Original article

Prevalence and related factors of food addiction among nurses of a university hospital in Bangkok

Sita Ngarmgan[a], Rasmon Kalayasiri[b], Wiroj Jiamjarasrangsi[a, *]

[a]*Department of Preventive and Social Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand*
[b]*Department of Psychiatry, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand*

Background: Food addiction (FA) is referred to when the need to eat becomes compulsive or uncontrollable. It may result in higher risk of various medical conditions and thus being appropriate target for designing effective therapeutic approaches for such conditions. Information about FA in Thai population is however limited nowadays.
Objective: This study aimed to investigate the prevalence and related factors of FA among nurses of a university hospital in Bangkok.
Methods: A cross-sectional study was conducted among 773 nurses of a university hospital in Bangkok, Thailand between April 2018 and April 2019. FA was assessed by the Thai version of the Modified Yale Food Addiction Scale Version 2.0 (mYFAS 2.0). Associations of personal demographics and various potential risk factors with FA were examined by logistic regression analyses and the odds ratio (OR) as measures of association.
Results: The prevalence (95% confidence interval or CI) of FA was 9.7% (7.6 – 11.8). The proportions of mild, moderate and severe FA of 48.0%, 26.7% and 25.3%, respectively. Factors which were significantly and independently associated with FA included the presence of medical condition (OR = 2.55; 95%CI = 1.16 – 5.62), doing part-time job (OR = 3.86; 95%CI = 1.68 – 8.88), low decision latitude on working (OR =2.49; 95%CI = 1.37 – 4.52), and higher number of buffet per month (OR = 2.27, 2.85, and 2.51 respectively for having 1 - 2, 3 - 4, and more than 4 buffets per month). In addition, having couple and colleague as the influencer of eating habit (OR = 4.87 and 2.24 respectively) and the presence of chronic pain and depress as the stress symptoms (OR = 2.96; 95%CI = 1.10 – 7.92) also associated with FA.
Conclusions: FA prevalence among nurses in this university hospital was quite high. A number of factors related to personal health, work, and eating were significantly associated with FA. Additional longitudinal studies are imperative before being firmly conclude about the causality of such associations.

Keywords: Food addiction, modified Yale Food Addiction Scale Version 2.0., YFAS, eating disorders.

In recent years, people prefer to eat more high-caloric foods that may have an addictive potential and can cause overweight or obesity. Food addiction (FA) referred to specific food related behaviors characterized by excessive or uncontrollable consumption, especially with high calorie food and "hyperpalatable" foods and seems to have psychopathological overlaps with other eating disorders.[1] Although this term seems to be relatively new in Thailand, research on FA have been published for several decades[2] but little attention has been paid to the related factors of FA.

FA diagnosis is more common among females.[3, 4] FA may cause weight regain after weight loss in obese individuals[5] and 8.6% newly diagnosed type 2 diabetes mellitus met the FA diagnostic criteria.[6] FA was associated with BMI, stress and depression[3, 7, 8] and therapeutic approaches focused on the neurobehavioural correlates of self-regulation.[1]

A tool specifically designed to assess FA, the Yale Food Addiction Scale (YFAS) [9] was developed in 2009 by using Diagnostic and Statistical Manual of Mental Disorders 4th edition (DSM-IV) for substance dependence and had two scoring options including a FA symptom score and diagnostic score. YFAS has multiple adaptations such as briefer scale (mYFAS). Recently, the Modified Yale Food Addiction Scale

Version 2.0 (mYFAS 2.0)[10] was developed by modelling of the DSM-5.

This study aimed to understand the prevalence and related factors of FA among nurses of a university hospital in Bangkok by using mYFAS 2.0.

Materials and methods
Study population
This study was a cross-sectional study. Questionnaire was used as the research instrument with nurses who were currently employed of a University Hospital in Bangkok, Thailand from April 2018 to April 2019. The study has been approved by the Ethics Committee of the Faculty of Medicine, Chulalongkorn University (no.065/62).

Inclusion criteria were: nurses who were employed in 2018 and had been working at the hospital for at least one year. Those who were pregnant or on six months of breast feeding post-partum were however excluded. A sample size of 941 was required to ensure an acceptable margin of error, using stratified sampling method in each nurse department. However, only 773 of the eligible nurses were enrolled in the study, with the response rate of 82.1 % (773/ 941).

Data collection
This self-report questionnaire was divided into 4 sections. The first section collected data was about personal demographics; the second section was about factors that may be associated with FA according to literature reviewed; the third section was the Thai version of the mYFAS 2.0 (Thai mYFAS 2.0), and the final section was the Thai Job content questionnaire[11] to evaluated job stress that is and categorized into two groups by using median. Thai mYFAS 2.0 consists of 11 questions; each asking about the presence of specific symptom of FA; and two additional questions about the clinical significance of such symptoms (if existed), with the response to either of these two questions was sufficient for indicating the clinical significance. FA status was categorized as follows: No FA—1 or fewer symptoms existed, or 2 or more symptoms but no clinical significance; Mild FA— 2 or 3 symptoms and clinical significance; Moderate FA— 4 or 5 symptoms and clinical significance; and Severe FA—6 or more symptoms and clinical significance. The Thai mYFAS 2.0 had been assessed for content validity by 3 experts, namely: Rasmon Kalayasiri, Somruk Suntibenchakul, and Napakkawat Buathong. It had good internal consistency (Cronbach's Alpha was 0.879) and temporal stability Pearson Correlation Coefficient of 0.971 for the Test- retest method).

Statistical analysis
Data were analyzed by frequency and percentage for categorical variables and mean and standard deviation for continuous variables. Pearson's Chi-square test (or Fisher's exact test was applied whenever appropriate) and the independent-samples t - test were used to compare group difference for such variables respectively.

Association of personal demographics and potential risk factors with FA was assessed by using the odds ratio (OR) and the corresponding 95% confidence interval (CI) as the measure of association. Univariate analysis was initially conducted, followed by multiple logistic regression analysis to determine the independent association of each factor with food addiction. Backward stepwise and force-entered procedures were used in the statistical modelling. In the latter procedure, all variables with literature reviewed evidence were force-entered into the final model. All statistical analyses were two-tailed with $\alpha = 0.05$ as the significance level using SPSS (Statistical Package for Social Science) version 22. Deta were expressed as mean ± standard deviation (SD). $P < 0.05$ was considered statistically significant.

Results
Table 1. shows that a larger proportion of the study subjects were female with mean age 36.0 (± 6.0) years old, single, and had achieved bachelor's degree. The majority of the study subjects had no medical conditions and had monthly incomes around 30,001 - 45,000 Thai baht a month. The mean body mass index (BMI) of the subjects was 21.8 (± 2.6) kg/m².

Among all 773 study subjects, 75 met criteria for FA, with the overall prevalence (95%CI) of 9.7% (7.6 - 11.8). The proportions of those with mild symptoms was 48.0%, moderate symptoms 26.7% and severe symptoms 25.3% (Table 2).

Univariate analyses showed that factors significantly associated with FA were BMI, presence of medical condition, doing part-time job, total working duration of 45 or more hours per week, low decision latitude on working, higher frequency of having buffet per month, and the presence of various symptoms of stress (Table 3).

Table 1. Summary of the participants' characteristics (n = 773).

Characteristic	n (%)
Gender	
Male	24 (3.1)
Female	749 (96.9)
Age (years)	
21 - 30	158 (20.4)
31 - 40	481 (62.2)
>40	134 (17.3)
Body mass index (kg/m²)	
<18.5	61 (7.9)
18.5 - 22.9	479 (61.9)
23.0 - 24.9	135 (17.5)
25.0 - 29.9	90 (11.6)
>30	1 (0.1)
Marital status	
Single	569 (73.6)
Married	199 (25.7)
Divorced	5 (0.7)
Education Level	
Bachelor's degree	707 (91.5)
Master's degree or above	66 (8.5)
Monthly income (Thai Baht; THB) (n = 765)	
15,000 - 30,000	297 (38.8)
30,001 - 45,000	408 (53.3)
>45,000	60 (7.8)
Medical condition	
No medical condition	705 (91.2)
Has at least one medical condition	68 (8.8)

Table 2. The prevalence and severity of food addiction (n = 773).

	n (%)	Prevalence (95% CI)
No food addiction	698 (90.3)	-
Food addiction	75 (9.7)	9.7 (7.6 - 11.8)
Mild	36	4.7 (3.2 - 6.1)
Moderate	20	2.6 (1.5 - 3.7)
Severe	19	2.5 (1.4 - 3.5)
Total	773 (100.0)	

Table 3. Factors associated of FA in the univariate analyses.

Factors	No food addict	Food addict	Crude OR (95 % CI)	P - value[a]
Body mass index (kg/m²)				
<18.5	56 (91.8)	5 (8.2)	1.00	0.013
18.5 – 22.9	444 (92.7)	35 (7.3)	0.9 (0.3 - 2.4)	
23.0 - 24.9	113 (83.7)	22 (16.3)	2.2 (0.8 - 6.1)	
25.0+	80 (87.9)	11 (12.1)	1.5 (0.5 - 4.7)	
Presence of medical condition				
No	645 (91.5)	60 (8.5)	1.00	<0.001
Yes	53 (77.9)	15 (22.1)	3.0 (1.6 - 5.7)	
Doing part-time job				
No	626 (92.5)	51 (7.5)	1.00	<0.001
Yes	71 (75.5)	23 (24.5)	4.0 (2.3 - 6.9)	
Total working hours per week				
<45	421 (92.9)	32 (7.1)	1.00	0.003
45+	277 (86.6)	43 (13.4)	2.0 (1.3 - 3.3)	
Decision latitude on working				
High	374 (93.0)	28 (7.0)	1.00	0.007
Low	324 (87.3)	47 (12.7)	1.9 (1.2 - 3.2)	
Buffet frequency per month				
<1	371 (94.4)	22 (5.6)	1.00	0.001
1 - 2	256 (86.8)	39 (13.2)	2.6 (1.5 - 4.4)	
3 - 4	63 (82.9)	13 (17.1)	3.5 (1.7 - 7.3)	
>4	7 (87.5)	1 (12.5)	2.4 (0.3 - 20.5)	
Stress symptom				
No	144 (91.7)	13 (8.3)	1.00	0.016
Irritable or restless	375 (92.6)	30 (7.4)	0.9 (0.5 - 1.8)	
Abnormal eating and insomnia	123 (85.4)	21 (14.6)	1.9 (0.9 - 3.9)	
Chronic pain and depress	55 (83.3)	11 (16.7)	2.2 (0.9 - 5.2)	

a = Pearson's Chi square, OR = odds ratio

From literature review and univariate analyses with multicollinearity adjusted, the variables: gender, BMI, monthly income, medical condition, doing part-time job, total working hours per week, decision latitude on working, buffet frequency per month and stress symptoms were included in multiple logistic regression model. However, multiple logistic regression results showed that the presence of medical condition, doing part-time job, low decision latitude on working, and higher frequency of having buffet per month, having couple or colleague as the eating habit influencer and the presence of chronic pain and depress as the stress symptoms were significantly associated with FA in the enter model (Table 4).

Discussion

This study revealed that the overall prevalence of FA among the nurses in a university hospital in Bangkok was 9.7%, with the proportions of mild, moderate, and severe FA of 48.0%, 26.7%, and 25.3% respectively. Factors significantly associated with FA included the presence of medical condition, doing part-time job, low decision latitude on working, and higher number of buffet per month. In addition, having couple and colleague as the influencer of eating habit and the presence of chronic pain and depress as the stress symptoms may also be associated with FA.

Our reported FA prevalence of 9.7% (95% CI 7.6 – 11.8), although quite high, was well corresponded with previous studies showing the FA prevalence ranged between 1.9 and 13.0% in the general population and 5.4% specifically among female nurses.[3, 12 - 14] Our finding that the presence of medical condition, doing part-time job, low decision latitude on working, and higher number of buffet per month were significantly associated with FA was also consistent

Table 4. Multivariate logistic regression analyses for FA.

Factors	Adjusted OR (95% CI) Enter‡	B	SE (b)
Presence of medical condition			
No	1.00		
Yes	2.55 (1.16 - 5.62)*	0.935	0.404
Doing part-time job			
No	1.00		
Yes	3.86 (1.68 - 8.88)*	1.351	0.425
Decision latitude on working			
High	1.00		
Low	2.49 (1.37 - 4.52)*	0.911	.0.305
Buffet frequency per month			
< 1	1.00		
1 - 2	2.27 (1.22 - 4.22)*	0.820	0.317
3 - 4	2.85 (1.17 - 6.91)*	1.046	0.452
> 4	2.51 (0.19 - 33.88)	0.922	1.327
Eating habits influencer			
Family -	1.00		
Friend	2.88 (1.10 - 7.60)*	1.059	0.494
Couple	4.87 (1.63 - 14.58)*	1.583	0.559
Colleague	2.24 (1.14 - 4.38)*	0.805	0.342
Stress symptom			
No -	1.00		
Irritable or restless	0.89 (0.41 - 1.91)	- 0.120	0.391
Abnormal eating and insomnia	2.09 (0.90 - 4.88)	0.739	0.431
Chronic pain and depress	2.96 (1.10 - 7.92)*	1.084	0.502

OR = odds ratio

* Statistical significance at $P < .05$

‡ Variables in the model included presence of medical condition, doing part-time job, decision
latitude on working, buffet frequency per month, eating habits influencer, stress symptom.

with a number of previous studies. These included the finding that FA associated with medical conditions such as diabetes and depression, as reported by Yang F, et al. [6] and Raymond KL, et al.[15] Low working decision latitude can cause stress in nurses [16] and many studies have found that stress can had effect on eating behaviors.[7, 17] Doing a part - time job can cause sleep deprivation and increase stress that may be associated with food intake.[7]

On the contrary, while previous studies have demonstrated the association of age[4, 8], gender [3, 4], educational level[3], and body weight [8, 11] with FA. However, such association are not pronounced in our study. This might have been due to the subjects in our study were quite homogeneous in term of these variables (i.e., being mostly females with bachelor's degree of education, and limited number of nurses in the obese group); thus, they limited our statistical ability to detect their association with FA. Further studies

with higher variability in these factors and sufficient number of study subjects are therefore needed to address these issues.

The strengths of our study included its relative large sample size and the questionnaire instrument was well validated before being used. However, in addition to a limitation mentioned above, its cross-sectional nature also hindered the possibility for causal inference for the various factors and FA relationship.

Conclusion

Food addiction was positively associated with the presence of medical condition, doing part-time job, low working decision latitude, having more frequent buffet, having couple and colleague as eating habits influencer, and presence of some stress symptoms. Additional longitudinal studies are imperative before being firmly conclude about the causality of such associations.

Conflict of interest

The authors, hereby, declare no conflict of interest.

References

1. Imperatori C, Fabbricatore M, Vumbaca V, Innamorati M, Contardi A, Farina B. Food Addiction: definition, measurement and prevalence in healthy subjects and in patients with eating disorders. Riv Psichiatr 2016; 51:60-5.
2. Meule A. Back by Popular Demand: A Narrative Review on the History of Food Addiction Research. Yale J Biol Med 2015;88:295-302.
3. Nunes-Neto PR, Kohler CA, Schuch FB, Solmi M, Quevedo J, Maes M, et al. Food addiction: Prevalence, psychopathological correlates and associations with quality of life in a large sample. J Psychiatr Res 2018; 96:145-52.
4. Ayaz A, Nergiz-Unal R, Dedebayraktar D, Akyol A, Pekcan AG, Besler HT, et al. How does food addiction influence dietary intake profile? PLoS One 2018;13: e0195541.
5. Swanson DW, Dinello FA. Follow-up of patients starved for obesity. Psychosom Med 1970;32:209-14.
6. Yang F, Liu A, Li Y, Lai Y, Wang G, Sun C, et al. Food Addiction in Patients with Newly Diagnosed Type 2 Diabetes in Northeast China. Front Endocrinol (Lausanne) 2017;8:218.
7. Yau YH, Potenza MN. Stress and eating behaviors. Minerva Endocrinol 2013;38:255-67.
8. Flint AJ, Gearhardt AN, Corbin WR, Brownell KD, Field AE, Rimm EB. Food-addiction scale measurement in 2 cohorts of middle-aged and older women. Am J Clin Nutr 2014;99:578-86.
9. Gearhardt AN, Corbin WR, Brownell KD. Preliminary validation of the Yale Food Addiction Scale. Appetite 2009;52:430-6.
10. Schulte EM, Gearhardt AN. Development of the Modified Yale Food Addiction Scale Version 2.0. Eur Eat Disord Rev 2017;25:302-8.
11. Phakthongsuk P. Construct validity of the Thai version of the job content questionnaire in a large population of heterogeneous occupations. J Med Assoc Thai 2009;92:564-72.
12. Pedram P, Wadden D, Amini P, Gulliver W, Randell E, Cahill F, et al. Food addiction: its prevalence and significant association with obesity in the general population. PLoS One 2013;8:e74832.
13. Brunault P, Ballon N, Gaillard P, Reveillere C, Courtois R. Validation of the French version of the yale food addiction scale: an examination of its factor structure, reliability, and construct validity in a nonclinical sample. Can J Psychiatry 2014;59:276-84.
14. Hauck C, Weiss A, Schulte EM, Meule A, Ellrott T. Prevalence of 'Food Addiction' as Measured with the Yale Food Addiction Scale 2.0 in a Representative German Sample and Its Association with Sex, Age and Weight Categories. Obes Facts 2017;10:12-24.
15. Raymond KL, Lovell GP. Food addiction associations with psychological distress among people with type 2 diabetes. J Diabetes Complications 2016;30:651-6.
16. Shen HC, Cheng Y, Tsai PJ, Lee SH, Guo YL. Occupational stress in nurses in psychiatric institutions in Taiwan. J Occup Health 2005;47:218-25.
17. Sinha R, Jastreboff AM. Stress as a common risk factor for obesity and addiction. Biol Psychiatry 2013; 73:827-35.