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## Research Article

# Disordered Eating Attitudes and Exercise Behavior among Female Emirati College Students in the United Arab Emirates: A Cross- Sectional Study

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### Abstract

**Background:** Growing evidence is showing high levels of physical inactivity and disordered eating attitudes among young females in the United Arab Emirates. This is clearly concerning, but little is known about the activity level of those with disordered eating attitudes and their dieting behavior. This study examines the female Emirati college students' disordered eating attitudes and its relation to exercise behavior.

**Method:** A cross- sectional study using a validated and reliable questionnaire was conducted on 242 Emirati female students attending a public university in Dubai. Eating Attitudes Test- 26 (EAT26) was used to measure eating attitudes and the short International Physical Activity Questionnaire (IPAQ) was included to measure physical activity level. A systematic random sampling from a list of classes in the fall 2014 semester was used for recruitment. The university's Research Ethics Committee approved the study and consents were obtained from participants. SPSS v.21 was used for data analysis. Chi-square test was used to compare frequencies. Significance level was set at 0.05.

**Results:** The participants' mean age and standard deviation (Mean  $\pm$  SD) was  $19 \pm 1.3$  years. 31.4% of the participants showed disordered eating attitudes. The percentage of participants engaged in at least one concerning behavior in the past six months was 43.8%. A membership in a health club was significantly related to disordered eating attitudes ( $p < 0.01$ ). A high level of physical activity was correlated with laxative use, over the counter supplements, and exercising for more than 60 minutes to control weight ( $p < 0.05$ ).

**Conclusion:** There is a great need for intervention programs and policies to contain the level of abnormal eating attitudes and promote healthy level of physical activity among college students.

**Keywords:** Eating disorders, Physical activity, College Students, UAE

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## 1. Introduction

Eating disorders are defined as a group of serious conditions caused by preoccupation with food and weight that might threaten individual's health and quality of life [3]. The Diagnostic and Statistical Manual for Mental Health Fifth Edition (DSM V) classifies them into: Pica, Rumination Disorder, Avoidant/ Restrictive Disorder, Anorexia Nervosa, Bulimia Nervosa and Binge Eating Disorder [2]. The link between these disorders and several serious physical and psychological complications, such as amenorrhea, osteoporosis, heart diseases, depression, and death in some cases is established [3, 23].

Increasing evidence supports the link between having disordered eating attitudes and the likelihood of developing eating disorders which makes studying the former a predictor of the latter [22]. Extreme dieting behaviors such as restricted food intake and compulsive physical activity have been associated with abnormal eating attitudes and are worth in-depth study [14, 33]. It is important to note that studying these attitudes is preferred using a multi-dimensional perspective, since a number of interpersonal, psychological and social risk factors have been linked to its development [18, 24]. For example, the history of abuse and disturbed personal relationships, having low self-esteem, stress, depression, lack of control and being from a culture where "thinness" is glorified were found to increase the likelihood of eating disorder development [18, 24].

Physical activity is linked to positive outcomes and proposed as a treatment method for individuals with eating disorders [3]. The association between physical activity and many positive outcomes such as decreased risk of obesity, chronic diseases and improved psychological health is documented [29]. A positive relationship between increased obsession about physical activity and eating disorders has been found, especially among athletes and known as "anorexia athletica" [14, 27, 33]. Studies highlight that in most cases this obsession becomes dysfunctional, leading to spending hours in exercising, mood changes and withdrawal symptoms, such as missing social gatherings frequently, as well as physical and psychological problems. This phenomenon was described by earlier studies as "Exercise Dependence" [19, 33].

The Academy of Eating Disorders estimates that one in five women struggle either with eating disorders or disordered eating attitudes [1]. In the UAE, a study by Thomas, et al. found 24.6% of the surveyed undergraduate Emirati females with abnormal eating attitudes and 74.8% were dissatisfied with their body size [25]. Zmijewski, Howard and Musharrafieh, et al. found a positive relationship between disordered eating attitudes, hours spent in exercise and exercise-dependent symptoms among university students [16, 33]. Nevertheless, this relationship needs to be investigated among the UAE population before accepting it.

The United Arab Emirates (UAE) is a young country with more than one third of its population considered overweight and obese, not to mention cardiovascular diseases and type2 diabetes, the leading causes of death, that are linked to obesity in the country [11]. Growing evidence shows increased physical inactivity among UAE population and high levels of disordered eating attitudes among young females [17, 25, 26, 28, 29]. This is clearly concerning, but little is known about the activity level of those with disordered eating attitudes and their dieting behavior. This study aims to provide better insights into undergraduate university student's disordered eating attitudes in relation to exercise behavior and the effect of selected social factors on student dieting behavior.

## 2. Methododology

### 2.1. Study Design

A cross-sectional study was used to explore the relationship between eating attitudes and exercise behavior among Emirati college students attending a public university in Dubai during October- November 2014. An ethical clearance was obtained from the university's Research Ethics Committee; an informed consent that stated the purpose of the study, benefits and the right to withdraw at any stage was attached to the study questionnaire. The questionnaire was translated into Arabic and piloted on a group female students who are not included in the analysis for this study. IBM SPSS Statistics v.21 was used for analysis. The Chi-square test was employed to compare frequencies. Significance level was set at 0.05.

### 2.2. Sample Selection

A systematic random recruitment of classes was used as a sampling method. A list of all the classes offered by University College in fall 2014 semester at the Dubai campus was imported from the University's Banner Web. There were 180 classes and it was estimated that each class has approximately 22 students. Every 6<sup>th</sup> class was contacted to take part in the study. A total of a sample of 365 participants was reached from the responses. This was filtered by the inclusion criteria (females, UAE citizens, aged 17-25 years old, free from diseases and in the first or second year of college) to reach a net sample of 242.

## 2.3. Instrument

A 7-page self-administered questionnaire was distributed. The cover page entailed formal informed consent. The following six pages consisted of four sections: personal information, eating attitudes, physical activity level and exercise dependence.

### 2.3.1. Section 1

Sought to explore demographic information such as age, year of study, residency, etc. Also, it looked at different personal and social factors that might influence levels of physical activity and eating attitudes.

### 2.3.2. Section 2

Was a pre-validated, widely used reliable screening tool for eating attitudes, EAT26. Eating Attitudes Test- 26 (EAT26) was first developed in 1993, and aims to identify the risk of developing eating disorders among adolescent and adult age groups through a set of 26 items and five behavioral statements [9]. Items in this test cover four main areas: dieting scale, bulimia and food preoccupation scale, oral control subscale and behavioral questions. EAT-26 has been used as a screening tool for eating disorders and reported an accuracy of 90% when compared against a diagnostic interview by a qualified professional [13]. In EAT26, respondents are asked to respond to the given behaviors/thoughts by choosing the frequency of their occurrence in the past six months (scale: always to never). Then a certain scoring protocol is followed. Participants who score above 20 and others who answer positively to one or more of the behavioral statements are advised to go through a clinical interview by a qualified professional for further investigation [9, 13].

### 2.3.3. Section 3

Aimed to explore the level of physical activity using an English and Arabic version of the short International Physical Activity Questionnaire (IPAQ). Developed in 1998 and tested for years among many countries for reliability and validity, the short IPAQ was found to be an acceptable measure for physical activity practices in cross-sectional studies when direct measurements of physical activity are not feasible [5, 12]. The IPAQ measures the level of physical activity based on a recall of all activities performed in the past seven days. The level of physical activity is expressed by the MET-minute/week, which is calculated based on the type of activity, its duration and

number of days/week they exercise. In this study, participants' level of activity was classified based on cutoff points: MET= 600 and 1200 for young adults and adolescents respectively. These points were calculated based on meeting the international recommendations of physical activity (30 minutes for adults and 60 minutes for adolescents of moderate physical activity for at least five days a week) [29].

#### 2.3.4. Section 4

Consisted of a pre-validated Exercise Dependence Questionnaire (EDQ). The original EDQ was developed by Ogden, et al. [19]. It consists of 29-items that measure nine areas: interference with social/family life, positive reward, withdrawal symptoms, exercise for weight control, exercise for health reasons, insights into the problem, exercise for social reasons and stereotyped behavior [19]. Participants are asked to state their level of agreement with certain statements using a 7-point Likert scale (1 = Strongly disagree, 7 = Strongly agree) [19, 33]. For the purpose of this study, only questions related to positive reward, withdrawal symptoms, exercise for health reasons and interference with social/family life were included.

### 3. Results

The participants' mean age and standard deviation (Mean  $\pm$  SD) was  $19 \pm 1.3$ . The prevalence of disordered eating attitudes among the surveyed sample was 31.4% (n = 76). Table 1 presents the sample's main characteristics and their relation to eating attitudes measured by EAT-26. The  $p$ -value describes the level of significance when chi-square test was used. The effect of age, marital status, number of children, employment status, and year of study was found to be insignificant. However, having a membership in a gym or health club was found to be significantly related to disordered eating attitudes ( $p < 0.01$ ).

A significant positive correlation was found between EAT-26 scores and Body Mass Index (BMI) ( $r^2=0.181$ ,  $p<0.01$ , a two-tailed bivariate correlation), meaning that the increase in BMI was associated with increased risk of developing disordered eating attitudes (Table 2). When examining the correlation between the various EAT-26 scales and the level of reported physical activity, we found a strong positive correlation between higher scores on the dieting scale and a higher level of physical activity ( $r^2=0.193$ ,  $p= 0.006$ , two tailed bivariate correlation). Indicating that the higher engagement in dieting behaviors was linked to more hours spent exercising. Bulimia, food preoccupation and oral control subscale were not found to have an effect on the level of physical activity expressed by MET ( $p > 0.05$ ) (Table 2).

		Total N = 242	Eating Attitudes		P-value
			Normal N = 166	Disordered N = 76	
		N(%)	N (%)	N (%)	
<b>Age</b>	17-19	72 (71.1)	121 (70.3)	51 (29.7)	0.357
	20-25	70 (28.9)	45 (64.3)	25 (35.7)	
<b>Marital Status</b>	Single	216 (90.0)	149 (67)	67 (31)	0.617
	Engaged	10 (4.2)	8 (80)	2 (20)	
	Married	14 (5.8)	8 (57.1)	6 (42.9)	
<b>Number of Children</b>	0	7 (50)	4 (57.1)	3 (42.9)	0.614
	1	3 (21.4)	2 (66.7)	1 (33.3)	
	2	2 (14.3)	1 (50)	1 (50)	
	3	2 (14.3)	2 (100)		
<b>Employment Status</b>	Full time	1 (0.4)	1 (100)		0.26
	Part time	6 (2.6)	2 (33.3)	4 (66.7)	
	Not employed	226 (97)	157 (69.5)	69 (30.5)	
<b>Year of Study</b>	1 <sup>st</sup>	138 (57.2)	96 (69.6)	42 (30.4)	0.726
	2 <sup>nd</sup>	103 (42.8)	69 (67)	34 (33)	
<b>GYM membership</b>	Present	57 (23.6)	30 (52.6)	27 (47.4)	<0.01
	No membership	185 (76.4)	136 (73.5)	49 (26.5)	

TABLE 1: Sample main characteristics in relation to Eating Attitudes Test scores. \*Chi-square test was used.

Table 3 presents the associations concerning behaviors with dieting as measured by EAT-26. All of the surveyed behaviors were performed at a higher frequency among the sub-sample with disordered eating attitudes. In addition, a higher level of physical activity was found to be correlated with a higher frequency of engagement in behaviors examined by the EAT-26, such as use of laxatives and over-the-counter supplements and exercising for more than 60 minutes daily to control weight in the past six months ( $r^2 = 0.191$ ,  $p < 0.05$ , a two-tailed bivariate correlation).

To understand the behaviors of those who reported higher levels of physical activity and disordered eating attitudes, we examined some addictive behaviors related to exercise explored by the Exercise Dependence Questionnaire (EDQ) [19]. Increased

Eating Attitudes Test (EAT-26) Score classification	Body Mass Index Classification				p- value (r <sup>2</sup> )
	Underweight	Normal	Overweight	Obese	
	n = 239				
Disordered Eating Attitudes	3 (4%)	56 (74.7%)	6 (8%)	10 (13.3%)	
Normal Eating Attitudes	18 (11%)	130 (79.3%)	12 (7.3%)	4 (2.4%)	<0.01 -0.181

TABLE 2: Body Mass Index Classification in relation to Eating Attitudes Test Score. The table is based on two tailed bivariate correlation test.

Concerning behaviors as measured by EAT-26	Sample engagement in concerning behaviors in the past 6 months measured by Eating Attitudes Test (EAT-26)																	
	All sample (N=242)								Sub-sample with disordered eating attitudes (n=76)									
	Never	Once a month or less	2-3 times/month	Once a week	2-6 times a week	Once a day or more	Never	Once a month or less	2-3 times/month	Once a week	2-6 times a week	Once a day or more	Never	Once a month or less	2-3 times/month	Once a week	2-6 times a week	Once a day or more
Frequent binge eating episodes	100 (41.3%)	62 (25.6%)	23 (9.5%)	31 (12.8%)	15 (6.2%)	11 (4.5%)	19 (25%)	22 (28.9%)	8 (10.5%)	13 (17.1%)	8 (10.5%)	6 (7.9%)						
Vomiting to control weight or shape	218 (90.1%)	11 (4.5%)	3 (1.2%)	2 (0.8%)	3 (1.2%)	5 (2.1%)	59 (77.6%)	7 (9.2%)	3 (3.9%)	2 (2.6%)	2 (2.6%)	3 (3.9%)						
Use of laxatives or Over The Counter weight loss supplements	209 (86.4%)	11 (4.5%)	4 (1.7%)	5 (2.1%)	6 (2.5%)	7 (2.9%)	51 (67.1%)	8 (10.5%)	3 (3.9%)	4 (5.3%)	5 (6.6%)	5 (6.6%)						
Exercise >60minutes to burn off calories	81 (33.5%)	48 (19.8%)	20 (8.3%)	25 (10.3%)	46 (19%)	22 (9.1%)	14 (18.4%)	18 (23.7%)	6 (7.9%)	8 (10.5%)	16 (21.1%)	14 (18.4%)						
Significant weight loss (10kg or more)	Yes			No			Yes			No								
	38 (15.8%)			203 (83.9%)			19 (25%)			57 (75%)								

TABLE 3: Frequency of engagement in concerning behaviors in the past 6 months measured by Eating Attitudes Test.

time spent in exercise was found to be linked to interference with social life – meaning that participants would miss social events in order to exercise– and withdrawal symptoms such as irritability if they were unable to exercise (two tailed t-test,  $p < 0.05$ ). There was no strong significant correlation between exercising to feel better or for health reasons and the time spent in exercise (Table 4).



Exercise Dependence Questionnaire categories	Study's main variables	
	Level of exercise	Eating attitudes scores
	N = 193	N = 193
<b>Interference with social life</b>		
Pearson Correlation	0.155	0.209
Significance (2 tailed)	<0.05	<0.01
<b>Positive reward</b>		
Pearson Correlation	0.147	0.167
Significance (2 tailed)	<0.05	<0.05
<b>Withdrawal Symptoms</b>		
Pearson Correlation	0.21	0.322
Significance (2 tailed)	<0.01	0
<b>Exercise for health reasons</b>		
Pearson Correlation	0.079	0.089
Significance (2 tailed)	0.277	0.218

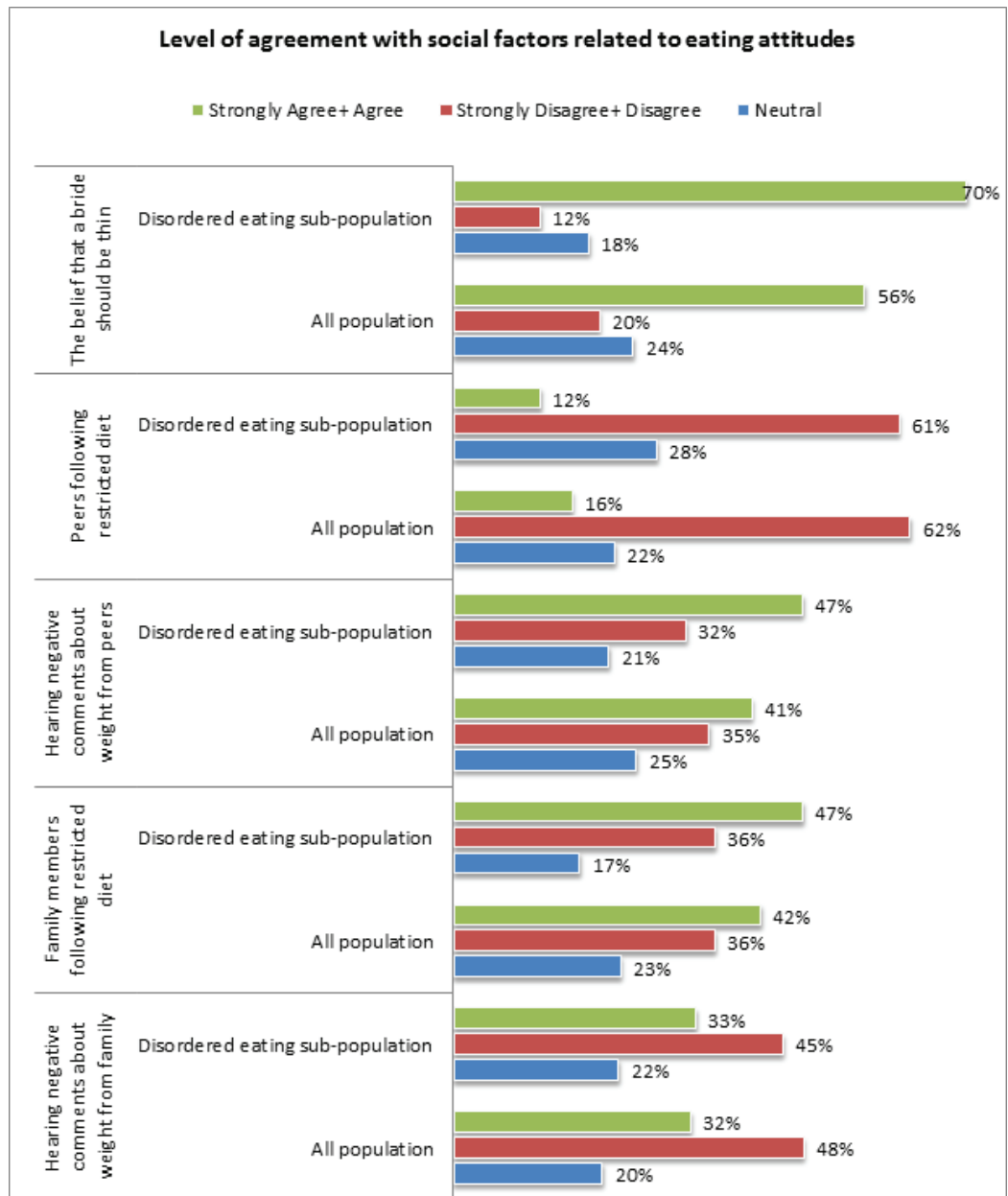
TABLE 4: The correlation between the main variables of the study and Exercise Dependence Questionnaire categories. The test was performed using a two tailed bivariate correlational test.

In addition, correlational tests were run to examine if social factors related to family and peers' diets and expressing negative comments about participant's weight influenced participants' eating attitudes, but there was no significant correlation.

Figure 1 highlights participants' responses to the given statements related to diet behaviors and social support. About one third of sub-population at risk to eating disorders stated that they heard negative comments about their weight from peers and family members, indicating social pressure; surprisingly, some 70% of them were convinced about the need to be thin on their wedding night.

## 4. Discussion

Disordered eating attitudes measured by EAT-26 have been used as an indicator of eating disorder development risk, and studies validated its use in the mild cases of



**Figure 1:** Level of agreement with statements related to social factors that might influence participants' eating attitudes.

eating disorders [13, 20]. The prevalence of eating disorders risk found in this study (31.4%) is higher than what was reported by number of earlier studies targeting the UAE population; there, scores above the EAT-26 cutoff did not exceed a quarter of the surveyed population [7, 25, 26]. It is also higher than reported scores among university students in other countries such as Malaysia and the Academy of Eating Disorders estimates (21.3%, 20% respectively) [1, 8]. The only study with a similar prevalence in the UAE found 33.5% of the surveyed adolescent females (n = 243) with abnormal eating attitudes [15].

Although Thomas, et al [17] focused on female university students with a similar sample size, the higher prevalence of abnormal eating attitudes found in this study (31.4% compared to 24.6%) could be due to a change in the attitudes of students towards dieting. It can also be related to greater accuracy in responding to the EAT-26 statements, since Arabic translation was provided in this study, a limitation cited in the former study.

The comparatively high socio-economic status that many Emiratis experience and their increased exposure to media ideals, especially in a rapidly developing city like Dubai (where most of the participants live) could have increased the risk of eating disorders by creating a disturbed self-image [10, 24]. This can be supported by the high level of body dissatisfaction reported in earlier studies [25, 26]. Little has been reported about the behaviors measured by EAT-26 in the literature, but the findings of the study in this area are alarming. Knowing that 9.9% and 13.6% of the whole sample used potentially damaging methods to control weight, such as vomiting and laxative consumption, emphasizes the need for intervention strategies to tackle these behaviors.

Social factors related to eating and exercise behavior were explored in this study to some extent to gain a better understanding of the population. No significant correlation found between the given statements and studied variables might be related to reporting bias or a low level of influence of these factors. The younger generation might be more influenced by media, as Swami, et al. [17] state, a factor that was not explored in this study. However, the level of agreement with exposure to peers and family negative comments was high among those with disordered eating attitudes, indicating some level of association between these variables as suggested by the National Eating Disorders Academy [18].

A significant positive correlation was found between BMI and EAT-26 scores, indicating a higher risk for developing eating disorders in those who are overweight or obese. The correlation can perhaps be justified by the UAE culture of modern body image, that is increasingly promoting a lean body, as suggested by studies and local reports [4, 6, 21, 25].

The significant relationship between dieting behavior and level of exercise examined in this study implies the presence of some symptoms associated with anorexia nervosa. The level of exercise dependence and its association with the time spent in exercise matches the findings of earlier studies, indicating that addictive behavior can appear among those who spend a lot of time in exercise to a level that impairs their social lives [14, 27, 33].

## 5. Conclusion

High levels of abnormal eating attitudes and engagement in behaviors deemed concerning were found in this study, along with some level of exercise addiction among those who meet the international recommendation for physical activity. It is important to note that abnormal eating attitudes do not necessarily mean a probable development of eating disorders. However, the presence of the former, increase the likelihood of the latter [3, 22]. Considering the devastating health effects associated with eating disorders, such as risk of heart disease, renal failure and other diseases, intervention is urgently needed [2, 25]. Effective interventions should be applied at an institutional level to guarantee better results. General campaigns in public places could help in raising awareness about eating disorders and their complications.

Integrating courses or specific lessons in high school curricula and university courses in regard to self-image acceptance, healthy weight loss methods, problem-solving skills, basic exercise knowledge and practices can greatly help in preventing eating disorders and exercise dependence among the general population as stated by the National Eating Disorders Academy [18]. In addition, frequent assessment should be done for students to detect abnormal trends, while the availability of trained psychologist is needed to help those with eating disorders in overcoming this problem.

Finally, the field of mental health and eating disorders is still new in the UAE; further research is needed to understand at a deeper level the reasons behind the increase in disordered eating attitudes among Emiratis such as found in this study and some of the correlates related to it.

The main limitation of this study is the reliance on self-reported behaviors and the lack of evidence to determine the direction of causality between disordered eating attitudes and the other characteristics measured. The nature of this study being a cross-sectional gives us information about the present behaviors and attitudes at the time of filling the survey only. Thus, our conclusions are speculations based on available evidence from the literature and observation.

## 6. Competing Interests

The authors declare that they have no competing interests

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