

Eating Disorders and Nutritional Status of College Girls in Ludhiana City, Punjab (India)

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Eating disorders and overweight are notable health issues, which are increasing day by day among young adults. Therefore, the study was conducted to evaluate the extent and type of eating disorders among college girls. A sample of 500 college girls in the age group of 18-25 years was randomly selected from five colleges of Ludhiana city, Punjab. Eating disorders were assessed by using Eating Attitude Test (EAT) questionnaire and subjects were categorized into two groups - With Eating Disorders (WED) and Without Eating Disorders (WOED). Prevalence of eating disorders among college girls on basis of EAT scale was 46 percent with higher mean scores of oral control (15.86±6.29) followed by dieting (13.17±8.47), bulimia, and food preoccupation (3.86±1.98). The correlation coefficient showed positive associations of eating disorders with body mass index. This study suggested formulating nutrition and health fitness clubs in colleges to create awareness and practices regarding diet, exercise, and yoga.

Keywords: *Body mass index; eating attitude test; eating disorders.*

1. INTRODUCTION

Eating disorders are critical, multifarious stressful habits differentiate by abnormal eating behavior and attitude. If eating disorders are not treated well then it leads to physiological and psychological problems which increased the incidence of mortality. Psychological illness including low self-confidence, depression, disturbs personality, misunderstanding in a relationship, and social factors such as social media, surroundings, friends, and family members play important role in the development of eating disorders [1]. There is a high prevalence of eating disorders among college girls because they are not satisfied with their body shape and weight and they are at high risk of appealing in bad eating habits [2]. The mortality rate of eating disorders is higher than any other mental disease. From the direct result of eating disorders at least one person dies every 62 minutes [3]. About 50-80 percent of person suffers from anorexia and bulimia nervosa because of genetic risk factor [4]. Almost 1 in 10 patients suffering from bulimia nervosa have abuse disorders such as more alcohol consumption [5]. The post-bariatric patients were found at a high rate of binge eating [6].

Anorexia nervosa, bulimia nervosa, and binge eating are the most common eating disorders among young women. Anorexia nervosa is a chronic illness characterized by self-starvation, excessive weight loss, and restrictive nutritional intake and has adverse effects on the physical, mental and social state of a person [7]. Patients with bulimia nervosa are disturbed and guilty by depletion of control over-eating. Binge eating, laxative behavior, uncontrolled exercising, uncontrolled drinking, body inspection, physical symptoms like weight loss, and problems in the menstrual cycle are more common attributes of eating disorders [8]. Eating disorder not otherwise specified (ED NOS) is a heterogeneous and less diagnostic category of eating disorders. Eating disorders in this category are binge-eating, a mixture of both anorexia nervosa and bulimia nervosa, and show symptoms of both [9].

Eating disorders and overweight are notable health issues that are increasing day by day. There are many features of eating disorders that are familiar with obesity such as binge eating, unhappiness with body shape, surroundings, unhealthy diet, and also some psychological

problems such as stress and nervousness. In general, females are more concerned about their body weight and carrying out weight restraint that signs are normally related to both eating disorders and obesity [10]. Stress has been evaluated as an analytic aspect in the occurrence of eating disorders. Avoidance and assortment of food by individuals under stress is a critical problem and has unfavorable effects on human health. During the time of stress, humans attract towards flavored foods like junk foods, fried foods, and energy-dense foods without falling in hunger and absence of homeostatic mandatory for energy which further leads to obesity and overweight [11]. The present study was carried out with objectives to estimate the extent and types of eating disorders and compare the factors included in eating disorders and anthropometric measurements of subjects with and without eating disorders.

2. MATERIALS AND METHODS

2.1 Selection of Subjects

A total sample of five hundred (500) college girls in the age group of 18-25 years was randomly selected from the different colleges of Ludhiana city, Punjab. Further identified the college girls with and without eating disorders based on Eating Attitude Test (EAT) mean scores (<20 as without eating disorders and >20 as with eating disorders) [12]. The subjects were categorized into two groups Group A: With Eating Disorder (WED) and Group B: Without Eating Disorder (WOED).

2.2 Eating Attitude Test (EAT)

The eating disorder questionnaire (EAT) was developed by Lane et al. [12] was used to identify the eating disorders of college girls. The statements of the questionnaire were categorized under the three aspects of Dieting, Oral control and Food preoccupation, and Bulimia [13]. Subjects rated the intensity of attitudes from seven options: *Always (3), Usually, Very Often, Often (2), Sometimes, Rarely (1), and Never (0)*. The last response was scored zero, while the other six responses from one to six scored 3, 2, and 1 accordingly. A sum-up of scores less than 20 was considered to be non-eating disorders and more than 20 considered as eating disorders.

2.3 Anthropometric Parameters

The anthropometric measurements i.e. height (cm), weight (kg), waist and hip circumferences (cm) were measured using standard procedures. Body mass index and waist to hip ratio were derived. Reference cut-off values of $>25 \text{ kgm}^2$ for BMI [14] and >0.85 for waist and hip ratio value [15] were used for the assessment of underweight, overweight, and obesity.

2.4 Statistical Analysis

Data were statistically analyzed on various aspects to determine different parameters. Computation of some descriptive statistical measures such as percentage distribution, the mean, and standard deviation for each study variable. The student's t-test was applied to evaluate the significant difference between different parameters associated with the eating attitude of college girls and all data was valued at 95 and 99% level of significance.

3. RESULTS AND DISCUSSION

3.1 Socio-Demographic Profile

Distribution based on age revealed that 49 percent of total girls were in the age group of 20-21 years followed by 26 percent in the age group of 22-23 years, 20 percent in age between 24-25 years, and only 5 percent in the age group 18-19 years, with a mean age of 21.9 ± 1.76 years. Feki et al. (2016) conducted a cross-sectional study on eating disorders among Tunisian students and found that the mean age of girl students was 21 years. Both gender and age were considered important predictors of eating disorders [8]. The distribution of subjects according to their living status revealed that 54 percent of college girls were living in hostels while 46 percent of girls were day scholars. Further, it was recorded that three-fourths of college girls (76%) were enrolled in under-graduation degrees while 24 percent were pursuing Post-graduation.

3.2 Eating Disorders

Table 1 represents the data about the eating attitude of college girls based on EAT questionnaire, which was designed for the identification of abnormal eating habits and eating disorders. The statements of the questionnaire were classified under three separate categories such as dieting, oral control, and food preoccupation, and bulimia.

3.3 Anorexia Nervosa

Dieting statements were based on the criteria proposed by Sharan and Sundar [16] and ICD-International Classification of Disease [17] for the diagnosis of anorexia nervosa. Among the selected subjects, 28 percent of girls always feared being overweight and some of the subjects i.e. 13 percent were always occupied with the thought of having too large thighs and hips. Srinivasan et al. [18] reviewed that 11 percent of adolescents developed a milder form of eating disorders due to the distress of becoming overweight. About 12 percent of college girls always lacked confidence due to being overweight and 11 percent of subjects were always humiliated about their body shape. However, 21 percent of them regularly exercised to lose the extra pounds. Females often engaged themselves in physical exercise to achieve either a perfect female body or to be close to an ideal body shape. This desire to achieve a perfect body serves as a motivation for women to exercise [19]. Approximately one-third (32.4%) of college girls always wanted to lose bodyweight. This was similar to the facts of Augustine and Poojara [20] who reported that more than half of adolescent girls wished to lose their weight and always wanted to become slim. Among college girls, 16 percent of them always engaged themselves in dieting behaviors, and 21 percent of subjects' always restricted foods high in simple carbohydrates and sugars. Lane et al. [12] reviewed that exercisers had a unique conceptualization of eating behaviors, particularly items that describe the carbohydrate content of food. It included avoiding eating foods that contain simple sugars. Exercisers knowing the nutritional value of food are likely to give a low score for eating simple sugars and a high score for eating complex carbohydrates. In the present study, 18 percent of college girls always felt guilty after eating too much food and emptying of the stomach was a feeling of satisfaction for 23 percent of the collegiate females. Around 26 percent of individuals always and 1 percent often tried to control their weight by limiting their food intake. Some subjects (12% always and 10% often) avoided eating food even when they were hungry.

3.4 Binge Eating

Oral control statements based on conditions given by Sharan and Sundar [16] and ICD-International Classification of Disease [17] were used for the identification of binge eating. The data on this revealed that only 12 percent of

subjects could not restrict themselves once they started eating and 30 percent of subjects felt that they were always pressurized by someone to eat. Among the selected subjects 22 percent of girls were habitual of eating when distressed and 14 percent felt nervous about eating food. Irritation, depression, worry, anxiety, and emotions triggered a desire to eat more than the sensory stimulus and indulged a person in abnormal eating attitudes [21]. Ennis [22] reported that when individuals were depressed, irritated, worried, and nervous, and emotionally upset, it led to the practice of binge eating and engaging in unhealthy dieting behavior. Around 33 percent always felt hungry to eat at any time and frequent consumption of a large amount of food in a short time.

3.5 Bulimia Nervosa

Food preoccupation and bulimia statements based on criteria enlist by ICD- International Classification of Disease [17] were used for diagnosis of bulimia nervosa such as overeating or consumption of a large number of foods, preoccupation with food and eating, self-induced vomiting and enema, usages of drugs like appetite suppressants and diuretics. As per the findings, 6 percent of subjects had a habit of inducing vomiting themselves after eating food and 1 percent performed enema to get rid of the food eaten. A mere percentage of subjects (3%) used laxatives and diet pills after eating food. Latha et al. [23] observed that only 2 percent of individuals consumed diet pills as an obsession

Table 1. Eating disorders among selected college girls (n=500)

Statements	Never	Rarely	Often	Always
Dieting				
Anorexia Nervosa				
Terrified about being overweight	334(66.80)	11(2.20)	13(2.60)	142(28.40)
Preoccupied with the thought of having too large thighs and hips	405(81)	20(4)	8(1.60)	67(13.40)
Loss of confidence due to overweight	394 (78.80)	12(2.40)	33(6.60)	61(12.20)
Exercise daily to control weight	356(71.20)	24(4.80)	15(3)	105(21)
Feel ashamed about body shape	357 (71.4)	11(2.02)	79 (15.80)	53(10.60)
Wish to lose weight	306(61.20)	13(2.60)	19(3.80)	162(32.40)
Engage in dieting behavior	407(81.40)	11(2.20)	2(0.40)	80(16)
Avoid foods with high carbohydrates and sugar in them	355(71)	17(3.40)	24(4.80)	104(20.80)
Feel guilty after eating too much	389(77.80)	8(1.60)	15(3)	88(17.60)
Feel happy after emptying the stomach	371(74.20)	13(2.60)	3(0.60)	113(22.60)
Try to limit food intake to control weight	350(70)	16(3.2)	6(1.2)	128(25.6)
Avoid eating in hunger	364 (72.80)	26(5.20)	50 (10.00)	60 (12.00)
Efforts to eat less	345(69.14)	24(4.81)	36(7.21)	95(19.00)
Oral control				
Binge Eating				
Start eating and can't stop	378(75.60)	18(3.60)	44(8.80)	60(12)
Others pressurized to eat	294(58.80)	43(8.60)	11(2.20)	152(30.40)
Eating in depression	335(67)	26(5.20)	28(5.60)	111(22.20)
Feel nervous by eating	391(78.20)	23(4.60)	17(3.40)	69(13.80)
Take longer time than others to eat	309(61.80)	18(3.60)	16(3.20)	157(31.40)
Feel guilty after eating too much	389(77.80)	8(1.60)	15(3)	88(17.60)
Always feel hungry enough to eat at any time	270(54)	31(6.20)	32(6.40)	167(33.40)
Food preoccupation and bulimia				
Bulimia Nervosa				
Self-induce vomiting	458(91.60)	1(0.20)	9(1.80)	32(6.40)
Enema to get rid of the food eaten	492(98.40)	3(0.60)	0(0.00)	5(1)
Use laxatives, diet pills, or diuretics	478(95.60)	2(0.40)	6(1.20)	14(2.80)
Food control the life	345(69)	26(5.20)	21(4.20)	108(21.60)

*Figures in parenthesis indicate a percentage, Multiple responses Scores- Never (0), rarely (0 to 0.99), often (1 to 1.99), and Always (2 to 3)

with their eating disorder. Among the selected subjects, 22 and 4 percent of college girls always or often felt that food controlled their life in a certain. Food made them unhappy if they craved and did not get it while it also could make them pleased and satisfied whenever the subjects felt low.

3.5 Prevalence of Eating Disorders

The data presented in Table 2 segregates the selected college girls into two groups i.e. With Eating Disorders (WED) and Without Eating Disorders (WOED) based on Eating Attitude Test (EAT). Lane et al. [12] stated that the total mean score of more than 20 of dieting, oral control, bulimia, and food preoccupation showed the suffering of subjects from eating disorders. The results in the present study showed the total mean score of dieting (13.17 ± 8.47), oral control (15.86 ± 6.29), and bulimia and food preoccupation (3.86 ± 10.98) was 32.86 ± 10.96 as in 46 percent college girls. On the other hand, 54 percent of the subjects had a total mean score of dieting (3.32 ± 3.71), oral control (5.35 ± 3.32), and bulimia and food preoccupation (1.10 ± 1.69) as 9.77 ± 4.93 showing that they did not suffer from any eating disorders. Further data indicated that there was a significant ($p \leq 0.01$) difference between the total mean score of WED and WOED subjects. Garner et al. [13] suggested that reported that subjects who had a mean score of 20 or more than 20 on EAT scale were considered to be an indicator of possible eating disorder problems than focusing on just exercise or diet alone. Mahmood and Bibi [1] confirmed that 53 percent of individuals were found to be at high risk of eating disorders based on EAT- Eating Attitude Test.

3.6 Types of Eating Disorders

The most common eating disorders among young women are found to be Binge Eating (BE), Anorexia Nervosa (AN), and Bulimia Nervosa (BN). The information in Fig. 1 showed the prevalence of each of these types among the WED subjects. Approximately half (48%) of WED subjects had a habit of binge eating. Almost 40 percent WED subjects suffered from anorexia nervosa and the rest 12 percent are affected by bulimia nervosa. Wilson et al. [9] analyzed that binge eating was a very important clinical problem and more prevalent in overweight and obese adults and the distribution of binge eating disorders was vast and more diversified than anorexia nervosa and bulimia nervosa.

3.7 Classification of Subjects Based on Body Mass Index (BMI)

Body mass index provides the most useful albeit crude population-level measure of undernutrition and obesity. It can be used to estimate the prevalence of nutritional status within a population. Based on BMI classification (Table 3) it was found that the overall mean BMI of college girls was $23.53 \pm 0.56 \text{ kg/m}^2$. It was observed that more than one-fourth (30.8%) of college girls were having a BMI of less than 18.5 kg/m^2 . Among selected college girls, more than half of them (53.8%) were having normal BMI and 13.8 percent of them were in the category of overweight. Around 1.6 percent of them were classified as obese. Out of underweight college girls, the Majority of them were mildly (20%) underweight.

Table 2. Prevalence of eating disorders based on Eating Attitude Test (EAT) among selected college girls (n=500)

Eating disorders	WED	WOED	t value
Prevalence rate	230 (46.00)	270(54.00)	-
Mean \pm SD			
Dieting	13.17 ± 8.47	3.32 ± 3.71	17.423**
Oral control	15.86 ± 6.29	5.35 ± 3.32	23.836**
Bulimia and food preoccupation	3.86 ± 10.98	1.10 ± 1.69	4.075**
Total	32.86 ± 10.96	9.77 ± 4.93	31.122**

WED-With Eating Disorders; WOED-Without Eating Disorders
 Mean scores more than 20 considered as eating disorders [12]

**Significant at 1% level

#Figures in parenthesis indicate the percentage

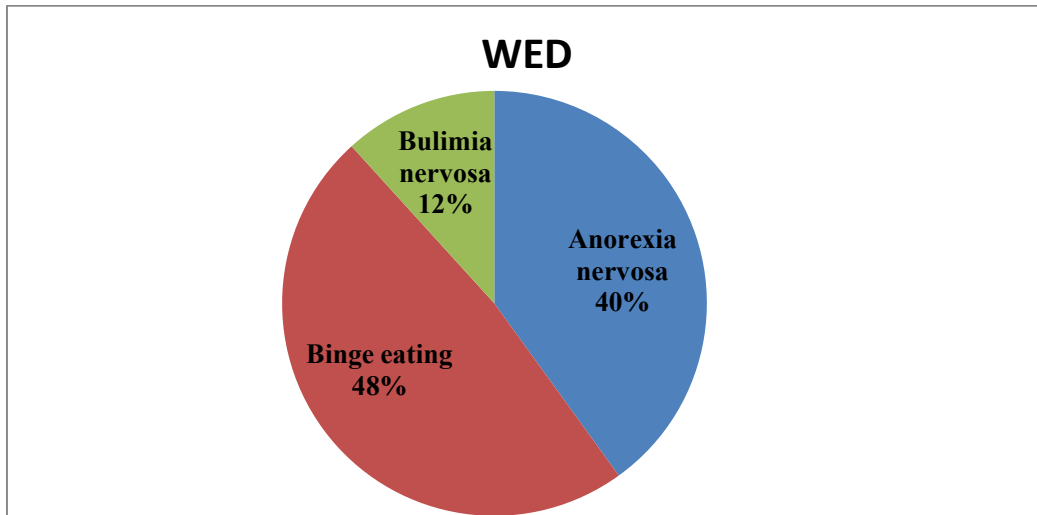


Fig. 1. Prevalence of eating disorders among selected college girls

Table 3. Body Mass Index (BMI) of selected college girls (n=500)

Categories of body mass index (BMI)	Principle cut-off points	Additional cut-off points	Total
Underweight	<18.50	<18.50	154(30.8)
Severe underweight	<16.00	<16.00	28(12.17)
Moderate underweight	16.00-16.99	16.00-16.99	31(6.20)
Mild underweight	17.00-18.49	17.00-18.49	100(20)
Normal	18.5-24.99	18.5-24.99	269(53.80)
		18.50-22.99	185(37)
		23.00-24.99	84(16.8)
Overweight	≥25.00	≥25.00	69(13.8)
Pre-obese	25.00-29.99	25.00-27.49	53(10.6)
		27.50-29.99	16(3.2)
Obese	≥30	≥30	8(1.6)
Obese Grade 1	30.00-34.99	30.00-32.49	5(1.00)
		32.50-34.99	1(0.20)
Obese Grade 2	35.00-39.99	35.00-37.49	1(0.20)
		37.50-39.99	0(0.00)
Obese Grade 3	≥40.00	≥40.00	1(0.20)

WED-With Eating Disorders; WOED-Without Eating Disorders

*Figures in parenthesis indicate the percentage

The data further revealed that 11 percent of college girls were in the pre-obese category and a very less number (1.20 %) of college girls were found to have BMI in the range of 30.00 to 34.99 Kg/m². Equal percentages (0.20% each) of college girls were having BMI between 35.00 to 39.99 and more than 40.00 Kg/m². Lundgren et al. [24] also observed that the majority of females (60%) with unhealthy eating habits were overweight. Fitzgibbon et al. [25] viewed that overweight and obese female with higher BMI i.e. more than 23.00 Kg/m² followed an unhealthy and wrong eating pattern.

3.8 Correlation between Eating Attitude Scores and BMI of College Girls

The correlation coefficient of dieting (0.36), oral control (0.38), and food occupation and bulimia (0.30) showed a positive correlation with the Body Mass Index (BMI). Eating attitude score increased with increasing body mass index. It clearly showed that obese and overweight college girls suffered from eating disorders. Similar observations were the revelation of Syed et al. [26] when they examined the positive relationship of eating attitude scores with weight,

BMI, waist, and hip ratio. A significant positive correlation of dieting, oral control, and bulimia with body mass index was also observed by Liao et al. [27].

4. CONCLUSION

Adverse changes in lifestyle patterns of youngsters led to a great hike in eating disorders and overweight among young individuals. Based on EAT scale, the extent of eating disorders such as dieting, oral control, bulimia, and food preoccupation was found to be 46 percent. Oral control and dieting were two major reasons for eating disorders among young girls. A higher percentage of subjects with eating disorders were found to be overweight and obese which showed that overweight subjects were more likely to engage in unhealthy eating behavior [10]. The increasing prevalence of overweight and obesity in girls is a warning sign of eating disorders development. Hence, there is a need to formulate nutrition and health fitness clubs in the colleges to create awareness and practices regarding diet, exercise, and yoga under the proper guidance of nutritionists and health practitioners.

CONSENT

As per international standard or university standard, Participants' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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