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# Relation between body appreciation, eating disorder risk, emotional distress, and BMI among a group of Egyptian subjects

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## Abstract

**Background** Body image appreciation is an important psychological aspect for all individuals of all ages which affects their psychological, personal, and social well-being.

**Objectives** Examining the relationship between disordered eating tendencies, body appreciation, body mass index (BMI), and emotional distress among individuals who follow and seek psychological services from the non-profit initiative Egyptian eating disorders initiative EEDI and an online therapy platform.

**Methods** A cross-sectional study including 301 healthy participants with no past medical or psychiatric history was conducted. Participants completed an online survey including demographic data, BMI, and three measures: The Eating Attitudes Test (EAT-26), the Body Appreciation Scale (BAS), and the Depression Anxiety and Stress Scale (DASS-21) questionnaires.

**Results** Participants with disordered eating tendencies — according to EAT-26 — had lower BAS scores ( $p < 0.001$ ) and higher DASS depression, anxiety, and stress scores ( $p < 0.001$ ). EAT-26 was negatively correlated with age ( $p = 0.003$ ) and BAS ( $p < 0.001$ ). Meanwhile, it was positively correlated with the three DASS scales ( $p < 0.001$ ). BAS was negatively correlated with body mass index and the three DASS scales ( $p < 0.001$ ).

**Conclusion** Body appreciation decreases with increased disordered eating tendencies and BMI. Depression, anxiety, and stress are associated with a decrease in body appreciation.

**Keywords** Body appreciation, Eating disorders risk, BMI, Emotional distress, Egypt

## Introduction

Body image is a multifactorial definition and referring to an individuals' thoughts, feelings, and perceptions about their physical appearance. Many factors, including social media, cultural norms, and personal experiences, usually shape it. Also, body dissatisfaction refers to the

negative perception and evaluation of one's body, leading to shame and low self-esteem. Unrealistic beauty standards and societal pressures often drive this perception. On the contrary, the level to which a person has a favourable attitude toward their body, including its look, function, and health, on the other hand, is referred to as body appreciation [12]. Body appreciation plays an important role in psychological and social well-being as it protects individuals from unrealistic beauty standards prevalent in societies and encourages the appreciation of the body's function and health [11]. Both these concepts, body dissatisfaction and appreciation, play a role in shaping a person's body image.

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The increased idealization of thinness in women and muscularity in men through the media has resulted in a significant increase in body dissatisfaction. According to a study conducted by Cash and Pruzinsky (2002), up to 70% of women and 35% of men experience dissatisfaction with their body image, negatively impacting their mental and physical health. Recent studies have focused on the positive aspect of body image [8]. Body appreciation has been found to have numerous positive relationships with various psychological aspects. It positively correlates with self-esteem, optimism, coping mechanisms, self-compassion, and overall life satisfaction.

Additionally, body appreciation is positively linked to behavioural indices such as females' sexual function and intuitive eating. On the other hand, body appreciation is negatively associated with body dissatisfaction, social anxiety, avoidance, body shame, and checking behaviours. It has also been found to negatively affect psychological disorders, including eating disorders, neuroticism, and clinical perfectionism [12]. Notably, there are differences between males and females in terms of body appreciation. Males show higher levels of body appreciation than females [8].

According to research, mental distress, body appreciation, and disordered eating tendencies are significantly related. Binge eating, purging, and restrictive eating are just a few of the problematic eating habits that fall under the category of disordered eating and are linked to detrimental physical and psychological effects [10]. Also, a variety of negative feelings, such as anxiety, despair, and stress, can lead to emotional distress [3]. Interpersonal disputes, life events, and health issues can bring on emotional distress. Furthermore, according to Tylka et al. (2015), people with disordered eating tendencies frequently have lower levels of body appreciation and higher levels of emotional distress. Conversely, those who have better body appreciation more often tend to engage in fewer disordered eating habits and feel less emotional distress [12]. Since disordered eating can cause emotional distress and negative body image, which can further worsen disordered eating behaviours, there is a complex link between these three topics [10].

This study aimed to investigate the association between disordered eating tendencies, body appreciation, and emotional distress in an Egyptian sample. We first hypothesized that higher levels of body appreciation will be negatively associated with disordered eating tendencies. Second, we hypothesize that body appreciation would be negatively associated with higher levels of emotional distress. Finally, we hypothesize that a BMI indicating normal body weight would be associated with higher body appreciation than underweight, overweight, or obese body weights.

## Methods

This cross-sectional study was conducted using an online survey between February 2023 and May 2023. Participants were invited by an advertisement about the study on social media platforms in collaboration with the Egyptian Eating Disorders Initiative (EEDI). Respondents of the survey are not known to have mental disorders, including eating disorders, or chronic physical diseases.

The study included a total of 301 participants, male and female educated participants, aged 18 to 65, and concerned. Exclusion criteria were children and participants with learning disabilities.

The online survey included first a consent form with a description of the purpose of the study. The consent form stressed the researchers' responsibility to keep participants' data confidential. By filling out the initial form, respondents agreed that their results would be used for research purposes to improve the understanding of body image and eating disorders in Egypt.

The survey also included questions about demographic data, weight and height. Then participants were asked to complete three scales: Eating Attitudes Test (EAT-26), Body Appreciation Scale (BAS), and Depression Anxiety Stress Scale (DASS-21), respectively.

The Eating Attitudes Test (EAT-26) is a self-reported questionnaire involving a 26-item scale that measures eating disorders symptoms, and concerns of eating disorders; a scale for each question involves six options, infrequently, almost never, never, and always. The total score is calculated by summing all responses and can vary from 0 to 78. A score of 20 or above indicates possible disordered eating [4].

The Body Appreciation Scale (BAS) is a 13-item scale that measures acceptance, respect, and care for a person's body. Moreover, protection from unrealistic beliefs of beauty standards. Items are rated on a 5-point scale, starting from never, seldom, sometimes, and often to always, and the total score is computed as the mean of the 13 items with higher scores on this scale indicative of higher body appreciation [1].

The Depression Anxiety Stress Scale (DASS-21) has 21 items in 3 subscales of 7 items each. They assess depression, anxiety, and stress. Each item was rated on a scale from 0 to 4, a 4-point scale. Higher scores indicate more significant emotional distress [7].

Body mass index (BMI), which was another measure included in the study, calculates participants' height and body weight to then categorize them as underweight, healthy weight, overweight, and obese.

Grammarly online was used for proofreading sentences and checking grammar.

**Statistics analysis**

Free collection of results, they were analysed using Statistical Package for the Social Sciences (SPSS) 20 (IBM 2011). The Kolmogorov–Smirnov test was used to test the normality of data, and then data were described using frequency (percent) and median and range. Mann–Whitney test was used to compare numerical data, while the chi-square test was used to compare categorical data. Finally, the Kruskal–Wallis H test was used for comparing more than two groups, and the Spearman correlation test was used for correlations.

**Results**

**Descriptive analysis**

This study included 301 participants in the statistical analysis, and none was excluded. The means, standard deviations for all demographic characteristics, and psychometric scores of the participants are shown in Table 1.

**Main analysis**

**Comparison of demographic and psychometric data between patients with disordered eating tendencies and those without disordered eating tendencies**

Table 2 shows a comparison between participants with disordered eating tendencies and those without disordered eating tendencies based on demographic and scale scores.

The comparison between age groups (value: 0.120) suggests that there is no statistically significant difference in age between the two groups. However, when comparing the distribution of sex between the groups, the *p*-value indicates a statistically significant difference, with a higher number of males in the group without disordered eating tendencies (*p*-value: <0.001).

Regarding the BAS scores, there is a statistically significant difference between the two groups, with higher scores observed in the group without disordered eating tendencies (*p*-value: <0.001). However, there is no statistically significant difference in BMI between the two groups (*p*-value: 0.133).

**Table 1** Descriptive demographic and psychometric data of all patients

		All patients N: 301
<b>Age</b> (median/range)		31/68
<b>Sex</b>	Males	31/10.3%
	Females	270/89.7%
<b>Occupation</b>	Not working	32/10.7%
	Student	72/24.2%
	Working	194/65.1%
<b>Body mass index (BMI)</b> (median/range)		28.37/45.85
<b>EAT 26</b> (median/range)		21/63
<b>BAS</b> (median/range)		35/56
<b>DASS depression</b> (median/range)		11/21
<b>DASS depression categories</b>	Normal	122/40.5%
	Mild	61/20.3%
	Moderate	92/30.6%
	Severe	268.6%
	Extremely severe	0/0%
<b>DASS anxiety</b> (median/range)		10/21
<b>DASS anxiety categories</b>	Normal	119/39.5%
	Mild	30/10.0%
	Moderate	90/29.9%
	Severe	43/14.3%
	Extremely severe	19/6.3%
<b>DASS stress</b> (median/range)		12/21
<b>DASS stress categories</b>	Normal	183/60.8%
	Mild	70/23.3%
	Moderate	48/15.9%
	Severe	0/0%
	Extremely severe	0/0%

**Table 2** Mann–Whitney test comparing between disordered eating tendencies and those without disordered eating tendencies regarding demographic and chi-squared test for psychometric data comparison

		No disordered eating tendencies N: 140	Disordered eating tendencies N: 161	p
<b>Age</b> (median/range)		26/50	25.5/52	0.120
<b>Sex</b>	Males	23	8	0.001
	Females	117	153	
<b>Body mass index (BMI)</b> (median/range)		20.26/8.47	22.38/10.56	0.133
<b>BAS</b> (median/range)		48.5/51	28.5/47	<0.001
<b>DASS depression</b> (median/range)		7/20	14/21	<0.001
<b>DASS depression categories</b>	Normal	79	43	<0.001
	Mild	27	34	
	Moderate	27	65	
	Severe	7	19	
	Extremely severe	0	0	
<b>DASS anxiety</b> (median/range)		8/21	12/21	<0.001
<b>DASS anxiety categories</b>	Normal	70	49	<0.001
	Mild	18	12	
	Moderate	39	51	
	Severe	7	36	
	Extremely severe	6	13	
<b>DASS stress</b> (median/range)		9/21	15/19	<0.001
<b>DASS stress categories</b>	Normal	110	73	<0.001
	Mild	19	51	
	Moderate	11	37	
	Severe	0	0	
	Extremely severe	0	0	

In terms of DASS depression scores, there is a statistically significant difference between the groups, with higher scores in the group with disordered eating tendencies ( $p$ -value: <0.001). Similar findings are observed for DASS anxiety scores, where the group with disordered eating tendencies has higher scores compared to the other group ( $p$ -value: <0.001). Additionally, there is a statistically significant difference in DASS stress scores between the two groups, with higher scores

again found in the group with disordered eating tendencies ( $p$ -value: <0.001).

**Comparison between body mass index (BMI) categories regarding psychometric data**

Table 3 presents a comparison between different categories of body mass index (BMI) regarding psychometric data. The BMI categories included in the comparison are underweight, healthy weight, overweight, and obesity. The  $p$ -value of <0.001 indicates

**Table 3** Kruskal–Wallis H test between body mass index (BMI) categories regarding psychometric data

	Body mass index (BMI) categories				p
	Underweight (n = 9)	Healthy weight (n = 72)	Overweight (n = 79)	Obesity (n = 111)	
<b>EAT 26</b> (median/range)	16/58	19/61	21/51	22/58	0.928
<b>BAS</b> (median/range)	31/39	40.5/50	37/52	31/54	<0.001
<b>DASS depression</b> (median/range)	18/20	8/21	11/21	13/21	0.013
<b>DASS anxiety</b> (median/range)	12/19	8/21	8/21	11/21	0.004
<b>DASS stress</b> (median/range)	16/14	12/21	12/20	13/21	0.099

a statistically significant difference between the BMI categories, healthy weight individuals demonstrating a higher level of body appreciation compared to underweight, overweight, and obese individuals.

**Relationship between demographic and psychometric data in all patients**

Table 4 presents that there is a significant negative correlation between EAT-26 and BAS ( $r = -0.405$ ,  $p < 0.001$ ), indicating that higher scores on EAT-26 (indicating high levels of disordered eating tendencies) are associated with lower scores on BAS (indicating low body appreciation). There is no significant correlation between age and BAS ( $r = 0.029$ ,  $p = 0.615$ ), suggesting that age and body appreciation are not strongly related. There is a negative correlation between BAS and DASS anxiety, stress, and depression, and there is a negative association between BMI and body appreciation ( $r = -0.237$  and  $p = < 0.001$ ).

**Relationship between dependent variable BAS and independent variables**

Table 5 shows that EAT 26 has a negative degree of  $-0.274$ , suggesting that an increase in disordered eating tendency is associated with a decrease in body appreciation, with a high level of significance ( $p < 0.001$ ), and DASS depression has a negative degree, while DASS anxiety and DASS stress have positive coefficients, but they are relatively small and statistically nonsignificant. Additionally, BMI has a negative degree of  $-0.320$ , indicating that higher BMI is associated with lower body appreciation, and this relationship is statistically significant ( $p < 0.001$ ).

**Discussion**

This study aimed to examine the relationship between eating tendencies, body appreciation, emotional distress, and BMI in an Egyptian sample population. We first hypothesized that higher levels of body appreciation will be negatively associated with disordered eating tendencies. The study’s main finding is a negative association between body appreciation and disordered eating

**Table 4** Spearman correlation between demographic and psychometric data in all patients

		EAT 26	BAS	Age	DASS anxiety	DASS stress	DASS depression	BMI
BAS	<i>r</i>	-0.405	1	.029	-0.350	-0.391	-0.461	-0.237
	<i>p</i>	<0.001		0.615	<0.001	<0.001	<0.001	<0.001
Age	<i>r</i>	-0.171	.029	1	-0.025	-0.131	-0.111	0.342
	<i>p</i>	.003	0.615		0.663	.023	.054	<0.001
DASS anxiety	<i>r</i>	0.356	-0.350	-.025	1	0.779	0.711	0.181
	<i>p</i>	<0.001	<0.001	0.663		.000	<0.001	.003
DASS stress	<i>r</i>	0.421	-0.391	-0.131	0.779	1	0.795	0.113
	<i>p</i>	<0.001	<0.001	.023	<0.001		<0.001	.064
DASS depression	<i>r</i>	0.377	-0.461	-0.111	0.711	0.795	1	0.120
	<i>p</i>	<0.001	<0.001	.054	<0.001	<0.001		.048
BMI	<i>r</i>	.060	-0.237	0.342	.181	0.113	0.120	1
	<i>p</i>	0.328	<0.001	<0.001	.003	.064	.048	

**Table 5** Multiple regression analysis considering BAS as a dependent variable

Model	Unstandardized coefficients		Standardized coefficients	<i>t</i>	<i>p</i>	95.0% confidence interval for B		Collinearity statistics	
	B	Std. error				Lower bound	Upper bound	Tolerance	VIF
(Constant)	57.804	3.043		18.997	.000	51.813	63.795		
EAT 26	-0.274	.056	-0.280	-4.911	.000	-0.384	-0.164	0.814	1.229
DASS anxiety	0.114	0.202	.049	0.567	0.571	-0.283	0.512	0.350	2.856
DASS stress	.071	0.240	.030	0.298	0.766	-0.401	0.543	0.266	3.765
DASS depression	-0.803	0.183	-0.381	-4.382	.000	-1.164	-0.442	0.349	2.864
BMI	-0.320	.090	-0.187	-3.571	.000	-0.496	-0.143	0.965	1.037

R square 0.300

tendencies. This was also supported by previous studies that have examined the relationship between body appreciation and disordered eating. In fact, according to Baceviciene et al. [2], adolescents were found to have body appreciation linked to lower levels of disordered eating in both females and males. Another study on women by Pinto et al. [9] demonstrated that disordered eating was associated with inflexible eating habits. Also, body appreciation mediated the relationship between social safety and more flexible eating habits.

Second, we hypothesize that body appreciation would be negatively associated with higher levels of emotional distress. The results of this study also supported our initial hypothesis. In accordance with these findings, Winter et al. [13] also found that body appreciation was inversely associated with depression and anxiety scores in a racially diverse women sample. Another study by Gillen [5] also demonstrated that positive body image was negatively associated with depression and positively associated with better mental health.

Finally, we hypothesized that a BMI indicating normal body weight would be associated with higher body appreciation than underweight, overweight, or obese body weights, which was also proven by our current study. These findings are also supported by Watkins et al. [14], which found that obese, overweight, and underweight BMI were associated with body dissatisfaction compared to average-weight participants. Also, another study by Gruszka et al. [6] found that normal weight reported less body dissatisfaction than overweight and obese.

According to our knowledge, this is the first study investigating the relationship between eating tendencies, body appreciation, emotional distress, and BMI in an Egyptian sample. Also, using an online survey has allowed us to collect a large number of respondents contributing to the current data. However, an online survey may have posed other limitations. For instance, respondents may not have understood the questions accurately. Other respondents may feel bored when answering surveys, and this would lead to random answers. The relatively small number of subjects (especially males who were not equally represented in the sample) is another limitation for generalization of our results. Finally, the absence of detailed psychiatric and medical history and examination of the participants may add confounding factors to our results.

## Conclusion

To conclude, body appreciation is associated with lower disordered eating tendencies and with lower emotional distress. More research with a larger sample size to deepen our understanding of body image disorders and

their relation with other psychological and social factors in Egypt would be informative.

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## Authors' contributions

All authors have contributed to our study as follows: Doaa El Basiouny, conceptualization, writing — original draft, resources, and investigation. Hana I. Habib, investigation, writing — review and editing, and visualization. Sally Moore, conceptualization and investigation. Mohamed A. Khalil, methodology, formal analysis, software, and supervision.

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## Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

## Declarations

### Ethics approval and consent to participate

The online survey included first a consent form with a description of the purpose of the study. The consent form stressed the researchers' responsibility to keep participants' data confidential, by filling out the initial form.

### Consent for publication

Respondents agreed that their results would be used for research purposes to improve the understanding of body image and eating disorders in Egypt.

### Competing interests

The authors declare that they have no competing interests.

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