Food Addiction: definition, measurement and prevalence in healthy subjects and in patients with eating disorders

Food Addiction: definizione, misurazione e prevalenza in soggetti sani e in pazienti con disturbi del comportamento alimentare

CLAUDIO IMPERATORI*, MARIANTONIETTA FABBRICATORE, VIVIANA VUMBACA, MARCO INNAMORATI, ANNA CONTARDI, BENEDETTO FARINA
*E-mail: imperatori.c@libero.it

Department of Human Sciences, European University, Rome, Italy

SUMMARY. The construct of “Food Addiction” (FA) has been introduced in the last decades to better understand abnormal eating patterns in obese and overweight people and in patients with Eating Disorders (EDs). Despite a substantial parallelism between drug addiction and FA, there is still no agreement in considering FA an independent ED or a useful convincing concept. Therefore, the purpose of this review is to aggregate available data, in order to increase knowledge about: 1) definition, measurement and general features of FA; 2) prevalence of FA in clinical and non-clinical samples. Available data suggest that FA seems to be a transnosographic construct and exists in all EDs, with higher prevalence in Bulimia Nervosa. Although the discussion on the autonomous diagnosis of FA within EDs remains open, studies have reported that comorbidity between FA and other EDs is associated with worse clinical conditions and symptoms, justifying, as a result, the usefulness of assessing and treating this condition.

KEY WORDS: food addiction, food craving, eating disorders, obesity, overweight.

INTRODUCTION

Obesity [body mass index (BMI) >30 kg/m²] and being overweight (BMI between 25.0 and 29.9 kg/m²) are well-known conditions, caused by various factors, which appear to be spreading exponentially throughout the world. The prevalence of these conditions has increased dramatically in recent decades with estimates classifying more than a billion and at least 400 million as obese. This is particularly alarming because excessive adiposity is a major risk factor for several medical conditions and several mental disorders. The significant increase in dysfunctional coping strategies (e.g., the use of potentially toxic weight-loss products) as the “fastest” and “healthiest” ways to lose weight in both obese and non-obese individuals is also alarming.

The construct of “Food Addiction” (FA) was introduced in the last decades to better understand abnormal eating patterns in obese and overweight people. This concept has gained increasing attention not only from the media, but also from researchers, resulting in a significant increase in the number of published scientific articles in recent years.

A growing body of literature has detected similarities between excessive and uncontrolled consumption of hyperpalatable foods and drug addiction, both on a behavioral and neurobiological level. For example, different studies reported a dysregulation in the brain’s dopamine pathway of obese patients similar to that previously observed in drug addiction. Furthermore, other studies observed an overlap between the Diagnostic and Statistical Manual of Mental Disorders 4th edition, text revision (DSM-IV-TR) criteria for drug addiction, and some dysfunctional eating patterns observed in obese and in Eating Disorders (EDs) patients such as “persistent desire or repeated unsuccessful attempts to quit”. Moreover, Food Craving (FC), defined as...
the intense desire to consume a specific food which is diffi-
cult to resist 27-29, seems to be another important overlapping
symptom. Although FC was only recently added to the 5th
edition of the Diagnostic and Statistical Manual of Mental
Disorders (DSM-5)30,31, it has been considered an essential
element of drug addiction since the 50s and 60s32. Like
substance abuse, FC was found to be a crucial component of
FA33 and was also found to be associated with: 1) Bulimia
Nervosa (BN)14,37; 2) Anorexia Nervosa (AN)36,38; 3) over-
weight and obesity39,40; 4) Binge Eating Disorder (BED)41,42;
5) Night Eating Syndrome (NES)43.

Other significant equivalences between drug addiction
and FC come from animal and clinical neurosciences studies.
Research mainly on animal models documented neurobe-
havioral changes related to intermittent sugar availability,
similar to those associated with drug abuse (e.g., withdrawal
symptoms)14,45. Likewise, clinical neuroscience studies de-
tected various alterations of the reward circuit in EDs pa-
tients46-48 and in obese individuals18,19,49,50.

Although there are substantial overlaps, there is still no
agreement in considering FA as an independent ED51 or a
valid and useful concept52. For example, opponents of the FA
construct have argued that certain core symptoms of sub-
stance addiction, such as tolerance and withdrawal, are re-
stricted to animal models and require careful thought when
translated to humans.53,54 Furthermore, it is also observed that
neuroimaging data on reward deficit in obese subjects as well
as in BED patients are still limited and sometimes contro-
versial52,53. Therefore, the purpose of this review is to aggre-
gate available data and increase knowledge about: 1) defini-
tion, measurement and general features of FA; 2) prevalence
of FA in clinical and non-clinical samples.

FOOD ADDICTION: DEFINITION, MEASUREMENT AND
GENERAL FEATURES

The idea that compulsive and dysregulated intake of high-
calorie food can produce abnormal consumption patterns,
similar to those observed in patients with substance-related
and addictive disorders, has been proposed since the mid-
50s54. Nevertheless, concrete attempts to operationalize this
construct are quite recent.

FA refers to specific food related behaviors characterized by
excessive and dysregulated consumption of high calorie
food22,55 (i.e., foods with high sugar and/or fat)56. While
some behavioral addictions, such as Gambling Disorder, were
recently identified as addictive disorders in DSM-554, there
is still no agreement in considering FA as an independent ED
nor as a universally accepted definition51.

FA has been defined as a chronic and relapsing condition
caused by the interaction of many complex variables that in-
crease cravings for certain specific foods in order to achieve
a state of high pleasure, energy or excitement, or to relieve
negative emotional or physical states20,57. To date, the most
widely employed definition2,22,26,58,59 derives from the overlay
with the DSM-IV-TR criteria25 for drug addiction. These cri-
teria include: 1) substance taken in larger amount and for
longer period than intended; 2) persistent desire or repeated
unsuccessful attempts to quit; 3) a large amount of time/act-
ivity necessary to obtain, to use or to recover; 4) important
social, occupational, or recreational activities dismissed or
reduced; 5) compulsive use despite knowledge of adverse
consequences; 6) tolerance; 7) withdrawal symptoms.

FA seems to have significant psychopathological overlaps
with other EDs, especially with BED and BN. Consistently,
addiction models of AN and BN have already been pro-
posed60,62. Reduced control over eating, continued use de-
spite negative consequences, elevated levels of impulsivity
and psychopathology are several overlaps between FA and
both BED and BN62,63. However, there are also some crucial
differences between FA and other EDs. First, contrary to FA,
BED is associated with elevated concerns with shape or
weight62. In the same way BN and AN are characterized by
body image disturbance, an overvaluation of body weight
and shape that drives dysfunctional eating and related be-
haviors (i.e., restrained eating and/or compulsive behaviors)
50. This crucial psychopathological core is not considered
in patients with FA60,64. Furthermore, contrary to FA, BED
and BN diagnoses specify that binge eating episodes must
occur during a discrete period of time51. Finally, FA diagno-
sis assesses criteria such as withdrawal or tolerance, which
are not included in any ED50.

In the last 15 years numerous psychometric question-
naires have been developed to investigate the general as-
pects of FA, such as impulsivity, disinhibition and craving.

Merlo et al.65 developed the Eating Behaviors Question-
naire (EBQ) to investigate, in a pediatric sample, the three
crucial components of FA, the so-called “3 Cs” of addiction:'
compulsive use, attempts to cut down (quitting attempts)
and continued use despite consequences. Regardless of the
good psychometric properties of the questionnaire, attempts
to adapt this self-report to the adult population have not yet
been pursued.

In the same year, Gearhardt et al.59 developed a specific
questionnaire for FA evaluation and diagnosis, the Yale Food
Addiction Scale (YFAS). The YFAS is a 25-items self-report
that investigates eating behaviors concerning hyper-palatable
food consumed in the previous 12 months. The 25 YFAS items
were developed in accordance with the DSM-IV-TR diagnos-
tic criteria25 for drug addiction, and also according to self-re-
ports assessing behavioral addictions, such as pathological
gambling or sexual addiction. The YFAS provides two scoring
alternatives: a symptom count version and a diagnostic ver-
sion. A categorical diagnostic cut off is met when three symp-
toms, together with a clinically significant impairment or dis-
tress from eating, are present59. The YFAS was initially vali-
dated in US undergraduate students showing a single factor
structure and satisfying psychometric properties (e.g., Cron-
bach’s alpha= 0.86)59. Furthermore, supporting its construct
validity, YFAS’ total score was positively associated with neu-
ral activation of the brain regions involved in the reward sys-
tem (i.e., amygdala, anterior cingulate cortex) in response to
anticipated intake of palatable food50. The one-factor struc-
ture and the good psychometric properties have been repli-
cated in bariatric patients55, in obese BED patients53 and in
obese and overweight patients attending weight loss treat-
ment66. YFAS has also been translated and validated in sev-
eral European countries including Germany69, France70,
Spain71 and Italy.66 Lastly, a short version of YFAS72 and a
version for children have recently been developed63.

Gender and age differences were reported for both FA
and FC. FA diagnosis appears to be more frequent in women
than men72,74 and more frequent in middle-aged adults (45-
FOOD ADDICTION PREVALENCE IN CLINICAL AND NON-CLINICAL SAMPLES

To date, YFAS is the most commonly used tool to assess FA in clinical and non-clinical samples.51,105 Using YFAS, 11.4% of American students were diagnosed as addicted to food.99 Comparable percentages were observed in non-clinical samples in France (8.7%)70 and Germany (8.8%).99 Lower prevalence was reported in Italy (1.7%)168 and Spain (2.7%)171, suggesting, as already hypothesized for FC,106 the possibility of cross-cultural differences. Finally, a recent Canadian study74 on 652 adults (415 women and 237 men) recruited from the general population, reported a prevalence of FA in 5.4% of the sample. In all these studies, the most reported symptom was “persistent desire or repeated unsuccessful attempts to quit”.

A small amount of research has investigated FA in children and adolescents. Using EBD, Merlo et al.63 found that 15.2% of overweight children declared either “often”, “frequently” or “always” as an answer when asked if they believed themselves to be dependent on food. A qualitative study conducted by Pretlow107 on overweight and obese children detected that 29% of them felt addicted to food and that the most common symptoms were: 1) consumption of high quantities of food for long periods; 2) unsuccessful quitting attempts; 3) continued use despite consequences. Finally, Gearhardt et al.73, using a modified version of YFAS, investigated FA in 75 children (mean age= 8.32 years) recruited from the general population, and showed that 7.2% of participants met the diagnostic criteria for FA.

Higher prevalence of FA has been reported in clinical samples. Studies were initially focused on the relationship between BED and FA, and between FA and obesity to understand if FA could be considered an independent ED. Using the YFAS, FA prevalence has been reported to oscillate between: 1) 41.5%,67,108 and 72.2%11 in obese people with BED; 2) 15.2%106 and 53.7%66,110 among patients attending weight-loss surgery programs; 3) between 15.2%,66,92,93,109 and 25%11 among overweight and obese patients seeking weight-loss treatments. Cassin and von Rasson110, using a semi-structured interview based on the DSM-IV-TR diagnostic criteria for substance addiction, found that 92.4% of BED patients also revealed a FA diagnosis. This percentage, however, dropped to 40.5% after applying the changes to the diagnostic criteria for addiction suggested by Goodman112. A recent meta-analysis51 reported that both FA diagnosis and FA symptoms explain the total variance of BED symptomatology. The incomplete overlap between BED diagnosis and FA, according to a dimensional perspective rather than a categorical one, has led some scholars13,114 to consider FA as a more severe variant of BED. The high co-morbidity between BED and FA, however, has led other researchers55 to believe FA is more like a phenotypic clinical manifestation rather than an independent ED, characterized by the overlap between several dysfunctional eating behaviors.

In addition to the widely investigated relationship between BED and FA, recent studies assessed the co-morbidity between FA and BN, Anorexia Nervosa Restrictive-type (AN-R) and Anorexia Nervosa Purguing-type (AN-P). Using Goodman’s112 diagnostic criteria for addiction, Speranza et al.115 reported FA prevalence rates in 65% of BN patients, in 48% of AN-P patients and in 35% of AN-R patients. Using...
YFAS, Granero et al. observed a FA prevalence in 60% of AN patients, in 81% of BN patients, in 76.9% of BED patients and in 72.2% of Eating Disorders Not Otherwise Specified (EDNOS) patients. Gearhardt et al. recently investigated the relationship between FA, EDs and BMI in a large non-clinical sample (815 subjects). The authors reported that participants with BN showed FA criteria more frequently than individuals with BED (83.6% vs. 47.2%). Authors showed that, compared to BN and BED, FA is associated with a current higher BMI, a greater lifetime BMI and more severe eating disorders psychopathology (for example, concerns about body weight and food). Lastly, co-morbidity between FA and other EDs is associated with a more severe eating disorder, with a greater current and lifetime BMI, compared to healthy controls and compared to the “singular” forms of EDs.

The strong association between BN and FA was also detected by Meule et al. who, through YFAS, observed that 100% of women with a current BN diagnosis also exhibited a FA diagnosis, compared with 30% of BN patients in remission.

CONCLUSIONS

The reported data seem to suggest that FA is a transnosographic construct and exists in all EDs (with higher prevalence for BN) as well as in obese and overweight patients. Therefore, the debate on the independent diagnosis of FA within EDs remains open. However, it seems to be clear that the co-morbidity between FA and other EDs is associated with worse clinical conditions and symptoms. Thus, clinicians should carefully assess specific addictive eating patterns in EDs as well as obese and overweight patients. For these patients, FA symptoms should be a target of specific psychotherapeutic interventions. For instance, like for drug and substance addiction treatments, new therapeutic approaches focused on the neurobehavioural correlates of self-regulation, such as neurofeedback, should be developed and implemented in patients with FA.

Finally, future neuroscience studies are needed in order to understand the differences and similarities between FA and other EDs and to determine whether, in addition to the psychopathological level FA, on a neuro-physiological level, can also be considered an independent ED.

Conflict of interests: the authors declare they have no competing interests.

REFERENCES

Imperatori C et al.

Food Addiction: definition, measurement and prevalence in healthy subjects and in patients with eating disorders


