

Food Addiction Prevalence and its Association with COVID-19 Related Stress among Clinical Rotation Medical Students in Jakarta

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Abstract

Introduction: This study investigated the relationship between food addiction and stress among clinical rotation medical students during the COVID-19 pandemic. While prior research has examined the impact of mental and physical well-being on medical students, the exploration of food addiction in this demographic has been limited.

Methods: The survey study includes 355 clinical-level medical students. Stress levels are assessed using the Coronavirus Stress Measure (CSM) questionnaire, while food addiction is evaluated with the Yale Food Addiction Scale 2.0 questionnaire. Comparative analysis was performed to see the association between food addiction and the stress level related to COVID-19.

Results: Both questionnaires indicate good validity and reliability measures. Medical students exhibited lower stress levels during the pandemic than the general population. Approximately 30.1% of students showed signs of food addiction, with most cases classified as mild. Food addiction was significantly higher among women, partially influenced by the dominant presence of female students. The study reveals a significant connection between food addiction and stress levels among medical students ($p < 0.001$). Those with moderate and severe food addiction experience notably higher stress ($p < 0.05$).

Conclusion: This study highlights the prevalence of food addiction among medical students and its association with increased stress levels during the COVID-19 pandemic. It underscores the need for further research and support mechanisms to address food addiction and stress management among medical students, ultimately promoting their overall well-being and academic success.

Keywords: food addiction - medical students - stress - COVID-19.

INTRODUCTION

In March 2020, the World Health Organization (WHO) declared COVID-19 a pandemic. This declaration prompted governments worldwide, including Indonesia, to implement various regulations to curb the spread of the virus.¹ These regulations included restricting outdoor activities, enforcing social distancing, and mandating mask-wearing in public spaces.^{2,3} One significant consequence of these measures was the transition from face-to-face interactions to online activities in various aspects of daily life. This substantial shift in routines, combined with the prevailing uncertainty, increased psychological distress and mental health issues. Individuals also grappled with fear, anxiety, stress, and heightened levels of uncertainty in response to the evolving situation.⁴⁻⁶

Elevated psychological distress often triggers maladaptive coping mechanisms in individuals. These mechanisms may manifest as increased alcohol or illicit drug use, gambling, or overeating. High stress levels have been associated with alterations in eating habits and reduced satisfaction following meals, resulting in increased food consumption.^{7,8}

The concept of food addiction has gained increasing attention, fostering ongoing debates in this area. Broadly defined, food addiction pertains to excessive and dysregulated eating behaviors, particularly involving comfort foods

or hyper-palatable foods.⁹ These foods typically boast high levels of sugar, fat, salt, and caloric content, including ice cream, chocolate, white bread, chips, burgers, and pizza.^{10,11}

Supporters of the food addiction concept argue that certain eating behaviors resemble addiction, backed by research demonstrating that foods rich in sugar, fat, and salt can activate the brain's dopamine reward system, akin to the neural pathways activated in substance addiction.¹² However, food addiction has yet to be officially recognized as a diagnostic category in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5), primarily due to the challenge of defining clear boundaries compared to well-established eating disorders like bulimia nervosa or binge eating disorder.¹³

Becoming a medical doctor demands considerable mental, physical, and emotional commitment. Over recent decades, consistent research findings have indicated that the stress associated with medical education significantly contributes to a heightened prevalence of health issues among medical students compared to their peers of the same age. These health issues encompass stress, fatigue, anxiety, depression, thoughts of suicide, and, in some cases, substance misuse.¹⁴ Given these challenges, this study formulated a hypothesis suggesting that clinical-level medical students experience a higher incidence of food addiction

than individuals of the same age, particularly when compounded by the stress stemming from the COVID-19 pandemic.

To date, no studies have explored the phenomenon of food addiction among medical students in Indonesia since the onset of the COVID-19 pandemic. Consequently, this study aimed to ascertain the prevalence of food addiction among clinical-level medical students and investigate its potential association with pandemic-induced stress.

METHODS

Study Design

This study employed an online survey using google form targeting clinical medical students in a private university in Jakarta, Indonesia. The survey consisted of two questionnaires: the Yale Food Addiction Score 2.0¹⁵, and the Coronavirus Stress Measure (CSM), which gauged individual stress levels during the COVID-19 pandemic.^{16,17} Data collection was conducted at a private medical faculty in Jakarta from January 19 to 22, 2022.

Subject and Sampling method

The study population comprised active medical students undergoing clinical clerkship, with a total student amounted to 383 students. Inclusion criteria encompassed active medical students in clinical clerkship and agreed to participate.

Data Collection

Data collection employed two measurement instruments: the Yale Food Addiction Scale 2.0, used to determine food addiction as the dependent variable, and the CSM questionnaire to assess individual stress levels during the COVID-19 pandemic. The institutional ethics committee thoroughly reviewed and approved the study procedures.

The Yale Food Addiction Scale 2.0 comprised 35 questions addressing various eating habits, such as losing control over excessive consumption, persistent cravings, and withdrawal symptoms experienced within the past 12 months. Participants responded to each item on an 8-point scale, ranging from "never," "less than once a month," "once a month," "two to three times a month," "once a week," "two to three times a week," "four to six times a week," to "every day." Each question had a different threshold. A score of 0 was assigned if the threshold was not met, while a score of 1 indicated it was met. Subsequently, the questions were categorized based on eleven symptom criteria: tolerance, withdrawal, clinical significance, use despite adverse consequences, and others. If symptoms met the criteria for each criterion > 1, it was considered fulfilled, resulting in a score ranging from 0 to 11. The following diagnostic criteria were used:

1. No food addiction: 1 or fewer symptoms and does not meet clinical significance criteria.
2. Mild food addiction: 2-3 symptoms with clinical significance.
3. Moderate food addiction: 4-6 symptoms with clinical significance.
4. Severe food addiction: 6 or more symptoms with clinical significance.

The Coronavirus Stress Measure (CSM) consisted of questions concerning the frequency of specific stress-related experiences due to the COVID-19 pandemic, adapted from the Perceived Stress Scale. A consistent 5-factor pattern was detected, which aligns with measurements evaluating stress and anxiety symptoms related to COVID-19. These factors encompass concerns about (1) the fear of danger and contamination, (2) apprehensions regarding economic repercussions, (3) xenophobia, (4) compulsive behaviours involving checking and seeking reassurance, and (5) experiencing traumatic stress symptoms related to COVID-19. These measurements exhibited strong performance across various assessments of reliability and validity. The factors displayed correlations with each other, indicating the existence of a COVID-19 Stress Syndrome. These measurements hold promise as valuable tools for gaining deeper insights into the distress

linked to COVID-19 and for identifying individuals who may require mental health support. Responses were recorded on a 5-point Likert scale, ranging from "never" with a score of 0 to "very often" with a score of 4. The total scores on this questionnaire ranged from 0 to 20.¹⁸

Statistical Analysis

Data obtained from the CSM questionnaire were numeric, while data from the YFAS questionnaire were categorical. Numeric data were presented as means and standard deviations (SD). In contrast, categorical data were grouped into categories such as "no food addiction," "mild food addiction," "moderate food addiction," and "severe food addiction."

In the study, we assessed the questionnaire's validity and reliability using two statistical methods: Pearson product-moment correlation and Cronbach's alpha. The Pearson product-moment correlation was applied to explore the relationships among different items or scales in the questionnaire. This analysis provided valuable insights into the questionnaire's construct validity, expecting to achieve correlation coefficients greater than 0.5 to indicate strong associations. Additionally, Cronbach's alpha coefficient was employed to evaluate the questionnaire's internal consistency and reliability. One-way ANOVA and Bonferroni post hoc analysis were conducted subsequently to determine

dependencies in a normally distributed data, while Kruskal Wallis employed if the data was skewed.

RESULTS

Validity and Reliability

A sample of 120 students from another major/faculty completed both questionnaires to evaluate construct validity. The results of the Pearson correlation analysis show a substantial increase in both YFAS 2.0 ($r > 0.675$, $p < 0.01$) and CSM ($r > 0.503$, $p < 0.01$). A single factor explains 59.94% of the scale variation in YFAS 2.0 and 56.11% in CSM, indicating a one-

dimensional underlying structure. The internal consistency among items is strong, as demonstrated by the Cronbach's alpha coefficient (YFAS 2.0=0.94; CSM=0.90).

Study Results

The research respondents who had agreed to the informed consent and completed the questionnaire were active clinical-level medical students, totaling 355 respondents (355/383 [93%]), consisting of 113 males (31.83%) and 242 females (68.17%). The respondents had an average age of 22.99 ± 1.43 years, with the youngest being 20 and the oldest 42 years old.

Table 1. Respondent's Characteristics

Variables	Frequency	%	$\bar{x} \pm SD$	Min-Max
Age [$\bar{x} \pm SD$; Min-max] in years	355	100	22.99 ± 1.43	20-42
Sex				
Male	113	31.83		
Female	242	68.17		
Stress related to COVID-19	355	100	8.73 ± 3.85	0-20
Food Addiction				
No addiction	248	69.90		
Mild	70	19.70		
Moderate	14	3.90		
Severe	23	6.50		

Data on stress during the COVID-19 pandemic obtained from the Coronavirus Stress Measure questionnaire had an average score of 8.73 ± 3.85 , with a median of 9, a minimum score of 0, and a maximum score of 20. Data on food

addiction obtained from the Yale Food Addiction Scale 2.0 questionnaire consisted of 248 respondents (69.9%) who did not meet the criteria for food addiction, 70 respondents (19.7%) met the criteria for mild food

addiction, 14 respondents (3.9%) met the criteria for moderate food addiction, and 23

respondents (6.5%) met the criteria for severe food addiction.

Table 2. Comparative Test Between Food Addiction Levels

Variable	Freq.	No Addiction	Mild	Moderate	Severe	P-value
		$\bar{x} \pm SD$	$\bar{x} \pm SD$	$\bar{x} \pm SD$	$\bar{x} \pm SD$	
CSM Score	355	8.05 ± 3.58	8.98 ± 3.71	12.42 ± 3.67	13.00 ± 3.17	0.000

One-way ANOVA analysis indicated a significant difference in CSM scores, with a value of $P < 0.001$ (Table 2.). Bonferroni post-hoc analysis revealed a significant difference in CSM scores between the group without food addiction and the moderate and severe food addiction groups ($p < 0.05$). The results showed that the mean CSM score was significantly higher in moderate and severe food addiction groups than those without. Similar results were

also found in the group with mild food addiction, with a significantly higher mean CSM score in the moderate and severe addiction groups. At the same time, there was no significant difference in CSM scores between the group without addiction and the mild addiction group ($p = 0.222$), nor between moderate and severe groups ($p = 0.966$) (Figure 1.).

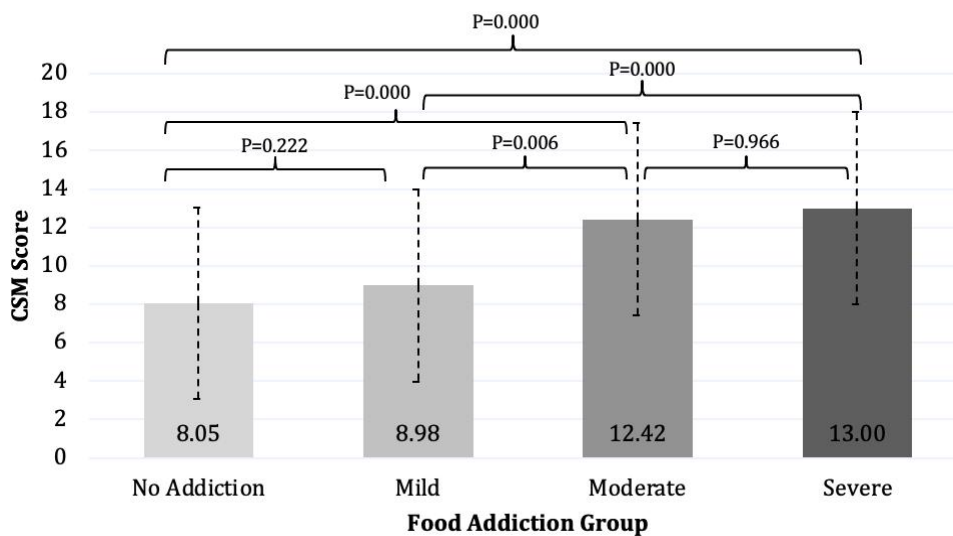


Figure 1. Mean CSM Score Comparison Between Food Addiction Levels

DISCUSSION

The study aimed to investigate the relationship between food addiction and stress related to COVID-19 pandemic among clinical rotation or clerkship medical students. The results provide valuable insights into the prevalence of food addiction and its association with stress levels in this population. Numerous studies have delved into the influence of mental and physical well-being on medical students.^{7,19,20} However, exploring food addiction in this demographic has been relatively limited. While several studies have examined food addiction in the adult population during the pandemic^{9,10}, a different approach was taken in a Bangladesh and a Brazilian study, focusing solely on university students due to their distinct stressors.^{11,21} Although prior research has touched upon shifts in eating behavior and eating disorders in medical students²², there is a notable gap in studies explicitly addressing the issue of food addiction within this group.

The COVID-19 pandemic presented unique challenges and stressors, particularly for medical students involved in clinical training.²³ These stressors may have included concerns about their safety and exposure to the virus²⁴, changes in clinical rotations and learning formats^{23,25}, increased workload and responsibilities, and witnessing the impact of the pandemic on patients and healthcare systems.^{24,26} Quantifying the extent of stress

experienced by clerkship students compared to the general population is complex. Nevertheless, it is widely acknowledged that medical faculties tend to subject their students to higher stress levels when compared to other academic disciplines. Within this context, it becomes evident that these distinct stressors could influence varying prevalence rates of food addiction.

The study included 355 active clinical-level medical students, with a majority of 68.17% being females. This gender distribution is in line with the increasing representation of women in medical education and the healthcare workforce in recent years.²⁷ The stress levels during the COVID-19 pandemic was assessed using the CSM questionnaire. The average stress score was approximately 8.73, ranging from 0 to 20. This mean score is lower compared to studies conducted on young adult populations in Malaysia (10.71) and adults in Turkey (11.66).^{16,17} The lower CSM scores observed in medical students compared to the general population may be attributed to several factors. These include the development of effective coping mechanisms and resilience through their medical training, which equips them with stress management techniques and a deeper understanding of health-related matters.²⁸ Additionally, medical students often have better access to accurate and reliable information about the pandemic, reducing uncertainty-related anxiety.²⁹ Furthermore, the

stressors experienced by medical students, such as academic and clinical challenges, may differ from those of the general population.³⁰ However, response bias and the timing of assessments should also be considered in understanding these differences.

The prevalence of food addiction in clinical rotation medical students was assessed using the Yale Food Addiction Scale 2.0 questionnaire, and the findings were quite revealing. It was found that approximately 30.1% of these medical students exhibited signs of food addiction. However, it's important to note that most of these cases, about 65.4%, were classified as mild food addiction. This prevalence rate is notably higher than what was observed in a study conducted in Bangladesh, where the rate was only 7.5%²¹, and it also surpasses the findings of a Brazilian study, which reported a food addiction prevalence of 19.1%. Interestingly, when looking at the distribution of severe addiction levels, it closely resembled the figures from the Brazilian study. Food addiction was significantly higher among women. Thus, it's crucial to consider that the study's characteristics, such as the dominant presence of female medical students, may influence the reasons behind this prevalence. Another critical point is that the study did not directly measure Body Mass Index (BMI), which could contribute to this rate. Past research has indicated that food addiction tends to be higher

among overweight and obese individuals, with rates soaring to 56.8% in this particular demographic.

The study's key finding revolved around the significant differences observed in CSM (Coronavirus Stress Measure) scores based on food addiction status among medical students. The one-way ANOVA statistical analysis revealed a robust connection between food addiction and stress levels, illustrated by a p-value of less than 0.001. Digging deeper into this relationship, the post-hoc analysis provided additional clarity, demonstrating that students grappling with moderate and severe food addiction experienced notably higher stress levels than their counterparts without food addiction. Even within the group of students with food addiction, there remained a significant difference in stress levels between those with moderate and severe addiction and those with mild addiction.

Moreover, the findings indicated no substantial difference in stress levels between the non-addicted and mildly addicted groups. Notably, mild addiction accounts for more than half of the food addiction cases. This may explain an intriguing aspect illuminated by the study results on why stress levels related to COVID-19 tended to be lower among medical students on clinical rotations in contrast to the general population, which demonstrated higher rates of food addiction. These outcomes underscore

the critical importance of addressing high-stress levels among medical students as a potential risk factor for the development of food addiction, particularly during challenging periods such as the COVID-19 pandemic. This suggests that implementing interventions aimed at effective stress management could benefit this population.

However, there are limitations to consider. The study's cross-sectional design prevents establishing causality between food addiction and stress levels. Longitudinal studies could provide a more comprehensive understanding of this relationship over time. Additionally, the study relied on self-reported data, which may be subject to recall and social desirability biases.

Discussion should emphasize new or important aspects of experimental results and discuss their implications. Results of own studies are to be compared with findings described in other studies.

CONCLUSION

In conclusion, this study highlights the prevalence of food addiction among medical students and its association with increased stress levels during the COVID-19 pandemic. These findings emphasize the need for further research and the development of support mechanisms to address food addiction and stress management among medical students,

ultimately promoting their overall well-being and academic success.

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CONFLICT OF INTEREST

The author declares that there was no conflict of interest.

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