



Food addiction, in obese patients seeking bariatric surgery, is associated with higher prevalence of current mood and anxiety disorders and past mood disorders

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ABSTRACT

The current cross-sectional study investigates the prevalence of the food addiction (FA) phenotype and its association with psychiatric disorders in bariatric surgery candidates. It also investigates the eating behavior characteristics associated with FA and the association between FA and loss of control over specific foods high in sugar, salt and/or fat. We included 128 bariatric surgery candidates and we assessed FA (YFAS 2.0), mood and anxiety disorders, suicidality, eating disorders (current bulimia nervosa and current anorexia nervosa), alcohol and tobacco use disorders (MINI 5.0.0, beck depression inventory, AUDIT, Fagerström Test for Nicotine Dependence) and eating behavior (DEBQ). Prevalence of FA in our sample was 25%. FA was significantly associated with higher prevalence of current mood and anxiety disorders and past mood disorders, higher current suicidality but not with eating disorders and alcohol use disorder. FA was significantly associated with higher emotional eating, and with loss of control over consumption of foods high in fat, sugar and/or salt, but not of fruits, vegetables or grain products. Our results provide arguments for considering psychiatric disorders and suicidality in FA and for considering FA as an addictive disorder in obese patients, with many risk factors in common with other addictions.

1. Introduction

Despite the fact that food is widely available in western societies, that eating is an essential and frequent human activity, and that certain foods have powerful rewarding and addictive effects similar to drugs (Volkow et al., 2012; Volkow and Wise, 2005), the hypothesis that some individuals are addicted to food or to their eating behavior has only recently been proposed (Meule and Gearhardt, 2014). The recognition of food addiction (FA) as an addictive disorder is a hotly debated topic with some authors suggesting that the FA phenotype should be viewed as an expression of strong habits and preferences

rather than as an addictive disorder (Long et al., 2015) while others suggest that it should be seen as a distinct addictive disorder (Avena and Gold, 2011; Gearhardt et al., 2009a, 2011; Iffland et al., 2009).

Considering the revised 4th edition of the diagnostic and statistical manual of mental disorders (DSM-IV-TR) and adapting the diagnostic criteria for substance dependence to certain foods, Gearhardt et al. (2009b) designed the first self-administered questionnaire to identify a subpopulation of patients exhibiting substance-dependence symptoms in their eating behavior (i.e., food addiction), and particularly to foods high in sugar, fat and/or salt (the Yale food addiction scale version 1.0, YFAS 1.0). This questionnaire was further

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Table 1
Descriptive statistics, weight-related variables and food addiction symptoms: comparison of patients with and without food addiction.

	Patients with food addiction (N = 32)	Patients without food addiction (N = 96)	Statistical test	p
<i>Sociodemographic characteristics</i>				
Age (years ± SD)	39.0 ± 12.0	42.3 ± 11.0	$t = 1.44$	0.15
Gender (female)	78.1% (25)	68.8% (66)	$\chi^2 = 1.03$	0.31
Education level (completion of the baccalaureate or beyond)	25% (8)	37.5% (36)	$\chi^2 = 0.85$	0.20
<i>Weight-related variables</i>				
Weight (kg ± SD)	129.0 ± 25.8	129.5 ± 25.9	$t = 0.08$	0.93
BMI (kg/m ² ± SD)	46.7 ± 7.0	45.9 ± 6.5	$t = -0.58$	0.56
Previous maximal BMI (kg/m ² ± SD)	48.4 ± 9.0	49.4 ± 12.6	$t = 0.41$	0.68
Period of onset of obesity	–	–	$\chi^2 = 0.10$	0.95
Childhood (<12 years)	37.5% (12)	40.6% (39)		
Adolescence (from 12 to 18 years)	18.8% (6)	17.7% (17)		
Adulthood (≥ 18 years)	43.8% (14)	41.7% (40)		
<i>YFAS 2.0 food addiction symptoms</i>				
Food consumed in larger quantities or over a longer period than intended	59.4% (19)	21.9% (21)	$\chi^2 = 15.71$	< 0.001
Persistent desire or unsuccessful efforts to cut down or control consumption of certain foods	43.8% (14)	9.4% (9)	$\chi^2 = 19.24$	< 0.001
Considerable time spent to obtain, consume, or recover from effects of food	75% (24)	14.6% (14)	$\chi^2 = 41.97$	< 0.001
Giving up important social, occupational, or recreational activities because of food consumption	53.1% (10)	10.4% (15)	$\chi^2 = 26.30$	< 0.001
Continuing to eat certain foods despite physical or psychological problems	68.8% (22)	34.4% (33)	$\chi^2 = 11.57$	< 0.001
Tolerance	59.4% (19)	10.4% (10)	$\chi^2 = 32.83$	< 0.001
Withdrawal	59.4% (19)	11.5% (11)	$\chi^2 = 30.71$	< 0.001
Continued consumption despite social or interpersonal problems	62.5% (20)	20.8% (20)	$\chi^2 = 19.39$	< 0.001
Failure to fulfill major role obligations	75% (24)	26% (25)	$\chi^2 = 24.35$	< 0.001
Use in physically hazardous situations	93.8% (30)	45.8% (44)	$\chi^2 = 22.59$	< 0.001
Craving	68.8% (22)	25% (24)	$\chi^2 = 19.95$	< 0.001
Significant distress in relation to food	100% (32)	4.2% (4)	$\chi^2 = 109.04$	< 0.001

Note. YFAS = Yale food addiction scale. Descriptive data are presented as mean ± standard deviation (SD) or percentage (number). We compared patients with and without food addiction using mean comparison tests (Mann Whitney *U* test or Student's test) and chi-squared tests. BMI: Body mass index.

validated among a sample of adult individuals with obesity and among patients with obesity applying for bariatric surgery (Clark and Saules, 2013; Davis et al., 2011; Gearhardt et al., 2012; Meule et al., 2012). Following the recent DSM-5 update in substance-related and addictive behaviors, Gearhardt et al. (2016) designed the YFAS 2.0 (see Table 1 for the criteria of FA of the YFAS 2.0). This revised scale allows for the characterization of the food addiction phenotype and has been validated in nonclinical and clinical populations (Gearhardt et al., 2009a, b).

Individuals with obesity seeking bariatric surgery constitute one of the clinical populations with a high prevalence (14–25%) of food addiction (Koball et al., 2016; Pursey et al., 2014). In this population, FA is associated with eating pathology (particularly binge eating) and higher general psychopathology, including higher depression, higher impulsivity and low self-esteem compared to bariatric patients without FA (Meule and Gearhardt, 2014). However, these studies are only based on self-administered questionnaires and, to our knowledge, no studies assessed whether this FA phenotype would be associated with psychiatric disorders (i.e., mood and anxiety disorders) as assessed by semi-structured interviews. Current psychiatric disorders are known risk factors for other addictions and some of these psychiatric disorders can defer the indication of a bariatric surgery and such information is essential to improve cares prior to surgery. It is also essential to improve our understanding of this phenotype and to bring arguments to further the debate about including food addiction in the category of “substance-related and addictive disorders” (Meule et al., 2017; Nolan, 2017). In addition, the YFAS 2.0 required validation in a sample of patients with obesity applying for bariatric surgery, given that bariatric surgery is not equally effective in all subjects and that the factors influencing postsurgical outcomes are still unclear even if FA as measured by the previous version of the YFAS has been shown to significantly decrease after bariatric surgery (e.g., 1 year post-surgery) (Sevinçer et al., 2016). There are indeed data about the prevalence of the FA phenotype in a variety of populations based on the YFAS 1.0 but, to our knowledge, there are only few data based on the YFAS 2.0 in this

clinical population (Meule et al., 2017; Pursey et al., 2014).

Our main study's aim was to determine the prevalence of the FA phenotype in our population and whether this phenotype would be associated with psychiatric disorders (i.e., mood and anxiety disorders, alcohol use disorder) and suicidality after having verified whether the food addiction phenotype was reliable by assessing the psychometric properties of the YFAS 2.0 in this population (factor structure and internal consistency). Our secondary objective was to assess the psychological factors associated with this phenotype (i.e., eating behavior characteristics) and to assess the type of foods associated with loss of control over eating.

Our main hypothesis was that this phenotype would be prevalent among bariatric surgery candidates and would be associated with higher prevalence of current mood and anxiety disorders and with higher prevalence of past mood disorders. Our secondary hypotheses were that FA would be specifically associated with higher emotional eating and loss of control over consumption of foods that have powerful rewarding and addictive effects (i.e. foods high in fat, sugar and/or salt, but not fruits, vegetables or grain products).

2. Methods

2.1. Study design and subjects

This cross-sectional study, which was performed in accordance with the ethical standards laid down in the 1964 Helsinki Declaration and its later amendments, included all consecutive bariatric surgery candidates seen in the Nutrition Department of two French University Hospitals (Reims and Tours), referred for preoperative psychiatric assessment and seen between October 2014 and January 2016 by one of the two psychiatrists involved in this study (FB and PB). Out of the initial population ($N = 137$), nine patients were excluded due to incomplete data, leading to a final sample of 128 patients. Response rate was 93.4%. Patients answered the questionnaires shortly before the routine pre-operative psychiatric consultation. They were informed that their

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