



Characteristics of individuals seeking addictive eating treatment

Kirrilly M. Pursey^{1,2,3} · Rebecca Collins^{1,2} · Janelle Skinner^{1,2} · Tracy L. Burrows^{1,2,3}

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Abstract

Purpose There is increasing interest in food addiction and its potential treatment. However, little is known about the characteristics of people seeking addictive eating treatment, which is important to develop appropriate treatment and referral pathways. The aim was to describe the characteristics of individuals seeking addictive eating treatment and examine differences between eligible participants who did and did not engage in treatment.

Methods Participants interested in an addictive eating treatment were recruited to an online screening survey. The 55-item survey included demographic questions, body satisfaction; weight-loss attempts; the modified Yale Food Addiction Survey (mYFAS); the Binge Eating Scale and mental health outcomes (DASS-21).

Results Individuals seeking addictive eating treatment ($n=309$) were predominantly female (61%), from the obese BMI category (67%) and had accessed a range of services for weight loss (97%). Using multiple logistic regression, participants with higher mYFAS scores were more likely to engage in treatment (AOR 1.68; 95% CI 1.12–2.52), while participants with higher DASS total scores were less likely to engage in treatment (AOR 0.97; 95% CI 0.95–0.99).

Conclusion This study indicates considerable interest from consumers in seeking addictive eating treatment. Individuals who did not engage in treatment displayed higher mental health comorbidity, suggesting that higher mental health symptomatology may be a barrier to treatment. Future qualitative research is needed to provide an in-depth understanding of the reasons for seeking and engaging in addictive eating treatment, as well as to identify the optimal treatments and referral pathways.

Level of evidence Level IV.

Keywords Food addiction · Addictive eating · Treatment · Treatment seeking

Introduction

Interest in the food addiction construct has increased rapidly in recent years. While the term food addiction is not currently recognised by the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), it has been operationalised to describe a pattern of compulsive overeating. Although the construct remains contentious in the scientific community, self-reported food addiction has gained popularity and is widely accepted by the general population [1, 2].

While support options such as Overeaters Anonymous have been available since the 1960's [3], newer approaches and published interventions for addictive eating have emerged more recently [4, 5]. The popularity and range of treatment options now available suggests considerable interest from the general population in accessing treatment for addictive eating. However, little is currently known about the characteristics of people specifically seeking out addictive eating treatment.

Approximately, 15–20% of the general population is estimated to display addictive eating behaviours, with higher rates reported in females, those of a higher weight status and clinical compared to non-clinical populations [6]. Rates of addictive eating have been reported to be higher in those with disordered eating behaviours such as binge eating and bulimia nervosa [7–10] as well as those undergoing bariatric surgery (ranging from 40 to 60%) [11]. Addictive eating has also been shown to be associated with mental health conditions such as depression and anxiety [12]. Given the high

✉ Kirrilly M. Pursey
Kirrilly.Pursey@newcastle.edu.au

¹ School of Health Sciences, Faculty of Health and Medicine, University of Newcastle, Callaghan, NSW 2308, Australia

² Priority Research Centre for Physical Activity and Nutrition, University of Newcastle, Callaghan 2308, Australia

³ Hunter Medical Research Institute, New Lambton Heights, NSW 2308, Australia

comorbidity associated with addictive eating, it is important to understand those seeking treatment to better tailor appropriate interventions and referral pathways to improve health outcomes and individual well-being.

Addictive eating has frequently been assessed in specific populations such as those seeking weight-loss treatment [13]. In one study, 38 percent of adolescents seeking weight-loss treatment were classified as food addicted [14], while in another study, 15% of adults seeking weight-loss treatment were classified as food addicted [13]. The variability in addictive eating rates in those seeking weight-loss treatment may be due to the heterogeneous nature of obesity and broad range of presentations in weight management settings, meaning that there is likely to be variable proportions of people affected by addictive eating within these samples. This is an important area of study as, while previously mentioned, the prevalence of addictive eating using validated tools is approximately 15–20% [6], up to 47% of individuals self-identify as having an addictive eating [15]. Given the large discrepancy between self-identification and published rates of addictive eating, it is likely that the population seeking addictive eating treatment may differ from those who are characterised in the literature as having compulsive overeating. Therefore, further investigation into the characteristics of those specifically seeking addictive eating treatment is warranted.

To date, only one study has assessed the characteristics of individuals seeking weight-loss treatment, reporting that the majority of treatment seekers were female and had a comorbid mental health condition [16]. However, this study did not assess differences in those that engaged in treatment compared to those that did not engage in treatment as well as treatment options previously accessed by participants, which is important to identify appropriate referral and treatment pathways. It is therefore important to better understand the potential differences between those engaging in treatment and those not engaging in treatment to identify potential barriers or enablers to effective treatment.

It is timely and important to identify the characteristics of those seeking addictive eating treatment to effectively target referral pathways and translate published interventions into clinical contexts. The aim of this study was to describe the characteristics of individuals seeking addictive eating treatment and examine differences between eligible participants who did and did not engage in treatment according to food addiction status, binge eating and mental health conditions.

Methods

Participants

The current study analysed the screening assessment data of individuals interested in participating in an addictive eating intervention study conducted by the University of Newcastle, Australia (Australian New Zealand Clinical Trials Registry ACTRN12619001540101). The eligibility screening was undertaken between February and March 2018 via an online survey. Participants were recruited to the screening survey via social media posts on Facebook and Twitter, and newsletter, newspaper, and radio advertisements, as well as contacting interested participants from a previous addictive eating survey [17]. The recruitment materials specifically sought participants aged 18 years and older who were interested in participating in an addictive eating intervention and who were above a healthy weight range. Participants accessing the survey provided implied consent to participate in the eligibility survey. Three hundred and forty participants entered the screening survey with 309 participants completing the survey. A total of 105 (34.2%) individuals were deemed eligible and 204 (65.8%) deemed ineligible for inclusion in the intervention. Of these, $n = 174$, did not meet the inclusion criteria; and $n = 30$, unable to determine eligibility due to incomplete survey data. One participant withdrew consent, and their data were excluded from the current analysis. Of the eligible participants, 49 individuals engaged in their allocated treatment while 56 did not engage in treatment. This study was approved by the University of Newcastle's Human Research Ethics Committee (approval H-2017-0167).

Procedure

Interested participants were invited to click on a weblink in the recruitment materials to complete the online eligibility screening questionnaire. The screening questionnaire comprised 55 questions and took 10–15 min to complete. The questions included demographics; body satisfaction; weight-loss attempts; the modified Yale Food Addiction Survey (mYFAS) [18]; the Binge Eating Scale (BES) (16 items); and the DASS-21 Depression Anxiety Stress Scales (21 items). To be eligible for inclusion in the intervention, individuals needed to be residing in Australia, fluent in the English language, endorse at least three symptoms of addictive eating as part of the modified Yale Food Addiction Scale, have a body mass index (BMI) greater than 25 kg/m², not currently pregnant and have access to the internet. An upper limit for BMI was not included as part of the eligibility criteria. The first few screens of the survey assessed participant eligibility (e.g. weight status, pregnancy), with ineligible

participants exited from the survey. Those deemed eligible for inclusion in the study was contacted by the research team to participate in the intervention. Eligible individuals who had a score on the DASS-21 scale that indicated severe or extremely severe for either category of depression, anxiety, or stress were asked to obtain clearance from their general practitioner prior to enrolment in the intervention. For this analysis, ‘Engagers’ refers to the individuals who actively enrolled and participated in treatment after determining eligibility, and ‘Non-engagers’ refers to the individuals who did not proceed to enrol and participate in treatment, despite being deemed eligible.

Measures

Demographics and anthropometrics

Nine self-reported demographics and anthropometrics were assessed, including age, sex, current pregnancy, postcode, weight, and height. Self-reported weight and height were used to calculate BMI, with online data collection previously reported to be a valid method [19]. Participants were asked about body satisfaction (“How satisfied are you with your current weight?”) using a 5-point Likert scale, previous weight-loss attempts (“Have you attempted to lose weight in the past?”) with dichotomous yes/no scoring, as well as services accessed to lose weight (“In the past have you used any of the following for weight loss purposes?”) which included a range of predefined responses.

Modified YFAS

The *mYFAS* [18] is a nine-item questionnaire that assesses seven symptoms of addictive eating plus two questions assessing clinical impairment or distress in line with the DSM-IV-TR substance use disorder criteria. As it contains fewer questions than the original YFAS, the *mYFAS* was used to reduce participant burden during screening. Participants are allocated a symptom score out of seven, plus a food addiction “diagnosis” for those who endorse ≥ 3 symptoms plus clinical impairment or distress. The *mYFAS* has been shown to have adequate internal consistency in adults, convergent and discriminant validity, similar psychometric properties to that of the original YFAS [18]. The *mYFAS* has shown excellent sensitivity and negative predictive value and has been suggested to be an appropriate substitute for the full measure [20].

Binge eating scale

The Binge Eating Scale (BES) is a 16-item self-reported survey that assesses binge eating behaviours and cognitions over the past 28 days [21]. The BES has demonstrated

good construct reliability and convergent validity, very good retest-reliability, as well as sensitivity (81.8%) and specificity (97.8%) [22].

DASS-21

The DASS-21 Depression Anxiety Stress Scales [23] is a 21-item questionnaire used as a measure of distress related to depression, anxiety, and stress. The DASS-21 has been demonstrated to be psychometrically sound, with good reliability and validity [24]. The DASS-21 scale was used to score the severity of symptoms, not for diagnosis in the current study.

Statistical analysis

Descriptive statistics were undertaken for the total sample including both eligible and ineligible participants. Those with missing data ($n = 30$) were excluded from the analysis. Differences between Engagers and Non-engagers were examined using *t* tests for continuous variables and chi-squared tests for categorical variables. Multiple logistic regression analyses were conducted to examine the relationship between variables that were significantly different between Engagers and Non-Engagers as predictor variables and engagement in the addictive eating intervention as the dependent variable. With this purpose, *mYFAS* symptom scores and DASS total scores were included in the regression analysis, and adjusted for age, sex and BMI. As DASS subscale scores were highly correlated, we did not include them in the regression analyses to avoid multicollinearity. Statistical significance was defined as $p < 0.05$. The analysis was undertaken using JMP Pro 14, SAS Institute Inc., Cary, NC.

Results

Sample description

The total sample that completed the screening survey ($n = 309$) was predominantly female (60.5%), with a mean age of 42.7 years (Table 1). Most participants were in the obese BMI category (68.6%), followed by overweight (21.4%), healthy weight (9.4%) and underweight (0.6%). An overwhelming majority reported being dissatisfied or extremely dissatisfied with their weight (93.4%) and had attempted weight loss in the past (97.1%).

Participants deemed eligible for inclusion ($n = 105$) were predominantly female (31.1%) with a mean age of 43.7 years, and mean BMI of 36.6 kg/m² (Table 1). Eligible participants had a mean *mYFAS* score of 5.13 ± 1.11 (Table 2). The mean BES score was 28.10 ± 7.57 (range

Table 1 Characteristics of participants who accessed the screening survey ($n=309$)

	Total sample ($n=309$)	Ineligible ($n=204$)	Eligible ($n=105$)
Age (years)	42.69 ± 12.73 (20–75)	42.10 ± 12.64 (20–75)	43.69 ± 12.77 (21–74)
Not specified	1 (0.3)	1 (0.5)	0 (0.0)
Sex			
Male	25 (8.1)	16 (7.8)	9 (8.6)
Female	195 (63.1)	99 (48.5)	96 (91.4)
Not specified	89 (28.8)	89 (43.6)	0 (0.0)
BMI (kg/m^2)	34.65 ± 7.88 (18–65)	33.64 ± 8.14 (18.0–65.0)	36.70 ± 6.97(25.2–56.3)
BMI category			
Underweight	2 (0.6)	2 (1.0)	0 (0.0)
Normal	29 (9.4)	29 (14.2)	0 (0.0)
Overweight	66 (21.4)	46 (22.5)	20 (19.0)
Obese	212 (68.6)	127 (62.3)	85 (81.0)
Weight satisfaction			
Very dissatisfied	196 (63.6)	115 (56.4)	81 (77.1)
Dissatisfied	92 (29.9)	69 (33.8)	23 (21.9)
Neither	8 (2.6)	8 (3.9)	0 (0.0)
Satisfied	8 (2.6)	8 (3.9)	0 (0.0)
Very satisfied	2 (0.6)	2 (1.0)	0 (0.0)
Rather not say	2 (0.6)	1 (0.5)	1 (1.0)
Attempted weight loss in past			
Yes	300 (97.1)	196 (96.1)	104 (99.0)
No	9 (2.9)	8 (3.9)	1 (1.0)

Data reported as mean ± SD (range) or n (%)

10–46) while the DASS-21 general mental health distress total score ranged from 6 to 124. More than one-third eligible participants had had severe or extremely severe levels of depression (34.3%), anxiety (42.8%), and stress (44.8%). Ninety-nine percent of eligible individuals ($n=104$) reported being dissatisfied ($n=23$) or very dissatisfied ($n=81$) with their current body weight, and one individual declined to answer (Table 1). Ninety-nine percent of individuals had attempted weight loss in the past, and 80% of the total sample had accessed four or more services or used products for weight-loss purposes. The most common weight-loss services accessed, or products used for weight-loss purposes, in descending order, included: General Practitioner, dietician, group meetings such as Weight Watchers, and personal trainers. The most common products used for weight-loss purposes, in descending order, included: meal replacements, Smartphone ‘apps’, internet or web, and meal deliveries.

Differences between Engagers and Non-engagers

There were no significant differences in sex, age, or BMI between Engagers ($n=49$) and Non-engagers ($n=56$) (Table 1). Reasons for not engaging in treatment included declining to participate or withdrawing from treatment ($n=14$), or survey responses determined to self-report severe or extremely severe mental health scores using the

DASS-21 ($n=33$), and failure to complete baseline assessments the proceeded after the eligibility screen was complete ($n=10$). The mean FA symptom score (mean ± SD) was significantly higher for Engagers (5.37 ± 1.18 , range 3–7) than Non-engagers (4.93 ± 1.01 , range 3–7; $p=0.045$) (Table 1). Frequencies for food addiction symptoms were similar for both groups, except for Engagers endorsing the *Withdrawal* symptom more frequently ($p=0.048$) than Non-engagers. Overall, withdrawal was the least common food addiction symptom reported (42.9%), while the most common symptom reported was continued use despite consequences (99.0%). There was no significant difference between Engagers and Non-engagers in BES score. The DASS-21 mean score was significantly higher for Non-engagers than Engagers ($p=0.003$) (Table 1). The three domain-specific scores for anxiety, depression, and stress were also significantly higher in Non-engagers compared to Engagers ($p=0.001$, $p=0.005$ and $p=0.043$, respectively). Overall, the percentage of individuals with more severe psychological distress classifications (i.e. severe or extremely severe) for depression, anxiety, and stress was higher for Non-engagers than Engagers. The mean number of reported weight-loss services accessed, or weight-loss products tried was similar for both Engagers and Non-engagers (6.78 ± 3.41 and 5.98 ± 3.21 , respectively; $p=0.225$). Compared to Non-engagers, significantly more Engagers had sought weight-loss advice/

Table 2 Characteristics, food addiction diagnoses, symptom scores and the frequency of symptoms for eligible participants ($n=105$; Engagers and Non-engagers)

	Total sample ($n=105$) Mean \pm SD or n (%)	Non-engagers ($n=56$)	Engagers ($n=49$)	Test statistic t or χ^2	p
Sex					
Male	9 (8.6)	6 (5.7)	3 (2.9)	0.70	0.498
Female	96 (91.4)	50 (47.6)	46 (43.8)		
Age (years)	43.69 \pm 12.77	43.88 \pm 13.54	43.47 \pm 11.97		0.871
BMI (kg/m ²)	36.64 \pm 7.01	36.64 \pm 7.58	36.64 \pm 6.37		0.999
BMI category					
Overweight	20 (19.0)	12 (11.4)	8 (7.6)	0.44	0.621
Obese	85 (81.0)	44 (41.9)	41 (39.1)		
mYFAS symptom count ^a	5.13 \pm 1.11	4.93 \pm 1.01	5.37 \pm 1.18	2.03	0.045*
mYFAS symptoms endorsed					
Substance taken in greater quantity and for longer than intended	79 (75.2)	40 (38.1)	39 (37.1)	0.94	0.334
Persistent desire or unsuccessful repeated attempts to quit	55 (52.4)	26 (24.8)	29 (27.6)	1.71	0.192
Great time and effort to obtain, use and recover from substance	92 (87.6)	49 (46.7)	43 (41.0)	0.002	0.968
Important life activities given up or reduced	75 (71.4)	39 (37.1)	36 (34.3)	0.19	0.665
Withdrawal	45 (42.9)	19 (18.1)	26 (24.8)	3.91	0.048*
Continued use despite consequences	104 (99.0)	56 (53.3)	48 (45.7)	1.15	0.283
Tolerance	89 (84.8)	47 (44.8)	42 (40.0)	0.07	0.800
Clinically significant impairment	60 (57.1)	32 (30.5)	28 (26.7)	0.00	0.999
Clinically significant distress	83 (79.0)	43 (41.0)	40 (38.1)	0.37	0.543
BES score ^a	28.10 \pm 7.57	28.29 \pm 7.94	27.88 \pm 7.20	-0.28	0.783
DASS total score ^b	56.44 \pm 26.61	62.96 \pm 25.65	48.98 \pm 25.95	-2.77	0.003*
Depression score ^b	19.50 \pm 11.01	21.79 \pm 11.03	16.90 \pm 10.51	-2.32	0.001*
Anxiety score ^b	14.19 \pm 9.43	16.54 \pm 9.24	11.51 \pm 9.00	-2.82	0.005*
Stress score ^b	22.74 \pm 10.36	24.64 \pm 10.38	20.57 \pm 10.00	-2.04	0.043*

BE binge eating, BES binge eating scale DASS-21, FA food addiction, mYFAS-modified Yale food addiction scale

^aTotal scale score out of 46: ≤ 17 = 'no binge eating', 18–26 = 'mild to moderate binge eating', > 27 = 'severe binge eating'

^bScore out of a possible 42

* $p < 0.05$

treatment from their General Practitioner ($p = 0.028$), attended weight-loss group meetings ($p = 0.025$), and used Smartphone 'apps' ($p = 0.023$).

The multiple logistic regression models demonstrated that higher mYFAS scores and lower DASS total scores significantly predicted engagement in treatment ($X_2 = 17.20$, $df = 5$, $p = 0.004$), when adjusted for age, sex and BMI. The odds ratios demonstrate that individuals with higher mYFAS scores are more likely to engage in treatment (AOR 1.68; 95% CI 1.12–2.52), and individuals with higher DASS total scores are less likely to engage in treatment (AOR 0.97; 95% CI 0.95–0.99).

Discussion

This study explored the characteristics of individuals interested in participating in an addictive eating intervention, as well as potential differences between those engaging in treatment and those not engaging in treatment. This study found that people seeking addictive eating treatment were overwhelmingly female and in the obese BMI category, as opposed to the overweight BMI category. This is consistent with previous research in this area, with one previous study reporting 80% of addictive eating treatment-seekers being female [16] as well as more females being classified as food addicted across published literature [6]. The overrepresentation of females is also similar to previous studies exploring participant characteristics of individuals

participating in online binge eating treatment [25] and online nutrition, physical activity and weight-loss interventions [26]. Gender differences in treatment seeking should be considered when developing referral pathways and treatments, and future research should explore how to better engage males. Interestingly, people from a normal weight and underweight BMI category entered the survey, although the recruitment materials sought those from higher BMI categories. This suggests that self-perceived food addiction is not synonymous with higher weight status. Future studies should explore the perceptions of those from lower BMI categories who are seeking addictive eating treatment.

Mental health comorbidities were common in this addictive-eating treatment seeking sample, which is consistent with recent research [16]. Differences in mental health outcomes were observed between those Engagers and Non-engagers, and higher mYFAS scores predicted engagement with treatment, while those with higher DASS scores were less likely to engage in treatment. This is of concern given the reported comorbidity between addictive eating and mental health outcomes [12]. Part of the inclusion criteria for the intervention study was for those with more severe mental health outcomes to obtain GP clearance to participate in the intervention; however, this may have been a barrier to engagement for some individuals due to the perceived stigma associated with mental health conditions. Previous qualitative research has identified compulsion and control as major themes in the participants' experiences with addictive eating [27]. Future directions include qualitative research approaches to identify reasons why individuals are specifically seeking treatment for addictive eating as well as strategies to improve engagement in treatment for people with severe mental health issues, who are an already vulnerable group. Given the high rates of comorbid mental health conditions, transdiagnostic, integrative treatment approaches should be explored to identify if addictive eating, mental health conditions and disordered eating behaviours can be addressed simultaneously to optimise treatment outcomes.

Individuals interested in the addictive eating intervention accessed a wide range of services and products to lose weight. Among the most common were GPs, dieticians, group meetings, meal replacements, and Smartphone apps. The findings of this study suggest that targeting recruitment strategies or embedding interventions within GP or dietetic services may be efficacious in engaging people seeking addictive treatment or the development of referral pathways. This is further supported by the findings of a recent health professional survey, which found that 72% of dietetic and psychology clinicians surveyed had been approached by clients about addictive eating [28]. Future interventions may also consider using Smartphone apps as a method of supporting intervention delivery to complement personalised

clinical service delivery between active sessions and maintain engagement as apps are commonly used by individuals seeking treatment. Group sessions may also be a way to provide support to people during treatment, given that treatment-seeking individuals frequently access these.

Strengths and limitations

Strengths of the study include the use of validated tools to assess addictive eating and mental health covariates. However, this study has some limitations to acknowledge. As the ethics approval for the study was obtained prior to the release of the mYFAS 2.0, which is mapped to the DSM-5 criteria, the study utilised the original mYFAS. Future studies should use the updated version of the tool. As the recruitment materials sought people above a healthy weight range, the sample recruited may not be generalisable to the wider population. In addition, a single item was used to assess body satisfaction, and future studies should use a validated assessment tool. The eligibility criteria did not include medications that may affect appetite, medical conditions with specific dietary requirements (e.g. type 2 diabetes), drug use or bariatric surgery, which may have affected responses. These should be considered in future research. In addition, this survey assessed few characteristics between Engagers and Non-engagers. Future studies should assess a wider range of characteristics such as personality characteristics and disordered eating behaviours, as well as a broader range of tools such as the Power of Food Scale to assist in better describing those seeking addictive eating treatment. Finally, a forced response was not implemented for the gender question for the first participants entering the survey, which contributed to some missing data.

The findings of this study indicate considerable interest from the general population in seeking addictive eating treatment. Individuals seeking addictive eating treatment were predominantly female, dissatisfied with their weight and had accessed a range of services for weight loss. Individuals with higher mental health comorbidity were less likely to engage in treatment, suggesting that higher mental health symptomatology may be a barrier to treatment. Future research should consider qualitative approaches to provide an in-depth understanding of the reasons for seeking treatment and engaging in treatment, as well as to identify the most optimal treatment options and referral pathways.

What is already known on this subject?

There is increasing interest in food addiction and its potential treatment. There is currently a large discrepancy between self-identified addictive eating (47%) and published rates of addictive eating (15–20%). In addition, little is known about the characteristics of people seeking addictive eating

treatment, as well as those engaging and not engaging in treatment. It is therefore important to better understand the characteristics of those seeking addictive eating treatment specifically to develop appropriate treatment and referral pathways.

What this study adds?

This is the first study to explore the differences between those engaging in addictive eating treatment and those not engaging in treatment. This study identified that individuals seeking addictive eating treatment were predominantly female and from the obese BMI category. Individuals who did not engage in treatment displayed higher mental health comorbidity, suggesting that higher mental health symptomatology may be a barrier to treatment. This study indicates considerable interest from consumers in seeking addictive eating treatment and provides evidence to inform appropriate treatment and referral pathways.

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Compliance with ethical standards

Conflict of interest None to declare.

Ethics approval This study was approved by the University of Newcastle's Human Research Ethics Committee (approval H-2017-0167).

Informed consent Implied consent was obtained for all individuals in the current study.

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