social anxiety.

Developed by Stice and colleagues, the 22-item EDDS assesses EDs. Its three subscales evaluate food aversion, bulimia, and binge-eating disorder, enabling diagnostic classification in both clinical and non-clinical levels. Items 1- 4 employ an 8-point Likert scale (0 = not at all; 7 = a great deal), measuring body image attitudes where higher scores denote more negative attitude toward one's body. Eating disorders are closely related to an individual's thoughts and feelings about their body and body image. Therefore, assessment scales often examine this aspect to provide a more accurate diagnosis of eating disorders. Item 5 assesses the degree of body image disturbance with (yes/no) responses. Items 6, 9-14 feature yes/no/don't know options to evaluate lack of control, overeating, and subsequent avoidance behaviors. Item 7 records mean weekly binge-eating episodes over the preceding six months (0-7 days), while Item 8 captures Measures binge-eating frequency over the past three months (0-14 days). Items 15-18 assess the frequency of

compensatory behaviors (e.g., vomiting, laxatives use, meal skipping, abstaining, too much exercise) over three months (0-14 instances). Items 19 and 20 record weight (kg) and height (m). Item 21 records menstrual periods missed in three months, and Item 22 assesses birth control use (yes/no). The EDDS demonstrated strong criterion, predictive, and convergent validity. Its reliability was confirmed via test-retest and internal consistency methods [21, 22]. A study reported Cronbach's alpha values of 0.87 (for a normal-weight sample) and 0.83 (for overweight people) [22]. In our investigation, the Cronbach's alpha of EDDS was calculated at 0.89, indicating satisfactory reliability.

The BIQ contains 16 items divided into two 8-items dimensions: body surveillance and body shame. Items are answered on a five-point Likert-type scale form "strongly agree" to "strongly disagree." Higher body surveillance scores indicate a tendency to habitually monitor one's physical appearance and to prioritize others' perceptions over internal bodily awareness. Elevated body shame scores reflect beliefs of personal inadequacy, self-blame, and feelings of failing to meet sociocultural body standards [23]. Psychometric evaluation established the BIQ's overall Cronbach's alpha = 0.87, with subscale alphas of 0.76 (body surveillance), 0.74 (body shame), and 0.72 (appearance control belief) [24]. In our study, Cronbach's alpha was 0.89 for body surveillance and 0.75 for body shame, confirming the measure's reliability.

The BDI-II, developed by Beck, Steer, and Brown in 1996, is a 21-item instrument prepared to examine depression severity. As a multiple-choice self-report inventory, it evaluates symptoms and attitudes commonly observed in individuals with depression. While covering general depressive symptomatology, the BDI-II places particular emphasis on cognitive aspects of the disorder. Respondents self-rate all items on a scale varying from zero to 3. The items encompass domains such as sadness, pessimism, guilt, feelings of failure or helplessness, sleep disturbances, appetite changes, and self-critical thoughts. Total scores range from 0 to 63, with established thresholds representing severity levels: scores of 0–13 suggest negligible or no depression, while scores 14–19, 20-28, and 29-63 indicate mild, moderate, and severe depression, respectively [25]. The BDI-II demonstrated to have a high reliability among university students (Cronbach's alpha=0.92) [26]. In our investigation, Cronbach's alpha for the BDI-II was 0.91, confirming its reliability.

Developed by Elina Jerabek in 1996, the SAQ measures social anxiety in individuals aged 10 and older [27]. This 25-item instrument requires respondents to indicate their agreement with each statement using a five-point scale, ranging from "least characteristic of me = 1" to "extremely characteristic of me = 5". Overall scores can range from 25 to 125. A score of 25–50 indicates low social anxiety, 51–85 indicates moderate social anxiety, and 86–125 indicates high social anxiety. Factor analysis revealed five primary dimensions, collectively explaining 47.23% of the total variance: (1) fear of strangers, (2) worry of negative evaluation by others, (3) fear of public speaking, (4) fear of social isolation, and (5) fear of displaying physical anxiety symptoms. Previous research supports the SAQ's reliability, reporting a Cronbach's alpha of 0.85. An Iranian validation study further established a reliability coefficient of 0.76 for the instrument [28]. In the current investigation, internal consistency remained strong, as indicated by a Cronbach's alpha of 0.87.

Statistical Analysis

Statistical analyses were conducted using SPSS (version 23) and AMOS (version 23) software. Initial data summarization involved calculating means, standard deviations, and percentages. To evaluate the study's hypotheses, SEM and correlation matrix analysis were implemented. All inferential tests utilized a significance threshold of $p < 0.05$ and a 95% confidence interval. We assessed the model fit for the SEM analyses using multiple indices. These included absolute fit measures: Chi-square divided by degrees of freedom (χ^2/df), Goodness of Fit Index (GFI), and Adjusted Goodness of Fit Index (AGFI). We also examined incremental fit indices: Comparative Fit Index (CFI), Incremental Fit Index (IFI), Relative Fit Index (RFI), Normed Fit Index (NFI), and Non-Normed Fit Index (NNFI). Additionally, the Root Mean Square Error of Approximation (RMSEA) was evaluated. The following criteria defined acceptable model fit: $\chi^2/df < 3$, RMSEA < 0.05, fit indices (NFI, RFI, IFI, GFI) > 0.90, and AGFI > 0.85.

Results

The study included 200 students, most of them were single (67%). The majority of participants (48%) were between 20 and 30 years old, 32% were between 31 and 40, and 20% were 41 years or older. Regarding their education levels, 59% were pursuing Bachelor's degrees, 35.5% were enrolled in Master's programs, and 5.5% were studying for a PhD. Mean scores (±SD) for psychometric measures were as follows: eating disorder, 26.54 ± 13.04; body image, 37.18 ± 8.97; depression, 16.59 ± 10.75; and social anxiety, 76.85 ± 13.82. This finding indicated that the students experience moderate anxiety and eating disorder. In this study, a score of 30 was considered the clinical threshold for eating disorders.

Analysis of the correlation matrix revealed statistically significant linear relationships among key variables, indicating both the direction and strength of the associations. Findings demonstrated that depression and negative body image predict elevated levels of EDs

and social anxiety in female students. Additionally, social anxiety served as a mediating variable in the depression-eating disorder relationship. Positive correlations were observed between social anxiety, body image, depression, and EDs (Table 1).

Table 1. Correlation matrix of research variables

Variable	Eating disorder	Body image	Depression	Social anxiety
Eating disorder	1	-0.472	0.492	0.698
Body image	-	1	0.511-	-0.531
Depression	-	-	1	0.686
Social anxiety	-	-	-	1

Structural Equation Modeling results demonstrated significant associations between the investigated variables. Specifically, social anxiety was strongly associated with EDs ($p<0.001$), as was body image ($p=0.006$). Depression showed a significant effect on social anxiety ($p<0.001$), and body image was also significantly related to social anxiety ($p<0.001$). Nonetheless, depression and eating disorders did not exhibit a significant association ($p=0.170$; Table 2). Model fit was assessed using multiple indices (Table 3), all of which supported the acceptability of the proposed model. The χ^2 statistic for this analysis was 26.30 with 16 degrees of freedom (df).

Table 2. Structural pattern: paths and standard coefficients related to direct effects in the proposed model

Paths	Final Model			
	Beta Coefficient (B)	Standard Error (S.E)	Critical Ratio (C.R)	*P*-value*
Depression → EDS	0.120	0.088	1.363	0.170
Social anxiety → EDS	0.447	0.068	6.573	0.001
Body image → EDS	0.260	0.094	2.762	0.006
Depression → Social anxiety	0.652	0.079	8.307	0.001
Body image →Social anxiety	-0.569	0.169	4.115	0.001

Table 3. Model fit index of structural equation modeling

Model Fit Index	χ^2	df	χ^2/df	GFI	IFI	CFI	AGFI	NNFI	NFI	RMSEA
Result	26.30	16	1.64	0.91	0.95	0.94	0.96	0.95	0.92	0.045

χ^2: Chi-square, χ^2/df: Chi-square / Degrees of Freedom, GFI: Goodness-of-Fit Index, IFI:Incremental Fit Index, CFI: Comparative Fit Index, AGFI: Adjusted Goodness-of-Fit Index, NNFI :Non-Normed Fit Index, NFI: Normed Fit Index, RMSEA: Root Mean Square Error of Approximation

The data were normally distributed as shown by skewness and kurtosis values falling within satisfactory limits (Table 4).

Bootstrap analysis revealed that social anxiety mediates between depression, body image, and EDs ($p\leq0.05$; Table 5).

Table 4. Skewness and Kurtosis of variables

Statistic	Skewness	Std. Error	Kurtosis Statistic	Std. Error
Eating disorder	0.294	0.172	-0.233	0.342
Body image	0.110	0.172	0.109	0.342
Depression	-0.190	0.172	0.287	0.342
Social anxiety	0.105	0.172	0.300	0.342

Table 5. Results of Bootstrap method for mediation of social anxiety

Paths	Standard Error (S.E)	Effect	Lower CI	Upper CI	*P*-Value
Depression → Social anxiety → EDS	0.043	0.240	0.156	0.324	0.02
Body image → Social anxiety → EDS	0.035	0.173	0.104	0.242	0.01

Discussion

The results showed that body image, depression, and social anxiety are key contributors to the onset of EDs among female students. Our findings, consistent with numerous previous research [30-33], demonstrate a notable link between poor body image and increased likelihood of EDs in female students. It appears that dissatisfaction with one's appearance can heighten social anxiety, which in turn may exacerbate depressive symptoms. In turn, depression can diminish self-care, perpetuating and amplifying poor body image. This creates a cyclic pattern that substantially elevates the risk of developing Eds [34]. The findings revealed a significant indirect link between depression and EDs, with social anxiety acting as a mediator. Previous studies [14, 35] highlight the connection between depressive symptoms and the onset of eating pathology. Research suggests that mood disturbances such as depression can disrupt eating patterns in young adults, often leading to a loss of control over food intake that may worsen existing EDs or contribute to unhealthy weight outcomes [36].

Our findings suggest that female students frequently face intense social and media pressure to achieve idealized thin body types, a factor that can further increase their susceptibility to EDs. Depression and diminished self-worth appear to amplify susceptibility to both EDs and depressive states. Furthermore, it has been shown that maladaptive thought patterns often linked to mood disorders (e.g., depression) can combine with distorted beliefs about eating among adolescent girls, potentially predisposing them to develop eating disorder symptoms.

The connection between depression and EDs may arise from the negative thought patterns and self-critical tendencies that often accompany depression. These pessimistic cognitive styles can reduce motivation for physical activity, healthy eating, and self-care, thereby creating conditions in which EDs are more likely to develop. This dynamic is particularly concerning in contexts where individuals are exposed to unrealistic body standards, as depressive symptoms may interact with body dissatisfaction to further increase the risk of EDs.

Our analysis confirms a direct link between social anxiety and ED symptoms, indicating that heightened social anxiety is associated with greater severity of eating pathology. This aligns with prior research, confirming that the two conditions frequently co-occur [37-39]. One study identified the primary fears associated with EDs, including apprehension about body-image-based rejection, discomfort with eating in public, stress related to food consumption, weight-gain-related criticism anxiety, and generalized food-related anxiety [40]. Furthermore, another study demonstrated that anxiety about one's physical appearance significantly predicts binge eating behaviors and preoccupation with overeating, alongside traits such as scrutiny apprehension, unease in social interactions, and discomfort with praise. Structural equation modeling further supported these findings, revealing that both social appearance anxiety and dread of undesirable evaluation contribute substantially to the manifestation of EDs and social anxiety symptoms [31].

In explaining this finding, it can be argued that social anxiety primarily emerges from apprehension about receiving negative assessments from peers. This leads individuals to avoid social encounters, driven by the perception that their appearance, behavior, and characteristics are constantly under others' scrutiny. Additionally, social appearance anxiety is characterized by distress stemming from concerns about physical appearance and the way others perceive it. Research shows that increased levels of this anxiety are linked with higher susceptibility to exhibiting eating disorder symptoms.

Our study indicated social anxiety plays a mediating role in the relationship between depression and EDs, also between body image and EDs. This finding aligns with prior research [41, 42]. Moreover, it was observed that although the direct effect of depression on EDs was not significant, depression indirectly affects EDs through social anxiety.

To explain these findings, individuals with higher levels of depression tend to experience cognitive distortions more frequently than others. These cognitive distortions may lead to avoidance behaviors, such as staying away from social situations and interactions, especially when individuals feel that their behavior is being evaluated by others and they are under scrutiny. This perception of negative evaluation from others can exacerbate social anxiety in these individuals. On the other hand, social anxiety

acts as a facilitator, pushing individuals toward unhealthy eating behaviors.

The findings suggest that social anxiety may serve as a mediating factor in the transmission of the negative effects of depression onto EDs. In other words, managing and controlling social anxiety could potentially mitigate the detrimental impact of depression on individuals' eating behaviors. Therefore, interventions that combine psychological strategies to reduce social anxiety alongside addressing cognitive distortions linked to depression may be effective in improving the condition of those struggling with EDs.

Limitations of the current study include the inability to account for individual characteristics, such as personality traits, and the absence of comparative analysis involving male students. Given these limitations, future research should explore how personality factors contribute to EDs and examine how social anxiety mediates connections between depression, body image concerns, and unhealthy eating behaviors among male academic populations.

Conclusion

Social anxiety may act as a mediating factor between depression, body image, and EDs, potentially influencing the success of interventions. Therefore, addressing social anxiety while promoting healthier body perceptions is critical for developing effective strategies for managing EDs. Consequently, specialists and psychologists should design and deliver targeted interventions such as educational workshops and seminars addressing EDs, body image concerns, and social anxiety to raise awareness among female university students.

Ethical Considerations

This research is based on the third author's master's thesis in psychology. The Ethics Committee of Islamic Azad University, Rasht Branch, approved this study (Code: IR.IAU.RASHT.REC.1403.042).

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Authors' Contributions

All authors were involved in drafting and revising the manuscript and take responsibility for its content.

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Conflicts of Interest

The authors declare they have no conflicts of interest.

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