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Subclinical eating disorders and association with vegetarianism in female students of Saudi Arabia: A cross-sectional study

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Abstract: *Increasing Number Of People Are Choosing Vegetarian Diet For Various Reasonsoften Associated With Health Benefits. Some Recent Studies Revealed That Vegetarian Are More At Increased Risk For Developing Unhealthy Weight Control Behaviors May Lead To Disordered Eating: The Most Common Psychiatric Problems Of Female Students Of Saudi Arabia. The Information On The Role Vegetarianism Plays In Eating Disorder Is Certainly Mixed And Complex. So Present Cross-Sectional Study Design Toexplore The Prevalence Of Disordered Eating And Determine Differences In Eating Attitudes Of Vegetarian And Non-Vegetarian Among Female Saudi Students. The Sample Of 120 Females Students Aged Between 18 To 21 Years Were Selected By Stratified Random Sampling Technique Form Faculty Of Medicine And Applied Medical Sciences. Subjects Were Ask To Fill Pre Tested Questionnaire About Socioeconomic Status, Eating Habits And Eating Attitude Test 26 (EAT 26), After That There Height And Weight Were Measured And BMI Was Calculated. Disturbed Eating Behaviors (EAT-26> 20) Was Found In 32 (26.66%) Participants.The Mean EAT 26 Was 15.42±11.57 For Vegetarians And 16.07±9.11for Non Vegetarians. Non Vegetarian With Normal Eating Attitude Have Higher EAT 26 Score Than Vegetarian (P<.01). Non-Significant Difference Was Found In EAT 26 Subgroup Namely Oral Control, Bulimia And Dieting In Vegetarian And Non-Vegetarian Female Students. As A Conclusion, The Present Study Indicated Abnormal Eating Attitudes, In Female Saudi Students But Vegetarianism In College Women Was Not Associated With Disordered Eating Attitudes.Overall, These findings Suggest A Need For Appropriate Preventive Interventions That Will Promote Healthy Lifestyle Behaviors And Prevent Distorted Eating Behaviors In The Future.*

Keywords: *Eating Disorder, EAT 26, Arab Countries, Female Students, Vegetarianism*

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I. Introduction

Eating disorders (ED) characterized by chronicity and relapse along with disordered eating behavior where the individual's attitude towards weight and shape, as well as their perception of body shape, are disturbed (1). Individuals, who are more concern about their body weight and shape, and it may lead to disturbed eating and unhealthy weight control behavior such as starvation, fasting, frequently skipping meals, overeating and binge-eating followed by purging, also using of diet pills, laxatives, and diuretics and excessive exercising.(2, 3).Recent research also shows that a growing number of people, especially young women are adopting vegetarianism and eliminates meat and/or animal products from diet and follow restrictive eating patterns.(4, 5) Beside health, moral and ethical belief, the main reasons for adopting vegetarian and vegan diets were to lose weight, maintain low body weight,(4) However, several studies note a link between eating disorder and vegetarian eating style. ((4-9) The information on the role vegetarianism plays in eating disorder is certainly mixed and complex. Notably, some studies found that most eating disorder patients report vegetarianism in their history (5). 65% Anorexia nervosa patients in western countries state to be vegetarians (6, 10). Neumark sztainer 1998 found that vegetarian were twice likely to be dieter and four time to used vomit for weight control. Gilbody 1999 also found vegetarian group had more dietary restriction. On the other hand many studies reported Vegetarianism as a method for complicating the normalization of eating rather than a simple risk factor for eating disorders and avoidance of meat does not precede the onset of the eating disorder symptoms(4, 11)

However, epidemiological data indicate eating disorders increasing dramatically worldwide in past two decades and occur across all ethnic, cultural, socioeconomic groups and the most vulnerable group for anorexia nervosa comprised girls and young women aged 15 to 24 years (12, 13).Recently, high prevalence of abnormal Eating attitude and behaviors is confirmed by nonclinical studies (scored >20, Eating Attitude Test (EAT 26) cutoff score for clinical significance) in several Arab countries like UAE, Iran, Jorden, Oman and

Sudan was 36.2%, 24.2%, 42.7%, 33.33% and 21.2% respectively ((14-19). Although, the prevalence of abnormal eating attitudes based on surveys with the 26-item EAT ranged from 19 to 36% in Saudi Arabia among female student(16, 20-23). Although there is no study that examined vegetarianism in relation to eating disorders have been conducted in KSA so far. Therefore, Keeping in view the seriousness of problem on one hand and lack of knowledge on another, the present study carried out in Arar, KSA to determine the prevalence of abnormal Eating and to find out its association with weight status and vegetarianism.

II. Methods

For the purpose of study, the Arar city of Kingdom Saudi Arabia was selected and cross-sectional Survey design was used to conduct present study. Females students of faculty of medical and applied medical science of university selected by Stratified Random Sampling Technique**.** Total 160 students (66.66% of total population of college) were selected but 40 subjects did not give response, therefore sample of 120 female students (18 to 23 years) interviewed, with response rate of 75%.

All the techniques for measurement was piloted on a set of 18 students of applied medical science, to test the efficiency of the questionnaire. Consequently, the content of the questionnaire can be modified and minor changes was made in the method of gathering information about various variables of the study. At the beginning, consents will be taken from the all students according to the World Medical Association (WMA) Declaration of Helsinki Sixth revision guide lines (Schmidt H et al 2010) and following the guidelines of ethical research committee in Northern Borders University. Students who have chronic diseases, obesity other than exogenous dietetic and those who are pregnant will be excluded from the study.

The researchers introduce themselves and briefly explain the study objectives to participants. Then, the participants asked to proceed to fill in the questionnaires under the supervision of the researchers. All information gathered kept confidentially. Data was collected in general activity time of university between 10 – 12.

Questionnaire was translated in Arabic language and two Arabic professor double checkit to understand eating behaviors and disorders that consequently could affect their nutritional status. Questionnaire divided into three section : Section (A) collect general information

factors such as socio-demographic characteristics , education level,, nationality , their family size, household type, parent's educational and employment status, pubertal status, health status etc. Section (B) consist of dietary intake and food habits which collected information on meal patterns such as skipping meals, snack consumption, breakfast eating habits, eating out and fast food consumption .Section (C) consist of EAT 26.

The Eating Attitudes Test (EAT-26) was used to measure those at risk of disordered eating attitudes and it consists of 26 statements refer ring to various eating attitudes(24, 25). Each statement uses a six-point Likert-type scale ranging from ‘always’ to ‘never’. A score of 3 points was given for ‘always’, 2 for ‘usually’, 1 for ‘often’, and 0 for ‘sometimes’, ‘rarely’ and ‘never’. The responses of all the 26 items were summed at the end and the respondents, who score exactly at, or above, the cut off score of 20, considered at risk of disordered eating attitudes and behaviors. The three factors of EAT-26 were classifiedaccording to Garner et al. are: (1) dieting, which reflects restricting intake of high caloric foods and preoccupation with body image/shape. This factor consisted of 13 items including “eat diet foods and avoid foods with sugar in them”; (2) bulimia and food preoccupation describes thoughts regarding food, binging and self-induced vomiting. This dimension included 6 items such as “have gone on eating binges where I feel I may not be able to stop”, as well as “feel that food controls my life”; and (3) oral control that illustrates the ability to regulate food intake and perceived pressure from others to gain weight.

Validity of the study's questionnaire

To ensure the validity of the discussion was conducted with an expert panel from northern border university to review, edit, and double-check the questionnaire. EAT 26 has high internal consistency ($\alpha = 0.90$) and acceptable criterion-related validity, being highly accurate in classifying eating disordered and non-eating disordered individuals (24). EAT-26 was validated by Al-Subaie et al. (1996 and 1998)in Arabic language (21, 26).

The weight of student was recorded with the help of platform spring balance zero error checked and remove it if present every day prior to start data collection. The students remain in college uniform without shoes. The weight measure upto accurately of 500 gram and nearest reading was recorded. The same weighing machine was used in whole study.

Height measured in cms by using standard stediometer. The student asked to stand erect without shoes with the support to the wall with erect head eyes straight and head, buttocks, heels, shoulder and back touching with the stediometer scale. The height recorded up to nearest 1 cm when the metallic scale brought down on

the head, pressing the hair and touching the head. BMI was calculated as weight/height^2, with weight being in kilograms and height being in meters.

SPSS 22 (2017) Statistics for Windows was used in entering, managing survey data and in generating the statistics in this study. Mean, SD, percentages, independent t-test, ANOVA and chi square was applied at the 0.05 level of significance.

III. Results :

Out of 120, 32 female students (26.6%), age ranged between 18 and 23 years scored at or above the cutoff point of EAT-26 (>20), indicating negative eating attitude (fig 1). Only12 participants were vegetarians, and 108 participants were non-vegetarians. Table 1 show the characteristics of study population in vegetarian and non-vegetarian group but no significant difference was found between the vegetarians and non-vegetarians in height, weight, age, or body mass index (table 1).

The mean EAT score of the vegetarians (15.42+11.57) was notsignificantly differ with the non-vegetarian (16.07+9.11) (table 2). But significant difference was found between mean EAT 26 score of vegetarian and non-vegetarian with normal eating attitude (<20).

Table 3 shows mean and SD of EAT-26 score in different subgroups. Score in dieting behavior, oral control and buluminia subgroup was 7.08±8.59, 5.166±4.01 and 2.75±2.17 respectively in vegetarian and 8.66±5.79, 3.99±3.04, and 2.53±2.22 respectively among non-vegetarian but non-significantly different was found between two group with EAT 26 subgroups. Higher EAT 26 score was found in non-vegetarian in dieting subgroup, but in bulimia and oral subgroup higher score was in vegetarian than non-vegetarianbut the all these results was statistically insignificant.

On comparing each item of EAT 26 scorein three subgroup separately (table 4, 5 and 6) significant difference was found among score of vegetarian and non-vegetarian just two items of oral control sub group(13^{th} and 20^{th} items).

IV. Discussion

The results of present study indicate Saudi female college students suffer from higher rates of eating disordered attitudes and this finding was consistent with previous literature in different Arab countries, (17, 18, 20, 22, 23, 27).

Musaiger et al., (2013) highlighted the magnitude of the risk of disordered eating attitudes among adolescents in seven Arab countries countries and found, risk of disordered eating attitude was twice as high among females as in males in Jordan, Libya, Palestine and Syria and risk of disordered eating attitude among obese adolescents was two to three times higher than that of non-obese, in both genders. Eapen V,et al found that in 116 UAE females students (23.4%) scored above the recommended cut-off on EAT was associated with age, BMI and watching western TV programs(28).

Several studies have shown that young people exposed to Westernization in arab countries are more at risk of disordered eating than those who are not exposed, despite their cultural background (17, 29). These results are consistent with the assumption that cultural changes in arab countries have involved identification with Western norms of body shape and weight contributing to eating disorder development in young females students. Vegetarianism were adopted by young generation of as yet another tool in the quest for weight loss also associated with eating disorder in arab{Bas, 2005 #30}. The association between eating disorder and vegetarianism very complex. Some recent studies revealed that vegetarian are more at increased risk for involvement of unhealthy weight control behaviours may lead to disordered eating (5-8).

In ourstudy population, 10% adopted vegetarianism in order to lose weight, this result was analogous withseveral other studies stated more number female young population becoming vegetarian because they are more concern for body image and pay more attention on weight control methods(4, 6, 9).

Our finding that vegetarianism was not related with abnormal eating behavior among female students contrary with the claimed hypothesis that vegetarianism emerged as the most potent predictor of eating pathology. Similar result was found in one turkey study(30) but in a Minnesota study, vegetarian more likely to exhibit bulimic behavior than non vegetarian.(8)

Another Exploratory studies in Emirati female university student reported 24% had eating disorder (EAT 26) additionally 74.8% of participant were dissatisfied with their current body image and positively correlated with body image dissatisfaction (31). In present study, significant difference was found in two items of oral control scale which shows that perceived societal pressure among study group and body dissatisfaction could be fostered from internalized body ideal and socio-cultural pressure.

Very limited literature on vegetarianism and eating disorders were available and this study is novel in being the first to examine vegetarianism association with eating disorder. Limitations include the cross sectional design, the small sample size and the lack of differentiation of eating disorder diagnoses. Given the small number of vegetarians, the findings should be considered preliminary and need to be replicated in larger

samples. Further, information about vegetarianism using more precision (e.g., semi-vegetarian, vegan, etc.) would help identify if certain types of vegetarianism are more strongly connected to eating disorders or eating disorder recovery.

Future research should examine vegetarianism and eating disorders/eating disorder longitudinally in order to better understand how eating disorder symptoms and vegetarianism may propel each other over time and whether transitioning from a vegetarian diet may facilitate full recovery.

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Figure 1: Prevalence of eating disorder among female students of Northern Broader University, Arar, KSA

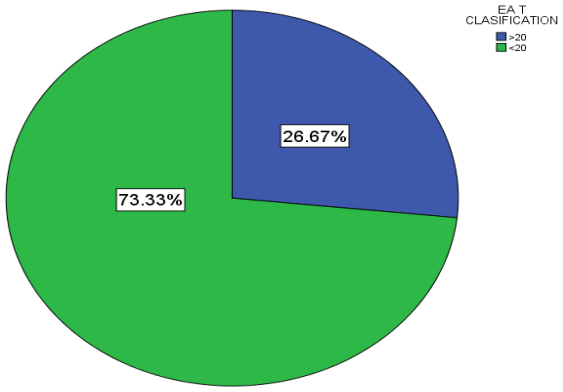

Table 1: Characteristics of study population

Characteristics	Vegetarian	Non vegetarian
Age (yrs)	20.00±1.04	20.77±1.21
Weight (kg)	57.04±8.91	54.59±7.24
Height (cm)	155.08±.070	155.77±.060
BMI(kg/m^2)	23.64±2.73	22.53±2.95

Table 2:Association between eating attitude (EAT 26) and eating habits

Eating attitude	Vegetarian (n=12)	Non vegetarian(n=108)	P value
Normal eating attitude(108)	6.79+6.22	11.76+5.35	.01**
Abnormal eating attitude (32)	32.33±3.21	27.83 +6.45	.24
Total	15.42+11.57	16.07+9.11	.83

Table 3:Mean and SD of EAT 26 subgroup score of participants according their eating habits

EAT 26 SUBGROUP	Vegetarian	Non Vegetarian	P value
Dieting	7.08±8.59	8.66±5.79	.39
Oral	5.166±4.01	3.99±3.04	.22
Bulimia	2.75±2.17	2.53±2.22	.75

Table 4: Mean and SD dieting scale score of EAT 26 participants according their eating habits

Item no. in EAT 26	Dieting scale	vegetarian	Non vegetarian	P value
1	Am terrified about being overweight.	1.42±1.44	1.41±1.26	.98
6	Aware of the calorie content of foods that I eat.	0.08±0.28	0.45±0.77	.10
7	Particularly avoid food with a high carbohydrate content (i.e. bread, rice, potatoes, etc.)	0.25±0.86	0.73±0.68	.69
10	Feel extremely guilty after eating	0.83±1.26	0.85±1.11	.95
11	Am preoccupied with a desire to be thinner	0.50±1.0	0.60±0.86	.75
12	Think about burning up calories when I exercise.	0.75±1.21	0.94±1.14	.59
14	Am preoccupied with the thought of having fat onmy body.	0.83±1.2	0.45±0.82	.15
16	Avoid foods with sugar in them	0.6±0.9	0.66±0.92	.57
17	Eat diet foods	0.42±0.90	0.40±0.78	.93
22	Feel uncomfortable after eating sweets.	0.50±0.79	0.42±1.10	.20
23	Engage in dieting behavior.	0.17±0.57	0.57±0.94	.14
24	Like my stomach to be empty.	0.58±1016	0.56±0.89	.94
25	Have the impulse to vomit after meals	0.25±0.86	0.52±0.89	.32

Table 5: Mean and SD of oral control score of EAT 26 in participants according their eating habits

Item no. in EAT 26	Oral control scale	vegetarian	Non vegetarian	P value
2	Avoid eating when I am hungry	0.67±1.2	0.96±1.15	.40
5	Cut my food into small pieces.	0.83±1.19	0.85±1.04	.95
8	Feel that others would prefer if I ate more.	0.58±1.63	0.48±0.92	.72
13	Other people think that I am too thin.	1.33±1.3	0.59±0.89	.01*
15	Take longer than others to eat my meals	0.58±0.66	0.68±1.05	.76
19	Display self-control around food	0.33±0.73	0.92±1.14	.08
20	Feel that others pressure me to eat.	1.17±1.19	0.43±0.78	.004**

Table 6: Mean and SD bulimia scale score of EAT 26 in participants according their eating habits

Item no. in EAT 26	Bulimia	vegetarian	Non vegetarian	P value
3	Find myself preoccupied with food	1.88±1.33	0.66±0.89	.14
4	Have gone on eating binges where I feel that Imay not be able to stop.	0.50±1.16	0.51±0.84	.97
9	Vomit after I have eaten.	0.17±0.38	0.30±0.71	.53
18	Feel that food controls my life.	0.50±0.79	0.550±0.95	.87
21	Give too much time and thought to food	0.50±1.0	0.44±0.86	.83
26	Enjoy trying new rich foods.		0.080±0.41	.48

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