




# Factors associated with body dissatisfaction among the Lebanese population

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## Abstract

**Objective** To evaluate the factors associated with body dissatisfaction among the Lebanese population, including sociodemographic characteristics, self-esteem, stress, anxiety, depression, emotional regulation, emotional eating and the adult attachment style.

**Methods** This cross-sectional study, conducted between January and May 2018, enrolled 811 adult participants from all districts of Lebanon. The body dissatisfaction subscale of the eating disorder inventory version 2 (EDI-2) was used to measure body disturbance.

**Results** The mean age of the participants was  $27.59 \pm 11.76$  years, with 66.5% females. The final model of the regression analysis showed that a higher binge eating score (Beta = 0.202), being married (Beta = 1.233), having a family history of eating disorders (Beta = 1.933), higher BMI (Beta = 0.076), dieting to lose weight (past 30 days) (Beta = 2.345), receiving comments from the family (Beta = 2.234) and pressure from TV/magazines to lose weight (Beta = 1.320), vomiting or taking laxatives to lose weight (past 30 days) (Beta = 1.861), higher depression (Beta = 0.103) and higher perceived stress (Beta = 0.107) were associated with a higher body dissatisfaction score. However, higher self-esteem (Beta = -0.246), increased physical activity (Beta = -0.022) and being divorced (Beta = -4.226) were significantly associated with a lower body dissatisfaction score.

**Conclusion** A significant association was found in this current study between the main variables: depression, self-esteem, social anxiety, eating disorders, family and television pressure and body image dissatisfaction.

**Level of evidence** Level V, cross-sectional descriptive study.

**Keywords** Body dissatisfaction · Eating disorder · Diet · Distress · Psychological factors

## Introduction

Excessive dieting and body dissatisfaction is a main public concern, with the prevalence of obesity increasing dramatically [1]. Dieting and other restrictive eating

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practices have played a major causal role in the development of eating disorders. However, weight control efforts made by individuals to slow the increase in obesity have become their main concerns [2]. Body image disturbance, characterized by a negative evaluation of one's physical appearance, plays a major role in the causation and maintenance of eating disorders [3]. Three dimensions define body image: cognitive, subjective and behavioral [4]. The perception of the physical appearance (weight, size and body shape) is related to cognitive aspects and concerns, whereas anxiety about the appearance is related to subjective aspect and avoidance of exposure [4]. The difference in perception between appearance and ideal body image could lead to considerable dissatisfaction, and often to anxiety and depression [5–7]. People with body dissatisfaction suffer from negative emotions and worries such as anxiety, depression, low self-esteem, isolation and obsession about weight loss [8]. Body image impacts all aspects of human personality and is closely related to mental health [9]. Weight control behaviors such as vomiting, diet pills, skipping meals and laxative use usually appear with eating disorders. These practices can be easily detected during a diet assessment [10–12]. Poor body image is often linked to dieting, the purpose of which is to limit caloric intake and consequently improve health. However, diet may be associated with weight regain and obesity that could lead to recurrent body dissatisfaction and to physical and mental illness [13]. Media has a great impact in creating a typical image for attractiveness emphasizing thinness as an image for beauty. This pressure put on women to be thin, has increased the prevalence of body dissatisfaction and restrictive dieting among adolescent girls and women. As a result of this body dissatisfaction, these individuals become at a higher risk of developing eating disorders, mental, physical and health problems as well as higher weights over time [14].

Neurobiological causes are predisposing factors for eating disorders [15]. The brain and the peripheral nervous system release neurotransmitters such as dopamine, serotonin, adrenaline and noradrenaline, which are incriminated in many psychobiological factors such as anxiety, depression, impulsivity, appetite, hunger, energy level and memory [15, 16]. An impairment of these neurotransmitters, particularly the serotonin and dopamine, was found in patients with anorexia nervosa [17] and autism [18] compared to normal subjects. Difficulties in cognitive, social and emotional functioning are common characteristics of autistic and anorexic disorders [19, 20]. Recently orthorexia nervosa had been defined as pathological behaviors related to excessive concerns on eating healthy food. Orthorexic persons had greater tendencies for appearance and overweight preoccupations and have a fear of becoming overweight [21]. A study done by Dell'Osso et al. showed

that more than one-third of a sample of university students had orthorexic symptoms [22].

Attachment styles had been found to be related to eating disorders and body image [23]. A study done by Keating et al. had found that insecure attachment was related to body dissatisfaction [24]. Insecure attachment may have difficulties in expression, tend to be overly concerned with their bodies, in turn would aggravate eating disorders symptoms [23]. Anxiety attachment and avoidance may have an effects on body dissatisfaction since the lack of parental affection could lead to greater attachment anxiety that in turn may make one vulnerable to body dissatisfaction [25]. Securely attached individuals, having an ability to moderate their emotions in stress situations, have lower body dissatisfaction as they have a positive view of self and positive view of others [26].

Findings about body image disturbance are extensive and had controversial outcomes. Some studies showed the harmful effect of body dissatisfaction on physical and psychological wellbeing, whereas opposite results were found on other studies [27–30]. Psychological functioning, eating disturbance, body image and being annoyed about weight/size would influence the level of obesity and weight [31]. A study done by Sorbara et al. showed that body image disturbance among obese persons, remains elevated following weight loss [32]. In adult-onset obese patients, the alterations in body image could be accounted for a body shape different from that socially acceptable [33]. Weight normalization in obese patients could cause an improvement of body image [33]. In the early-onset obese patients, the body image might reflect inner feelings, independent of body weight [33]. A recent Lebanese study done by Abbas et al. among adults with excessive body weight had showed that body dissatisfaction was associated with psychological distress in the overall sample [34].

Emotional eating and regulations relevant to negative affect is one facet of dysfunctional eating [35]. In bulimic patients, negative affect had been found to increase body disturbance [36, 37]. A study done by Hayaki et al. found that a lower level of emotional expression is significantly related to greater body dissatisfaction [38]. These findings suggest an implication between negative affect and body dissatisfaction. In addition, empirical studies had showed that emotional expression would decrease the negative events and yields to a variety of positive physiological and psychological health [39]. On another hand, Johnson and Wardle suggested that emotional eating is predicted by body dissatisfaction as a way of coping when experiencing negative affect [1].

The causal relation between body image, dieting and psychological distress had a theoretical basis [1]. Repeated experience of failed dieting had a negative impact on psychological adjustment leading to negative affect and worrying about body image, which could be generalized by

depression and other psychiatric illnesses [40]. Negative affect, low self-esteem and dieting could influence body weight dissatisfaction [40]. Psychological distress had been linked to dieting and body image through the feelings of inability and failure to sustain weight reduction [40]. Several studies had been done in Lebanon concerning body dissatisfaction [34, 41–43], however, scarce work had been done to test the psychological associations with body dissatisfaction among the general population. Therefore, it was found very important to evaluate the factors associated with body dissatisfaction among the Lebanese population. It is essential to understand body image concerns and eating disorders that may have long term health effects to develop appropriate educational health awareness programs to prevent unhealthy dieting behaviors.

## Methods

### Participants

This study was a cross-sectional descriptive study, conducted between January and May 2018, which enrolled 811 community dwelling adult participants using a proportionate random sample from all Lebanese governorates (Beirut, Mount Lebanon, North, South and Bekaa). Each governorate is divided into Caza (stratum); two villages were randomly selected from the list of villages provided by the Central Agency of Statistics in Lebanon. Participants were randomly selected from each village. Prior to participation, individual subjects were briefed on the study objectives and methodology, and were assured of the anonymity of their participation. Individuals agreeing to participate in the study were asked to sign a written informed consent form. Individual participants had the right to accept or refuse participation in the study, with no financial compensation provided in exchange for participation.

### Ethical approval

The Psychiatric Hospital of the Cross Ethics and Research Committee, in compliance with the Hospital's Regulatory Research Protocol, approved this study protocol (HPC-020-2018) based on the fact that the autonomy and confidentiality of participants were respected and since it was an observational study, no harm will be prompted to them. The purpose and requirement of the study were informed to each participant. Consent was obtained as a written approval on the ethical consent form.

### Questionnaire

The questionnaire used during the interview was in Arabic, the native language of Lebanon. The first part assessed the sociodemographic details of the participants [age, gender, marital status, educational level, monthly income (divided into four levels: no income, low income < 1000 USD; intermediate income 1000–2000 USD; and high income > 2000 USD)]. The body mass index (BMI) was calculated by dividing the person's weight (in kg) by the height in meters squared ( $m^2$ ). Alcohol, tobacco and caffeine were categorized into dichotomous variables (yes/no). The physical activity index, based on responses to a series of questions about the intensity, frequency and duration of participation in leisure-time physical activity, is a frequently used indicator of physical activity at the population level. The Total Physical Activity Index was calculated by multiplying the intensity, duration and frequency of daily activity [44].

The second part of the questionnaire consisted of the perception of eating habits among participants. The questions were identified from previous articles [45–47]. Examples given of the asked questions: “Do you take your weight daily?”, “Do you follow diet to lose weight?”, “Do you exercise to lose weight?”, “Do you take diet pills to lose weight?”, “Do you take laxatives or vomited to lose weight?”, “Do you starve to lose weight?”, “Do you take your weight daily?” The final part included the scales used in this study as follows:

### Body dissatisfaction subscale of the Eating Disorder Inventory-second version (EDI-2)

The EDI-2 is a 91 item self-report instrument that is used to assess psychological characteristics relevant to eating disorders [48]. It consists of 11 subscales: (1) drive for thinness, (2) bulimia, (3) body dissatisfaction, (4) ineffectiveness, (5) perfectionism, (6) interpersonal distress, (7) introspective awareness, (8) maturity fears, (9) asceticism, (10) impulse regulation, (11) and social insecurity [48]. In the present study, the body dissatisfaction score was measured from the eating disorder inventory (EDI-2) subscale. The scale assesses the levels of dissatisfaction with the overall body shape and specific body parts. The body dissatisfaction subscale consists of nine items, measured in 4-point Likert scales, ranging from 0 (sometimes, rarely, never) to 3 (always). Five questions were reversed while doing the score calculation. The total score was calculated by summing the nine items. The total score ranged from 0 to 27. Higher scores are indicative of greater body dissatisfaction [48]. In this study, the Cronbach alpha was 0.779.

### The Rosenberg self-esteem scale

The Rosenberg self-esteem scale is composed of ten items and is used to assess beliefs and attitudes regarding general self-worth. The answers were graded using a four point Likert scale, with answers ranging from 1 (strongly disagree) to 4 (strongly agree). Five questions (3, 5, 8, 9, and 10) were reversed while doing the score calculation. The total score is calculated by summing the 10 items. The scale ranged from 10 to 40. Higher scores would indicate higher self-esteem [49]. In this study, the Cronbach alpha was 0.759.

### Perceived stress scale (PSS)

The PSS is a ten-item scale widely used for measuring the perception of stress. The scale includes a number of direct questions about current levels of experienced stress and were designed to tap how unpredictable, uncontrollable, and overloaded respondents find their lives. The questions in the PSS ask about feelings and thoughts during the last month [50]. The questions answers ranged from never (0) to almost always (4). Items 4, 5, 7, and 8 are reversed items. The total score was calculated by summing the 10 items, with higher scores indicating more perceived stress [50]. The total score ranged from 0 to 40. In this study, the Cronbach alpha was 0.709.

### Hamilton Anxiety Rating Scale (HAM-A)

The HAM-A is one of the first rating scales to measure the severity of perceived anxiety symptoms. It consists of fourteen symptom-defined elements, identifying both psychological and somatic symptoms. Each item is scored on a basic numeric scoring of 0 (not present) to 4 (severe). The total score, calculated by summing the 14 items, ranged from 0 to 56, with higher scores indicating higher anxiety [51]. In this study, the Cronbach alpha was 0.912.

### Hamilton Depression Rating Scale (HAM-D)

The HAM-D, validated in Arabic [52], was used to assess the severity of depression in patients who are already diagnosed as depressed. The questionnaire consists of 21 questions that rate the severity of depression by probing mood, feelings of guilt, suicide ideas, insomnia, agitation or retardation, anxiety, weight loss and somatic symptoms. The total score is based on the sum of the first 17 items. The total score ranged from 0 to a maximum of 52 points. Higher scores would indicate higher depression [53]. In this study, the Cronbach alpha was 0.879.

### Emotion Regulation Questionnaire (ERQ)

The ERQ, a ten-item scale, is used to measure respondents' tendency to regulate their emotions in two ways: (1) Cognitive Reappraisal and (2) Expressive Suppression. Answers scores ranged from 1 (strongly disagree) to 7 (strongly agree). The sum of items 1, 3, 5, 7, 8, 10 make up the Cognitive Reappraisal facet and the sum of items 2, 4, 6, 9 make up the Expressive Suppression facet. Each facet's scoring is kept separate. The higher the scores, the greater the use of the emotion regulation strategy [54]. In this study, the Cronbach alpha values for the Cognitive Reappraisal facet and for the Expressive Suppression facet were 0.744 and 0.732, respectively.

### Binge Eating Scale (BES)

The BES was originally developed to identify binge eaters within an obese population [55]. It does not specify a time frame and presents a series of differently weighted statements for each item, from which respondents select the statement that best describes their attitudes and behaviors. The BES is a sixteen-item instrument designed to measure binge eating symptomatology. The total score is based on the sum of the sixteen items. This yields a continuous measure of binge eating pathology of 0–46. Scores below 17 indicate absence or mild binge eating, scores between 18 and 26 indicate moderate binge eating, whereas scores of  $\geq 27$  indicate the presence of severe binge eating [56]. In this study, the Cronbach alpha was 0.862.

### Emotional Eating Scale (EES)

The EES scale is composed of twenty-five items, with three derived subscales: anger, anxiety and depression. Participants rate the extent to which certain feelings lead to the urge to eat, using a five point Likert scale ranging from 0 (no desire to eat) to 4 (an overwhelming urge to eat). The total score is calculated by summing the answers of all items. The highest possible score is 100. Higher scores indicate a reliance on using food to help managing emotions [57]. In this study, the Cronbach alpha was 0.957.

### State Adult Attachment Measure (SAAM)

The SAAM measures three different aspects of the adult attachment: security, anxiety and avoidance. It consists of twenty-one Likert scale questions ranging from 1 (strongly disagree) to 7 (strongly agree). The total score is calculated by summing the 21 items. The highest possible score

is 147 indicating a high features of attachment [58]. In this study, the Cronbach alpha was 0.827.

## Statistical analysis

SPSS software version 23 was used to conduct data analysis. A Cronbach's alpha was recorded for reliability analysis for all the scales. A descriptive analysis were done using the absolute frequency and percentages for categorical variables and mean and standard deviation for quantitative measures. The Student's *t* test was used to compare two means, whereas the ANOVA test was used to compare 3 or more means. The Pearson's correlation was used for linear correlation between continuous variables. For categorical variables, the Chi-square and Fisher's exact tests were used. Three hierarchical stepwise linear regressions were conducted, taking the body dissatisfaction score as the dependent variable. All variables that showed a  $p < 0.1$  in the bivariate analysis were considered as important variables to be entered in the model to eliminate the potential confounding factors. These three models were built by adding variables to the previous model at each step to determine that the newly added variables would improve the proportion of explained variance of the dependent variable by the model (improve in adjusted  $R^2$ ). The stepwise method was used to simultaneously remove variables that were weakly correlated to the dependent variable. Thus, the final variables kept in the model explain better the distribution. A  $p$  value less than 0.05 was considered significant.

## Results

The sociodemographic characteristics of the participants are summarized in Table 1. The results showed that the mean age of the participants was  $27.59 \pm 11.76$  years, with 66.5% females. The majority (73.2%) had a university level of education, single (67.0%), with a low monthly income (77.9%). The majority of the participants drank caffeine (90%), 30.8% were smokers and 4.2% were alcoholic. The majority (62.4%) practiced physical activities. The mean BMI of the participants was  $18.09 \pm 11.68$  kg/m<sup>2</sup>.

Table 2 shows participants views about eating habits. In the past 30 days, 30.3% of participants dieted, 38.2% exercised and 19.6% starved to lose weight. Only 17.5% of participants had pressure from TV, magazine and 30.0% received comments from the family concerning losing weight. The majority did not have any family history of eating disorders (78.9%).

**Table 1** Sociodemographic characteristics of the study sample

	Frequency (%)
Gender	
Male	270 (33.5%)
Female	536 (66.5%)
Marital status	
Single	533 (67.0%)
Married	230 (28.9%)
Widowed	11 (1.4%)
Divorced	22 (2.8%)
Education level	
Primary	24 (3.1%)
Complementary	61 (7.8%)
Secondary	125 (15.9%)
University	574 (73.2%)
Monthly income	
No income	340 (45.1%)
Low income < 1000 USD	247 (32.8%)
Intermediate 1000–2000 USD	117 (15.5%)
High > 2000 USD	50 (6.6%)
Smoking	
Yes	246 (30.8%)
No	554 (69.2%)
Drug addiction	
Yes	7 (0.9%)
No	751 (99.1%)
Alcohol	
Yes	32 (4.2%)
No	724 (95.8%)
Caffeine	
Yes	721 (90.0%)
No	80 (10.0%)
Practicing sport activities	
Yes	490 (62.4%)
No	295 (37.6%)
	Mean $\pm$ SD
Age	27.59 $\pm$ 11.76
BMI	18.09 $\pm$ 11.68

## Bivariate analysis

A significantly higher mean body dissatisfaction score was found in widowed persons compared to the other groups. A significantly higher mean body dissatisfaction score was found in participants who were following a diet (13.10 vs. 9.63), exercised (11.71 vs. 10.07), vomited (14.63 vs. 10.30), taking diet pills (14.76 vs. 10.30) and starving to lose weight (13.38 vs. 10.05) compared to those who did not follow these habits. In addition, a significantly higher mean body dissatisfaction score was found in participants that agreed on being



**Table 2** Frequencies of participants states about their diet habits

	Frequency (%)
Dieted to lose weight (past 30 days)	242 (30.3%)
Exercised to lose weight (past 30 days)	306 (38.2%)
Vomited or taken laxatives to lose weight (past 30 days)	73 (9.0%)
Taken diet pills to lose weight (past 30 days)	72 (8.9%)
Starving to lose weight (past 30 days)	158 (19.6%)
Daily weighting	135 (16.7%)
Receiving comments from the family concerning losing weight	242 (30.0%)
Have you been insulted	79 (9.8%)
Have you been physically abused	66 (8.2%)
Have you been sexually abused	28 (3.4%)
Being in a bad romantic relationship	226 (28.0%)
Family history of eating disorders	170 (21.0%)
Pressure from TV, magazine to lose your weight	141 (17.5%)

verbally insulted (12.01 vs. 10.58), physically (12.06 vs. 10.56) and sexually abused (13.00 vs. 10.62), had pressure from their families (13.00 vs. 9.70) and television (13.77 vs. 10.08) to lose weight, who took their weight on a daily basis (12.10 vs. 10.42) and had a family history of eating disorders (12.86 vs. 10.09) compared to those who did not agree with these statements. In addition, significant but low correlations were found between higher body dissatisfaction score and increased age ( $r=0.061$ ), higher BMI ( $r=0.202$ ), higher perceived stress (PSC score) ( $r=0.145$ ), higher anxiety (HAMA) ( $r=0.128$ ), higher depression (HAMD) (0.063), higher emotional eating (EES scale) ( $r=0.088$ ), and more binge eating (BES scale) ( $r=0.245$ ). However, a low but significant negative correlation was found between higher body dissatisfaction score and lower self-esteem ( $r=-0.135$ ) and emotional regulation (cognitive reappraisal facet) ( $r=-0.068$ ). No significant difference was found between genders (Table 3).

### Multivariable analysis

The results of a first linear regression, taking the body dissatisfaction score as the dependent variable and the sociodemographic as independent variables, showed that being married (Beta = 1.644) and higher BMI (Beta = 0.095) were significantly associated with a higher body dissatisfaction score (Table 4, model 1).

A second linear regression, taking the body dissatisfaction score as the dependent variable and the opinion about eating habits as independent variables, showed that being married (Beta = 1.326), higher BMI (Beta = 0.077), dieting to lose weight in the past 30 days (Beta = 1.971), receiving comments from the family (Beta = 2.425) and pressure from TV/magazines to lose weight (Beta = 2.309) were associated with a higher body dissatisfaction score. However, increased physical activity (Beta = -0.032) and being

divorced (Beta = -4.135) were significantly associated with lower body dissatisfaction scores (Table 4, model 2).

A third linear regression, taking the body dissatisfaction score as the dependent variable and the scales and opinion about eating habits as independent variables, showed that a higher binge eating score (Beta = 0.202), being married (Beta = 1.233), having a family history of eating disorders (Beta = 1.933), higher BMI (Beta = 0.076), dieting to lose weight (past 30 days) (Beta = 2.345), receiving comments from the family (Beta = 2.234) and pressure from TV/magazines to lose weight (Beta = 1.320), vomiting or taking laxatives to lose weight (past 30 days) (Beta = 1.861), higher depression (Beta = 0.103) and higher perceived stress (Beta = 0.107) were associated with a higher body dissatisfaction score. However, higher self-esteem (Beta = -0.246), increased physical activity (Beta = -0.022) and being divorced (Beta = -4.226) were significantly associated with a lower body dissatisfaction score (Table 4, model 3).

### Discussion

Body dissatisfaction is a growing interest in our society, therefore, this study aimed at assessing the factors correlated with body dissatisfaction among a representative sample of the Lebanese population. This study is the second from a project about correlates of eating disorders among the Lebanese population after the first study about orthorexia nervosa [59]. Our study showed that body dissatisfaction was correlated to different sociodemographic, psychological and eating habits factors.

Starting with the results of the multivariable analysis, a significantly higher mean body dissatisfaction score was found in married persons compared to single ones, while being divorced was significantly associated with lower body

**Table 3** Bivariate analysis of the factors associated with the Body dissatisfaction score

	Body dissatisfaction score Mean $\pm$ SD	<i>p</i> value
Gender		
Male	10.44 $\pm$ 5.66	0.366
Female	10.82 $\pm$ 5.83	
Marital status		
Single	10.12 $\pm$ 5.84	<0.001
Married	11.97 $\pm$ 5.48	
Widowed	13.27 $\pm$ 2.57	
Divorced	10.18 $\pm$ 5.48	
Dieted to lose weight (past 30 days)		
No	9.63 $\pm$ 5.54	<0.001
Yes	13.10 $\pm$ 5.55	
Exercised to lose weight (past 30 days)		
No	10.07 $\pm$ 5.63	<0.001
Yes	11.71 $\pm$ 5.86	
Vomited or taken laxatives to lose weight (past 30 days)		
No	10.30 $\pm$ 5.76	<0.001
Yes	14.63 $\pm$ 4.30	
Taken diet pills to lose weight (past 30 days)		
No	10.30 $\pm$ 5.70	<0.001
Yes	14.76 $\pm$ 5.01	
Starving to lose weight (past 30 days)		
No	10.05 $\pm$ 5.59	<0.001
Yes	13.38 $\pm$ 5.85	
Daily weighting		
No	10.42 $\pm$ 5.77	0.002
Yes	12.10 $\pm$ 5.60	
Receiving comments from the family concerning losing weight		
No	9.70 $\pm$ 5.43	<0.001
Yes	13.00 $\pm$ 5.90	
Have you been insulted		
No	10.58 $\pm$ 5.74	0.037
Yes	12.01 $\pm$ 6.13	
Have you been physically abused		
No	10.56 $\pm$ 5.77	0.044
Yes	12.06 $\pm$ 5.88	
Have you been sexually abused		
No	10.62 $\pm$ 5.81	0.011
Yes	13.00 $\pm$ 4.51	
Family history of eating disorders		
No	10.09 $\pm$ 5.62	<0.001
Yes	12.86 $\pm$ 5.75	
Pressure from TV, magazine to lose your weight		
No	10.08 $\pm$ 5.67	<0.001
Yes	13.77 $\pm$ 5.35	
	Body dissatisfaction score Correlation coefficient	<i>p</i> value
Age	0.061	0.045
BMI	0.202	<0.001
PSS scale	0.145	<0.001

**Table 3** (continued)

	Body dissatisfaction score Correlation coefficient	<i>p</i> value
HAM-A score	0.128	<0.001
HAM-D score	0.063	0.046
ERQ cognitive reappraisal facet	−0.068	0.070
EES scale	0.088	0.015
BES scale	0.245	<0.001
Self-esteem scale	−0.135	<0.001

The Student's *t* test was used to compare the body dissatisfaction score mean of a dichotomous variable; the ANOVA test was used to compare the means of 3 groups or more (marital status); the Pearson's correlation test was used between 2 continuous variables

dissatisfaction score. These results were not in line with previous studies [60, 61]. A study done by Lundborg et al. showed that married people in societies where divorce rates are high are more invest in their physical appearance [62]. In fact, Tom et al. showed that body image dissatisfaction is less important in married couples despite its existence in both married and single people [60]. Other researchers showed that body dissatisfaction among married and non-married individuals occurs at comparable levels but marital discordance is correlated positively with body dissatisfaction. That means that the quality of marriage could be a protective or a risk factor for various women that could influence the level of body dissatisfaction [63]. Good marital quality is a protective factor for women's physical and mental health because of social support and intimacy in the relationship [63] in opposite to a poor marital quality, where the feelings of less desirable or physically attractive could occur [61, 63]. Married individuals would have more concerns on their body shape since it may affect spousal relations by maintaining in attractive appearance and could lead to divorce [62]. However, the divorced people would not have these concerns and would invest more in their physical appearance [62]. In this study, the aspects of relations in marriage were not assessed; further studies are needed to address the role of marital and family structure in body dissatisfaction.

Body dissatisfaction was also higher in patients following diet, vomiting or taking laxative to lose weight compared to those who did not follow these habits. In fact, body dissatisfaction is strongly correlated to eating disorder [64]. Moore DC's study showed that participants with body dissatisfaction are more likely to engage in unsafe weight control behaviors, such as vomiting, dieting, diet pill use, fasting, skipping meals, diuretic use and laxative use [65]. The results of our study did not find any gender difference related to body dissatisfaction. A meta-analysis done by Feingold and Mazella showed that males had a more positive body image than females [66]. Several studies had showed that females had more body dissatisfaction

than males [67–69]. Other studies showed that body image disturbance is higher in women with eating disorders (EDs) than women without EDs [70]. Lavender also showed that male body dissatisfaction is correlated to shape concerns and other maladaptive behaviors such as excessive exercise, extreme dieting rigid and, use of anabolic steroids [71]. Nowadays, body image dissatisfaction is a common concern among men and women, where male gave longer and more attention to muscular bodies, while women paid more attention to thin bodies [72].

Our results showed that those who had a greater influence on body appearance from media messages, concerns from parents, siblings and peer had higher body dissatisfaction. Our study showed that participants who received pressure from their families and TV/magazines to lose weight, and those who had a family history of eating disorders had higher body dissatisfaction score compared to those who did not agree with these statements. These results support previous findings [73–75]. Mainstream media is one of the major contributing factors to the increase in women's body dissatisfaction [76]. Our results are indeed consistent with earlier studies that showed the negative impact of critical comments from family members into late adolescence and adulthood on body image [77, 78]. The pressure of family regarding one's appearance and the need to diet are also associated with body dissatisfaction and bulimic symptoms [79].

Regarding BMI, the multivariable analysis showed that higher BMI was associated with a higher body dissatisfaction score. Our results are in line with a recent meta-analysis done by Weinberger et al. that found that individuals with obesity (higher BMI) reported higher body dissatisfaction compared to normal weight [80]. In addition, a study done among the Mediterranean adult population had found that overweight adults were more likely to underestimate their body weight and were dissatisfied with their body image compared to normal weight [81]. However, disagreement was found with previous studies that reported that body image dissatisfaction is not necessarily



**Table 4** Multivariable analysis

	Unstandardized Beta	<i>p</i> value	Confidence interval	
			Lower bound	Upper bound
Model 1: Linear regression taking the body dissatisfaction score as the dependent variable and the marital status and body mass index (BMI) as independent variables				
Married	1.644	<0.001	0.757	2.532
BMI	0.095	<0.001	0.061	0.129
Variables entered: age, BMI, and marital status Adjusted $R^2$ : 0.056				
	Unstandardized Beta	<i>p</i> value	Confidence interval	
			Lower bound	Upper bound
Model 2: Linear regression taking the body dissatisfaction score as the dependent variable and the opinion about eating habits as independent variables				
BMI	0.077	<0.001	0.037	0.1117
Married	1.326	0.017	0.236	2.415
Divorced	-4.135	0.010	-7.256	-1.014
Physical activity index	-0.032	0.002	-0.053	-0.012
Dieted to lose weight (past 30 days)	1.971	<0.001	0.948	2.995
Receiving comments from the family concerning losing weight	2.425	<0.001	1.403	3.447
Pressure from TV, magazine to lose your weight	2.309	<0.001	1.047	3.571
Family history of eating disorders	1.899	0.001	0.754	3.043
Variables entered = age, marital status, BMI, physical activity index, exercised to lose weight (past 30 days), dieted to lose weight (past 30 days), vomited or taken laxatives to lose weight (past 30 days), taken diet pills to lose weight (past 30 days), starving to lose weight (past 30 days), daily weighting, receiving comments from the family concerning losing weight, have you been insulted, have you been physically abused, have you been sexually abused, family history of eating disorders, pressure from TV, magazine to lose your weight Adjusted $R^2$ : 0.182				
	Unstandardized Beta	<i>p</i> value	Confidence interval	
			Lower bound	Upper bound
Model 3: Linear regression taking the body dissatisfaction score as the dependent variable and the scales and opinion about eating habits as independent variables				
Binge eating scale score	0.202	<0.001	0.130	0.274
Dieted to lose weight (past 30 days)	2.345	<0.001	1.272	3.419
Receiving comments from the family concerning losing weight	2.234	<0.001	1.192	3.276
Family history of eating disorders	1.933	0.001	0.769	3.097
BMI	0.076	<0.001	0.035	0.117
Married status	1.233	0.030	0.123	2.343
Pressure from TV, magazine to lose your weight	1.320	0.051	-0.008	2.647
Divorced	-4.226	0.008	-7.325	-1.126
Self-esteem scale	-0.246	0.051	-0.493	0.001
Perceived stress scale	0.107	0.013	0.023	0.190
Depression (HAMD score)	0.103	0.007	0.029	0.177
Vomited or taken laxatives to lose weight (past 30 days)	1.861	0.041	0.074	3.647
Physical activity index	-0.022	0.044	-0.043	-0.001
Variables entered in the model: age, marital status, BMI, physical activity index, self-esteem scale, perceived stress scale, HAMA scale, HAMD scale, ERQ cognitive reappraisal facet, EES total score, exercised to lose weight (past 30 days), dieted to lose weight (past 30 days), vomited or taken laxatives to lose weight (past 30 days), taken diet pills to lose weight (past 30 days), starving to lose weight (past 30 days), daily weighting, receiving comments from the family concerning losing weight, have you been insulted, have you been physically abused, have you been sexually abused, family history of eating disorders, pressure from TV, magazine to lose your weight Adjusted $R^2$ : 0.239				

associated with BMI for all individuals [82, 83]. The association between BMI and body dissatisfaction needs further investigation.

In addition, the multivariable analysis results showed that higher depression, perceived stress and binge eating were significantly associated with higher body dissatisfaction scores, whereas higher self-esteem was associated with lower body dissatisfaction. These results are in line with previous studies that showed a correlation between psychological problems and eating disorders and body disturbance [84–86]. Psychological distress may increase once a person has a negative perception of body image [87]. Studies had showed that depressive symptoms are correlated with body image dissatisfaction [88–90]. Several studies had found a strong association between body dissatisfaction and binge eating, in turn there is clear evidence that binge eating is strongly related to dietary restraint. Lower self-esteem and dieting behaviors promote the initiation of bingeing which is associated with higher bulimia symptoms and higher body dissatisfaction [91]. Regarding perceived stress, studies have shown that stress has a very notable impact on body image [92]. Psychologically, stress is also associated with low self-esteem and poor body image [93, 94].

Physical exercise had been found to be related with lower body dissatisfaction consistent with the findings of other studies [95–98]. A meta-analysis done by Hausenblas and Fallon had found that exercise is positively associated with body satisfaction [99]. However, other studies had found that exercise was significantly and positively correlated with body dissatisfaction [98, 100]. Physical exercise and fitness had a positive impact on improving the mood, tranquility and appearance satisfaction [95].

## Limitations

There are many limitations in this study. First, we relied on participants to provide us with information on depression, anxiety, emotion regulation, body dissatisfaction and others using self-report questionnaires (the results were based on self-report measures). Second, the study has a cross sectional design and causality cannot be proved. Third, the length, type and frequency of exposure to media were not assessed in this study. Finally, some of the scales (i.e. BES scale) were not validated in Lebanon. Nonetheless the authors believed that their findings are noteworthy, since they are consistent with other recent studies.

## Conclusion

In this study, a significant association was found between the main variables: self-esteem, depression, stress, physical activity, BMI, family and television pressure, and body

image dissatisfaction. These crucial information can reduce the body dissatisfaction in the Lebanese population by promoting the knowledge of health professionals, researchers and policy makers with regard to the effect of body image on psychological wellbeing. Several interventions should be applied to combat depression, stress, low self-esteem and many other variables before it develops into an eating disorder and so into body dissatisfaction. Further interventional studies examining the role of social and media support in reducing the body dissatisfaction body image among Lebanese people are warranted.

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## Compliance with ethical standards

**Conflict of interest** All authors declare that they have no conflict of interest.

**Ethical approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed consent** Informed consent was obtained from all individual participants included in the study.

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