


Distorted weight perception correlates with disordered eating attitudes in Kuwaiti college women

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Abstract

Objective: We investigated the presence of disordered eating attitudes and weight perception among young women at body mass index (BMI) values that correspond to underweight, normal weight, overweight, and obese weight status.

Method: Data were collected from 1,147 female undergraduate students (89% Kuwaiti nationals) recruited from Kuwait University through employment of the eating attitude test (EAT-26) together with an anonymous, self-administered questionnaire to determine the prevalence of symptomatology indicative of anorexia nervosa and bulimia nervosa.

Results: The mean EAT-26 scores differed significantly between the weight categories. More students with overweight and obesity scored above the established EAT-26 cut off value indicating at risk of disordered eating compared to students who were at a normal weight or underweight (52.1% vs. 38.8%, respectively, $\chi^2(1) = 16.1, p < .001$). Logistic regression analyses showed significantly higher odds ratios (ORs) for the groups with overweight and obesity for dieting and bulimic behaviors, while women at normal and underweight had higher ORs for restrictive oral control behaviors associated with anorexia nervosa. Distorted weight perception was found in all weight categories.

Discussion: The high proportion of disordered eating attitudes among Kuwaiti college women could not be attributed to obesity alone as the type of disordered eating behavior varied more by weight perception than by weight status. The high levels of eating disorder related symptoms could be due to a combination of the social influences, diet, and lifestyle of college students. Such factors need to be considered by healthcare professionals as early as possible with more focused programs towards promotion of healthy weight for college students.

KEYWORDS

anorexia, bulimia, eating disorders, obesity, perceptions, weight

1 | INTRODUCTION

The global escalating obesity rate and its associated health complications are believed to be leading to increased anxiety about excessive body weight that, in turn, can result in extreme dieting or abnormal eating behaviors (Goldschmidt, Aspen, Sinton, Tanofsky-Kraff, & Wilfley, 2008; Neumark-Sztainer et al., 2006). There is also pervasive discrimination toward individuals with obesity, which can contribute to disparities in psychological and physical health outcomes and interfere with effective obesity interventions (Puhl & Heuer, 2010).

The excessive emphasis on thinness in most societies seems to be a major contributing factor to the increased prevalence of disordered eating attitudes and behaviors (Urquhart & Mihalynuk, 2011). As the societal pressure to be thin is higher for females than for males, they are more likely to perceive themselves as overweight and to attempt to lose weight (Dellava et al., 2010). In fact, while perceived ideal body image has become progressively smaller, the female body size has been increasing steadily (Urquhart & Mihalynuk, 2011). Such a dynamic might contribute to the increase in disordered eating among young women (Farrell, Lee, & Shafran, 2005) and individuals who are overweight

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(Conley & Boardman, 2007). Recent studies showed that thinness was viewed as the preferred body shape among female college students in Kuwait (Kabir, Zafar, & Waslien 2013), which can be attributable to a westernized socio-cultural transition occurring in this population (Musaiger & Al-Mannai, 2014).

Although there has been much attention regarding the negative influence of media in terms of abnormal eating patterns and body image dissatisfaction in individuals with anorexia nervosa (Hamilton & Waller, 1993), there is evidence that such attitudes are also prevalent in adolescents and young adults who are overweight. For example, Desai, Miller, Staples, and Bravender (2008) showed that undergraduates in the United States who were overweight or obese were more likely to engage in dieting and binge eating, had a greater desire to be thinner, and were more preoccupied with food compared with their normal-weight peers. Disordered eating attitudes have been reported worldwide among adolescents who are overweight and obese (Goldschmidt et al., 2008; Mousa, Al-Domi, Mashal, & Jibril, 2010), including in the Arab states, where the prevalence of overweight and obesity has paralleled disordered eating attitudes (Ahmed, Waslien, Al-Sumaie, & Prakash, 2012; Al-Adawi et al., 2002; Eapen, Mabrouk, & Bin-Othman, 2006; Musaiger et al., 2013). The prevalence of disordered eating attitudes was notably high among Kuwaiti adolescents of both genders who were overweight or obese (Musaiger et al., 2013). In that regard, in a study of 228 female Kuwaiti university students, aged 19–25 years, Musaiger and Al-Mannai (2013) showed that women with obesity were influenced more negatively by the media as compared to non-obese women. These authors suggested that dieting and food restrictive behaviors were more prevalent in female students with obesity due to pressure to lose weight by mass media, peers, and parents. Such social pressures toward thinness in women have been indicated to be more likely lead to disturbed attitudes toward eating (Dellava et al., 2010).

Weight control behaviors have been indicated to be precipitated by body weight perception, or the personal evaluation of one's weight as "underweight," "normal weight," or "overweight," irrespective of actual body mass index (BMI; Cheung, Ip, Lam, & Bibby, 2007; Tremblay, & Limbos, 2009). A discrepancy between body weight perception and BMI has been characterized as body image distortion (Liechty, 2010). A high proportion of normal weight males and females reportedly misclassify themselves as overweight whereas conversely some individuals who are overweight appear to misclassify themselves as normal weight (Lim et al., 2014). The above situations are of concern as weight misperception can modulate eating attitudes and behaviors, depending on the perceived acceptability of the weight (Desai et al., 2008). Both overweight and underweight misperceptions are associated with increased risk of psychological morbidity (Desai et al., 2008), which might be linked to disordered eating attitudes.

The present study investigated the range of BMIs and weight misperceptions among female undergraduate students living in Kuwait in relation to disordered eating attitudes and behaviors. This approach was applied to aid in the identification of subgroups of individuals that might be most at risk for disordered eating. The eating attitude test (EAT-26) was utilized to measure eating attitudes, as this test has been

validated in a variety of cultures, settings, and age groups for screening eating disorder features (Lim et al., 2014). The aims of the current study were to examine in young Kuwaiti women with a wide range of BMIs: (a) the prevalence of disordered eating attitudes, including tendencies toward anorexia nervosa and bulimia nervosa, using the EAT-26 subscales; and (b) the relationships of self-estimated weight status and weight perception with eating disorder features.

2 | METHOD

This cross-sectional descriptive study included 1,147 female undergraduates recruited from Kuwait University's five campuses (comprising 14 colleges in total). Data collection was conducted between November 2014 and May 2015 using self-administered anonymous questionnaires. Students were invited to voluntarily participate in the study during breaks between classes. During recruitment, the purpose and format of the questionnaire were explained orally to participants. All information regarding study participation was written clearly as a preface to each questionnaire. Questionnaires took about 15–20 mins to complete. Before study commencement, ethical approval was obtained from the Kuwait University Research Sector and Campuses Administration Office, which provided access to all campuses for participant recruitment. The consent to publish and report individual data was obtained from all participants. Students under 18 years of age and participants who provided incomplete questionnaires were excluded.

2.1 | Dependent variables

Disordered eating attitudes were measured using the EAT-26, which has high sensitivity and reliability (Cronbach's alpha of .80 in participants with either eating disorders or normal eating behavior; Gearhardt, Corbin, & Brownell, 2009). The EAT-26 comprises 26 items in three subscales: dieting (Sub-D; contains 13 items related to a distorted body image); bulimia (Sub-B; contains six items on body image and a tendency toward bulimic behavior); and oral control (Sub-O; contains seven items on self-control and high-risk behaviors associated with anorexia nervosa). Each item in the EAT-26 test is rated on a 4-point Likert scale (0 = sometimes, rarely, or never, 1 = often, 2 = usually, 3 = always). The total EAT-26 score ranges from 0 to 78. EAT-26 scores of ≥ 20 indicate possible anorexia nervosa or bulimia nervosa, while scores of ≥ 11 indicate possible binge-eating disorder. There are no specific cut-off points for the EAT-26 subscales, although researchers propose that scores >20 for the Sub-D and 10 for the other two subscales indicate a high risk of developing an eating disorder (Garfinkel & Newman, 2001). Each participant completed an Arabic or English version of the EAT-26, both of which were previously validated among undergraduates (Al-Subaie et al., 1996; Fortes, Meireles, Neves, Almeida, & Ferreira, 2015).

2.2 | Independent variables

The body mass index was calculated from self-reported weights and heights. Students were grouped according to the following BMI (kg/m^2) standards: <18.5 = underweight, 18.5 – 24.9 = normal weight,

25.0–29.9 = overweight, >30.0 = obesity. Two variables were used to assess body weight perception: (a) Weight perception: Weight perception was determined by asking participants, “Do you consider yourself to be at an acceptable weight, underweight, or overweight?” This question has been used in previous population surveys to determine weight perception (Schulte & Thomas, 2013; Thomas, Khan, & Abdulrahman, 2010). The term “acceptable” is believed to refer to desirable weight relative to ideal body size, rather than BMI categorization. (b). Self-estimated weight status: This variable was used to measure participants’ self-perceived BMI categorization. Participants were asked, “Do you estimate your body mass index to be in the underweight (BMI 1), normal weight (BMI 2), overweight (BMI 3), or obese category (BMI 4)?” Participants were then categorized according to their answers to this question and their actual BMI (calculated from their self-reported weights and heights), as follows: correct-estimator for BMI 1 and 2; correct-estimator for BMI 3 and 4; over-estimator for BMI 1 and 2; over-estimator for BMI 3; under-estimator for BMI 3; and under-estimator for BMI 4. For some of the statistical analyses, these six categories were merged to create three superordinate categories: correct-estimators, over-estimators, and under-estimators. This variable assessed the extent of weight misperception, which was used as an index of participants’ dissatisfaction with their body image despite knowing their BMI range. Weight misperception is associated with psychological stress, independent of weight perception and actual weight status (Desai et al., 2008). Only individuals with prior knowledge of their BMI could answer this part correctly.

2.3 | Covariates

The following variables were included as potential covariates of disordered eating attitudes: nationality (Kuwaiti vs. Non-Kuwaiti), age (continuous variable), marital status (single vs. married), and field of study (science-related major vs. non-science-related major).

2.4 | Statistical analysis

All anthropometric and eating behavior scores were checked for normality before being treated as continuous variables in the analysis. The EAT-26 and subscales scores were compared among the following two binomial categorical variables using Student’s *t*-tests: (a) yes, at risk of disordered eating versus no, not at risk of disordered eating; (b) overweight and obese versus non overweight or non-obese. Comparisons among the multinomial variables—including the four BMI groups and the three self-estimated weight status groups (over-, under-, and correct-estimators)—were performed using analyses of variance (ANOVAs). Bonferroni’s post hoc adjustments for multiple comparisons were used when a significant *F*-statistic was observed. Cross-tabulations (χ^2 tests) were performed to determine the differences in the prevalence of at-risk groups of disordered eating (based on the EAT-26 and subscale scores) according to BMI group, weight perception category, and covariates. All *p*-values were two-tailed, and an alpha of .05 was considered significant for all tests performed.

Unadjusted logistic regression analyses were conducted to generate prevalence odds ratios (ORs) with 95% confidence intervals (CI) for the following outcomes: (a) risk of disordered eating attitudes (EAT-26 \geq 20); (b) risk of extreme dieting behaviors (Sub-D \geq 20); (c) risk of bulimic tendencies (Sub-B \geq 10); and (d) restrictive oral control behaviors associated with anorexia nervosa (Sub-O \geq 10). Self-estimated weight status was included as independent variable. Adjusted multinomial logistic regression analysis was then conducted to: (a) examine the independent effects of self-estimated weight status on the same outcome variables; and (b) to examine these associations while adjusting for all covariates. All statistical analyses were performed using SPSS Statistics 23.0 (IBM Corp., Armonk, NY).

3 | RESULTS

3.1 | Participant characteristics

Participants’ characteristics are shown in Table 1. A total of 1,500 female students were approached, of whom 1,248 participated voluntarily. However, only 1,147 (91.8%) completed the EAT-26 and provided self-assessed body weight and height measurements. Means are reported as mean \pm SD. A slightly higher percentage of students were from arts-related majors than from science-related majors (54.6% vs. 45.4%, respectively, $X^2(1) = 9.30$, $p = .002$), and all Kuwait University colleges were represented.

3.2 | Participants BMI groups

Over one-third of the participants were categorized as overweight or obese (24.5% and 9.9%, respectively), while 7.8% were underweight and 57.8% were normal weight (Table 1). The mean BMI was 23.91 ± 4.6 , which is within the normal weight category (Table 2).

3.3 | Disordered eating attitudes and behaviors

Among all participants, the mean total EAT-26 score was 21.0 ± 11.2 (Table 2). The most common EAT-26 items for which participants answered “usually” or “always” were, in descending order, “thinking about burning up calories when exercising” (47.4%); “preoccupied with a desire to be thinner” (46.2%); “preoccupied with the thought of having fat on my body” (40.8%); “take longer than others to eat my meals” (36.8%); “terrified about being overweight” (33.7%); “fear other people think that I am too thin” (32.3%); and “feel that food controls my life” (28.5%). Forty six percent (46.4%) of participants were above the diagnostic cut-off on the EAT-26 (≥ 20 ; Table 2). The mean EAT-26 score of the at-risk group for disordered eating was significantly higher than that of the not-at-risk group ($31.3 \pm .8$ vs. 10.4 ± 5.1 , $t(777) = 46.4$, $p < .001$, $d = 2.7$). In addition, the participants in the at-risk group had a significantly higher BMI than did those not at risk; however, the mean BMI of both groups was within the normal BMI category (24.7 ± 4.9 vs. 23.3 ± 4.3 , $t(1,145) = 5.7$ $p < .001$, $d = .33$) (Table 2). When using the proposed cut-off values for the subscales, 15.9% of participants scored ≥ 20 on the Sub-D, 9.9% scored ≥ 10 on the Sub-B, and 18.3% scored ≥ 10 on the Sub-O. The mean scores of these three subscales were 11.8 ± 8.0 (Sub-D), 4.0 ± 3.8 (Sub-B), and 5.8 ± 4.2 (Sub-O; Table 2).

TABLE 1 Student characteristics and the means and standard deviations of EAT-26 score (N = 1,147)

Nationality, n (%)	Kuwaiti 1,023 (89.2)	Non-Kuwaiti 124 (10.8)	t(df), p, d		
	Mean (SD)	Mean (SD)			
EAT-26	20.3 (13.2)	18.5 (11.9)	1.44 (1145), .15, .14		
Sub-D	10.9 (8.0)	9.8 (7.6)	1.38 (1145), .17, .14		
Sub-B	3.8 (3.8)	3.4 (3.9)	1.25 (1145), .21, .10		
Sub-O	5.6 (4.2)	5.3 (3.6)	.674 (168), .50, .08		
Marital status, n (%)	Married, 147 (12.8) Mean (SD)	Single, 1,000 (87.2) Mean (SD)	F(df), p, η^2		
EAT-26	11.2 (7.9)	10.7 (7.9)	1.06 (1145), .29, .63		
Sub-D	3.9 (3.9)	3.8 (3.8)	.74 (1145), .46, .03		
Sub-B	3.9 (3.9)	3.8 (3.8)	.41 (1145), .68, .03		
Sub-O	6.0 (4.2)	5.5 (4.1)	1.49 (1145), .14, .12		
Major field of study, n (%)	Science, 521 (45.4) Mean (SD)	Art, 626 (54.6) Mean (SD)	F(df), p, η^2		
EAT-26	18.5 (12.3)	21.3 (13.3)	3.59 (1145), <.001, -.22		
Sub-D	10.2 (7.9)	11.2 (8.0)	2.17 (1145), .03, -.13		
Sub-B	3.2 (3.9)	4.4 (4.1)	4.65 (1145), <.001, -.30		
Sub-O	5.2 (4.0)	5.9 (4.2)	2.71 (1145), <.001, -.17		
BMI groups, n (%)	Underweight, 90 (7.8) Mean (SD)	Normal weight, 663 (57.8) Mean (SD)	Overweight, 281 (24.5) Mean (SD)	Obese, 113 (9.9) Mean (SD)	F(df), p, η^2
EAT-26	16.9 (11.3) ^{a*}	19.3 (12.9) ^a	21.9 (13.1) ^b	22.7(13.1) ^b	6.1 (3,1146), <.001, .012
Sub-D	5.6 (6.7) ^{a*}	9.9 (7.9) ^b	13.2 (7.8) ^c	13.5(7.1) ^c	30.6 (3,1146), <.001, .07
Sub-B	3.1 (3.8) ^{a*}	3.6 (3.6) ^a	3.9 (4.1) ^a	5.1 (4.5) ^b	6.17 (3,1146), <.001, .02
Sub-O	8.3 (4.2) ^{a*}	5.8 (4.2) ^b	4.8 (3.8) ^c	4.1(3.9) ^c	22.6 (3,1146), <.001, .06

Note. EAT-26 = eating attitude test; underweight = BMI <18.5; normal weight = BMI 18.5–24.9; overweight = BMI 25.0–29.9, obese = BMI >30.0; Sub-D = dieting; Sub-B = bulimia; Sub-O = oral control. Means in a row that do not share superscript letter differ at $p < .05/16$ using the Bonferroni post-hoc adjustments.

* $p < .003$.

3.4 | Covariates and disordered eating attitudes and behaviors

The mean scores of the EAT-26 and its subscales differed significantly according to major field of study and BMI group (Table 1). Specifically, students from arts-related majors had significantly higher mean EAT-26 and subscales scores as compared to students in science-related majors (Table 1). The participants who were overweight and obese also had significantly higher mean EAT-26 and subscales scores compared to the non overweight students; in fact, their means exceeded the cut-off (EAT-26 \geq 20) for at-risk of disordered eating. The EAT-26 scores or subscales did not differ according to nationality or marital status.

3.5 | Weight perception and self-estimated weight status

The majority of participants correctly estimated their weight status (75.3%), 13% overestimated their weight status, and 11.6% underestimated their weight status (Table 3).

The proportion of over-estimators in the underweight, normal weight, and overweight categories were 23.3%, 18.1%, and 2.8%. Under-estimators were found only in the groups categorized as overweight (24.9%) or obese (52.2%). In terms of weight perception, 53% of participants regarded their weight as “acceptable,” 8.4% regarded their weight as “underweight,” and 38.5% considered themselves “overweight” (Table 4).

The mean EAT-26 total scores and subscale scores according to weight perception and self-estimated weight status categories are also listed in Table 4. Participants with an overweight perception had higher mean total scores on the EAT-26 compared to those with an acceptable weight and underweight perception (22.8 \pm 12.5 vs. 18.3 \pm 12.9 and 19.0 \pm 12.7, respectively). In contrast, individuals with an underweight perception had a higher mean score on Sub-O compared to those with an acceptable weight or overweight perception (7.7 \pm 4.1 vs. 5.9 \pm 4.2 and 4.6 \pm 3.8, respectively).

TABLE 2 Means and standard deviations of anthropometrics, EAT-26, and EAT-26 subscales

Independent variable	Total sample (N = 1,147) Mean (SD)	EAT-26 categories		t(df, p, d)
		At risk of disordered eating (EAT-26 ≥ 20) n (%) = 532 (46.4) Mean (SD)	Not at risk of disordered eating (EAT-26 < 20) n (%) = 615 (53.6) Mean (SD)	
Age	20.5 (2.3)	20.5 (2.4)	20.6 (2.19)	.88 (1,145), .38, -.04
Reported weight	61.1 (12.4)	63.4 (12.9)	59.0 (11.5)	6.13 (1,145), <.001, .36
Reported height	159.7 (5.9)	160.1 (6.0)	159.4 (6.0)	1.73 (1,145), .08, .12
Body mass index	23.9 (4.6)	24.7 (4.9)	23.2 (4.3)	5.74 (1,145), <.001, .33
EAT-26 total score	21.1 (11.2)	31.3 (9.8)	10.4 (5.1)	46.4 (778), <.001, 2.68
Subscale 1-dieting	11.8 (8.0)	17.1 (6.7)	5.3 (4.0)	36.7 (834), <.001, 2.14
Subscale 2-bulimia	4.0 (3.8)	6.4 (3.8)	1.5 (2.0)	27.6 (781), <.001, 1.61
Subscale 3-oral control	5.8 (4.2)	7.9 (4.0)	3.5 (3.1)	20.7 (994), <.001, 1.23

Note. Eating attitude test = EAT-26.
p < .05 is significant.

3.6 | Disordered eating attitudes according to independent variables

Tables 5 and 6 present the prevalence and unadjusted odds ratios for disordered eating attitudes according to BMI group, self-estimated weight status, and weight perception. High prevalence of disordered eating was noted for all BMI groups: 31.1% for the underweight category, 43.6% for normal weight, 53.4% for overweight, and 57.5% for obese. Being in the BMI groups indicated to be overweight or obese significantly increased the odds of disordered eating attitudes (OR [95% CI] = 1.48 [1.12–1.06], $p = .006$; 1.75 [1.17–2.62], $p = .006$), dieting behaviors (1.77 [1.23–2.5], $p = .002$; 1.95 [1.19–3.19], $p = .008$), and bulimic behavior tendencies (1.69 [1.07–2.6], $p = .03$; 2.79 [1.61–4.87],

$p < .001$). Being in the underweight BMI group increased the odds of restrictive oral control behaviors associated with anorexia nervosa (OR [95% CI] 2.79 [1.75–4.43], $p = .005$).

An overweight perception was associated with increased odds of disordered eating attitudes (2.07 [1.62–2.66], $p < .001$) and dieting behaviors (2.00 [1.44–2.79], $p < .001$), but was associated with lowered odds of restrictive oral control behaviors (.49 [35–.71], $p < .001$). Having an underweight perception, including normal, overweight, and obese individuals who considered themselves underweight, was associated with increased odds of restrictive oral control behaviors (OR [95% CI] = 1.97 [1.24–3.14], $p = .004$).

The same pattern of results was observed for the adjusted analysis (adjusting for covariates, BMI and major field of study), as seen in Table

TABLE 3 Cross-tabulation of weight self-estimation categories for each BMI group

Self-estimated weight status categories (% within BMI)		BMI groups				Total
		BMI <18.5	BMI 18.5–24.9	BMI 25–29.9	BMI ≥ 30	
Correct estimator, BMI 1 and 2	n	69 ^a	543 ^a	–	–	612
	%	76.7	81.9	–	–	53.4
Correct estimator, BMI 3 and 4	n	–	–	203 ^b	49 ^c	252
	%	–	–	72.2	43.4	22.0
Over-estimator, BMI 1 and 2	n	21 ^a	120 ^a	–	–	141
	%	23.3	18.1	–	–	12.3
Over-estimator, BMI 3	n	–	–	8 ^a	–	8
	%	–	–	2.8	–	.7
Under-estimator, BMI 3	n	–	–	70 ^c	5 ^a	75
	%	–	–	24.9	4.4	6.5
Under-estimator, BMI 4	n	–	–	–	59 ^b	59
	%	–	–	–	52.2	5.1
Total	n	90	663	281	113	1,147
	%	100	100	100	100	100

Note. BMI = body mass index; BMI 1 = underweight; BMI 2 = normal weight; BMI 3 = overweight; BMI 4 = obese. Each superscript letter denotes a subset of the four BMI groups whose column proportions did not differ significantly from each other at $p < .05$.

TABLE 4 Means and standard deviations of the EAT-26 and its subscales

Weight perception	Acceptable weight, <i>n</i> = 608 Mean (SD)	Underweight, <i>n</i> = 97 Mean(SD)	Overweight, <i>n</i> = 442 Mean(SD)	<i>F</i> (df), <i>p</i> , η^2
EAT-26	18.3 (12.9)	19.0 (12.7)	22.8 (12.5)	15.9 (1146, 2), <.001, .03
Sub-D	8.9 (7.8)	8.2 (8.0)	13.8 (7.2)	59.4 (1146, 2), <.001, .09
Sub-B	3.5 (3.7)	3.1 (3.3)	4.3 (4.0)	6.9 (1146, 2), .001, .01
Sub-O	5.9 (4.2)	7.7 (4.1)	4.6 (3.8)	26.7 (1146, 2), <.001, .05
Self-estimated weight status	Correct estimator, <i>n</i> = 864 Mean (SD)	Over-estimators, <i>n</i> = 149 Mean (SD)	Under-estimators, <i>n</i> = 134 Mean (SD)	
EAT-26	19.7 (12.8)	22.0 (12.9)	19.9 (13.9)	1.95 (1146,2), .14, .003
Sub-D	10.2 (7.8) ^{a*}	12.8 (8.1) ^b	12.1 (8.2) ^b	9.15 (1146,2), <.001, .02
Sub-B	3.8 (3.8)	4.0 (3.9)	3.6 (4.0)	.44 (1146,2), .65, .001
Sub-O	5.8 (4.2) ^{a*}	5.2 (4.2) ^{ab}	4.4 (3.9) ^b	7.69 (1146,2), <.001, .01

Note. EAT-26 = eating attitude test; Sub-D = dieting; Sub-B = bulimia nervosa; Sub-O = oral control. Means in a row that do not share superscript letter differ at $p < .05/24$ using the Bonferroni post-hoc adjustments.

* $p < .002$.

7. An overweight perception was associated with higher odds of disordered eating (OR [95% CI] = 1.65 [1.2–2.3], $p = .002$) and dieting behaviors (1.61 [1.08–2.4], $p = .021$). The underweight perception was associated with higher odds of oral control (1.74 [1.08–2.79], $p = .021$).

4 | DISCUSSION

To our knowledge, this is the first large-scale study to quantify the scope of disordered eating attitudes and behaviors among female

TABLE 5 Prevalence and odds ratios for being at risk of disordered eating and the dieting subscale (*N* = 1,147)

Risk factor	Category	Prevalence (%) ^a	OR (95% CI)	<i>p</i>
<i>Dependent variable: At risk of disordered eating (EAT-26 ≥ 20)</i>				
BMI group	BMI 18.5–24.9	43.6	1	
	BMI <18.5	31.1	.58 (.37–.94)	.026
	BMI 25–29.9	53.4	1.48 (1.12–1.06)	.006
	BMI ≥30	57.5	1.75 (1.17–2.62)	.006
Self-estimated weight status	Correct estimator	45.5	1	
	Over-estimators	53.7	1.39 (.98–1.97)	.064
	Under-estimators	44.0	.943 (.65–1.36)	.753
Weight perception	Acceptable weight	39.5	1	
	Underweight	39.2	.99 (.63–1.53)	.96
	Overweight	57.5	2.07 (1.62–2.66)	<.001
<i>Dependent variable: Subscale 1–dieting (distorted body image)</i>				
BMI group	BMI 18.5–24.9	13.3	1	
	BMI <18.5	8.9	.64 (.29–1.36)	.25
	BMI 25–29.9	21.4	1.77 (1.23–2.5)	.002
	BMI ≥30	23.0	1.95 (1.19–3.19)	.008
Self-estimated weight status	Correct estimator	14.0	1	
	Over-estimators	20.8	1.61 (1.04–2.5)	.033
	Under-estimators	22.3	1.77 (1.3–2.78)	.013
Weight perception	Acceptable weight	12.2	1	
	Underweight	12.3	1.02	.96
	Overweight	21.7	2.00 (1.44–2.79)	<.001

Note. EAT-26 = Eating Attitude Test; BMI = body mass index; OR = odds ratio; CI = confidence interval. ^aIndicates the prevalence of each dependent variable within each category of the risk factor.

$p < .05$ indicates significance.

TABLE 6 Prevalence and odds ratios for the bulimia and oral control subscales (N = 1,147)

Risk factor	Category	Prevalence (%) ^a	OR (95% CI)	p
<i>Dependent variable: Subscale 2-bulimia</i>				
BMI group	BMI 18.5–24.9	7.5	1	
	BMI <18.5	10.0	1.36 (.65–2.87)	.42
	BMI 25–29.9	12.1	1.69 (1.07–2.6)	.03
	BMI ≥30	18.6	2.79 (1.61–4.87)	<.001
Self-estimated weight status	Correct estimator	9.5	1	
	Over-estimators	10.7	1.147 (.65–2.02)	.634
	Under-estimators	11.9	1.293 (.73–2.29)	.376
Weight perception	Acceptable weight	9.1	1	
	Underweight	.5	.55 (.21–1.4)	.21
	Overweight	12.2	1.4 (.94–2.08)	.1
<i>Dependent variable: Subscale 3-oral control (anorexic tendencies)</i>				
BMI group	BMI 18.5–24.9	19.3	1	
	BMI <18.5	40.0	2.79 (1.75–4.43)	<.001
	BMI 25–29.9	11.7	.56 (.37–.84)	.005
	BMI ≥30	11.5	.54 (.29–.99)	.05
Self-estimated weight status	Correct estimator	19.9	1	
	Over-estimators	14.1	.66 (.40–1.08)	.097
	Under-estimators	12.6	.585 (.34–.999)	.049
Weight perception	Acceptable weight	20.7	1	
	Underweight	34.0	1.97 (1.24–3.14)	.004
	Overweight	11.5	.49 (.351–.710)	<.001

Note. EAT-26 = eating attitude test; BMI = body mass index; OR = odds ratio; CI = confidence interval. ^aIndicates the prevalence of each dependent variable within each category of the risk factor. $p < .05$ indicates significance.

undergraduates living in Kuwait. Almost half the respondents were at risk of disordered eating according to EAT-26, and the mean total score of the entire sample exceeded the cut-off value for being at risk of disordered eating behaviors. This rate of disordered eating attitudes and behaviors is the highest reported to date among females in Arabian Gulf Countries (Al-Subaie et al., 1996; Schulte & Thomas, 2013). The relatively high rate can be partially explained by the higher prevalence of overweight and obesity among female undergraduates in this study as compared with female undergraduates in other Arabian Gulf countries (Al-Isa, 2003; Al-Nuaim et al., 1996). The present results, however, are consistent with those of other investigations of women's weight status in Kuwait, wherein almost one-third of the sample was categorized as overweight or obese (Ahmed et al., 2012; Al-Mannai, Dickerson, Morgan, & Khalfan, 1996). Similar to past studies, the present results indicated that BMI was positively correlated with body dissatisfaction and abnormal eating behavior (Hay, Mond, Buttner, & Darby, 2008; Neumark-Sztainer, Wall, Larson, Eisenberg, & Loth, 2011), and that obesity significantly increased the odds of disordered eating attitudes, especially extreme dieting behaviors (Delinsky & Wilson, 2008). Such behaviors could stem from a distorted body image together with the presence of bulimic tendencies (Mohr et al., 2011).

To our knowledge, the present study is the first to show the interrelationships of weight perception, weight misperception, and disordered eating attitudes and behaviors in young female undergraduates. Interestingly, the findings appear to indicate that disordered eating is

more associated with weight perception than with BMI. Female Kuwaiti students who perceived themselves as overweight or who incorrectly estimated their weight status had higher odds of disordered eating attitudes and dieting behaviors, regardless of their BMI. This result suggests that such patterns of eating attitudes can be used to identify female undergraduates at particular risk of disordered eating practices. More detailed studies within a similar population are needed to further validate these findings and provide a more detailed psychological analysis.

It is noteworthy that disordered eating attitudes and behaviors were present in all groups, not only the overweight or obese groups. Among normal weight participants, 38.8% with a BMI of ≤ 24.9 had an EAT-26 score of ≥ 20 . Previous studies have also found a high prevalence of disordered eating attitudes based on EAT-26 scores among female undergraduates with a normal BMI (Alberston, Dal-Bó, Piovezan, & Silva, 2013). The present findings have also indicated that women with an underweight status had greater than twice the odds of exhibiting restrictive oral control behaviors associated with anorexia nervosa. A lower BMI has been linked to disordered eating and a drive for thinness in some vegetarian populations (Kayano et al., 2008) as well as with anorexia nervosa (Tantleff-Dunn, Barnes, & Larose, 2011). The link between lower BMI and anorexic tendencies is unclear, but may be the result of a propensity for severe caloric restriction and higher physical activity as a means of regulating anxious states (Dellava et al., 2010).

TABLE 7 Adjusted logistic regression analysis for the dependent variables and subscales

Model	Independent variables	B	SE	Wald	df	p	Exp (B)	95% CI for EXP (B)	
								Lower	Upper
Model 1: Disordered eating	Acceptable weight			9.87	2	.01			
	Underweight	.05	.23	.04	1	.84	1.05	.67	1.63
	Overweight	.50	.16	9.83	1	.00	1.65	1.21	2.26
	Major field of study	-.36	.12	8.90	1	.00	.70	.547	.88
	BMI	.04	.02	5.68	1	.02	1.04	1.01	1.08
	Constant	-1.18	.4	8.77	1	.00	.31		
Model 2: Dieting, distorted body image	Acceptable weight			5.39	2	.07			
	Underweight	.08	.33	.06	1	.81	1.08	.56	2.09
	Overweight	.48	.21	5.37	1	.02	1.61	1.08	2.40
	Major field of study	-.003	.16	.00	1	.98	.99	.72	1.38
	BMI	.04	.02	3.71	1	.05	1.04	.99	1.08
	Constant	-2.83	.47	35.71	1	.00	.06		
Model 3: Bulimia, tendencies	Acceptable weight			1.25	2	.53			
	Underweight	-.53	.48	1.20	1	.27	.59	.23	1.52
	Overweight	.03	.25	.01	1	.92	1.03	.63	1.67
	Major field of study	-.73	.22	11.46	1	.00	.48	.317	.736
	BMI	.06	.02	5.31	1	.02	1.06	1.01	1.11
	Constant	-3.24	.55	34.10	1	.00	.04		
Model 4: Oral restriction, anorexic tendencies	Acceptable weight			6.63	2	.04			
	Underweight	.55	.24	5.27	1	.02	1.74	1.08	2.79
	Overweight	-.21	.22	.84	1	.36	.82	.53	1.26
	Major field of study	-.33	.16	4.36	1	.04	.72	.53	.98
	BMI	-.09	.03	12.13	1	.00	.91	.87	.96
	Constant	.81	.59	1.89	1	.17	2.24		

Note. BMI = body mass index; OR = odds ratio; CI = confidence interval. Weight status is self-estimated, Kuwait University major field of study is Science (1) or Arts (2), and BMI was entered as a continuous covariate. $p < .05$ indicates significance.

Disturbed eating attitudes and behaviors are well documented problems among females in Western countries (Alberston et al., 2013; Madanat, Brown, & Hawks, 2007; Tantleff-Dunn et al., 2011). Recently, however, the phenomenon has also been observed in Arab countries (Musaiger et al., 2013). The present findings can therefore be understood in the context of the dietary transition in the Arab world. During the past two to three decades, there has been shift in most Arab countries from a traditional diet containing whole grains, fiber, fruits, and vegetables to a more Westernized diet rich in fat, sugar, and salt (Madanat, Lindsay, & Campbell, 2011). Body image and weight fears might thus be partly related to the worsening dietary patterns of the population (Madanat et al., 2011).

A comparison of the present findings with existing data from Arab Gulf countries shows that the proportion of participants at risk of disordered eating was higher compared with previously reported rates among female undergraduates in Saudi Arabia and the UAE (Al-Adawi et al. 2002; Schulte & Thomas, 2013). Al-Subaie et al. (1996) found that 19.6% and 24.6% of Saudi and UAE female college students scored above 20 on the EAT-26, respectively. In contrast to these high levels, Al-Adawi et al. observed that disordered eating attitudes were rare in Omani adults, with only 2% of adult participants showing a propensity toward eating disorders. These variations among Gulf countries could be caused by differences in the levels of urbanization, Westernization, and dietary transitions (Musaiger et al., 2013).

The results of the present work are comparable to the more recent findings of Musaiger et al. (2013), who found that the prevalence of disordered eating attitudes in Kuwaiti adolescents of both genders was higher than was that of their counterparts in other Arab countries. It is of concern that the prevalence of disordered eating attitudes in the present study closely matches the study of Musaiger et al. (2013) (i.e., 46% vs. 43%, respectively), as this observation indicates a continual high prevalence in Kuwait. As the Kuwaiti adolescents described in the Musaiger et al. (2013) were younger than the participants in our study, it is conceivable that the risk of disordered eating attitudes has been tracking from adolescence to early adulthood, similar to the risk of overweight and obesity (Madanat et al., 2011).

The overall strengths of this study included its relatively large sample size of college women across a broad range of science- and arts-related majors in addition to a high response rate and the use of a validated instrument. There are likely other social and cultural factors associated with the high prevalence of disordered eating attitudes that were not investigated in this study such as media exposure. The media emphasis on an ideal body that is thin and slender can negatively influence the body image and self-esteem of young females (Madanat et al., 2007). The idealized images of beauty and attractiveness in today's "slenderness culture" and the traditional sociocultural assumption that thinness is the societal stereotype for women can cause their eating behavior to become more disordered (Tantleff-Dunn et al., 2011). The

present study limitations also include a reliance on the use of self-reports for the main variables, including BMI estimates. High correlations have been observed, however, between self-reported and objectively measured height, weight, and BMI ($r > .9$; Spencer, Appleby, Davey, & Key, 2002). Similarly, in a pilot study, a highly significant correlation (Spearman rank $r = .94$ and $.90$, respectively) was noted between actual weights and heights measured by trained research assistants and self-reported weights and heights (data not shown). Thus, self-reported data on weights and heights can be considered reliable estimates for the population. The prevalence rates of overweight and obesity in this study were 24.5% and 9.9%, respectively. The above finding indicates that the obese population was underrepresented in this sample as compared to our previous survey, wherein the prevalence rates of overweight and obesity were 23.9% and 19.6%, respectively, among 198 female students (unpublished data). Likewise, Almajed et al. (2011) who studied a sample of 169 Kuwaiti college women aged 18–24 years showed prevalence rates of overweight and obesity of 33.5% and 15.9%, respectively.

In summary, the present results indicate that the high proportion of disordered eating attitudes among female undergraduates cannot be attributed to obesity alone. It appears that the type of disordered eating behavior varies by weight perception to a greater extent than weight status. Our study also highlights that disordered eating attitudes are a significant potential problem among college women in Kuwait, which coincides with the high prevalence of overweight and obesity in this population. Excessive dieting linked to eating disorders and other aberrant diet-related behaviors might work against the development of healthy eating behaviors to maintain a normal BMI. The high prevalence of disordered eating attitudes could be due to a combination of the social influences, diet, and lifestyle of undergraduates. These findings call for the need for more focused obesity interventions and behavioral modification programs for college students. Similar future studies should include male students as well as participants who have not entered a university. Weight status of young women appears to be influenced negatively by societal pressures and unhealthy body weight perception. The findings of the present work emphasize further that the above issues should be addressed by healthcare professionals as early as possible during the college years.

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CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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