

IMPACT OF COVID-19 LOCKDOWN ON FOOD ADDICTION IN INDIA**Das A^{1*}, Bharti N² and S Malik³****Ankan Das**

*Corresponding author email: ankan.das2019@siib.ac.in

¹Student at Symbiosis Institute of International Business, Pune. Currently pursuing MBA - Agri-Business Management. Address: 53/26 Anilalay, R.N.Guha Road, Nagerbazar, Dumdum, North-24-Parganas, Kolkata-700028, India

²Faculty (HOD), Agri Business Management at Symbiosis Institute of International Business, Pune. Address: G. No. 174/1, Taluka Mulshi, Dist. Pune, Hinjewadi, Maharashtra 411057, India

³Faculty, Agri Business Management at Symbiosis Institute of International Business, Pune. Address: G. No. 174/1, Taluka Mulshi, Dist. Pune, Hinjewadi, Maharashtra 411057, India



ABSTRACT

Food addiction (FA) has a long-term impact on the health of individuals. This study analyses the changes in FA and related behaviour in India in the wake of lockdown which started on 25th March 2020 as a response to the COVID-19 outbreak. This paper provides insight into the food consumption behavior of various segments of the population during this lockdown. It offers some new insights in this regard by establishing the relationship between a temporary pause in the consumption of palatable food and FA. This study was conducted between March and May 2020 in two stages. First, a quantitative study used the Yale Food Addiction Scale (YFAS) to identify food addicts from a sample of 150 respondents. In the second stage, in-depth telephone interviews were conducted with the food addicts; the responses were recorded, transcribed, and analysed to ascertain the changes in their overall consumption and addiction behavior towards palatable foods. This was done by conducting a thematic analysis with the help of the NVivo software where various tools like word cloud and cluster analysis were used. This study found that COVID-19 restrictions had significantly brought down the addiction to palatable food in India as the regular consumption chain had got broken during the lockdown. The consumption of palatable food is expected to remain low for a brief period after the lockdown due to hygiene issues like improper or lack of sanitization and cleanliness. However, in the long-run, the consumption of palatable food is expected to rise in India owing to its growing population, modernisation, increasing disposable income and changes in customer preferences. These findings have significant implications for the food, packaging and health industries as the changes in customer behavior will certainly impact them, and they need to duly change their strategy to adapt to the changes promptly.

Key words: Food, addiction, Yale Food Addiction Scale, lockdown, nutrition



INTRODUCTION

Food is consumed to get nutrition, which in turn helps produce energy for the proper functioning of our bodies. However, palatable food (highly refined and often containing high salt, high sugar, and high fat) is consumed mainly for pleasure, regardless of its energy-producing potential [1]. Such reward-related consumption only multiplies the overall calorie intake and leads to obesity [2]. Food addiction means an irresistible desire for the consumption of highly palatable foods. This behaviour is commonly observed among the youth in particular. Palatable foods have a greater impact on young people for the following two reasons: first, in their developmental phase, their young bodies are undergoing tremendous transformations [3], and secondly, most advertisements on chocolates, ice-creams or fried foods specifically target young people [4]. These factors result in development of unhealthy food habits that have irrevocable consequences on our bodies and ultimately result in chronic diseases like diabetes [5].

Currently, the world is combating the COVID-19 pandemic which compelled many countries including India to have a lockdown for 52 days (as of 17th May 2020), and the lockdown could have been extended or its reimposition may be necessary, later. All of India's metropolitan cities (including Delhi, Hyderabad, Kolkata and Mumbai) were severely affected, and they were designated as 'Red Zones', that is, hotspots with the highest reported COVID-19 cases. The pandemic has claimed thousands of lives and shattered many livelihoods. The lockdown disrupted the daily routine and food habits of people of all ages. It tremendously impacted the food habits of people aged between 18–25 years (as of 1st January 2020) who regularly consume highly refined foods as most restaurants were closed, and delivery services, in many areas, were restricted. This study attempted to determine the following: 1) the impact of the lockdown on food addicts and their addiction and 2) whether the unprecedented situation resulted in behavioral changes among youth and 3) if the changed situation led to the adoption of a healthier lifestyle for the long-term.

Earlier studies have shown certain foods to have addictive properties [6]. The FA concept was proposed to suggest that some foods may trigger an addiction-like response in some individuals [7]. Individuals with poor food habits often complain about craving, withdrawal symptoms when they try to quit certain foods or, in some extreme cases, have to relinquish social activities [8]. Many people have reported feeling an irresistible temptation to eat sweet food in a manner similar to how an alcoholic feels compelled to drink alcohol [9].

As argued by Davis and Carter [10], compulsive overeating has striking similarities with conventional drug addiction based on clinical features, biological mechanisms, and "evidence of shared diathesis" [10]. The intensity of withdrawal symptoms is significantly higher in the case of high-fat savoury and high-fat, sugar-based food than low-fat sugary food [11].

Yale Food Addiction Scale (developed in 2009) is the first integrated tool to measure FA [12]. It has 25 questions developed by re-modelling the questions in the Diagnostic



and Statistical Manual of Mental Disorders (DSM-IV), originally developed for substance abuse and eating behaviour [13]. It has facilitated population-wide FA studies using standardised tools. The questionnaire employs scoring methods like dichotomous questions, frequency-based and the Likert scale of which the combination of the first two is considered as best to capture diagnostic criteria [6]. Yale Food Addiction Scale has been used as a preliminary tool to identify FA. Initial studies found no significant correlation between the YFAS Score and Body Mass Index (BMI). Hence, the YFAS score was associated with binge-eating, emotional eating, distressed eating, and problematic eating [13]. Later, however, researchers claimed to have found conclusive evidence that Binge-Eating Disorder (BED) increased impulsivity in response to food stimuli in obese people [14]. Yale Food Addiction Scale is widely used, now, for different populations and especially for people who are considering bariatric surgery [15]. Moreover, some studies have suggested that women with BED are more likely to match YFAS criteria of food addiction [16].

While significant work has gone into identifying FA, certain gaps remain in the relevant literature. Thus, to the best of this researcher's knowledge, research on the effect of temporarily forced stoppage of consumption of palatable food on FA is limited. This is also the case, given the unavailability of palatable food for a particular period, individuals are forced to change their eating habits for a considerable period and, consequently, exhibit a wide variety of behavioural and psychological changes. The objectives of this study were determined with these gaps in mind.

This study is significant because while vaccine research continues, Coronavirus is likely to stay on for at least another 18–24 months. In countries like India, where the lockdown lasted for nearly 2 months, the restrictions were bound to be lifted (even when the cases peaked) because of an ever-deepening economic crisis. Currently, co-existence with the Coronavirus is the new normal. A key life-saving factor in this situation is personal hygiene and proper sanitation and choice and quality of food, its nutrient content and the food vendors' surroundings. This study can help understand how the lockdown made people more careful about maintaining personal hygiene and healthy food habits.

Notwithstanding its significance, this study has certain limitations. First, the studies were only from metropolitan cities or urban areas. Even though this population has the highest availability of and exposure to highly palatable foods, yet including semi-urban and rural populations would have minimised possible biases and made the findings more representative. Second, parental control of overeating behaviours of people (living with their parents) has been discussed but not assessed in detail. Parents greatly influence the eating behaviours of the age group covered as they are the ones who prepare or source the meals. Future research, independent of parental control, is required to get a more exact picture vis-à-vis this topic.



MATERIALS AND METHODS

Sample selection

A total of 150 participants (N = 150) including 68 females and 82 males were sent an *online* questionnaire link based on YFAS 1.0. Participant selection was through simple random sampling among the author's social media (Facebook and WhatsApp) connections, word-of-mouth, and the snowballing technique. In all, 109 participants took the survey of which 66 were aged 18–24 years, while 43 were aged 25–30 years (as of 1st January 2020). All these participants were under lockdown for at least 50 days. Being able to read and write English was a requirement for participation, although, an exception had to be made later. Most of them had completed college-level education, and they were a mix of students staying at home or in a hostel for the last 12 months and employed individuals. The validity of the responses was ensured by checking for duplicate IP addresses and not having any unrealistic time frame for completing the survey.

Design and methodology

A subset of the above-mentioned participants (N = 45), who were found to be food addicts based on the YFAS analysis were then interviewed over the telephone. The interview round was conducted in three different languages (English, Hindi and Bengali) as preferred by the interviewees. The interviews were later transcribed and translated (English) to text form for being thematically analysed using the NVivo software (Figure 1).

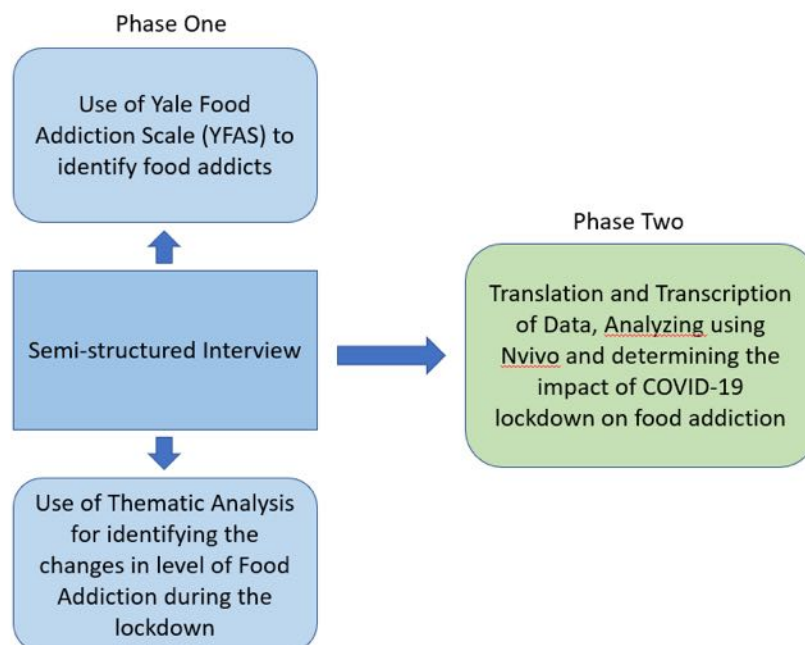


Figure 1: Research Methodology Framework

Source: (Prepared by Authors, based on data received during research)

Tools used

All of the interviews were in-depth and semi-structured; each one was of different durations, with the average duration being 12 minutes and 15 seconds. There were 13 questions in all (11 compulsory and two optional). Of these, five questions were dichotomous but required the interviewee's explanation for their choice. The questions focused on various aspects of their food consumption behaviour during the lockdown. For example, one of the questions was - "During this lockdown phase, have you ordered ready-to-eat (cooked) food *online*? If yes, how many times?" and a complementary question was "Is it that while you craved for some particular food you wished to order it but could not because of either being restricted by your parents or because of unavailability of delivery service in your area or because of the hygiene factor concerning the restaurants, or you did not wish to order at all?" While the first question is dichotomous with a 'yes' or 'no' answer, any answer to this question demands an explanation for their actions by way of answering the other question, which helps understand their state of mind when they craved for any particular type of food.

Another telephonic-round question was, "If 40 days of lockdown were divided into two parts of 20 days each, how would you describe your level of craving between the two parts? Would it increase or decrease or remain unchanged?" This question was meant to provoke the respondents, while the answers were very useful in understanding their craving curve during the lockdown.

Data analysis

The YFAS version used for this study measured all the items on a Likert scale ranges from one to five, one being the least. According to YFAS scoring guidelines, five of the Likert scale items were dichotomised in a way that participants who had never experienced the symptoms (mentioned in the question) were assigned a value of zero, and those reporting the symptoms (in the last year) were assigned a value of one.

For YFAS diagnosis, the symptom count must be ≥ 3 for 7 food addiction criteria, *viz.*, 1) characteristic withdrawal symptoms; 2) tolerance; 3) repeated unsuccessful attempts to quit; 4) substances consumed in large amounts and for a longer period than intended – more time or effort is needed to obtain, use, and recover; 5) despite having awareness and knowledge of adverse consequences, the consumption continues; 6) important social, occupational, or recreational activities are given up or reduced; and 7) clinical impairment or distress.

The two YFAS questions to identify clinically significant impairment asked if their behavior with regard to food and eating caused significant distress and also whether the participants experienced significant problems in being able to function effectively due to their food or eating habits. It was only when both the answers were positive that it could be said that the respondent had a clinically significant impairment.

After the telephone interviews, once the data was translated and transcribed, a thematic analysis of the data was undertaken using the NVivo software. Braun and Clarke suggest the following five steps for thematic analysis: familiarisation with data,



generating initial codes, searching for themes, defining and naming themes, and producing the final report. The primary objective of using this technique was to collect relevant information. The data set was coded into nine parent nodes and four child nodes based on the interview questions. Once the data was organised, each transcript under the said nodes was carefully examined to identify similarities in words, phrases, or sentences and differences in the participants’ responses.

RESULTS AND DISCUSSION

YFAS

Out of 102 participants who answered the YFAS-based questionnaire, 45 participants matched ≥ three out of seven FA criteria and showed clinical impairment or distress. A total of 48.04% of the participants fulfilled the Tolerance criterion (marked increase in amount; marked decrease in effect), while 30.39% of the participants suggested having faced characteristic withdrawal symptoms or reported substances taken to relieve withdrawal symptoms. Only 27.45% of the participants agreed to have taken the substances in larger amounts and for a longer period than intended. The most surprising observation was that as many as 78.43% of the participants had a persistent desire or multiple unsuccessful attempts to quit the consumption of refined foods.

Impact of lockdown on Food addiction

The respondents were asked several questions from eight categories as presented below:

Word cloud



Figure 2: Most Frequently Used Words in The Qualitative Interview

Source: (Prepared by Authors, based on data received during research)

Respondents' responses were recorded, transcribed, and added to the NVivo software. Based on the frequency of words used a word cloud was prepared (Figure 2). A few words had been used repeatedly while answering. The top five most frequently used words were food, craving, lockdown, going, and consumption. These words signify the general concern of the Indian population during the COVID-19 lockdown while dealing with their FA (Figure 2).

Food Craving

Ordered food *online* or not

Table 1 suggests that only 18% of the participants ordered refined food during the lockdown, while the majority (80%) did not. Those who chose to order food admitted either to having craved for certain foods like 'chicken from KFC', 'biryani' and 'momos' or cited an occasion like 'Navratri' (a popular India festival) or a 'birthday' as the reason. Few people used sentences like 'I was willing to eat something special.' While almost everyone who ordered food did it two to three times during the entire lockdown, only one participant admitted to having ordered food two to three times a week.

In the explanations for not ordering refined food, there were three most common answers: – the hygiene concern related to the food or food delivery, the restriction from parents, and unavailability of the delivery services in the area - in that order.

Beyond the semi-structured interviews, the participants were asked if they would order food, had the delivery services been available, and no restrictions from parents. Almost all the interviewees stated lack of hygiene as the primary concern. Only three participants mentioned that they did not feel like ordering as they were getting everything they wanted to eat at home.

Time-specific craving curve

Interviewees' responses were almost evenly distributed into 'yes' and 'no'. Around 49% of them felt that their craving was specific to a particular time which they commonly referred to as 'in the evening.' Some of them used phrases like 'post-lunch' and 'post-heavy meal' to describe the timing, especially for something sweet in this case. One interviewee described having cravings at night, before going to sleep. About 38% of the participants suggested that their craving was not time specific. For some, it happened all the time, while the rest felt it whenever they were hungry. However, one respondent said, that they thought they would have a lot of craving, but the situation was different. They did not crave as much as expected.

Use of substitute food

Nearly three-fourths of the participants admitted to having used substitute food in the absence of the food they craved for. Most of them opted for substitutes like 'Maggi', 'noodles', 'chips' and 'wafers' instead of 'biryani', 'chow mein', 'pastries', and 'pizza'. An interviewee said that her mom understood her cravings and made certain dishes for her, like 'biryani', and she loved it. For another interviewee, substitution



happened every day. Whenever she felt like eating chicken and when it was not available, she ate soybeans as a substitute.

The participants who admitted to having substitutes also admitted to having them multiple times ranging from two occasions to every day. One of the respondents said that it did not happen at all as only essential things were required during this lockdown, and fast foods are avoidable. She explained that as a working professional, she needed to eat nutritious food, not junk food. A normal diet helped her get the nutrition she sought, increased her proficiency, and helped her in being more productive. She generally desired something sweet, something that would provide her energy, but recently, she started buying toffees and ate at her home as chocolates were not available. She substituted chocolate with toffees (Figure 3).





Figure 3: Cluster Analysis of Craving for Palatable Food and Impact of Lockdown on FA

Source: (Prepared by Authors, based on data received during research)



Change in Craving for Palatable Food During the Phases of Lockdown

This question is considered as one of the most significant ones in studying the change(s) in the craving levels in the absence of refined foods throughout the phases of the lockdown. Close to 73.3% of the interviewees agreed that they faced changes in the craving level(s) throughout the phases, and only eight participants felt the craving level to be the same throughout.

This detailed study found that a large number of people felt that their craving level(s) decreased, while only a few reported an increase(s). Some of the respondents talked about their craving level(s) following a cycle from high to low or *vice-versa*.

Those who felt that their craving level(s) had increased attributed it to the length of time since they last ate fast foods. The desire had increased with time. Another group felt that their craving decreased, and some of them mentioned the realisation that they could not order palatable food from restaurants as the reason. Whatever they wished to eat, had to be homemade with whatever was available at home. One of them said that the craving decreased after the first few days. He shifted back to eating homecooked food. The most common phrase of the interviewees in answering this question was 'got used to it.'

Impact of the Lockdown on Craving and FA

Change in consumption level of fast food in post lockdown phase

A significantly large number of the respondents (80%) agreed that there were some changes in the amount of fast-food they consumed in the post-lockdown period compared to what the consumption was previously. However, these responses were largely divided in terms of whether the consumption would increase or decrease. Those who considered that it would increase said that for the first few days, it was a huge increase. For a change, they would jump into eating junk food but again, a balance would be established over the next few days. One of them stated that it definitely increased in the beginning, as he did not often eat fast foods. Yet, despite their assumptions regarding increased consumption of palatable food post-lockdown, most of them concluded with a common thought that considering the risks in eating palatable food from outside, they would try to restrict their consumption.

Those who anticipated a decrease in their consumption commented that even if the lockdown ends, they would still feel that the situation is not hygienic enough, and the pandemic may return. Therefore, their consumption would decrease. They also guessed that their consumption would decrease due to some changes in their feeding habits.

About 18% of them said that there would not be any change in their consumption of junk food, and they blamed it on circumstances and unavailability of homecooked food for them. Also, only three respondents refused to give a clear answer as they were unsure of their future consumption levels.



Changed importance of homemade food from pre-lockdown to post-Lockdown phases

The purpose of asking this question in the interview was to understand the impact of COVID-19 on hygiene of food and gauge post-lockdown eating behaviours among individuals.

Around three-fourth (75.5%) of the interviewees firmly believed that they experienced a change in their perception of the importance of home-cooked food during the lockdown in the absence of palatable food, while one-fourth of the participants denied experiencing any such change and considered the value of the homemade food in their view to be same as before. Of those who believed that there is a change, almost all except two people concluded that the value of homemade food had increased for them. Before lockdown, they used to treat homemade food as a substitute, but now it is the main thing, and that they are realising that homemade food is much tastier than refined food.

One of the participants felt that the value had decreased. Earlier he used to eat palatable food only, so the value of homemade food was high, but since he started eating only homemade food, its value decreased. Those who denied experiencing any change mentioned that everything was same as before and that they still did not like home-made food.

Cooked food at home to satisfy cravings

This question might seem to be of lesser importance, but it helped understand the emotional value related to eating a portion of food whose hygiene and quality levels is guaranteed. Many interviewees agreed that they had re-discovered homemade food with unique experiments that they never thought of previously.

Eighty percent of the respondents admitted to being involved in some kind of cooking during this phase, and their responses were that they cooked frequently. These respondents claimed to have prepared a wide range of dishes and desserts themselves including 'pasta', 'momo', 'sandwich', 'pizza', 'cake', 'chicken soup', and a wide range of other chicken dishes.

Change in overall energy levels by eating only homemade food during the entire lockdown

This question was tricky for the interviewees to answer, as the circumstances under the pre-lockdown phase and in the lockdown phase differed, but it was purposely retained in the interview to understand their daily activities during the lockdown.

More than half of the participants (55.5%) felt some difference in their overall energy levels, and one of them had become proactive. Back in his hostel, after waking up, he used to take some time to get rid of his tiredness and stabilise but currently, he reported not feeling the need for that anymore, and could instantly start working once he was awake, and no one could guess that he was sleeping just a minute earlier.



The goal of this study was to establish a relationship between forced stoppage of consumption of palatable food and FA. In the post-lockdown scenario, the lifestyle of people is likely to change drastically. One of the most significant impacts will be on their eating behaviours, including the choice of food and where it is being cooked. People with an improved understanding of hygiene due to the pandemic are most likely to avoid street food due to the poor quality of ingredients, oil, or low overall hygiene.

There is a chance that local or street food will come up under a brand name, and hygiene-related concerns will be addressed. A rise in food-delivery services is also expected as dine-in restaurants will continue to practice social distancing for quite some time. For delivery services to do well, proper packaging of the food will be crucial. Hence, this research has significant implications for the food, packaging, and health industries as a whole.

CONCLUSION

The results of this study suggest that the lockdown has been successful in bringing down the craving for highly palatable food as the chain of regular consumption of such food has been kept on pause for a long period (more than 50 days). This study showed 'unbearable craving' as the reason for ordering food by the addicts. Moreover, it revealed that those who overcame the fear while ordering palatable food for the first time tended to do it more than once. It also reflects that craving is somehow related to the biological clock of humans, and it was at its peak, when people usually ate such food in the pre-lockdown phase in the evening. Participants often used substitute food to counter their craving. They believed that they experienced a change in their craving levels during the lockdown. There is going to be a significant change in the level of consumption of palatable food in the post-COVID-19 scenario, and hygiene has emerged as a prime concern in the Indian context. There is a chance that the consumption might shoot once the lockdown is lifted.

There is scope for future research to match the prediction of consumption with actual consumption to track the level of correctness of this research. Further, when the stores re-open, post-lockdown, a study with the same population to validate these findings will also be useful.



Table 1: Participants displaying their response to Dichotomous Question categories

	Categories of Questions	Yes	No	Diff. Ans
1.	Ordered Food <i>Online</i>	8	36	1
2.	Craved Fast Food At any particular time of Day	22	17	6
3.	Ate substitute Food	34	10	1
4.	Change in Consumption Post Lockdown	33	7	5
5.	Change in Craving between the phases of Lockdown	36	8	1
6.	Change in Significance of Homemade food	34	8	2
7.	Tried to cook to satisfy craving	36	8	1
8.	Change in Overall energy Level	25	5	16

REFERENCES

1. **Kenny P** Reward Mechanisms in Obesity: New Insights and Future Directions. *Neuron* 2011; **69(4)**: 664–79.
2. **Ceccarini M, Manzoni G, Castelnuovo G and E Molinari** An Evaluation of the Italian Version of the Yale Food Addiction Scale in Obese Adult Inpatients Engaged in a 1-Month-Weight-Loss Treatment. *Journal of Medicinal Food* 2015; **18(11)**: 1281–1287.
3. **Gearhardt A, Roberto C, Seamans M, Corbin W and K Brownell** Preliminary Validation of the Yale Food Addiction Scale for Children. *Eating Behaviors* 2013; **14(4)**: 508–12.
4. **DeWit D, Adlaf E, Offord D, Alan C and A Ogborne** Age at First Alcohol Use: A Risk Factor for the Development of Alcohol Disorders. *American Journal of Psychiatry* 2000; **157(5)**: 745–750.
5. **Volkow N and R Wise** How Can Drug Addiction Help Us Understand Obesity? *Nature Neuroscience* 2005; **8(5)**: 555–560.
6. **Gearhardt A, Corbin W and K Brownell** Food Addiction. *Journal of Addiction Medicine* 2009; **3(1)**: 1–7.
7. **Davis C, Curtis C, Levitan R, Carter J, Kaplan A and J Kennedy** Evidence That ‘Food Addiction’ is a Valid Phenotype of Obesity. *Appetite* 2011; **57(3)**: 711–717.
8. **Pelchat M** Of Human Bondage: Food Craving, Obsession, Compulsion and Addiction. *Physiology & Behavior* 2002; **76(3)**: 347–352.
9. **Avena N, Rada P and B Hoebel** Evidence for Sugar Addiction: Behavioral and Neurochemical Effects of Intermittent, Excessive Sugar Intake. *Neuroscience & Biobehavioral Reviews* 2008; **32(1)**: 20–39.
10. **Davis C and J Carter** Compulsive Overeating as an Addiction Disorder. A Review of Theory and Evidence. *Appetite* 2009; **53(1)**: 1–8.
11. **Gordon E, Ariel-Donges A, Bauman V and L Merlo** What Is the Evidence for “Food Addiction?” A Systematic Review. *Nutrients* 2018; **10(4)**: 477.
12. **Gearhardt A, Yokum S, Orr P, Stice E, Corbin W and K Brownell** Neural Correlates of Food Addiction. *Archives of General Psychiatry* 2011; **68(8)**: 808.
13. **Pursey K, Stanwell P, Gearhardt A, Collins C and T Burrows** The Prevalence of Food Addiction as Assessed by the Yale Food Addiction Scale: A Systematic Review. *Nutrients* 2014; **6(10)**: 4552–4590.



14. **Schag K, Schönleber J, Teufel M, Zipfel S and K Giel** Food-related Impulsivity in Obesity and Binge Eating Disorder – A Systematic Review. *Obesity Reviews*, 2013; **14(6)**: 477–495.
15. **Penzenstadler L, Soares C, Karila L and Y Khazaal** Systematic Review of Food Addiction as Measured with the Yale Food Addiction Scale: Implications for the Food Addiction Construct. *Current Neuropharmacology* 2019; **17(6)**: 526–538.
16. **Curtis C and C Davis** A Qualitative Study of Binge Eating and Obesity from an Addiction Perspective. *Eating Disorders* 2013; **22(1)**: 19–32.

