

## Original Article

# Eating Disorders Among Female Students of Taif University, Saudi Arabia

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**Background:** Eating disorders are a common health problem among adolescents, and females are especially vulnerable to them. There is lack of information on the prevalence of eating disorders in Saudi Arabia. The current study aimed to investigate the prevalence of eating disorders among female undergraduate university students in Taif city, Saudi Arabia.

**Methods:** The study was undertaken in the female section at Taif university from November 1, 2016 to March 30, 2017. Eating Attitudes Test (EAT-26) was used to determine the prevalence of eating disorders. The questionnaire was distributed among undergraduate students and their anthropometric measurements were assessed after obtaining their consent. The sample included 1200 university students with a median age of 21 years (range 17–33). Nonparametric tests were used to assess relationship between variables. Chi-squared test was used to compare items of the disordered eating attitudes and behaviors between positive and negative EAT respondents.

**Results:** Using the cutoff score of 20 on EAT-26 test, 35.4% of the students were classified at risk for eating disorders. Medical and obese students achieved the highest significant EAT scores.

**Conclusion:** A high prevalence of eating disorders was found among females at Taif university, Kingdom of Saudi Arabia. Our findings call for prevention of these disorders and we recommend establishing a national screening program among Saudi university female students for early detection and management of these problems.

**Keywords:** Anorexia nervosa, Bulimia, Eating disorders, Females, Taif, University students

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**Introduction**

Adolescent eating behaviors are affected by many interfacing factors which include the social environment such as family and friends and other factors like the mass media and the availability of fast food outlets.<sup>1</sup>

Adolescents are bombarded with many advertisements which promote extreme thinness as the beauty standard. There is also a weight prejudice in the society towards thinness where thin people are viewed as more attractive, successful and happier. Consequently, adolescents experience great body dissatisfaction, feel social undesirability and engage in weight loss behaviors.<sup>2</sup>

Weight loss products are achieving great popularity these days, especially among females<sup>3</sup>; e.g. Americans spend about 35 billion dollars per year on such products.<sup>4</sup> Many of these products are not regulated by the government and do not achieve the desired results so the end result is that the individuals engage in poor eating behaviors.<sup>5</sup>

Adolescent girls particularly have excessive concerns with their body weight and are very sensitive to their appearance, so they adopt dietary modifications that impose threat on their nutritional status and make

them more vulnerable than boys to eating disordered behaviors.<sup>6-8</sup>

Shisslak et al reported that about 35% of normal dieters will turn to be pathological dieters and about 20% to 25% of those pathological dieters will later develop full-blown or partial eating disorders.<sup>9</sup>

Eating disorders are a group of psychiatric problems characterized by dissatisfaction about body image and disturbances in eating behaviors. Three types exist: anorexia nervosa (AN), bulimia nervosa (BN) and eating disorder not otherwise specified (EDNOS). AN is characterized by self-starvation where persons voluntarily eat too little because they have a morbid fear of gaining weight. AN sufferers see themselves as overweight, even when they are emaciated.<sup>10</sup> On the other hand, bulimia nervosa is characterized by frequent binge eating followed by intense weight-control behaviors, such as prolonged fasting, self-induced vomiting, and the maluses of laxatives and diuretics.<sup>11</sup>

Nowadays, health professionals pay great attention to eating disorders because of the striking figures reported in adolescent age and their significant impact

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on morbidity and mortality.<sup>12</sup> Recent data derived from epidemiological studies denote elevated prevalence in university students.<sup>13,14</sup>

Eating disorders can influence every organ in the body. Sufferers may experience higher levels of cardiovascular problems, infertility, digestive disorders, insomnia, anxiety, depression, suicide, fatigue, pain, and limitations in activities due to poor musculoskeletal health.<sup>15</sup> Moreover, eating disorders have the highest mortality rate of any psychiatric disease.<sup>16</sup>

Conduction of screening studies for eating disorders among youth is mandatory to face their alarming statistics in this population. Therefore, the objective of the current study was to investigate the prevalence and associated factors of eating disorders among female college students in Taif city in Saudi Arabia.

### Materials and Methods

This study was conducted in Taif city, the Kingdom of Saudi Arabia from November 1, 2016 to March 30, 2017. A cross-sectional design was used where 1200 undergraduate volunteer students from the female university were asked to participate in the study after taking their verbal consent. Pregnant students and those who had chronic diseases were excluded from participation. Questionnaires were distributed to students within the college time. Data collectors informed the students not to leave any questions unanswered and they made sure that all questions were answered by every participant before receiving the questionnaires from them.

The questionnaires included 2 parts. The first part was about demographic and anthropometric data like age and type of college, weight and height. The second part was about evaluation of disordered eating attitudes where an Arabic version of Eating Attitude Test 26 (EAT-26) was used which has been previously validated by Al-Adawi et al.<sup>17</sup>

EAT-26 is a standardized widely used measure of self-reported symptoms of eating disorders. The updated version was published in 1982 which was proved to be highly reliable and valid.<sup>18</sup> It includes 26 items with three sub-scales which are dieting items, bulimia & food preoccupation items and oral control items. Each item has a 6-point Likert scale to choose from. To calculate the total score of items from 1 to 25, the scales of “always”, “usually” and “often” were given scores of 3, 2, and 1, respectively, while the other three scales (never, rarely and sometimes) were given a score of zero. Inversely, the scores of “never”, “rarely”, and “sometimes” in question 26 (Enjoy trying new rich foods) were given scores of 3, 2, and 1, respectively, and the three other scales were scored as zero. The range of the total score was 0-78. A total score of 20 or more was classified as being at risk of

eating disorders; positive EAT-26.<sup>19</sup>

Weight and height of participants were assessed in light clothes and without shoes using a digital scale and a portable stadiometer. Body mass index (BMI) was calculated as weight (kg)/height square (m<sup>2</sup>). Participants were divided into 8 groups according to the World Health Organization (WHO) classification of BMI; severe thinness (BMI <16), moderate thinness (BMI: 16–17), mild thinness (BMI: 17–18.5), normal weight (BMI: 18.5–25), overweight (BMI: 25–30), obese class I (BMI: 30–35), obese class II (BMI: 35–40) and obese class III (BMI >40).<sup>20</sup>

### Statistical Analyses

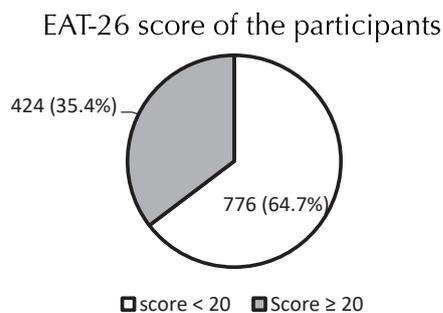
All statistical analyses were carried out with SPSS version 20.<sup>21</sup> Normality of distribution was assessed using Kolmogorov-Smirnov test. Data for continuous variables were expressed as mean  $\pm$  SD and median (range). Categorical variables were described in frequency (percentage). The distributions of BMI and EAT-26 scores were not normal; so, nonparametric tests (Mann-Whitney U test and Kruskal-Wallis test) were used for comparison between variables. Chi-squared test was used to compare items of the disordered eating attitudes and behaviors between positive and negative EAT respondents. A multiple linear regression analysis was used to assess independent predictors for the EAT attitudes and behaviors of the students. The significance level was set at equal to or less than 0.05.

### Results

The median age of participants was 21 years, ranging from 17 to 33. Out of 1200 students participating in the study, 45% were medical students, 29.7% were theoretical and 25.3% were scientific students. Regarding BMI of students, 1.7% were severely thin, 11% were mild thin, 5.1% were moderately thin, 59.6% had normal BMI, 17.4% were overweight, 4.1% were class 1 obese, and 1.1% were class 2 and 3 obese. The mean EAT-26 score of participants was 17.5 with a standard deviation of 10.4 and a median of 15 within a range of 0 to 64. Dieting subscale mean was 8.7 with a standard deviation of 6.5 while bulimia subscale mean was 3.3 with a standard deviation of 3.5. Oral control subscale had a mean of 5.5 with a standard deviation of 4.2.

In Figure 1, about 35.4% of students had an EAT-26 score of more than or equal to 20 and were classified as positive 26-EAT respondents.

All the responses of EAT-26 questions were divided into three subscales; Dieting, Bulimia and Oral Control and are represented in Tables 1 to 3. Positive EAT students had significantly higher proportion in all items of attitudes and behaviors compared to negative ones (all



**Figure 1.** EAT-26 Scores of the Participants.

$P < 0.001$ ) except only for the item of “enjoy trying new rich foods” which did not differ significantly between respondents ( $\chi^2 = 3.4$  and  $P = 0.065$ ).

The highest dietary subscale item (75.2%) in the positive EAT students was found to be “Think about burning up calories when exercising” followed by “Terrified of being overweight” and “Preoccupied with desire to be thinner” in 72.9% and 71.7%, respectively, while the lowest item was “Enjoy trying new rich foods” in 31.8% (Table 1). In Table 2, the highest bulimia and food preoccupation item in the positive EAT students was “Feel that food controls my life” in 64.9% while the lowest item was “Vomit after eating” in 25.2%. In Table 3, the highest oral control item in the positive EAT students was “Display self-control around food” in (76.2%) while the lowest item was “Avoid eating when hungry” in 39.4%.

**Table 1.** Dieting Subscale Scores of the Participants

Dieting Attitudes	EAT-26 Negative (776), No. (%)	EAT-26 Positive (424), No. (%)	$\chi^2$	P value
Terrified about being overweight	278 (35.8)	309 (72.9)	150.6	< 0.001
Aware of calorie content of food I eat	140 (18)	178 (42)	80.7	< 0.001
Avoid food with high carbohydrate content	75 (9.7)	174 (41)	164	< 0.001
Feel guilty after eating	134 (17.3)	259 (61)	239	< 0.001
Am preoccupied with desire to be thinner	283 (36.5)	304 (71.7)	136	< 0.001
Think about burning up calories when exercising	480 (61.9)	319 (75.2)	22	< 0.001
Am preoccupied with the thought of having fat on my body	103 (13.3)	207 (48.8)	180.8	< 0.001
Avoid foods with sugars in them	84 (10.8)	196 (46.2)	192	< 0.001
Eat diet food	135 (17.4)	208 (49)	134.6	< 0.001
Feel uncomfortable after eating sweets	136 (17.5)	224 (52.8)	162.7	< 0.001
Engage in dieting behavior	114 (14.7)	190 (44.8)	131.5	< 0.001
Like my stomach to be empty	110 (14.2)	202 (47.6)	159.6	< 0.001
Enjoy trying new rich foods	208 (26.8)	135 (31.8)	3.4	0.065

**Table 2.** Attitudes of Bulimia and Food Preoccupation Subscale Scores

Attitudes of Bulimia and Food Preoccupation	EAT-26 Negative (776), No. (%)	EAT-26 Positive (424), No. (%)	$\chi^2$	P Value
Find myself preoccupied with food	183 (23.6)	219 (51.7)	96.9	< 0.001
Have gone on Eating binges	105 (13.5)	220 (51.9)	204.3	< 0.001
Vomit after eating	41 (5.3)	107 (25.2)	100.9	< 0.001
Feel that food controls my life	286 (36.9)	275 (64.9)	86.4	< 0.001
Feel that others pressure me to eat	138 (17.8)	213 (50.2)	139.5	< 0.001
Have the impulse to vomit after meals	67 (8.6)	134 (31.6)	103.7	< 0.001

Behaviors of eating disorders, represented in Table 4, were generally low in the participants. However, they were significantly higher in the positive EAT students compared to negative ones ( $P < 0.05$ ). The highest item was “Gone on eating binges” in 38.7% of positive respondents while the lowest items were “Exercised more than 60 min/d to lose or control weight” and “Lost 9 kg or more in the last 6 months” in 9% and 9.2%, respectively.

Table 5 shows the univariate (using Kruskal-Wallis and Mann-Whitney tests) and multivariate (using multiple linear regression) association between college and BMI categories of the participants and their attitudes and behaviors of eating disorders. It was found that medical students achieved a median attitude score of 17 with a range of 2–64 which was significantly higher than ( $P < 0.001$ ) theoretical and scientific students’ median scores (15 and 13 respectively). However, there was no significant difference in attitude scores between theoretical and scientific college ( $P = 0.486$ ). Concerning behavior scores, medical college students scored significantly higher than theoretical college ones ( $P < 0.001$ ) but insignificantly different from scientific students ( $P = 0.072$ ). On the other hand, there was a significant difference in the behavior scores between scientific and theoretical colleges ( $P = 0.002$ ).

Regarding BMI categories, there was a significant difference between the 3 groups of BMI in their attitudes

**Table 3.** Attitudes of Oral Control Subscale of the Participants

Attitudes of Oral Control	EAT-26 Negative (776), No. (%)	EAT-26 Positive (424), No. (%)	$\chi^2$	P Value
Avoid eating when hungry	66 (8.5)	167 (39.4)	167	< 0.001
Cut my food into small pieces	237 (30.5)	218 (51.4)	50.8	< 0.001
Feel others prefer if I eat more	192 (24.7)	229 (54.4)	103	< 0.001
Other people think I am too thin	319 (41)	223 (52.6)	14.6	< 0.001
Take longer than others to eat my meal	195 (25)	231 (54.5)	103.2	< 0.001
Display self-control around food	413 (53.2)	285 (76.2)	22	< 0.001
Feel that others pressure me to eat	238 (30.7)	239 (56.4)	75.6	< 0.001

**Table 4.** Behaviors About Oral Control Subscale Scores of Participants

Attitudes of Oral Control	EAT-26 Negative (776), No. (%)	EAT-26 Positive (424), No. (%)	$\chi^2$	P Value
Gone on eating binges	144 (18.6)	164 (38.7)	58.2	<0.001
Ever made yourself vomited to control weight or shape	54 (7)	118 (27.8)	97.3	<0.001
Ever used laxatives or diuretics to control weight or shape	42 (5.4)	120 (28.3)	123	<0.001
Exercised more than 60 min per day to lose or control weight	44 (5.7)	38 (9)	4.7	0.031
Lost 9 kg or more in the last 6 months	44 (5.7)	39 (9.2)	5.3	0.021

**Table 5.** EAT- 26 Scores (Attitudes and Behaviors) in Relation to College and BMI of Participants

Categories	Attitudes of Eating Disorders			Behaviors of Eating Disorders		
	Median (Range)	P Value	Linear Regression	Median (Range)	P Value	Linear Regression
College						
Theoretical	13.5 (1–64)	$P_1 = 0.486$	$B = 1.34,$ $P \text{ value} < 0.001$	6 (4–20)	$P_1 = 0.002$	$B = 0.65,$ $P \text{ value} < 0.001$
Scientific	15 (0–55)	$P_2 < 0.001$		7 (4–22)	$P_2 < 0.001$	
Medical	17 (2–64)	$P_3 < 0.001$		7 (4–25)	$P_3 = 0.072$	
BMI						
Underweight	16 (3–37)	$P_4 = 0.008$	$B = 1.34,$ $P \text{ value} = 0.004$	5 (4–19)	$P_4 < 0.001$	$B = 1.32,$ $P \text{ value} < 0.001$
Normal	15 (0–64)	$P_5 = 0.003$		6 (4–22)	$P_5 < 0.001$	
Overweight/Obese	18 (1–55)	$P_6 = 0.73$		8 (4–25)	$P_6 < 0.001$	

and behaviors of eating disorders ( $P$  values range from 0.008 to <0.001), except for the difference in the attitude between underweight and normal groups which was insignificant ( $P=0.073$ ). The obese group achieved the highest median attitude and behavior scores among participants (18 and 8), respectively.

A multiple linear regression analysis was run to predict the attitude and behavior scores from college and BMI of the students, which revealed they were significant predictors for the attitudes and behaviors of the participants ( $P < 0.05$ ).

## Discussion

Adolescence is a window of vulnerability to eating disorders due to increased concerns about body image during that period. Females are especially highly conscious about their body image and always have the desire to be thin. They resort to inappropriate methods to lose weight that eventually make them suffer from eating disorders.<sup>22</sup> In this study, we described the prevalence of eating disorders among a large number of Taif female university students (1200 participants) and assessed the

relationship between eating disorders of the students and their BMI and college.

We found a high prevalence of eating disorders in the current study; 35.4% (Figure 1), which is in concordance with the results from recent studies; 37.6% and 36.4% in Bangladesh and Oman, respectively.<sup>23,24</sup> The prevalence in the current study is slightly higher than that reported by a recent study in Saudi Arabia in 2015, where 32.9% of female students scored above the cut off level of 20 using the same tool of measurement; Eat-26 test.<sup>25</sup> Varying percentages of eating disorders among university students have been reported all over the world; a Brazilian study in 2011 reported a prevalence of about 22.4%,<sup>26</sup> 11.2% was reported in an Egyptian study<sup>27</sup> and 23.4% in an Emirati study.<sup>28</sup>

Our result regarding the descriptive statistics of EAT-26 total score of the participants (median is 15, range = 0-64 and mean  $\pm$  SD of  $17.5 \pm 10.4$ ) was slightly higher than figures reported by Memon et al in 2012 on the medical Pakistani students where he reported an EAT score median of 11 with a range of 75 and a mean  $\pm$  SD of  $13.2 \pm 9.7$ .<sup>13</sup>

More than 70% of positive EAT participants in our study (Table 1) reported the attitudes of thinking about burning up calories when exercising, being terrified of being overweight and being preoccupied with the desire to be thinner. A plausible justification for these findings is that females worry so much about their body image and have many concerns about it especially because they are maturing and approaching the age of marriage. Much research has shown that adolescents especially females are bombarded with the idea of perfect body due to intense pressure from the media and the society, particularly their peers.<sup>29,30</sup>

About 65% of the positive EAT students in our study felt that food controls their life (Table 2). Only 39% of positive EAT students avoided eating when hungry (Table 3). Moreover, nearly 39% of positive EAT respondents reported eating binges where they feel that they may not be able to stop (Table 4). All these findings indicate that students suffer from food obsession and addiction where they are unable to control their eating urges. Eating binges in adolescent females has been justified by Fallatah et al. They relate this condition to the attractive food advertisements in television shows, the food flavors that make food irresistible and the psychological instability that may affect adolescents.<sup>25</sup>

A review paper about prevalence of physical inactivity in Saudi population in 2004 reported increasingly prevalent sedentary living and low levels of physical activity among the Saudi people, especially females.<sup>31</sup> This may explain why the behavioral item "Exercised more than 60 min/d to lose or control weight" scored least (9%) among positive EAT respondents (Table 4).

Medical students in the current study (Table 5) had the highest median attitude and behavior scores for eating disorders and scored significantly higher than theoretical and scientific students in the attitude items. On the other hand, scientific college students scored significantly higher than their theoretical peers in the behavior items. No doubt, there is a difference in the educational load and stress between colleges where higher degrees of stress and eating disorders are experienced by medical students due to excessive curricular and extracurricular duties they have in their studies. These results are supported by many studies which relate eating disorders in students to their educational load.<sup>13,32-34</sup>

Eating disorders and obesity are usually regarded as different problems but in fact, they have converging scenarios. In binge eating disorder which is not followed by purging, sufferers may gain weight. Conversely, many obese persons in weight loss programs report difficulties in achieving weight loss which makes them feel shame, depression and lower self-esteem and consequently place them at higher risk for disordered eating.<sup>35,36</sup>

In the current study, obese subjects had significantly higher attitude and behavior scores compared to normal BMI and underweight groups (Table 5). The low EAT-26 scores in the underweight group could be attributed to their satisfaction after achieving the desired lean body image while most obese persons are dissatisfied with their body shape. Rohde et al stated that satisfaction about body size has a pivotal role in eating disorders.<sup>37</sup> On the other hand, the existing significant difference between the normal BMI group and the underweight group in the behavior scores reflects dissatisfaction about body image even in normal weight subjects enforced by media advertisements. Media often uses thin and even emaciated models in their advertisement. These unrealistic standards are very hard to attain and less than 5% of population of females can achieve it.<sup>38</sup> Adopting these thin models as models of beauty has led the females, even those with normal weight, to think negatively about their body size. These findings are in line with results from other studies; Martini et al stated that a high proportion of normal weighted adolescents especially females are dissatisfied about their weight.<sup>39</sup> Furthermore, Ferron et al reported that 70% of normal weight females feel they are fat and start dieting.<sup>40</sup> The association between anthropometric indices such as BMI and the increase in disordered eating has been well documented by many other studies.<sup>41-44</sup> A limitation for this study includes not assessing prevalence of eating disorders among male university students to be available for comparison with the females. However, we focused on females because the literature frequently reports high prevalence of eating disorders among them (as mentioned above) and we suggest implementing future studies to assess the male prevalence among the studied population.

In conclusion, our study found a high prevalence of eating disorders in female students at Taif university. Our findings recommend implementing effective prevention strategies for these disorders to help female students develop healthy eating attitudes and behaviors. A national screening program for eating disorders is also mandatory among those students for early detection and management.

#### Authors' Contribution

AAAET contributed to study design, analysis and interpretation of data, and drafting of the manuscript. HAAZ contributed to study design and critical revision. DESD contributed to study design, interpretation of data.

#### Conflict of Interest Disclosures

The authors have no conflicts of interest.

#### Ethical Statement

Students participated in the study voluntarily after obtaining their verbal consent.

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