

Prevalence of Food Addiction and its Relationship to Body Mass Index among University Students

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Abstract

Background: Food addiction is defined as an eating behavior that involves the overconsumption of certain foods in an addiction-like manner. The fact that food addiction might contribute to obesity has recently repiqued the interest of researchers, becoming a popular area of study. **Aim:** The present study aimed to: 1) assess prevalence rate of food addiction among students 2) Assess relationship between food addiction and body mass index among students. **Methodology:** A descriptive cross- sectional design was used to conduct this study at the faculty of nursing, Zagazig University, Egypt from the beginning of October to the beginning of November 2020. Sample: A random sample of 425 students from all academic years .**The tools** used to collect the data were demographic data sheet, Yale Food Addiction Scale and Body mass index (BMI). **Results:** 17.2 % of the studied sample had food addiction according to Yale food addiction scale, 66.8% of the studied sample has normal weight and there were significant relationship between food addiction and BMI. **Conclusion:** the reported prevalence rates of food addiction had shown a significant effect on body mass index among Zagazig University Students. **Recommendation:** According to the results due to the present study, we recommend that; Educational programs should be encouraged for Zagazig University Students to decrease the prevalence of food addiction and its health consequences.

Keywords: prevalence, food addiction, body mass index, students

Introduction

Obesity is a global issue and it has been suggested that an addiction to certain foods could be a factor contributing to overeating and subsequent obesity. Only one tool, the Yale Food Addiction Scale (YFAS) has been developed to specifically assess food addiction (Pursey,2014).Food Addiction is a chronic and progressive disease characterized by seeking the foods or food behaviors persons are addicted to, eating/doing them compulsively and having a great deal of difficulty controlling these urges despite harmful consequences (foodaddictioninstitute,2018).Furthermore, food addiction may play an important role in obesity. But normal-weight people may also struggle with food addiction. Their bodies may simply be genetically programmed to better handle the extra calories they take in. Or they may increase their physical activity to compensate for overeating (Casarella,2020).Food Addiction prevalence ranged from 7.8% to 25% for young adults (younger than 35 years old) .Food addiction prevalence was also twice as high in the overweight/obese population

compared to those with a healthy BMI (24.9% and 11.1% respectively) (Pursey et al., 2014). Similar to addiction triggered by traditional addictive substances (e.g., tobacco, alcohol, and cocaine), food addiction may be related to the addictive and rewarding effects of highly processed foods (e.g., foods with high levels of sugar, fat, and salt. Individuals who exhibit dietary patterns similar to the typical behavior of people addicted to drugs are described as food addicts (Zhao et al., 2018). Most of the foods rated as addictive were processed foods. These foods were usually high in sugar or fat — or both such as pizza, chocolate, chips, cookies and ice cream. The least addictive foods were almost all whole, unprocessed foods such as cucumbers, carrots, beans and apples (Bjarnadottir, 2019).

Significance of the study

Food addiction, eating disorders and obesity are all mutually reinforcing factors, or factors that can trigger each other. Highly processed foods, with added amounts of fat and/or refined carbohydrates, and foods with high a glycemic load were most likely to be associated with behavioral indicators of addictive-like eating. In addition to that Prevalence of obesity and an overweight status within the college student populace has become a rapidly increasing occurrence. Thus, the investigation of addiction eating behavior and body mass index among university students could shed some light on possible prevention and treatment suggestions for both obesity and food addiction among students.

The aim of the study

The current study aimed to assess prevalence rate of food addiction and relationship between food addiction and BMI among Zagazig University Students.

Method:

Research design: Cross- sectional descriptive design was conducted to achieve the aim of the study.

Study setting: The study was carried out at the Faculty of Nursing, Zagazig University.

Study subjects: A random sample of 425 students from all four academic years was recruited for this study according to the following, inclusion criteria:

- (a) Ages from 18 to 22 years
- (b) Students from all four academic years

Tools of data collection

Part I: Socio-Demographic Sheet: This tool was developed by researcher to assess the personal characteristic of the students and their parents including age, gender, residence, marital status, education level of parents

Part II: Yale Food Addiction Scale (YFAS) (Gearhardt et al., 2009) Gearhardt, Corbin, and Brownell (2009) developed the Yale Food Addiction Scale (YFAS) in accordance with the seven symptoms stated in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) in order to question the eating habits of individuals over the previous 12 months. The Yale Food Addiction Scale contains 25 self-reported questions using a dichotomous and Likert-type format. Different response categories are as follows: frequency (ranging from never to four or more times weekly or a daily occurrence) and dichotomous scoring (yes or no), responses (except primer questions) were then recoded as seven symptoms/criteria. After computing cutoffs, the questions under each substance dependence criterion (e.g., tolerance, withdrawal, clinical significance, etc.) were summed. If at least one question for each criterion was scored as a 1, then this criterion was met. The YFAS provided both a count of food addiction symptoms and a diagnosis of food addiction as scoring options. In this study, we used the food addiction symptoms and diagnosed scoring. A continuous symptom count could be calculated for diagnosis by adding up the criteria met (except

impairment/distress). This symptom score should range between 0 and 7. To score the dichotomous version, a variable could be computed in which clinical significance must equal 1, and the symptom count must be ≥ 3 . This should be a score of either 0 or 1 (no diagnosis or diagnosis met). Reliability: The reliability of this tool was assessed by Cronbach's alpha test in SPSS V.20. They show a good level of reliability as ($\alpha = 0.77$)

Part III: Body mass index (BMI)

Body Mass Index (BMI) is a person's weight in kilograms divided by the square of height in meters. A high BMI can be an indicator of high body fatness. BMI can be used to screen for weight categories that may lead to health problems but it is not diagnostic of the body fatness or health of an individual.

Scoring system

BMI Categories	BMI Categories
Underweight	= <18.5
Normal weight	= 18.5–24.9
Overweight	= 25–29.9
Obesity	BMI of 30 or greater

Pilot study: The pilot study was carried out on 42 students (about 10 percent of the total sample) to test the clarity and applicability of the study tools as well as estimation of the time needed to fill the questionnaire. Students involved in the pilot were excluded from the study. From the pilot study outcomes, the average time to fill in this tool was 25-30 minutes.

Fieldwork

- **Assessment phase:** Once the scales are completed and official approval is obtained. The researcher upon finalization of the tool and securing necessary official permissions to precede the study, the researcher visited the study setting and started to recruit the female students according to the eligibility criteria. The purpose and usefulness of the study was explained to the students briefly with clarifying the importance of their participation and asserted that their personal data would be kept secret in this study. Also, they were informed that their participation was voluntarily and that they could choose to withdraw at any time.
- Upon agreement to participate, the researcher started to select 15-20 students randomly. Then they were given appropriate instructions for filling in the questionnaires during the college day and encouraged to ask any question comes into their mind. After that, they were asked to fill- in the first part of the questionnaire regarding their demographics, before preceding to the second tool (YFAS) and then the third scale (BMI).
- Finally, the students were thanked for their cooperation. The time consumed for answering all the scales ranged from 15 to 20 minutes. This phase was completed over four weeks; from the beginning of October to the beginning of November 2020. The researcher collect the data regularly, two days/week and spent three hours daily from 10 am to 1pm during the college day until assessing 45-60 students/ day.

Administrative and ethical considerations:

Official permission was granted by the Dean and Vice Dean of Education and working Affairs. The study proposal was approved by the ethics committee of the faculty of nursing. The students were given a normal description of the aims of the study, the benefits, and non- participation or withdrawal rights at any time without giving any reasons. The students were informed that their participation in this study was voluntary; no names were included on the questionnaire sheet. The students were

assured about the confidentiality of the information gathered and its use only for their benefits and for the study.

Statistical Design

Data collected throughout history, questionnaires, outcome measures coded, entered, and analyzed using Microsoft Excel software. Information was at that point imported into Statistical Package for the Social Sciences (SPSS version 20.0) (Statistical Package for the Social Sciences) software for analysis. According to the type of data qualitative represent as number and percentage, quantitative continues group represented by mean $\pm$ SD. Difference and association of qualitative variable by Chi square test (X^2) paired percentage. Differences between parametric paired data paired t-test. P-value was set at <0.05 for significant results & <0.001 for a highly significant result.

Results

Table 1: Indicates that the mean age of the studied sample was (20.03 ± 1.4) and 66.4% of the sample aged 20 years or more, and 74.6% of them were females, the majority (94.6%) of the studied sample were single. An equal percentage of the studied sample was from four grades .The same table also reveals that 84.7% of the studied sample have middle socioeconomic level, and according to body mass index 66.8% of the studied sample have normal weight.

Table 1: socio-demographic characteristics of the students (n.425)

	n.	%
Age per years		
<20	143	33.6
≥ 20	282	66.4
Mean $\pm$ SD	20.03 $\pm$ 1.4	
Median(range)	20(17-24)	
Sex		
males	108	25.4
females	317	74.6
Faculty of nursing grade		.
First grade	107	25.2
second grade	106	24.9
third grade	107	25.2
fourth grade	105	24.7
Social status		.
single	402	94.6
married	23	5.4
Socioeconomic level		.
High	48	11.3
middle	360	84.7
Low	17	4.0
Residence		.
Rural	352	82.8
Urban	73	17.2
BMI		.
Underweight	16	3.8
Normal weight	284	66.8

overweight	107	25.2
Obese	18	4.2
Mean $\pm$ SD	23.7 $\pm$ 3.2	
Median (range)	23.4(16.14-34.72)	

Table 2: reveals that 91.3% of the studied sample have persistent desire or repeated unsuccessful attempts to quit eating certain types of food. The table also indicates that 54.8 % of the studied sample has tolerance and only 40.2% of them take much time to obtain, use or recover food. The same table pointed out that the total means scores of food addiction scale were 7.0 with mean $\pm$ SD (3.5 $\pm$ 1.6).

Table (2): Frequency distribution of studied students regarding parameters of food addiction (n.425)

parameters	yes		no	
	n.	%	n.	%
1. Substance taken in larger amount and for longer period than intended	79	18.6	346	81.4
2. Persistent desire or repeated unsuccessful attempt to quit eating certain types of food.	388	91.3	37	8.7
3. Much time/activity to obtain, use or recover food	171	40.2	254	59.8
4. Important social, occupational, or recreational activities given up or reduced	130	30.6	295	69.4
5. Use continues despite knowledge of adverse consequences (e.g., failure to fulfill role obligation, use when physically hazardous)	98	23.1	327	76.9
6. Tolerance (marked increase in amount; marked decrease in effect)	233	54.8	192	45.2
7. characteristic withdrawal symptoms; substance taken to relieve withdrawal	131	30.8	294	69.2
8. Use causes clinically significant impairment or distress	84	19.8	341	80.2
Total food addiction score (max=7):				
Range	0.0-7.0			
Mean $\pm$ SD	3.5 $\pm$ 1.6			
Median	4.00			

Figure 1 reveals that 17.2 % of the studied sample had food addiction according to Yale food addiction scale

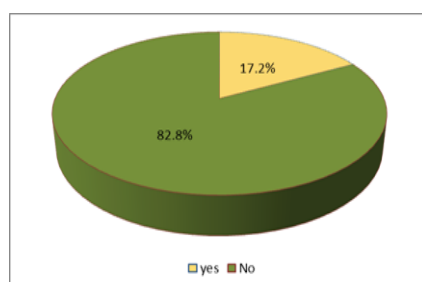


Figure (1): Prevalence of food addiction among studied students

Table (3): Frequency distribution of food staff difficult to control their intake among studied students (n.425)

Table 3 demonstrates that the most common food staff difficult to control their intake among students was chips, French fries and chocolate, where the percentage was 52.9%, 38.1% and 37.4% respectively

types		food staff difficult to control their intake among studied students			
		yes		no	
		n.	%	n.	%
Sweets	ice cream,	149	35.1	276	64.9
	chocolate	159	37.4	266	62.6
	Biscuit	49	11.5	376	88.5
	Cake	76	17.9	349	82.1
	Cakes	41	9.6	384	90.4
	Sweaty food	91	21.4	334	78.6
- Starches	white bread	45	10.6	380	89.4
	cabbage	132	31.1	293	68.9
	pasta,	112	26.4	312	73.4
	rice	92	21.6	333	78.4
Salt	Crisps	131	30.8	294	69.2
	chips	225	52.9	200	47.1
Fatty foods	French fries	162	38.1	263	61.9
	meat	85	20.0	340	80.0
	Fatty meat	30	7.1	395	92.9
	hamburgers	61	14.4	364	85.6
	pizza	133	31.3	292	68.7
	Sugary drinks	148	34.8	277	65.2
Fruits' and vegetables	apple	75	17.6	350	82.4
	Strawberrie	102	24.0	323	76.0
	banana	122	28.7	303	71.3
	lettuce	76	17.9	349	82.1
	carrot	44	10.4	380	89.4
	No thing	34	8.0	391	92.0

Table (4):Relation between studied students' food addiction and their Demographic characteristics (n.425)

Table (4):shows that there is a statistically significant relation between food addiction among students and their body mass index ($p=.036^*$)

	studied student's' food addiction				n.	χ^2	p-value
	no		yes				
	No.	%	No.	%			
Age per years							
<20	115	80.4	28	19.6	143	0.87	0.35
≥20	237	84.0	45	16.0	282		

sex							
males	86	79.6	22	20.4	108	1.04	0.38
females	266	83.9	51	16.1	317		
grade		.		.			
First grade	91	85.0	16	15.0	107		
second grade	82	77.4	24	22.6	106	5.5	0.14
third grade	86	80.4	21	19.6	107		
fourth grade	93	88.6	12	11.4	105		
Social status		.		.			
single	332	82.6	70	17.4	402	f	0.78
married	20	87.0	3	13.0	23		
Socioeconomic level		.		.			
high	41	85.4	7	14.6	48	0.67	0.72
middle	296	82.2	64	17.8	360		
low	15	88.2	2	11.8	17		
Residence		.		.			
Rural	295	83.8	57	16.2	352	1.4	0.24
Urban	57	78.1	16	21.9	73		
BMI		.		.			
Underweight	12	75.0	4	25.0	16		
Normal weight	235	82.7	49	17.3	284	8.6	0.036*
Overweight	94	87.9	13	12.1	107		
Obese	11	61.1	7	38.9	18		

Discussion

Eating habits for college students are a topic of interest because the greatest increase in overweight and obesity occurs between the ages of 18–29 according to the Behavioral Risk Factor Surveillance System (Yu & Tan,2016). Food addiction (FA) is defined as an insatiable desire for the consumption of specific high-fat, high-sugar foods beyond the required energy needs for sustenance(Najem,2019) .Therefore, the present study aimed to 1)assess prevalence rate of food addiction among students among Zagazig University Students 2)assess relationship between food addiction and body mass index.Regarding socio demographic data, the study was carried out on 425 students at ZagazigUniversity. The range of age of the studied sample was 17-24 years old with 19.9 ± 1.5 Mean $\pm$ SD. This might be explained due to the rules of education in Egypt that the students attend university at the age of 18 years old. A similar finding was reported also by (Şanlıer et al.2017) who conducted a study in university in Ankara, Turkey and found that the range of age of the study sample was from (20.19 ± 1.90) years old. In contrast with(Najem et al.2019) who found that more than two thirds of the studied students (72.7%) the participants' age ranged between 18 and 28.Regarding Sex of nursing students, more than two thirds of the studied students (74.6%) were females. The reason the number of male participants was especially low was that the students entering the nursing college are generally female. As well, Zagazig University is predominantly attended by females more than male and the commitment of females at university .This goes in line withZu& Tan, (2016) who conducted a studying 21 schools in New Zealand and found that the female participants represent (72.7%). On the other hand (Dinçyurek et al.2018) who found that (42.5%) of students were female. Regarding Body mass index,about two third (66.8%) of the studied students had

normal weight. This might due to nature of their scientific academic education made them aware of health and proper body fit. At the same line, (Ahmed&Sayed,2017) revealed that about two third more than one third (37.6%) have normal weight. On the other hand,(Şanlıer et al. 2016) who examined general characteristics of the study participants according to their BMI and found that the more than majority of the studied sample were underweight (87.1%). Regarding food addiction among students, the current study reveals that the majority of the studied sample have a persistent desire or repeated unsuccessful attempts to quit, and that more than one third have tolerance and follow much time to use, obtain recover according to Yale food addiction scale. This could be due to insufficient willingness, the pressure of friends, lack of support from environment, psychological stressors, barriers to access to intervention and social life circumstance. This consistent with, (Fauconnier et al.2020) revealed that the most frequently met criteria of food addiction (FA) were “clinically significant impairment or distress in relation to food”, “craving” and “persistent desire or repeated unsuccessful attempts to cut down”. This result was supported by, (Elhelw,2018) revealed that “Persistent desire or repeated unsuccessful attempts to quit” rated the highest (86.88%) among reported FA criteria, followed by “Tolerance” (69.58%), then “Important social, occupational or recreational activities given up or reduced” (68.54). On the other hand, study conducted by (Bailey, 2017) revealed that participants most frequently indicated that they had a desire to quit or have made numerous attempts to quit eating a particular food (27%), have experienced withdrawal symptoms when discontinuing eating a particular food (23.7%), have spent excessive amounts of time trying to get access to a food (22.4%), or have consumed an amount of the food in excess of what was intended (21.2%). In terms of prevalence of food addiction among students, The current study indicated that the prevalence of food addiction among students was 17.2%. This prevalence may be attributed to multiple stressors that face adolescents and the fact that more than the majority of participants were females, and females are two times more likely to be food addicts than males. Additionally this type of addiction is newly discovered and not all students are aware of its mechanism and consequence of over consuming certain types of food. This was comparable to the results of study conducted by (Najem et al.2019) who reported that the prevalence of food addiction among the same age group were (10.1%). The current results were also concordant with (Al- Coel et al.2017) study which revealed that (18.7%) of the students had food addiction as well as study done by (Alaa&Amany,2017) which reported that FA prevalence was 15.7% in the studied sample. However, this is differing with a study done in Egypt by (Lewis,2015) which revealed that Eight percent met criteria for both clinical impairment and diagnosis of food addiction. On the same context, (Pedram et al.2013) found that the prevalence of ‘food addiction’ was 5.4% (6.7% in females and 3.0% in males) and increased with obesity status. Regarding Problematic food items as reported by students in the study sample, the current study revealed that more than half of the studied students have problematic food most commonly with chips. This might be due to a availability of potatoes, its suitable price and it is also easy to cook it. Furthermore the human brain evolved to crave foods that provide quick energy. This is in agreement with (Abd-Allah, et al.2018) whom findings suggested that the 10 Most Addictive Foods was potato chips, Chocolate, soda, fried potatoes, Ice cream, Bananas, Stuffed food, Pizza, Crackers and macaroni. This was on the contrary with, (Lewis Et al.2015) who found that more than one third of respondents (34.7%) had problem with foods, most commonly ice cream. Similarly, Schulte,(2015) found that Foods of which participants have struggled to control consumption were chocolate (27.06), Ice Cream (27.02) and French Fries (26.9), concerning relation between Food addiction and Body mass index. This study Pointed out that food addiction had statistically significant relation with body mass index. This might be due to it has been

suggested that an addiction to certain foods could be a factor contributing to overeating and subsequent obesity. There is a growing interest in the role of 'food addiction' in the increasing prevalence of human obesity which has reached an epidemic degree globally (Pedram, et al. 2013). On the same line, Meule (2012) mentioned that group comparisons between food-addicted and non-addicted individuals in normal-weight or obese samples did not show differences in BMI. However, the prevalence of food addiction diagnoses is remarkably increased in obese individuals. It is suggested that there might be a cubic relationship between food addiction and BMI. Food addiction symptomatology may remain stable in the under- and normal-weight range, increase in the overweight- and obese range, and level off at severe obesity. However, Ahmed & Sayed, (2017) found that FA diagnosis didn't differ across the different BMI categories. FA does occur in obese, overweight, normal and underweight individuals. Finding no significant differences in the different BMI categories in those with and without FA may argue for the presence of other controllers of the BMI other than the mere excess of caloric intake or may be explained by the fact that the BMI is not a true reflection of the body fat and that other measures of fat accumulation should be put in consideration when seeking relationships with FA.

Conclusion

Based on the findings of the current study, it can be concluded that the reported prevalence rates of food addiction had shown a significant effect on body mass index among Zagazig University Students.

Recommendation

Based on the findings of this study, the following recommendations are proposed:

- Monitoring food addiction symptoms early may help reduce the likelihood that compulsive food consumption patterns result in weight gain and obesity.
- Educational programs should be encouraged for Zagazig University Students to decrease the prevalence of food addiction and its health consequences.
- Screening for food addiction offers the potential for early risk identification, education, and treatment.
- Universities should provide students with opportunities to learn added sugar intake recommendations, effects of overconsumption, and healthy eating behaviors and attitudes in order to prevent possible chronic disease occurrence.
- Further research should be done to assess risk factors for food addiction and the effects of food addiction on college students.
- Future studies should evaluate the effects of nutrition education on addictive food behaviors in college students.

Conflict of Interest: The authors declare that they have no conflict of interest

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