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PREVALENCE OF BINGE EATING DISORDER AMONG ADULTS IN THE EASTERN PROVINCE OF SAUDI ARABIA

Medicine

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ABSTRACT

Background: Binge eating disorder (BED) is an eating disorder characterized by frequent consumption of unusually large amounts of food within a 2-hour period accompanied by a sense of lack of control, without the use of compensatory behaviors such as vomiting, gorging, or excessive exercising unlike bulimia nervosa (BN). It is associated with feelings of guilt, disgust, depression after a binge eating episode. It also involves eating without being hungry and sometimes eating out of board, leading to various complications mainly obesity.

Objectives: This study aimed to determine the prevalence of BED among health care workers at King Fahd Military Medical Complex (KFMMC) in the eastern province of the Kingdom of Saudi Arabia, determine the risk factors of BED among them, and measure the association between body mass index (BMI) and BED from 2016 to 2017.

Methodology: A cross-sectional study design was used to determine the prevalence of BED and the associated factors. Self-administered questionnaires including the binge eating scale were used for data collection to measure the symptoms and characteristics of BED with a cutoff point of 18. A score of 18-26 was considered as moderate binge eating and above 27 as severe binge eating. The questionnaire was distributed among a representative sample of health care workers at KMMC. The samples were selected using the simple randomization method.

Results: A total of 377 adult females and males participated in this study, with a response rate of 100%. About 50% participants were male and 50 % were female. The mean age was 33.69 years. The mean body mass index (BMI) was 25.35. Binge eating habits were present in 28.64 % of the health care workers at KFMMC. Results showed a strong association between binge eating score (BES) and BMI, with a p-value of 0.001. However, the association between BES and age was less significant, with a p-value of 0.044.

Conclusion: Only 28.64% of health care workers at KFMMC were binge eaters. Causality could not be determined due to the cross-sectional limitation, and further prospective studies need to be conducted.

KEYWORDS

Introduction

Background

Binge eating disorder (BED) is a serious eating disorder in which a person frequently consumes unusually large amounts of food and feels unable to stop eating; most people overeat on occasion, such as having seconds or thirds of a holiday meal. However, if excessive overeating while feeling out of control becomes a regular occurrence, it crosses the line to BED.

(1)

BED is characterized by compulsive overeating in which people consume huge amounts of food while feeling out of control and powerless to stop. The symptoms of BED usually begin in late adolescence or early adulthood, often after a major diet. A binge eating episode typically lasts around two hours, but some people binge on and off all day long. Binge eaters often eat even when they are not hungry and continue eating long after they are full. They may also gorge themselves as fast as they can while barely registering what they are eating or tasting.

(2)

The following are features of BED:

1. People with this disorder experience frequent episodes of uncontrollable binge eating.
2. People with this disorder feel extremely distressed or upset during or after binge eating.
3. Unlike bulimia nervosa (BN), no regular attempts are done to "make up" for the binges through vomiting, fasting, or overexercising.
4. People with BED struggle with feelings of guilt, disgust, and depression; they worry about what the compulsive eating will do to their bodies and beat themselves up for their lack of self-control. They desperately want to stop binge eating, but feel like they cannot.
5. Binge eating may be comforting for a brief moment, but then reality sets back in, along with regret and self-loathing. Binge eating often leads to weight gain and obesity, reinforcing compulsive eating. If binge eaters continue to feel bad about themselves and their appearance, they also continue to use food to cope. It becomes a vicious cycle: eating to feel better, feeling even worse, and then turning back to food for relief.
6. People with BED are embarrassed and ashamed of their eating habits; thus, they often hide their symptoms and eat in secret. Many binge eaters are overweight or obese, but some are of normal weight.

(2)

Signs and symptoms of binge eating

Eating unusually large amounts of food in a specific amount of time, such as over a 2-hour period
Feeling the lack of self-control
Eating without being hungry
Eating rapidly during binge episodes
Eating until becoming uncomfortably full
Frequently eating alone or in secret
Feeling depressed, disgusted, ashamed, guilty, or upset about eating
Frequently dieting, possibly without weight loss

(3)

- Eating normally around others, but gorging when they are alone
  Eating continuously through the day, with no planned mealtimes
  Feeling stress or tension that is only relieved by eating
- Embarrassment over how much they are eating
- Feeling numb while bingeing
- Never feeling satisfied, no matter how much they eat

(2)

Risk factors of BED

- Age: Although people of any age may be affected, a higher percentage of adults in their 40s and 50s have the disorder.
- Other eating disorders: Patients who have or had other eating disorders, such as anorexia or BN, are at a higher risk of developing BED.

- Dieting: Experts know that dieting is a risk factor for BN and anorexia. Some people with eating disorder have never dieted, whereas others have a history of dieting. More studies are needed in this area.
- Psychological problems: People with BED act impulsively and have no control over food. A higher percentage of people with BED have problems coping with stress, anxiety, anger, sadness, boredom, and worry. Hence, this is linked with depression.
- Sexual abuse: Some individuals with the disorder reported that they were sexually abused when they were young.
- Society's expectations: The media's obsession with body shape, appearance, and weight triggers the development of BED.
- Biology: The development of BED is linked to a person's biological vulnerability, involving genes as well as brain chemicals. Current research examines how the appetite regulation of the central nervous system affects the people's eating habits. Other clues may be considered to check how other people's gut functions.
- Eating disorders and alcohol abuse are genetically related: People with a genetic risk for certain eating disorders are also at higher risk of alcohol abuse, and vice-versa, according to the researchers from Washington University School of Medicine in St. Louis.
- Some jobs: Evidence shows that a higher percentage of sportswomen and models have BED as compared with other people. Although individuals who work in the catering industry (making and serving food) are susceptible, further studies are needed to confirm this issue.

Causes of BED

-Social pressure to look thin adds to the shame binge eaters feel and fuels their emotional eating.

-Some parents use food to comfort, dismiss, or reward their children. Children who frequently receive comments about their bodies and weight and those sexually abused in childhood are also vulnerable.

-A strong link exists between depression and binge eating. Many binge eaters are either depressed or have previously experienced depression; others may have trouble with impulse control and managing and expressing their feelings. Low self-esteem, loneliness, and body dissatisfaction also contribute to binge eating.

(2)

Diagnostic Criteria

Diagnostic and Statistical Manual of Mental Disorders 5 (DSM-5)

Recurrent episodes of binge eating. Binge eating is characterized by eating in a discrete period of time (e.g., within a 2-hour period) and consuming unusually large amounts of food in a similar period of time under similar circumstances:

- A person with a binge eating disorder has lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating).

The binge eating episodes are associated with three (or more) of the following:

- Eating much more rapidly than normal
- Eating until feeling uncomfortably full
- Eating large amounts of food when not feeling physically hungry
- Eating alone because of feeling embarrassed by how much one is eating
- Feeling disgusted with oneself, depressed, or very guilty afterward
- Marked distress regarding binge eating is present.
- The binge eating occurs, on average, at least once a week for 3 months.
- Binge eating is not associated with the recurrent use of inappropriate compensatory behavior (e.g., purging) and does not occur exclusively during the course of anorexia nervosa, BN, or avoidant/restrictive food intake disorder.

Complications of binge eating

Obesity and its complications

- Diabetes
- High blood pressure
- High cholesterol
- Gallbladder disease
- Heart disease
- Shortness of breath
- Certain types of cancer
- Menstrual problems
- Decreased mobility (inability to move around) and tiredness
- Sleep problems, including sleep apnea

(4)

Social Stigma of BED

Many people suffering from BED report that it is a stigmatized and frequently misunderstood disease. Greater public awareness that binge eating disorder is a real diagnosis—and should not be conflated with occasional overeating—is needed to ensure that every person with BED can access the resources, treatment, and support for recovery.

(5)

Treatment of binge eating disorder

1-Psychological therapy.

The following are the three main types of therapy used in people with BED:

- Cognitive behavioral therapy (CBT) for binge eating disorder (CBT-BED) involves talking to a therapist and working out new ways to deal with situations, feelings, and food addictions.
- An adapted form of dialectical behavioral therapy (DBT) focuses on improving the ability to control and regulate the emotions.
- Interpersonal therapy (IPT) focuses on relationship-based issues and how they influence eating habits.

*These therapies are effective in helping people who binge eat, although the long-term results remain unclear.

*It is common to experience some periods where the problem improves (remission) and experience periods where they get worse (relapses), especially in the early stages of treatment.

2-Selective serotonin reuptake inhibitors (SSRIs)

3-Losing weight

- Patients must have a balanced, calorie-controlled diet as recommended by a healthcare professional.
- Exercising regularly – most adults should do at least 150 minutes of moderate-intensity exercise every week.

Rationale

- BED has serious complications that can be prevented if detected early.
- Increasing the awareness toward the BED
- Selecting adults at high risk of developing BED
- Having a special interest in BED

Aim:

This study aimed to assess the prevalence of BED among adults in the eastern province of the Kingdom of Saudi Arabia.

Objectives:

1- To determine the prevalence of BED among adults in the eastern province of the Kingdom of Saudi Arabia
2- To determine the risk factors of BED among adults in the eastern province of the Kingdom of Saudi Arabia.
3- To measure the association between BMI and BED.

Literature review

This literature review aims to identify and discuss the main issues in the research literature related to BED and provide an outline of the key research findings. The review of the literature revealed several international studies related to the prevalence and risk factors of BED, but no local studies were found.

One study about the prevalence and correlates of binge eating disorder from the World Health Organization World Mental Health Surveys was published in PubMed 2013. The cross-national data of BED are presented and compared to those of BN based on the World Health Organization World Mental Health Surveys. The survey involved 2,4124 respondents (ages 18+) from 14 upper-middle and high-income countries. The 14 countries in the World Mental Health Survey assessed for BED comprised one lower-middle income (Colombia), three upper-middle income (Brazil, Mexico, Romania), and ten high

income (Belgium, France, Germany, Italy, the Netherlands, New Zealand, Northern Ireland, Portugal, Spain, and the United States). Results showed that the lifetime prevalence estimates on all surveys had an average of 1.0% for BN and 1.9% for BED. Lifetime risk of both disorders is elevated for women. Comorbid anxiety, mood, and disruptive behavior disorders predict subsequent onset of BN somewhat more strongly than BED and that BN.

(7)

Another study published in Pubmed1997 evaluated the prevalence of BED in obese adults seeking weight loss treatment.

This study investigated the prevalence of BED using the Questionnaire on Eating and Weight Patterns and the Interview for the Diagnosis of Eating Disorders in a sample size of 468 obese adults seeking weight loss treatment at two research facilities. Result showed that a large percentage of the sample (10.7% based on the Interview for the Diagnosis of Eating Disorders and 20.5% based on the Questionnaire on Eating and Weight Patterns) reported binge eating, but did not endorse all criteria necessary to warrant a diagnosis of BED.

(8)

Another study was published in PubMed 1998. It was a cohort study on the prevalence of BED, obesity, and depression in young adults. This study had 3,948 participants (aged 28-40 years). This study found that the prevalence of BED was 1.5% in the overall cohort, with similar rates among black women, white women, and white men. Black men had substantially lower BED rates.

(9)

Another study was published in International Journal of Obesity 2003. It was a study on the prevalence of BED in obese children and adolescents seeking weight loss treatment. The study involved 196 participants aged 10–16 years. Result showed that only 1% of the subjects met the criteria for BED and 9% were found to have objective bulimic episodes, which were more common in girls than in boys. Episodic overeating was more common than binge eating. Children with bulimic episodes were more overweight and showed a greater eating-related psychopathology than those without bulimic episodes.

(10)

A study was published in the Journal of the American Medical Association in 2011. It was a cross sectional study regarding the prevalence and correlates of eating disorders in adolescents. The study was conducted in schools where the target population of 10123 adolescents aged 13 to 18 years were selected.
Result showed that lifetime prevalence estimates of anorexia nervosa, BN, and binge eating disorder were 0.3%, 0.9%, and 1.6%, respectively.

(14)

A study published in the Journal of Eating Disorder in 2015 was a study on the prevalence and sociodemographic correlates of Diagnostic and Statistical Manual of Mental Disorders 5 (DSM-5) eating disorders in the Australian population.

This study aimed to determine the 3-month prevalence of the DSM-5 disorders in a representative sample of Australian older adolescents and adults. The secondary aim was to explore the demographic correlates of these disorders, specifically age, sex, income, educational attainment, and presence of obesity. In this study, a cross-sectional survey data of adults (aged over 15 years) were collected among the 6041 participants. The results showed that the 3-month prevalences of anorexia nervosa and BN were both under 1%, whereas the prevalence of BED and sub-threshold BED was 5.6-6.9%. In conclusion, the findings support the expanded demographic distribution of eating disorders. BED showed a higher prevalence than anorexia nervosa and BN. As it is in BED, obesity is a very common co-morbidity in BN.

(7)

A study was published in the American Journal of Psychiatry, Washington (Oct 1993)

The author determined the prevalence of binge eating disorder in a self-referred study group of moderately and severely obese subjects and investigated the association between BED and psychiatric illness or sexually abuse. They interviewed 89 obese women and 39 obese men without a recent weight loss treatment, using the BED clinical interview (the structured clinical interview for Diagnostic and Statistical Manual of Mental Disorders III-R and structured clinical interview for Diagnostic and Statistical Manual of Mental Disorders III-R personality disorder). Results showed that 43 (34%; 33 women and 10 men) of the subjects met the criteria for BED. Subjects with BED more likely have a life time prevalence of the Diagnostic and Statistical Manual of Mental Disorders III-R axis I or axis II diagnosis and have undergone psychotherapy or counselling than those without the disorder. The lifetime rate of depression, panic disorder, BN, border line personality disorder, and avoidance personality disorder were all significantly higher in subjects with binge eating disorder. The rate of reported sexual abuses was not higher among subjects with BED. However, they more likely had a family history of substance abuse.

(15)

A study was published in the Journal of Consulting and Clinical Psychology, Oct 1998. This study provided the estimates of comorbid psychiatric disorders in women with BED. A total of 61 Diagnostic and Statistical Manual of Mental Disorders 5 (BED) and 60 control participants, who were recruited from the community, completed the Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders-III-Revised (DSM-III-R) axis I and axis II disorders and self-report measures of eating and general psychiatric symptomatology. As regards psychiatric diagnoses, women with BED had higher lifetime prevalence rates for major depression. Any axis I disorder and any axis II disorder relative to controls. Women with BED had greater eating and psychiatric symptomatology as compared with controls. Thus, results suggest that the prevalence of comorbid psychiatric disorders in BED may be lower than previously indicated by clinical studies.

(16)

A study was published in the International Journal of Obesity (2001), Vienna, Austria. The study provided an estimate of the prevalence of BED and obesity; this study revealed that the community surveys have estimated the current prevalence of binge eating disorder to be between 2% and 5%. BED is more equal in sex ratio (65% female, 35% male) than in BN, for which only about 10% of persons affected are men. BED is more common among overweight women seeking treatment than those not seeking treatment. Approximately 30% of those participating in weight loss programs and 70% of individuals in the Overeaters Anonymous exhibit BED. Interestingly, in a community survey, only half of the subjects with BED were obese (BMI>27.5 kg/m^2) and only about 5% of the obese subjects met the BED criteria. Consequently, this problem behavior seems to be significantly less prevalent in obese subjects not currently receiving treatment.

(17)

A study was published in the United States National Library of Medicine - National Institutes of Health 2010. It was a study on screening for BED using the Patient Health Questionnaire in a community sample.

Objective: The study aimed to examine the operating characteristics of the Patient Health Questionnaire Eating Disorder module (PHQ-ED) to identify BN/BED or recurrent binge eating (RBE) in a community sample and compare true positive (TP) versus false positive (FP) cases on clinical validators.

Method: A total of 259 screen-positive individuals and a random sample of 89 screen-negative cases completed a diagnostic interview. The sensitivity, specificity, and positive predictive value (PPV) were calculated. The TP and FP cases were compared using the t-tests and chi-square tests.

Results: The Patient Health Questionnaire Eating Disorder module PHQ-ED had high sensitivity (100%) and specificity (92%) for detecting BN/BED or RBE; however, the PPV was low (10% or 19%). TP and FP cases had no significant differences on the frequency of

subjective bulimic episodes, objective overeating, restraint, BMI, and on self-rated health.

(18)

As the previous section reveals, there is a large body of research on the prevalence rates and clinical manifestations of BED among different countries around the world. However, the prevalence rates and clinical manifestations of BED in Saudi Arabia and other Arabian countries have been distinctly understudied; early and prompt recognition of the mild forms of BED prevents the subjects from practicing inappropriate eating behaviors and attitudes, which can lead to various complications. Therefore, prevalence studies play a key role in filling the gap between the current academic understanding of the rates and clinical manifestations of BED in Saudi Arabia.

Methodology

Background

The data used for this report were gathered through a cross-sectional method using a standardized and validated scale that measure BED among the population. The binge eating disorder questionnaire was used, and the same questionnaire was administered to the study sample. A total of 377 health care workers from the KFMMC in Dhahran were recruited in this study. The data from this group were used to evaluate the prevalence and risk factors of BED among health care workers. The BES was treated as the outcome/dependent variable (y-value), whereas the other variables listed were treated as predictors/independent variable (x-value).

Data Collection

Data collection was done using a self-administered questionnaire that was distributed randomly among the health care workers from KFMMC prior to the start of this study. A pilot study was conducted to test the reliability of the questionnaire and understand the applicability before the start of the actual research as well as ensure the clarity of the questionnaire. The questionnaire was administered among the 25 participants who were not included in the main study; they only participated in this study to test the validity of the questionnaire. The modification was done based on the participants' immediate feedback after the pilot study. After the pilot study was completed, the data collection phase started with a sample size of 377 participants with the following inclusion and exclusion criteria.

Population Selection Criteria

- Adults between 18 and 65 years of age
- Females
- Males
- All nationalities (Arabian, Asian, Indians, Africans, and American (western) employed as hospital staff
- Medical staff (physicians, nurses, dentists, dentist assistant, physiotherapist, radiologic technologist, paramedics, laboratory technicians, dietician, and nursing students) from KFMMC in Dhahran

Exclusion Criteria

- Children who are younger than 18 years old
- Older than 65 years old
- Pregnant women
- Non-medical staff from the KFMMC Dhahran

Data Collection

The data used in this project were based on the finding of the previous study. This study aimed to determine the prevalence of BED among health care workers and determine other factors that influence this disorder. A simple randomization was performed, and the health care workers from KFMMC were selected for this study. The sample included physicians, nurses, dentists, dentist assistant, physiotherapist, radiologic technologist, paramedics, laboratory technicians, dietician, and nursing students. The questionnaire was distributed in validated English language version and since all the participants spoke good English, no translation was needed.

The Exposure Measurement

Studies used different measurement scales to determine the association between binge eating behavior and risk factors. The age was highly associated with eating disorder as this disorder often starts in the early 20s.
(27).

The female sex is highly associated with eating disorder as compared with the male sex (28). An increase in binge eating behavior is associated with increased weight, which results in the elevation of BMI (29). However, ethnicity was also associated with eating disorder, especially among the minority groups; therefore, this factor was also included in this project to investigate the relationship between Arab race and eating behaviors (30).

The Outcome Measurement

A binge eating-related questionnaire was developed. It is a 16-item questionnaire used to assess the presence of a binge eating behavior, which is indicative of an eating disorder. It was devised by Gormally et al. in 1982 and was specifically used in obese individuals. The questions are based on the behavioral characteristics (e.g., amount of food consumed), emotional characteristics (e.g., feelings of guilt or shame), and cognitive response. The questionnaire was presented in English, with each question having 3-4 separate responses assigned to a numerical value. The score ranged from 0 to 46. The score was interpreted as follows: non-bingeing, less than 17; moderate bingeing, 18-26; and severe bingeing, 27 and greater. Each participant was given 15 minutes to complete the questionnaire. An investigator was available to check the completion of the data, and the questionnaires were collected in the same setting.

Data Entry and Analysis

A manual data collection was done and checked by an investigator. No missing data were reported. Coding of the data was done by the investigator and was done for all the variables.

Statistical Analysis

Statistical analysis was done using the Statistical Package for the Social Sciences (SPSS) to address the aims of this project. This project was a cross-sectional analysis, with its main outcome - binge eating - used as a categorical variable. This report aimed to determine if an elevated BMI and other factors are associated with the increased likelihood of increase in binge eating. To understand this relationship, a chi- square test was used.

Descriptive Sample

The data used in this project are based on the findings of the binge eating questionnaire distributed to a randomly selected sample of health care workers from KFMMC. This study aims to determine if age, sex, BMI, and other factors trigger binge eating. For this project, the data was collected on 377 of health care workers working in KFMMC. This project is a cross-sectional study that serves its main aim and objective.

Descriptive Analysis

The mean value and standard deviation of age, binge eating score with BMI was done. Further descriptive analysis was done to show number of observation in each variable.

Chi-square test: Chi-square test was done to show the association between multiple variables and the outcome of interest. All variables were assumed to be homogeneously distributed. Thus, no further adjustment was needed.

Ethical Consideration

-A written permission from the Joint Program of Family and Community Medicine was obtained to conduct the study. Furthermore, the study must be approved by the local ethics committee.

-The individual consent to participate in the study is a prerequisite for data collection; a written consent will be taken from each participant.

Limitations

There was limitation in the time

Budget

Self funded.

Results

This chapter presents the results of the data analysis. As such, it begins with a profile of the sociodemographic details of the participants. This is followed by the presentation of the data results related to the main research question. A total of 377 adults male and female between the age of 18 years and 65 years, physicians, nurses, dentists, dentist assistant, physiotherapist, radiologic technologist, paramedics,

laboratory technicians, nursing students, Arabian, Asian, Indians, Africans, and American (western) participated in this study, all of whom were working in KFMMC in Dhahran, the eastern province of the Kingdom of Saudi Arabia.

Descriptive characteristic of the sample

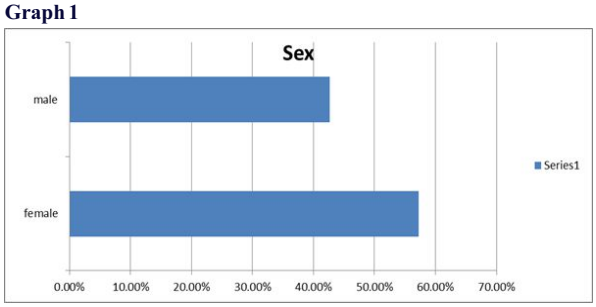
Table : 1

Sex **Female** **Male**	216 (57.29%) 161 (42.70%) 0.08
Age **18-24** **25 - 34** **35-44** **45 - 54** **55 - 64**	63 (16.71%) 183 (48.54%) 82 (21.75%) 0.044 33 (8.75%) 16 (4.24 %)
Marital status **Single** **Married** **Widowed** **Divorced**	146 (38.72%) 225 (59.68%) 3 (0.07%) 0.726 3 (0.07%)
Race **Arab** **Indian** **Asian** **White (western)** **Other**	265 (70.29%) 15 (3.97%) 77 (20.42%) 0.923 2 (0.06%) 11 (0.29%)
BMI **Underweight** **Normal** **Overweight** **Obese 1** **Obese 2** **Morbid obesity**	19 (9.03 %) 183 (48.54 %) 106 (28.11%) 0.0001 44 (11.67%) 18 (4.77%) 5 (1.32 %)
Career **Employee** **Student**	313 (83.02 %) 64 (16.98 %)

The demographic data of the 377 patients are presented in Table 1. This table showed that BED is prevalent in females, individuals aging 25-34 years old, married participants, Arabs, participants with normal weight, employed participants, and medical students.

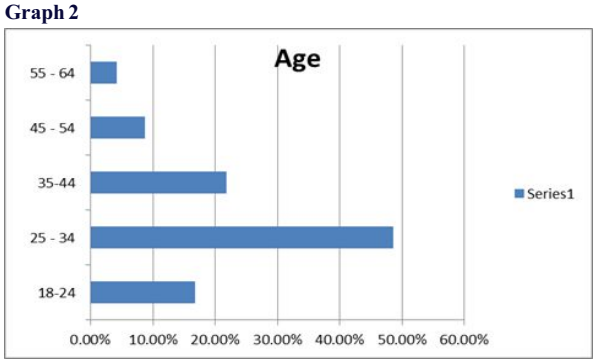
The graph distribution of each of the variables

Graph 1



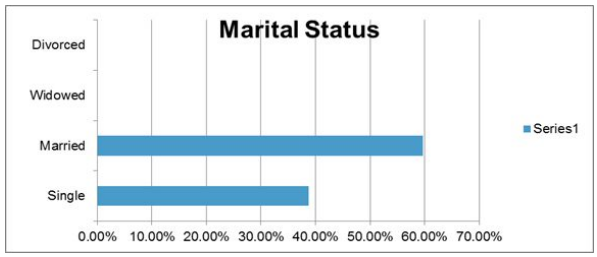
Graph 1. This graph shows the distribution of the study participants' sex.

Graph 2



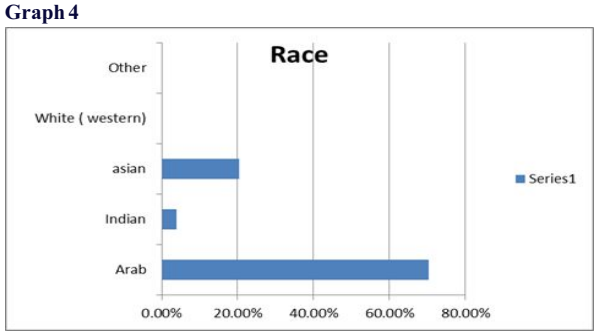
Graph 2. This graph shows the distribution of the study participants' age groups.

Graph 3



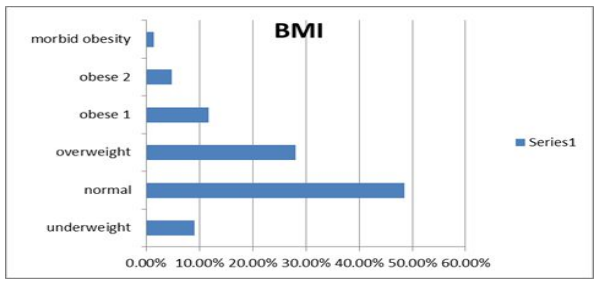
Graph 3. This graph shows the distribution of the study participants' marital status.

Graph 4



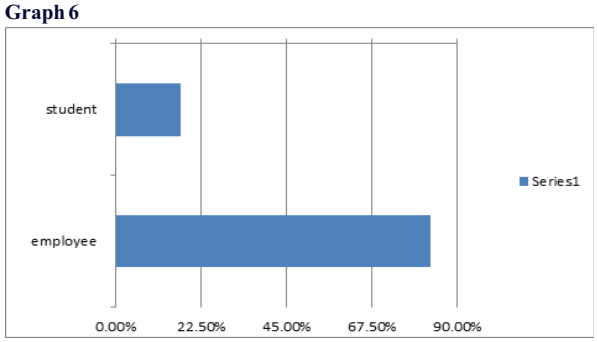
Graph 4.This graph shows the distribution of the study participants' ethnic race.

Graph 5



Graph 5. This graph shows the distribution of the study participants' body mass index.

Graph 6



Graph 6. This graph shows the distribution of the study participants' career.

Summary of the main variables:

Table 2

	Mean (SD)	S.D	Min	Max.	Observations
Age	33.69	4.965	18	64	377
BES	13.87	7.012	0	41	377
BMI	25.355	5.287	15.8	43.9	377

Table 2. This table shows that the mean age is 33.69, the standard

deviation is 4,965, the minimum is 18, and the maximum is 64. The mean score for binge eating disorder is 13.87, the standard deviation is 7.012, the minimum is 0, and the maximum is 41. The mean of body mass index is 25.355, the standard deviation is 5.287, the minimum is 15.8, and the maximum is 43.9. Each variable had an observation of 377 participants.

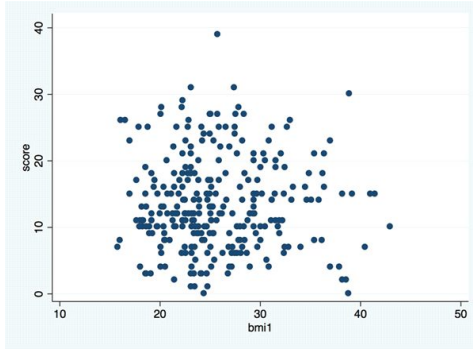
The association between Binge Eating Scores and explanatory variables

Table: 3

	No binge	Moderate	Severe	p-value
Sex				0.112
Male	107 (28.38%)	43 (11.40%)	11(2.91%)	
Female	162 (42.29%)	47 (12.46%)	7 (1.85%)	
Age				0.044
18-24	51 (13.52%)	11 (2.91%)	1 (0.26%)	
25-34	124 (32.89%)	50 (13.26%)	9 (2.38%)	
35-44	59 (15.64%)	17 (4.50%)	6 (1.59 %)	
45-54	22 (5.83%)	10 (2.65%)	1(0.26%)	
55-64	13 (3.44%)	2 (0.53%)	1(0.26%)	
Marital Status				0.329
Single	105 (13.52%)	36 (9.54%)	5 (1.32%)	
married	52 (13.79%)	52(13.79%)	12 (3.18%)	
Widowed	1 (0.26%)	1(0.26%)	1(0.26%)	
Divorced	2 (0.53%)	1(0.26%)	0	
Race				0.942
African	4 (5%)	2 (25%)	1 (12.5%)	
Arabian	189(50.13%)	64 (16.97%)	12 (0.79%)	
Indian	12 (3.18%)	3 (0.79%)	0	
Asian	17 (4.50%)	17 (4.50%)	4 (0.10%)	
American	1(0.26%)	1 (0.26%)	0	
Other	7 (1.85%)	3 (0.79%)	1 (0.26%)	
Career				0.785
Employee	223 (59.15%)	74(19.64%)	16 (4.24%)	
Student	46 (12.20%)	16 (4.24%)	2 (0.53%)	
BMI				0.001
	20 (95.2%)	1 (4.76%)	0	
	162 (88.5%)	19 (10.3%)	2 (1.09%)	
Underweigh t	61 (59.2%)	42 (40.7%)	0	
Normal BMI	19 (43.1%)	20 (45.4%)	5 (11.3%)	
Overweight	4(22.2%)	8(44.4%)	6(33.3%)	
Obese I	0	0	5(100%)	
Obese II				
Morbid obese				

Distribution of explanatory variables and the BES are presented in Table 3. This table shows that 28.38% of the male participants are not binge eater, 11.40% are moderate binge eaters, and only 2.91% are severe binge eaters according to binge eating scale. Approximately 42.29% of female participants are not binge eater, 12.46% are moderate binge eater, and only 1.85% are severe binge eaters according to the binge eating scale, because the participants are highly educated and highly aware of the effects of BED; the p-value of 0.12 means that sex is not significantly related to binge eating. However, in the age group of 18-24 years old, 13.52% of participants are non-binge eaters, 2.91% are moderate binge eaters, and only 1.5% are severe binge eaters. In the age group of 25-34 years old, 32.89% of the participants are non-binge eaters, 13.26% are moderate binge eaters, and only 2.38% are severe binge eaters. In age group of 35 to 44 years old, 15.64% of the participants are non-binge eaters, 4.50% are moderate binge eaters, and only 1.59% are severe binge eaters. In age group of 45-54 years, 5.83% of the participants are non-binge eaters, 2.65% are moderate binge eaters, and only 0.26% is a severe binge eater. In age group of 55-64 years, 3.44% of the participants are non-binge eaters, 0.53% are moderate binge eaters, and only 0.26% is a severe binge eater. The p-value of 0.044 means that age is slightly related to the binge eating score as BED affects young adults. Among the divorced participants, 0.53% are non-binge eaters and 0.26% is a moderate binge eater. In the group of married participants, 13.79% are non-binge eaters, 13.79% are moderate binge eaters, and 3.18% are severe binge eaters. Among the single participants, 13.52% are non-binge eaters, 9.54% are moderate binge eater, and 1.32% are severe binge eaters. Among the widowed participants, 0.26% is non-binge eater, 0.26% is a moderate binge eater, and 0.26% is a severe binge eater. The p-value of 0.329 means that marital status is not significantly related to binge eating score. As regards race, among the African participants, 0.57% are non-binge eaters, 0.28% are moderate binge eaters, and only 0.14% is a severe binge eater. Among the American (western) participants, 0.26% is non-binge eater and 0.26% is a moderate binge eater. Among the Arabian participants, 50.13% are non-binge eaters, 16.97% are moderate binge eaters, and only 3.18% are severe binge eaters. Among the Asian participants, 4.5% are non-binge eaters, 4.40% are moderate binge eaters, and only 0.10% are severe binge eaters. Among the Indian participants, 3.18% are non-binge eaters and 0.79% are moderate binge eaters. For other races, 1.85% of the participants are non-binge eaters, 0.79% are moderate binge eaters, and only 0.26% is a severe binge eater. The p-value of 0.942 means that race is not significantly related with binge eating score as the majority of the participants are Arabs. Among the employed participants, 59.15% are non-binge eaters, 19.64% is a moderate binge eater, and 4.24% are severe binge eaters. Among the student participants, 12.20% are non-binge eaters, 4.24% are moderate binge eaters, and only 0.53% are severe binge eaters. The p. value of 0.785 which means that career is not significantly related to binge eating score, as the participants have good awareness toward healthy eating habits. Among the underweight participants, 0.95%% are non-binge eaters and 0.26% are moderate binge eaters. Among the normal weight participants, 88.5% are non-binge eaters, 10.3% are moderate binge eaters, and only 1.09% are severe binge. Among the overweight participants, 59.2% are non-binge eaters and 40.7% are moderate binge eaters. Among the obese I participants, 43.1% are non-binge eaters, 45.4% are moderate binge eaters, and 11.3% are severe binge. Among the obese II participants, 22.2% are non-binge eaters, 44.4% are moderate binge eaters, and 033.3% are severe binge eaters. Among the morbid obese participants, 100% are severe binge eaters. The p-value of 0.001 means that BMI is related to the BED score, as the disorder increases the BMI as seen in the obese participants.

Figure1



This figure shows the distribution of BMI and BES.

Figure 1 shows that there is homogenous distribution of result, that is, the participants with lower BMI have lower BES. On the other, participants with higher BMI have higher BES. As expected, most of participants with normal BMI have lower BES, indicating the absence of binge eaters among those participants. This was predictable because the participants are health workers and they have higher awareness toward healthy eating behavior compared to those in public.

Discussion

Upon reviewing the literature, several international studies regarding BED were found, but local studies were not available. The reason could be that BED is more of a concern in the western countries.

The association between BED and psychiatric disorders

There were many articles studying the correlation between binge eating disorder, psychiatric disorders, and disruptive behavior disorders.

A study was published in The American Journal of Psychiatry (Washington (Oct 1993). The study determined the prevalence of BED in the self-referred study group of moderately and severely obese subjects and investigated the association between BED, psychiatric

illness, and sexually abuse. The result was that subjects with BED more likely have a life time prevalence of Diagnostic and Statistical Manual of Mental Disorders III-R axis I or axis II diagnosis and have undergone psychotherapy or counseling than those without the disorder. The rate of reported sexual abuse was not higher among subjects with BED; however, they more likely have family history of substance abuse.

(15)

A study published in the Journal of Consulting and Clinical Psychology (October 1998) provides an estimate of the women with both BED and psychiatric disorders. Results suggest that women with BED had higher lifetime prevalence rates for major depression.

(16)

In the present study, I did not estimate the prevalence of BED in participants with psychiatric illness, because in our culture, patients diagnosed with psychiatric disease, such as depression, generalized anxiety disorder, bipolar disorder, schizophrenia, or personality disorder, do not admit that they are psychiatric patients or having psychiatric consultations; this is because most of them believe that psychiatric diseases are caused by an evil eye or dark souls, whereas others think that a psychiatric illness is a social stigma.

Despite the increased understanding and sensitivity of individuals seeking formal mental health services of various minority groups in the United States, the experience of the Arab Muslim population is understudied. The dominant Arab Islamic research suggests that majority of individuals are not open to receiving formal mental health services. The results indicated that the attitudes of Arab Muslims toward seeking formal mental health services are affected by cultural and traditional beliefs about mental health problems, knowledge, and familiarity with formal services, perceived social stigma, and the use of informal indigenous resources.

(19)

Association of binge eating disorder and body mass index

A study published in Pubmed1997 evaluated the prevalence BED in obese adults seeking weight loss treatment at two research facilities using the Questionnaire on Eating and Weight Patterns and the Interview for the Diagnosis of Eating Disorders.

(8)

A study published in the International Journal of Obesity (2001) Vienna, Austria, provided an estimate on the prevalence of BED and obesity; the results suggest that BED is more common among overweight women seeking treatment than among overweight women not seeking treatment. Approximately 30% of those participating in weight loss programs and 70% of individuals in Overeaters; in a community survey, only half of the subjects with BED were obese (BMI>27.5 kg/m^2) and only about 5% of the obese subjects met the BED criteria. Consequently, this problem behavior seems to be significantly less prevalent in obese subjects not currently on treatment.

(17)

In the present study, I estimated the prevalence of BES regardless of the BMI; however, I found that most of participants with BED have high BMI. This means BED has high prevalence in obese participants, and BMI is significantly correlated with BED, as obesity is a complication of binge eating disorder.

BED and the night eating syndrome (NES) have been linked to obesity. METHOD: This study conducted a selective review of the literature on BED and NES (1990s). Results showed that BED is associated with more severe and earlier onset of obesity, earlier onset of dieting, and greater psychopathology. Furthermore, the results showed large placebo responses and reduction of binge eating in patients under the waiting-list controls. Traditional weight reduction programs and psychological treatments somehow reduce patients' bingeing. NES is a stress-related eating, sleeping, and mood disorder that is associated with problems in the neuroendocrine function. It follows a characteristic circadian pattern and responds to an agent that enhances serotonin function.

(20)

A study published in the International Journal of Obesity (2003) evaluated the prevalence of binge eating disorder in obese children and adolescents seeking weight loss treatment. Results showed that only 1% of the subjects met the criteria for binge eating disorder and 9% were found to have objective bulimic episodes, which were more common in girls than in boys. Episodic overeating was more common than binge eating. overweight and showed a greater eating-related psychopathology.

(21)

In the present study, I only estimated the prevalence of BED in adults, as this disorder usually begins in early adulthood.

A study published in the Journal of American Medical Association in 2011 evaluated the prevalence and correlates of eating disorders in adolescents. It was a cross-sectional study conducted in schools. Results showed that lifetime prevalence estimates of anorexia nervosa, BN, and BED were 0.3%, 0.9%, and 1.6%, respectively.

(14)

In the present study, the participants were health workers, such as physicians, nurses, dentist, dental assistants, laboratory technicians, radiology technicians, dietarian, and medical students. I believe that medical staff are more educated and have better awareness toward healthy eating habits. In my study, the number of employees are greater than the students, which decreases the statistical strength.

Risk factors of BED

A study on the prevalence eating disorder and sociodemographic correlates of the DSM-5 eating disorders in the Australian population was published in the Journal of Eating Disorder in 2015; the demographic correlates of these disorders include, age, sex, income, educational attainment, and presence of obesity. The result showed that the 3-month prevalence of anorexia nervosa and BN were both under 1%, whereas the prevalence of BED and subthreshold BED was 5.6-6.9%. In conclusion, the finding support the expanded demographic distribution of eating disorders. There is a relatively high prevalence of BED as compared with anorexia nervosa and BN. As it is in BED, obesity is a very common comorbidity in BN.

(14)

My study is similar to the study I regarding the demographic correlates, age, sex, race, marital status, career, and BMI. Trying to find the risk factors.

A study published in the JAMA Psychiatry (1998) was a study on the Risk Factors of Binge Eating Disorder: A Community-Based, Case-Control Study. The main risk factors identified from the comparison of subjects with BED with healthy control subjects were certain adverse childhood experiences, parental depression, vulnerability to obesity, and repeated exposure to negative comments about shape, weight, and eating. As compared with the subjects with other psychiatric disorders, those with BED reported more childhood obesity and exposure to negative comments about shape, weight, and eating. Certain childhood traits and pronounced vulnerability to obesity distinguished the subjects with BN from those with BED.

(22)

I found that age is slightly correlated to binge eating score, and it was expected because the majority of patients with binge eating are adults between the age of 25 and 34 years; the onset of binge eating was not included in the present study although it seemed to be risk factor. I found that the study focused on the onset of binge eating.

A study about “Age of onset for binge eating: Are there different pathways to binge eating” was published in the International Journal of Eating Disorder (1997).

This study aimed to determine if patients' binge eating preceded their first diet or their first diet preceded their binge eating, the age of their first diet, the age of their first binge, and the age when they met the diagnostic statistical mental disorder IV DSM-IV criteria for BED; results showed that the group who reported of having binged first had a younger age of onset and met the diagnostic criteria at a younger age

than the diet first group.

(23)

The sex was not significantly correlated with BED, although I expected that males have more tendency to get the binge eating disorder, because females are more interested about body image, making them at higher risk of having anorexia nervosa and BN. The race was not significantly correlated with BED because the majority of the participants were Arabian.

A study published in the Journal of Eating Disorder (December 2008) examined the sex differences in prevalence of eating disorder symptoms including body image concerns (body checking or avoidance), binge eating, and inappropriate compensatory behaviors. Results suggested that men were more likely to report overeating, whereas women were more likely to endorse loss of control while eating. Although statistically significant sex differences were observed, with women more likely to report body checking and avoidance, binge eating, fasting, and vomiting than men, effect sizes ("Number Needed to Treat") were small to moderate.

(18)

Contrary to the expected, marital status was not significantly correlated to BED, which was supported by study published in the Journal of Eating Disorder (May 1999). This study examined if married individuals have comparable body image disturbance than non-married individuals and if the quality of a marital relationship is significantly related to body image disturbance in a sample of dieters. Results showed that marital status was not associated with increased body dissatisfaction. Marital satisfaction was significantly related to body dissatisfaction when controlling for age, body mass index, self-esteem, and sex.

(25)

The number of married participants in this study is higher than single, divorced, and widowed participants. I subdivided the sample to further groups such as divorced, widowed, and singles, reducing the statistical power. It was expected that because the married participants have more stable life more routinely life, they are more emotionally stable; thus, the amount of eating and duration are increased but not statistically significant; single participants will usually take care of their body image and avoid binge eating especially in adult age group.

The race has no significant association with BED, which was supported by the study published in the Annals of Behavioral Medicine (September 1998). This article examined the prevalence of BED, obesity, and depressive symptomatology in a biracial, population-based cohort of men and women participating in a longitudinal study of cardiovascular risk factor development. Among overweight participants, the prevalence BED (2.9%) was almost double than that of the overall cohort. There were no differences in the rates of BED between overweight Black and White women. Thus, BED was common in the general population, with comparable rates among Black women, White women, and White men, but low rates among Black men.

(9)

A study on the Screening for Binge Eating Disorders Using the Patient Health Questionnaire in a Community Sample was published in the United States National Library of Medicine - National Institutes of Health (May 2010). It used the Patient Health Questionnaire eating disorder module (PHQ-ED) to identify the BN/BED or RBE in a community sample and compare TP versus FP cases on clinical validators. Results: The PHQ-ED had high sensitivity (100%) and specificity (92%) for detecting BN/BED or RBE, but the results of the PPV was low (10 or 19%). TP and FP cases had no significant differences in the frequency of subjective bulimic episodes, objective overeating, restraint, BMI, and self-rated health.

(26)

In the present study, I estimated the prevalence of BED without BN. The results showed that the prevalence of BED is 28.6%, which is expected because the participants of this study are highly educated and aware of healthy eating behaviors.

Conclusion

The present study shows that the BED score using the binge eating scale is significantly associated with BMI. Thus, an increase in BMI leads to an increase in BES. A slightly significant association exists between age and BES. The marital status, ethnic race, and career is not significantly associated with BED score. Through the collection and analysis of relevant data on the source population (i.e., adult male and female medical staff from KFMMC in Dhahran), a better understanding of the occurrence, exposure, and potential causes of BED was developed in this cohort. Furthermore, a longitudinal study on the targeted population cohort will support an assessment of the risk factors of BED.

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