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ORIGINAL ARTICLE

Prevalence of Eating Disorders among Students of Health Science Colleges in Majamaah University, Saudi Arabia

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ABSTRACT

Background: Due to internationalization Arab nations have witnessed significant lifestyle changes leading to perceptions of body dissatisfaction among young Arabs.

Objectives: Owing to the rise in prevalence of EDs and behaviors among the youth, the study was taken up to assess the prevalence of EDs and determine the correlation between EDs and BMI among health science students at Majmaah University, KSA.

Brief methods: EAT-26 standardized self-reported questionnaires was used. BMI calculated by Quetelet index. The data from the sampling figure was collected using systematic random sampling. A general medical examination and brief personal, family, and prior histories were conducted.

Results: An observational descriptive cross-sectional study conducted among 90 females and 35 males aged 18-25 yrs. Mean ± SD BMI was 25.6±5.1(males) and 22.9±4.9(females).Of the total 18.4% (under wt), 63.4% (normal wt), 26.8% (ow), and 18.4% (obese). Positive EAT-26 was observed in 35.2% with Mean±SD 29.05±8.7t (123) = 14.9 p<.00001. Highest proportion 56% participants (60% males and 54.4% females) was observed for the behavior "Exercise 60 minutes per day" while least was observed with weight loss of ≥9 Kgs in last six months 8% (5.7% male and 8.9% female).Our study revealed compared to males, females are more “conscious of calorie content of the food they eat” (p =.0013), and “gave too much time and thought to food” (p =.02).Our results though on higher side are consistent with other studies across the Arab countries. Our research supports that BMI is a significant indicator of EDs.

Conclusion: Most adults have physical and psychological issues due to unhealthy food consumption and opting for ideal body. Early diagnosis and prevention of ED complications are essential by conducting programs to encourage healthy eating habits and behaviors.

INTRODUCTION

EDs are considered disease of overstressed prosperity. Internationalization and urbanization have led to significant changes in lifestyles in Arab countries, leading to changes in the perception of body image in young Arab women and men.(1).The three most common eating disorders are Anorexia Nervosa (AN), Bulimia Nervosa (BN), and Eating Disorder Not Otherwise Specified (EDNOS). In AN, one has a morbid fear of weight gain resulting in emaciation and malnutrition. Despite being malnourished and emaciated, they see themselves as overweight. In contrast, BN is characterized by repeated binges of highly caloric, easily digestible food, followed by compensatory purging, causing fluctuation in weight ranging from underweight to obesity, as well as increased irritability. Binge eating is characterized by stealing and secretly eating food. Purging behaviors include self-induced vomiting, laxative misuse, and diuretic misuse. The non-purge behaviors include prolonged abstinence from food, rigorous exercise. Anxiety, fear, depression, inferiority, and other negative feelings are thought to be alleviated through BN.

According to the Academy of EDs, one out of every five women has an eating disorder or has disordered eating attitudes. (2).

The magnitude of EDs among university students spans between 8% and 17%. (3). (4), and 20% of college students seem to have an ED at some point in their lives, according to one survey[4 National Eating Disorders Association.(4) Anorexia nervosa [AN] and bulimia [BN] affect 0.3% and 1% of young women in Western countries, respectively. According to international surveys, adult women in KSA and other Arab nations have a 24% prevalence of ED. (5).Men are likely underserved when it comes to Eating Disorders.(6)

Obesity is rampant in Middle Eastern countries. The prevalence of overweight (OW) and obesity in the Middle East is second highest in the world. Peer pressure, academic stress, social contact, and high life expectations put university students at risk for EDs.(7).Extreme dieting activities, such as calorie restriction and excessive exercise, have been linked to aberrant eating attitudes(8) (4).Self-loathing, displeasure, retribution, and the illusion of control are all part of the vicious cycle. Amenorrhea, osteoporosis, depression, and mortality are among the known side effects of EDs affecting cardiovascular, gastrointestinal, and endocrine systems. (8) (9) (10).Male muscularity is idealized in the same way as the feminine thinness is idealized. Within the weight-obsessed culture, the muscularity ideal may present males with two potentially conflicting goals to stimulate and shape their body. One emphasizes leanness, that leads to AN in some men, while the other emphasizes muscularity, which leads

to muscle dysmorphia in others. Males' eating and weight-related issues are likely under-reported, therefore little is known about them. (11).

Considering the increased prevalence of ED attitude and behavior among the youth of Arab countries the current research study was conducted to explore and evaluate the prevalence of EDs and its associated factors among students of both genders of health sciences colleges, in Majamaah University, KSA. Also, assess the relationship between EDs, eating behaviors and BMI. Thus, students at Majmaah University in KSA will be more aware of good eating habits and practices.

To assess and explore the potentiality of EDs, an observational, descriptive cross-sectional study was conducted among volunteer medical students from Majamaah University's college of medicine and college of applied medical science. A total of 135 healthy students, both male and female, aged 18 to 25, were included in the research, with 125 responding (90 females and 35 males).

The data from the sampling figure was collected using systematic random sampling.

A general medical examination and brief personal, family, and prior histories were conducted.

Exclusion: Participants with genetic or chronic conditions, as well as history of medication that impacts weight or eating behavior, were excluded.

Data collection: Ethical approval was obtained from the ethical committee of a research review board of Majamaah University KSA.

Participants were debriefed with excerpts from the discussion and the study's objectives before commencing the procedure. Written consent was obtained.

The procedure was divided into 3 phases.

1 Anthropometric characteristics: A standard scale with a minimum error of 0.1 cm was used to measure height, and a standard weighing scale with a minimum error of 0.1kg was used to measure weight.

Quelet's Index was used to calculate BMI. BMI = Wt (kg)/ Ht $(m)^2$

BMI defines the importance of being underweight, normal, or overweight.

2 Eating Attitudes Test (EAT-26) Questionnaire is a standardized self-report questionnaire used to screen EDs based on attitudes, feelings, and actions linked to eating and Eating symptoms. The Eat -26 surveys are extremely trustworthy and accurate (12).

The EAT-26 Questionnaire is divided into three subscales,

1 Dieting, 2: Bulimia and food preoccupation, and 3: Oral control.

The score for each question was determined using the Likert scale. Score for 1-25 questions was as follows: Always-3, Usually-2, Often-1, Sometime, rarely and never =0. For question 26: Never-3, Rarely-2, and Sometimes -1, and always, usually, and often =0.

The total score ranged from 0-78. The cutoff value of 20 was considered as a positive EAT-26 score. (12) . 3: Questions based on food habits and behaviors in the last 6 months were of Yes or No type.

Statistical Analyses: SPSS version 25 was used for all statistical analyses. The Kolmogorov-Smirnov test was applied to test for normality. Continuous variables' data were described using the Mean±SD while Categorical variables using percentages. Mann-Whitney U test and Student's t-test were employed to compare BMI and EAT-26 scores. Using Pearson correlation coefficient linear relationship between the variables was calculated. The level of significance was ≤0.05.

RESULT

For our study, we recruited a total of 133 medical and applied medical sciences college students aged 18-25(Mean±SD 23.5±1.8), of whom 125 (93.3%) returned the completed questionnaires. Among total 125 participants males and females were 35 (28%) and 90 (72%) respectively.

Table 1 shows Mean ± SD of BMI 25.6±5.1 (95% CI 23.9-27.3) for males and 22.9±4.9 (95% CI21.9-24.0) for females. Frequency distribution of total participants BMI was, 18.4% underweight, 63.4% normal weight, 26.8% overweight and 18.4% obese.

The ED Positive Score of ≥ 20 in total participants was reported 35.2% (N= 44), with Mean± SD 30.8 ± 8.7(p <.00001).Forty percentage of male (N=14, Mean± SD: 32.7±10.4) and 33.3% of female (N=30, Mean± SD: 27.33±7.3) had the positive scores above cut off (p <.00001) as depicted in Table 2.

Table 3 depicts the Mean±SD of subscales: Total score, 17.13±11, Dieting subscale Score Mean±SD 9.1±7.2, Oral control Mean±SD 4.9±3.9 while Bulimia Mean±SD 3.1±3 for total participants. Applying two tailed students t test 35.2% total participants showed positive EAT-26 score with Mean±SD 29.05±8.7 t(123)= 14.9 P <0.00001.

As represented in Tables 4-6 " Questions 6 and 21(Aware of the calorie content of food that I eat and Give too much time and thought to food) were highly significant with t(123)=3.28.P=0.0013 and t(123)=2.3 P=0.002 respectively using two tailed unpaired t test with significant level of 0.05.

Table 1: Anthropometric characteristics of the participants

Parameters	Male (N=35)(28%)	Female (N=90)(72%)	Total (N=125)(100 %)
	Mean±SD	Mean±SD	Mean±SD
Height (cms)	174.4 ±0.1	159.2± 0.1	163±0.09
Weight (Kgs)	78.0±16.9	58.3± 13.8	63.8±17.1
BMI	25.6±5.1	22.9±4.9	23.71±5.1
BMI range	No. (%)	No. (%)	No. (%)
<18.5 (Underweight)	15(16.7%)	3(8.6%)	18(14.4%)
18.5-25(Normal weight)	50 (55.6%)	13(37.1%)	63(50.4%)
25-30 (Overweight)	14 (15.6%)	12(34.3%)	26(20.8%)
>30 (Obese)	11(12.2%)	7(20%)	18(14.4%)

This study reported a weak positive correlation with the Total Eating Score (p =0.003). Oral control has a negative correlation with a highly significant p-value (p=0.0005). There was weak positive Pearson correlation of dieting scale 0.16, Bulimia Preocp 0.10 in relation to BMI with the non-significant p-value. ED is associated with a

high BMI (body mass index). The ED was observed in 32 (24.1%), and in 101 (75.9%) not observed with Mean ± SD 64.52 ± 17.94.

Table 2: Distribution of Eat -26 Score ≥20 as cut off values using two tailed Student's t test significant level as 0.05

	Group	No. (%)	Mean ±SD	Group Mean	t value	P value
Male	≥20	14(40%)	32.7±10.4	23.57	8.8 df(33)	<.00001
	≤20	21(60.9%)	9.6±5.4			
Female	≥20	30 (33.3%)	27.33±7.3	16.15	12.3 df(88)	<.00001
	≤20	60(66.7%)	11.2±5.03			
Total	≥20	44(35.2%)	29.05±8.7	18.4	14.9 df(123)	<.00001
	≤20	81(64.8%)	10.7±5.2			

Dieting scales of 7.33 ± 6.15, Bulimia Preocp 3.18 ± 2.98, and Oral Control 3.62 ± 2.17 were shown to be significantly related to body mass index in this study.

Graph 1 shows highest frequency of 56 % for total 125 participants (Male 60 % and female 54.4%) for question "Exercised ≥60 minutes a day followed by "Gone on eating binges" total 54.4% (male 42.9% and Female 57.8%), Use of laxatives total 12.8% (Male 2.9% and female 16.7%) ,"self-induced vomiting" total 11.2%(Male 5.7% and female 13.3%) while least was seen in weight loss of ≥ 9 kgs in last six months total 8 %(5.7% male and 8.9% female).

Table 3: Shows Mean ±SD of EDs -subscales among the participants

Eating disorder subscales	Male M±SD	Female M±SD	Total M±SD
Total score	18.57±14	16.57±9.6	17.13±11
Dieting score	10.11±8.2	8.71±6.8	9.1±7.2
Oral control	4.49±4.3	5.04±3.8	4.89±3.9
Bulimia	3.97±3.8	2.82±2.6	3.14±3

Table 4: Shows the Mean ± SD of Dieting Scale questions

1:ED subscale: Dieting Scale questions		Mean ±SD			
Sno.	Question	Male	Female	t value	P value
1	I am terrified about being overweight.	1.17±1.27	1.46±1.32	1.11	0.3
6	Aware of the calorie content of food that I eat.	1±1.11	0.4±0.83	3.3	0.0013***
7	Particularly avoid food with a high carbohydrate content (i.e. bread, rice)	0.51±0.92	0.41±0.82	0.6	0.6
10	Feel extremely guilty after eating.	0.54±0.37	0.64±1.05	0.5	0.63
11	Am preoccupied with a desire to be thinner.	1.06±1.2	0.8±1.12	1.00	0.27
12	Think about burning up calories when I exercise.	1.31±1.23	0.99±1.15	1.37	0.17
14	Am preoccupied with the thought of having fat on my body.	0.94±1.03	0.81±1.1	0.6	0.55
16	Avoid foods with sugar in them.	0.6±1.04	0.57±0.92	0.16	0.88
17	Eat diet foods.	0.66±0.99	0.46±0.84	1.13	0.3
22	Feel uncomfortable after eating sweets.	0.63±1.03	0.39±0.86	1.32	0.19
23	Engage in dieting behavior.	0.66±1.08	0.53±0.88	0.7	0.5
24	Like my stomach to be empty.	0.63±0.9	0.61±1.00	0.1	0.9
25	Have the impulse to vomit after meals.	0.43±0.78	0.23±0.6	1.5	0.13

Table 4: Shows the Mean and SD of Oral control

2:ED subscale: Oral control		Mean ±SD			
Sno.	Question	Male	Female	T value	P value
2	Avoid eating when I am hungry.	0.31±0.72	0.44±0.78	0.9	0.4
5	Cut my food into small pieces.	0.54±0.918	0.87±1.04	1.6	0.1
8	Feel that other would prefer if I eat more.	0.54±0.85	0.8±1.07	1.3	0.2
13	Other people think that I am too thin.	0.63±1.08	0.8±1.11	0.8	0.4
15	Take longer than other to eat my meals.	0.91±1.15	0.9±1.15	0.04	0.97
19	Display self-control around food.	1±1.12	0.63±0.99	1.8	0.07
20	Feel that other pressure me to eat.	0.54±0.89	0.69±1.02	0.76	0.5

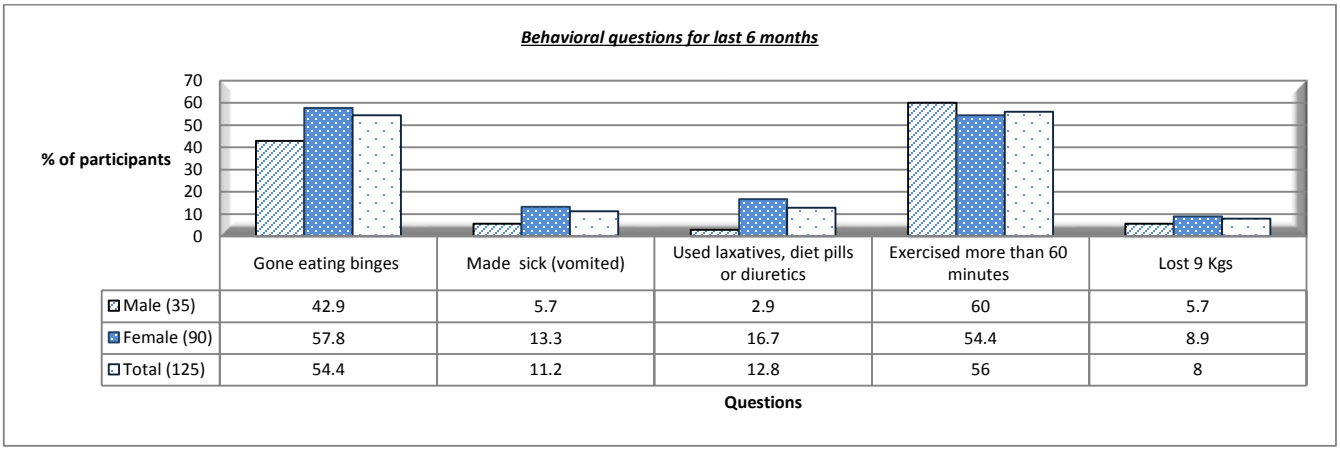
Table 5: Shows the Mean and SD of Bulimia and food preoccupation Scale questions

3:ED subscale: Bulimia & food preoccupation Scale questions		Mean ±SD			
Sno.	Question	Male	Female	T value	P value
3	Find myself preoccupied with food.	1.11±1.1	0.71±1.06	1.9	0.06
4	Have gone on eating binges where I feel that I may not be able to stop.	0.74±1.09	0.41±0.78	1.9	0.06
9	Vomit after I have eaten more.	0.09±0.37	0.07±0.29	0.3	0.8
18	Feel that food controls my life.	0.83±1.12	0.89±1.19	0.26	0.8
21	Give too much time and thought to food.	1±1.16	0.56±0.87	2.3	0.02**
26	Enjoys trying new rich foods.	0.49±0.919	0.61±0.96	0.6	0.53

Table6: Shows the Pearson correlation: Eating Scores with BMI among participants using two tailed with 0.05 as significant level

EDs	BMI r (p-value)	Total Eating Score r (p-value)
Total Eating Score	0.04(0.003)*	0.04(0.003)*-
Dieting Scale	0.16 (0.08)	0.7(0.45)

Oral Control	-0.31(0.0005)***	0.07(0.00001)***
Bulimia Preocp	0.10 (0.26)	0.07(0.00001)***
Behavior	0.026(0.004)**	-0.07(0.43)



Graph 1: Percentage distribution of behavior attitudes of ED among participants

DISCUSSION

University students are particularly prone to EDs due to academic stress and other contributing factors. Body dissatisfaction and disordered eating attitude is significantly observed among Kuwaiti male college students (13) .The primary purposes of the research were to explore the frequency of EDs and eating behaviors among medical students at Majmaah University in Saudi Arabia. This was done to determine the correlation between BMI and ED subscales. In our findings, we observed that participants with a significantly abnormal BMI had a higher prevalence of ED symptoms. The body mass index (BMI) is a reliable predictor of EDs.

Several studies have revealed that the Arab world's youthful population is more vulnerable and susceptible to westernization. This makes them at risk of suffering ED of extremities that are underweight and overweight(12) (15).Rapid evolution in life, and maybe even social media's influence on beauty standards in the Middle East, may transform both genders' perceptions and expectations of the ideal body weight and body image.(13) (7) The cutoff value ≥20 of the ED-26 score was observed to have a mean± SD of 29.05±8.7 in 35.2% of males and a mean ±SD of 27.3±7.3 in 37.1 % of females.

Nonclinical research studies using the Eating Attitude Test (EAT 26) in Arab countries reported a significant prevalence of dysfunctional food attitudes and behaviors. Eating disorders were documented to be 36.2 %, 42.7 %, 33.33 %, and 21.2 % in the UAE, Jordan, Oman, and Sudan, respectively (13)(16)(17) (18) (19).

Our findings, albeit on the higher side, are consistent with those of previous Arab research.

Similar studies conducted in other countries reported results ranging from 45.2 percent to 7.8 percent, with Turkey leading the way with 45.2 %, followed by Japan 35 %, the United States 22-26 %, South Africa 21.2 %, Canada 16 %, Brazil 13.3 %, Singapore 10.5 % and Spain with 7.8 % (20)(21) (22) (23) (4)(24)

In Pakistan and India (25) , attitudes and behaviors towards ED were 21,7% and 14.76%, respectively.

The increased prevalence of EDs in the modern era is attributed to the sociocultural idealization of thinness among young adults.(26) In comparison to men, our study revealed that women are more conscious of the calorie content in the food they eat t=3.3 p =.0.05 taking the significant level of 0.05, and spend much time and thought on food, with t=2.3 p =.0.05 taking the significant level of 0.05.(29) Other Middle Eastern research has shown similar results. (32) (33).

Some Arabs relate somatic complaints to a restricted eating style [29], while others claim body dissatisfaction and fear of fatness.

In one exploratory research, 24 percent of Emirati female students had ED-26 and 74.8 percent were unhappy with their current body image. These findings contradicted those of research with Qatari subjects, who appeared to be unaffected by the slim ideal weight (28)

A study conducted at Dammam's Imam Abdurrahman Bin Faisal University found that both males and females have ED. In contrast to our study (26.8%), females had a considerably higher rate of ED (29.4%). (5)

The frequency of EDs in our study is consistent with findings from a study focused solely on Saudi Arabian students. Scores of >=20 24.6 percent were reported in cities such as Hail, Jeddah, Qassim, and Riyadh. (29). A growing prevalence of ED is seen in Arab countries such as UAE, where 36.7%, Jordan, 33%, and Sudan, where 21% have been reported (30).

A study conducted in Jordan in 2014 that surveyed students between the ages of 18-27 showed that 71 percent have skipped at least one meal and 86 percent believe women in Jordan struggle with body image. Some 72 percent believe eating disorders among women are a problem in Jordan, however, only 18 percent felt adequately informed about eating disorders.74% of surveyed women in Jordan have changed their lifestyle because of family and media pressure Starving for life: Arab women open up about eating disorders

March 8, 2017, at 8:30 am | Published in Article, Jordan, Middle East, Opinion, UAE. (28)

Many studies show that males are more prone to have ED than females which oppose our studies. In our study, we found that males (34.3%, obese 20%) are more prone to overweight and obese as compared to females (15.5%, 12.2%).

In total participants, 20.8% and 14.4% of overweight and obesity respectively were observed.

Al Qahatani et al showed that the prevalence of overweight and obesity was 24.9% and 15.2% respectively./al Rethaiaa et al in their study showed the percentage of overweight among males and females was 25% and 20.3% respectively while the prevalence of obesity was 16.7% among male students higher than young females [6.7%].(2)

In our study in total, 56% (60 % male and 54.4% female) exercised vigorously for more than 60 minutes per day for the last six months.(31) found a positive relationship between disordered eating attitudes, hours spent in exercise, and exercise-dependent symptoms among university students(30) [33,16].

CONCLUSION

The present study indicated abnormal eating attitudes among the students of Majmaah health science colleges .Most adults had physical and psychological consequences when consuming unhealthy and fast meals and going for zero-size body figures.

Therefore, early diagnosis and prevention of EDs and their complications are essential for this susceptible population. It is imperative to increase awareness of a balanced diet.

Limitations of the study: The EAT-26 questionnaire cannot provide a diagnosis but only applied as an initial screening method. The current study should be followed up with larger numbers of students including other colleges of the Majmaah University; future studies should take into consideration mental health status and other factors like sleep pattern, and economic status as important variables when investigating EDs.

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REFRENCES

1. Hamadeh S. Healthy Lifestyles in the Arab World: between Nutrition Economics and Food Politics. J Clin Nutr Metab Int Publ Sci. 2017;1(2):1–2.
2. Hamadeh S. Healthy Lifestyles in the Arab World: between Nutrition Economics and Food Politics. Vol. 1, Journal of Clinical Nutrition and Metabolism International Publisher of Science. 2017.
3. Hoerr SL, Bokram R, Lugo B, Bivins T, Keast DR. Risk for Disordered Eating Relates to both Gender and Ethnicity for College Students. J Am Coll Nutr. 2002 Aug 1;21(4):307–14.
4. Reinking MF, Alexander LE. by the National Athletic Trainers [Internet]. Vol. 40, Journal of Athletic Training 47 Journal of Athletic Training. Association, Inc; 2005. Available from: www.journalofathletictraining.org
5. Alwosaifer AM, Alawadh SA, Abdel Wahab MM, Boubshait LA, Almutairi BA. Eating disorders and associated risk factors among imam abdulrahman bin faisal university preparatory year female students in Kingdom of Saudi Arabia. Saudi Med J. 2018 Sep 1;39(9):910–21.
6. Field AE, Sonneville KR, Crosby RD, Swanson SA, Eddy KT, Camargo CA, et al. Prospective associations of concerns about physique and the development of obesity, binge drinking, and drug use among adolescent boys and young adult men. JAMA Pediatr. 2014 Jan;168(1):34–9.
7. Saleh RN, Salameh RA, Yhya HH, Sweileh WM. Disordered eating attitudes in female students of An-Najah National University: A cross-sectional study. J Eat Disord. 2018 Aug 1;6(1).
8. Al Sabbah H, Muhsineh S. Disordered Eating Attitudes and Exercise Behavior among Female Emirati College Students in the United Arab Emirates: A Cross- Sectional Study. Arab J Nutr Exerc. 2017 Nov 12;1(2):62.
9. Tanofsky-Kraff M, Yanovski SZ, Schvey NA, Olsen CH, Gustafson J, Yanovski JA. A prospective study of loss of control eating for body weight gain in children at high risk for adult obesity. Int J Eat Disord. 2009 Jan;42(1):26–30.
10. Baş M, Karabudak E, Kiziltan G. Vegetarianism and eating disorders: Association between eating attitudes and other psychological factors among Turkish adolescents. Appetite. 2005 Jun;44(3):309–15.
11. Field AE, Sonneville KR, Micali N, Crosby RD, Swanson SA, Laird NM, et al. Prospective association of common eating disorders and adverse outcomes. Pediatrics. 2012 Aug;130(2).
12. Toner BB, Garfinkel PE, Garner DM. Affective and anxiety disorders in the long-term follow-up of anorexia nervosa. Int J Psychiatry Med. 1988;18(4):357–64.
13. Alkazemi D, Zafar TA, Ebrahim M, Kubow S. Distorted weight perception correlates with disordered eating attitudes in Kuwaiti college women. Int J Eat Disord. 2018 May 1;51(5):449–58.
14. Vahia VN. Diagnostic and statistical manual of mental disorders 5: A quick glance. Indian J Psychiatry. 2013;55(3):220–3.
15. Al-Rethaiaa AS, Fahmy AEA, Al-Shwaiyat NM. Obesity and eating habits among college students in Saudi Arabia: A cross sectional study. Nutr J. 2010;9(1):1–10.
16. Fedala N, Mekimene L, Mokhtari M, Haddam AEM, Fedala NS, Kardjadj M. Prevalence and risk factors of overweight and obesity among schoolchildren and adolescents in Algiers. Med J Nutrition Metab. 2017;10(2):105–12.
17. Al-adawi S, Dorvlo AS, Burke DT, Al-bahlani S, Martin RG, Al-ismaily S. Presence and Severity of Anorexia and Bulimia Among Male and Female Omani and Non-Omani Adolescents.
18. Musaiger AO, Al-Mannai M. Association between exposure to media and body weight concern among female university students in five Arab countries: A preliminary cross-cultural study. J Biosoc Sci. 2014;46(2):240–7.
19. Fatima W, Ahmad LM. Prevalence of disordered eating attitudes among adolescent girls in Arar City, Kingdom of Saudi Arabia. Heal Psychol Res. 2018;6(1).
20. Yu J, Lu M, Tian L, Lu W, Meng F, Chen C, et al. Prevalence of disordered eating attitudes among University students in Wuhu, China. Nutr Hosp. 2015 Sep 1;32(4):1752–7.
21. Disordered eating attitudes.
22. Mukai T, Cragot M, Shisslakt CM. Eating Attitudes and Weight Preoccupation Among Female High School Students in Japan. Vol. 35, J. Child Psychol. Psychiat. 1994.
23. Sepulveda AR, Carrobles JA, Gandarillas AM. Gender,

school and academic year differences among Spanish university students at high-risk for developing an eating disorder: An epidemiologic study. 2008; Available from: http://www.biomedcentral.com/1471-2458/8/102
24. 59-Body shape and eating disorders in a sample os studients in the basquet country.
25. Srinivasan TN, Suresh TR, Jayaram V, Fernandez MP. Eating disorders in India [Internet]. Vol. 37, Article in Indian Journal of Psychiatry. 1995. Available from: https://www.researchgate.net/publication/51481247
26. Freeman AC. Eating disorders in males : A review Correspondence : South African Psychiatry Rev. 2005;8(315):58–64.
27. Keilany Z. Book Reviews: Book Reviews. Rev Soc Econ. 1978;36(2):228–9.
28. Melisse B, de Beurs E, van Furth EF. Eating disorders in the Arab world: a literature review. Vol. 8, Journal of Eating Disorders. BioMed Central Ltd; 2020.
29. Alsubaie ASR, Omer EOM. Physical Activity Behavior Predictors, Reasons and Barriers among Male Adolescents in Riyadh, Saudi Arabia: Evidence for Obesogenic Environment. Vol. 9, International Journal of Health Sciences.
30. Fatima W, Fatima R, Anwar NS. Disordered Eating Attitude and Body Dissatisfaction among Adolescents of Arab Countries: A Review. Asian J Biol Sci. 2019 Jun 15;12(3):373–9.
31. Zmijewski CF, Howard MO. Exercise dependence and attitudes toward eating among young adults. Eat Behav. 2003 Aug 1;4(2):181–95.
32 TB of Bulimia.A guide to recovery by Lindsey Hall, Leigh Cohn 2011, 25th edition page 26
33 Palmer RL. Concept of eating disorders. In: Treasure J, Schmidt U, van Furth E, editors. Handbook of Eating Disorders. Chichester: Wiley, 2005, pp. 1–10.