

Prevalence of Atypical Disorders and Associated Factors in Undergraduate Students of Prince of Songkla University, Songkhla, Thailand

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Abstract:

Objective: To quantify the prevalence of eating disorders and factors associated with eating disorders among undergraduate students in Prince of Songkla University, Hat Yai Campus.

Material and Methods: This study was a cross sectional descriptive study using random sampling by proportionate accidental sampling. We used the Thai Eating Attitudes Test-26 (EAT-26) for collecting information about eating attitudes. Participants who had scores equal or higher than 12 (≥ 12) were assumed to have atypical eating attitudes and behaviors. We used the R and R studio program to analyze information. Multivariate logistic regression was used for correlation analysis.

Results: In this study, we had completed questionnaires from 500 students (response rate 65.6%). The overall prevalence of atypical eating attitudes and behaviors in undergraduate students in Prince of Songkla University, Hat Yai Campus was 37.2%. We found that overweight body mass index (BMI) (BMI 23.00–24.99 kg/m²) and obesity BMI (≥ 25.00 kg/m²) were significantly more prevalent in students with atypical eating attitudes and behaviors than normal BMI (18.50–22.99 kg/m²), with odds ratios of 3.3 [95% confidence interval (CI)=1.8–6.2] and 3.7 (95% CI=1.9–6.9), respectively. However, multivariate logistic regression revealed no associations between atypical eating attitudes and behaviors, sex, target weight, biological disease, psychological disease, current medication(s) or faculty. Atypical eating attitudes and behaviors were significantly associated only with body mass index BMI. The overweight and obese BMI groups had significantly increased risks of 3.3 and 3.7 times of atypical eating attitudes and behaviors compared to the normal group, with 95% CIs of 1.8–6.2 and 1.9–6.9, respectively.

Conclusion: From this study, overweight BMI and obesity BMI were significantly more prevalent in students with atypical eating attitudes and behaviors than normal BMI. BMI was the only factor significantly associated with atypical eating attitudes and behaviors.

Keywords: BMI, eating attitudes, eating behaviors, undergraduate students

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Introduction

Eating disorders (EDs) refers to a group of abnormal eating behaviors involving either insufficient or excessive food intake. Anorexia nervosa, bulimia nervosa and binge eating are considered to be the most common eating disorders.¹ Patients with these disorders predominately show a preoccupation with body weight, shape and diet. Eating disorders also frequently occur with other psychiatric disorders such as major depressive disorder, bipolar disorder, substance abuse and anxiety disorder.²

People with anorexia have an extreme fear of gaining weight, which propels them to maintain a weight far less than normal. Bulimia is characterized by a cycle of binge eating, followed by attempts to remove unwanted calories. People with binge eating disorders often eat an uncontrollable, large amount of food during the binges.²

The cause of eating disorders is currently unknown. However, many studies have suggested that eating disorders involve a combination of biological, psychological and environmental abnormalities. A common phrase in such conditions is that “Genetics loads the gun, environment pulls the trigger”.³

Many studies have found many complications associated with eating disorders, including a high mortality rate. A review of eating disorder complications in the American Journal of Medicine in 2016 discussed the medical complications associated with the weight loss and malnutrition of anorexia nervosa, as well as from the purging behaviors that characterize bulimia nervosa.⁴

Various studies have reported on the prevalence of eating disorders. Asia and The Pacific in 2016 reported eating disorder prevalences in Southeast Asia of 10.3% in Singapore, 18.5% in Malaysia, 48.8% in Vietnam and a very low prevalence in Thailand.⁵ A recent report of prevalence of eating disorders in Thai college students found the prevalences of anorexia nervosa and bulimia nervosa were 0.5% and 1.0 to 3.0%, respectively.⁶ Another study done in medical students in Prince of Songkla

University (PSU), Hat Yai Campus found 15.9% showed signs of atypical eating attitudes and behaviors.⁷

The reported prevalences of the eating disorders in college students were controversial. In addition, previous studies have reported only the prevalences of eating disorders, however, none of them examined associated factors. Therefore, our study quantified the prevalence of eating disorders in PSU student in Hat Yai Campus from July to August, 2017 and examined the associated factors.

Material and Methods

This study was a descriptive, cross-sectional study. The participants were undergraduate students from the 16 faculties in PSU, Hat Yai Campus, Thailand. The full population was 15,548 students (n=15,548). We set an allowable error of 5.0%, after using these numbers with the Taro Yamane formula, the required sample size was 390 students. The expected response rate was 50.0% so the proposed numbers of samples was doubled to 780 students. The participants were selected based on the proportional to size basis, stratifying by sex and faculty based on the student statistics in year 2016. The sampling technic is convenient sampling until the numbers of sample reach the calculated sample size for each faculty and by sex. The participants were provided with a participant information form, in order to review and consider participation. An informed consent was signed later if the participants agreed to participate in the research. After finishing the self-administered questionnaire, the participants returned their questionnaire in an opaque box for confidentiality purposes. The body mass index (BMI) of participants was classified using the Asian BMI cut-off points.

Questionnaire

In 1982, the Eating Attitudes Test *** (EAT-26 *Thai* version) was adapted from the Eating Attitudes Test-40 (EAT-40), used for examining eating disorders in

a general population.⁸ The EAT-26 included questions on dieting, bulimia, food preoccupation and oral control.⁹ In 2013, Kaewpornawan et al.¹⁰ translated the EAT-26 into Thai version. The Thai version was tested in pregnant women, known to have various eating behaviors related to the pregnancy. The mean score of the EAT-26 in pregnant women with eating disorders was 30.4 [standard deviation (S.D.)=15.7] and 6.5 (S.D.=5.9) in pregnant women with non-eating disorders.¹⁰ From the analysis of Kaewpornawan, the appropriate cut-off score of the EAT-26 should be at 12 with 71.4% sensitivity, 94.3% specificity, 11.83 positive likelihood ratio and 0.31 negative likelihood ratio. Therefore, we decided to use the EAT-26 as the questionnaire to quantify the prevalence of eating disorders in the PSU college students. We did a pilot study for reliability testing of the questionnaire in undergraduate students in a nearby university in southern Thailand and the Cronbach's alpha coefficient was 0.701.

The EAT-26 Thai version is divided into 3 parts as follows:

Part 1: General demographics (sex, birth, height, weight, targeted body weight, underlying diseases, current medications).

Part 2: 26 questions about health and eating behavior characteristics.

Part 3: 5 questions about eating behaviors during the previous 6 months.

The self-administered questionnaire takes around 15-30 minutes to complete.

Data management

Microsoft Excel version 2013 was used for data recording. The data were statistically analyzed using the R and R studio program. Frequency, percentage, average and standard deviation were used if the data had normal distribution. Median and interquartile range were used if the data did not have normal distribution.

The central values of targeted body weight and current body weight were analyzed using Paired T-test to show arithmetic mean differences and standard deviations if the data had normal distribution, while the Wilcoxon's signed rank test was used to show median differences and interquartile ranges for data which did not have normal distribution.

Atypical eating attitudes and behaviors and associated factors such as sex, faculty, body mass index (BMI), targeted body weight, biological disease, psychological diseases and current medications were analyzed by multivariate logistic regression, with odds ratios for measuring associations and Wald p-value for significance.

Results

This study was conducted using the Thai version of the EAT-26 questionnaire in a total of 780 PSU, Hat Yai Campus students. Five hundred students completely answered all questions, giving a response rate of 65.6%.

Part 1: Demographic data

Of the 500 individuals who completed the questionnaire, 324 were female (64.8%) and 176 were male (35.2%). The most common age group was 18-22 years (90.6%), with a median age of 20 years, interquartile range (IQR 2). Most of the participants were under 57 kg (53.0%). The median weight was 56 kg (IQR 17). The most common height group was 154-167 cm (56.4%). The median height was 163 cm (IQR 12). The most common BMI group was normal weight (BMI 18.50-22.99 kg/m², 51.2%). The median BMI was 20.57 kg/m² (IQR 5.6). However, most of the students (64.0%) had a target body weight lower than 57 kg. The median target weight was 52 kg (IQR 13). Most participants did not have an underlying biological or psychological disease or use a current medication (84.0, 99.2, and 95.4%, respectively) (Table 1).

The highest number from any one faculty was from the Faculty of Management Science (15.8%), followed by the Faculty of Science (14.2%), while the smallest number of participants was from the Faculty of Veterinary Science (0.6%) (Table 2).

Table 1 Demographic characteristics of the respondents (n=500)

Characteristic	Number (%)
Sex	
Male	176 (35.2)
Female	324 (64.8)
Age (years)	
<18	3 (0.6)
18–22	453 (90.6)
>22	44 (8.8)
Median	20
IQR	2
BMI (kg/m ²)	
<18.50 (underweight)	108 (21.6)
18.50–22.99 (normal)	256 (51.2)
23.00–24.99 (overweight)	59 (11.8)
≥25.00 (obese)	77 (15.4)
Median	20.57
IQR	5.6
Weight (kg)	
<57	265 (53.0)
57–76	180 (36.0)
>76	55 (11.0)
Median	56
IQR	17
Height (cm)	
<154	41 (8.2)
154–167	282 (56.4)
168–181	161 (32.2)
>181	16 (3.2)
Median	163
IQR	12

Table 1 (continued)

Characteristic	Number (%)
Underlying diseases	
Biological*	
Yes	80 (16.0)
No	420 (84.0)
Psychological*	
Yes	4 (0.8)
No	496 (99.2)
Current medication(s)	
Yes	23 (4.6)
No	477 (95.4)

*For biological diseases and psychological diseases, the questions included any biological or psychological diseases.

BMI=body mass index, IQR=interquartile range

Table 2 Number of participants from each Prince of Songkla University faculty (n=500)

Faculty	Number (%)
Thai Traditional Medicine	17 (3.4)
Natural Resources	38 (7.6)
Dentistry	17 (3.4)
Medical Technology	13 (2.6)
Law	28 (5.6)
Nursing	24 (4.8)
Medicine	49 (9.8)
Pharmaceutical Science	21 (4.2)
Management Science	79 (15.8)
Science	71 (14.2)
Engineering	64 (12.8)
Liberal Arts	30 (6.0)
Economics	20 (4.0)
Veterinarian Science	3 (0.6)
Agro–industry	18 (3.6)
International College	8 (1.6)

Part 2: Results of the EAT-26 questionnaire

From a total of 500 individuals who completed the EAT-26 questionnaire, 186 (37.2%) individuals had an EAT-26 score of 12 or higher, indicating that the prevalence of atypical eating attitudes and behaviors of PSU, Hat Yai Campus students was 37.2%.

Sixty-three males (12.6%) and 123 (24.6%) females had an EAT-26 score of 12 or higher (signifying atypical eating attitudes and behaviors). In addition, 51.2% of the students had a BMI 18.50–22.99 kg/m², whereas 15.4% of the students had a BMI at ≥25.00 kg/m². However, the most common body weight goal was <57 kg reported by 53.0% of the students. The second most common target body weight was 57–76 kg reported by 12.2% of the students. Regarding the results of the EAT-26, 420 (84.0%) students reported no biological disease, 496 (99.2%) reported no psychological disease, and 477 (95.4%) were taking no current medication (Table 3).

Multivariate logistic regression revealed no associations between atypical eating attitudes and behaviors, sex, target weight, biological disease, psychological disease, current medication and faculty (Table 4).

Atypical eating attitudes and behaviors were significantly associated only with BMI. The overweight and obese BMI groups were significantly associated with 3.3 and 3.7 times increasing odds of having atypical eating attitudes and behaviors compared to the normal weight group, with 95% CIs of 1.8–6.2 and 1.9–6.9, respectively (Figure 1).

Thus, most respondents scored at least 1 on each item and thus had atypical eating attitudes and behaviors. Seventy-six (40.9%) individuals responded to item#12 “Think about burning up calories when I exercise”. The second most common was 67 (36.0%) responded item no. 3 “Find myself preoccupied with food”, whilst only 10 (5.4%) individuals gave a positive respond to question no. 9, “Vomit after I have eaten” (Table 5).

Table 3 Associations between demographic characteristics, faculties and Eating Attitudes Test-26 scores (n=500)

Factor	EAT-26		OR (95% CI)	Wald p-value*
	Number of scores <12 (%)	Number of scores ≥12 (%)		
Sex				
Male	113 (22.6)	63 (12.6)	1.0	
Female	201 (40.2)	123 (24.6)	1.1 (0.6–2.1)	0.674
BMI (kg/m ²)				
<18.50 (underweight)	82 (16.4)	26 (5.2)	0.6 (0.4–1.0)	0.075
18.50–22.99 (normal)	176 (35.2)	80 (16.0)	1.0	
23.00–24.99 (overweight)	25 (5.0)	34 (6.8)	3.3 (1.8–6.2)	0.002**
≥25.00 (obese)	31 (6.2)	46 (9.2)	3.7 (1.9–6.9)	<0.001**
Target weight (kg)				
<57	205 (41.0)	115 (23.0)	1.0	
57–76	106 (21.2)	61 (12.2)	0.6 (0.3–1.1)	0.116
>76	3 (0.6)	10 (2.0)	1.6 (0.3–7.4)	0.566

Table 3 Associations between demographic characteristics, faculties and Eating Attitudes Test-26 scores (n=500)

Factor	EAT-26		OR (95% CI)	Wald p-value*
	Number of scores <12 (%)	Number of scores ≥12 (%)		
Biological disease				
No	262 (52.4)	158 (31.6)	1.0	
Yes	52 (10.4)	28 (5.6)	0.8 (0.4-1.4)	0.491
Psychological disease				
No	312 (62.4)	184 (36.8)	1.0	
Yes	2 (0.4)	2 (0.4)	1.5 (0.2-14.0)	0.677
Current Medication				
No	303 (60.6)	98 (34.8)	1.0	
Yes	11 (2.2)	12 (2.4)	1.6 (0.6-4.2)	0.386
Faculty				
Thai Traditional Medicine	10 (2.0)	7 (1.4)	1.0	
Natural Resources	22 (4.4)	16 (3.2)	0.9 (0.2-3.0)	0.818
Dentistry	11 (2.2)	6 (1.2)	0.7 (0.2-3.0)	0.602
Medical Technology	7 (1.4)	6 (0.6)	0.9 (0.2-4.3)	0.907
Law	18 (3.6)	10 (2.0)	0.6 (0.2-2.4)	0.505
Nursing	15 (3.0)	9 (1.8)	0.9 (0.2-3.4)	0.889
Medicine	33 (6.6)	16 (3.2)	0.8 (0.2-2.6)	0.658
Pharmaceutical Science	13 (2.6)	8 (1.6)	0.9 (0.2-3.4)	0.853
Management Science	49 (9.8)	30 (5.0)	0.8 (0.3-2.5)	0.728
Science	49 (9.8)	22 (4.4)	0.6 (0.2-2.0)	0.426
Engineering	44 (8.8)	20 (4.0)	0.7 (0.2-2.2)	0.520
Liberal arts	16 (3.2)	14 (2.8)	1.2 (0.3-4.2)	0.793
Economics	13 (2.6)	7 (1.4)	0.7 (0.2-2.9)	0.626
Veterinary Science	2 (0.4)	1 (0.2)	0.5 (0.0-7.0)	0.582
Agro-industry	8 (1.6)	10 (2.0)	1.4 (0.4-6.0)	0.615
International College	4 (0.8)	4 (0.8)	1.4 (0.2-8.7)	0.729

*Multivariate logistic regression analysis **significant at p-value<0.05

EAT=Eating Attitudes Test, OR=odd ratio, BMI=body mass index

Table 4 Associations between demographic characteristics, faculties and Eating Attitudes Test-26 scores (n=500)

Factors	EAT-26		OR (95% CI)	Wald p-value*
	Number of scores <12 (%)	Number of scores ≥12 (%)		
Sex				
Male	113 (22.6)	63 (12.6)	1.0	
Female	201 (40.2)	123 (24.6)	1.1 (0.6–2.1)	0.674
BMI (kg/m ²)				
<18.50 (underweight)	82 (16.4)	26 (5.2)	0.6 (0.4–1.1)	0.075
18.50–22.99 (normal)	176 (35.2)	80 (16.0)	1.0	
23.00–24.99 (overweight)	25 (5.0)	34 (6.8)	3.3 (1.8–6.2)	0.002**
≥25.00 (obese)	31 (6.2)	46 (9.2)	3.7 (1.9–6.9)	<0.001**
Target weight (kg)				
<57	205 (41.0)	115 (23.0)	1.0	
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>76	3 (0.6)	10 (2.0)	1.6 (0.3–7.4)	0.566
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No	262 (52.4)	158 (31.6)	1.0	
Yes	52 (10.4)	28 (5.6)	0.8 (0.5–1.4)	0.491
Psychological disease				
No	312 (62.4)	184 (36.8)	1.0	
Yes	2 (0.4)	2 (0.4)	1.5 (0.2–14.0)	0.677
Current Medication				
No	303 (60.6)	98 (34.8)	1.0	
Yes	11 (2.2)	12 (2.4)	1.6 (0.6–4.2)	0.386
Faculty				
Thai Traditional Medicine	10 (2.0)	7 (1.4)	1.0	
Natural Resources	22 (4.4)	16 (3.2)	0.9 (0.2–3.0)	0.818
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EAT=Eating Attitudes Test, OR=odd ratio, BMI=body mass index

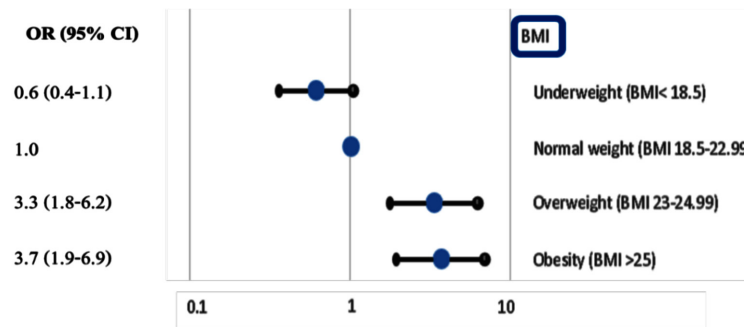


Figure 1 A forest plot showing the associations between body mass index and atypical eating attitudes and behaviors

Table 5 The responses and numbers of the students to the 26 individual questions of Eating Attitudes Test–26 part II

The participants were asked if they agreed with certain statements	Number (%)
1. Am terrified of being overweight.	60 (32.3)
2. Avoid eating when I am hungry.	25 (13.4)
3. Find myself preoccupied with food.	67 (36.0)
4. Have gone on eating binges where I feel that I may not be able to stop.	44 (23.7)
5. Cut my food into small pieces.	56 (30.1)
6. Am aware of the calorie content of foods that I eat.	48 (25.8)
7. Particularly avoid food with a high carbohydrate content (i.e. bread, rice, potatoes, etc.)	41 (22.0)
8. Feel that others would prefer if I ate more.	45 (24.2)
9. Vomit after I have eaten.	10 (5.4)
10. Feel extremely guilty after eating.	36 (19.4)
11. Am preoccupied with a desire to be thinner.	66 (35.5)
12. Think about burning up calories when I exercise.	76 (40.9)
13. Other people think that I am too thin.	41 (22.0)
14. Am preoccupied with the thought of having fat on my body.	65 (34.9)
15. Take longer than others to eat my meals.	51 (27.4)
16. Avoid foods with sugar in them.	49 (26.3)
17. Eat diet foods.	45 (24.2)
18. Feel that food controls my life.	60 (32.3)
19. Display self-control around food.	65 (34.9)
20. Feel that others pressure me to eat.	39 (21.0)
21. Give too much time and thought to food.	56 (30.1)
22. Feel uncomfortable after eating sweets.	44 (23.7)
23. Engage in dieting behavior.	61 (32.8)
24. Like my stomach to be empty.	35 (18.8)
25. Have the impulse to vomit after meals.	16 (8.6)
26. Enjoy trying new rich foods.	60 (32.3)

*For all items except no. 26, each of the responses could be answered using a 4–point scale with the following values: always=3, usually=2, often=1, sometimes, rarely or never=0. For item no. 26, the responses were always, usually and often=0, sometimes=1, rarely=2, and never=3.

Discussion

This study found a prevalence 37.2% of atypical eating attitudes and behaviors in university students, which was higher than in other similar studies. Although our study used ≥ 12 as a cut-off-point, which was lower than in most other studies, this cut off point was verified for accuracy. It was a realistic and accurate cutoff point according to Thitawee's research in 2013.¹⁰ Other studies such as Areemit and Patjanasontorn¹¹, 2012 in undergraduate students from KhonKaen University and in 2013 Pattanathaburt et al.¹² from Naresaun University used 20 as a cutoff point, and found abnormal eating behaviours of 3.0% and 6.3%, respectively. A study by Pitanupong and Jatchavala⁷, 2017 of medical students in PSU, Hat Yai Campus used 12.5 as a cut off point showed 15.9% atypical eating attitudes. Hence the cut-off [no hyphen] point affects prevalence.

In the present, there are many articles on the world-wide social media about desirable body shapes which affect eating behaviors. In 2016, a study by Winijjakul¹³ suggested that in the past, atypical eating behaviors were limited to certain groups. But in modern times, social media is widespread, so people share data and pictures about nutrition very widely. However, the shared data is often not completely correct, so it can lead to misunderstandings about eating, but with social media such false data can spread worldwide. Hence, the prevalence of eating disorders in the present is higher than in the past. Furthermore, the Thai health report of 2014 showed that 34.2% of the people were overweight in the south, higher than in the north (32.0%) and the northeast (30.9%).¹⁴ There have been many studies which have found that overweight or obese people have higher prevalences of eating disorders than normal-weight people.^{15,16} In addition, this study found the median difference between current weight and target weight was 4 kg, a significant difference.

This may be related to impressions young people have from social media, with their ideal body image of "Tyranny of Slenderness" which is now globally widespread.¹⁷ Concepts like this which become widely spread on social media could have effects on the students' attitudes and behaviors of eating, and especially on their concern about their current weight. This alone is a good explanation for the current high prevalence of eating disorders.

This study found the only factor significantly associated with eating attitudes and behaviors was BMI. Students who had a BMI defined as overweight (BMI 23.00–24.99 kg/m²) or obese (≥ 25.00 kg/m²) had significantly association with atypical eating attitudes and behaviors than normal BMI students (18.50–22.99 kg/m²), with odds ratios of 3.3 (95% CI=1.8–6.2) and 3.7 (95% CI=1.9–6.9), respectively. This finding is consistent to Chang's study¹⁵, 2015 and Lipson's study¹⁶, 2017 which found overweight and obese participants had greater likelihoods of showing atypical eating attitudes and behaviors. Both of these studies also suggested that the reason for their findings was because modern social values advocate "thin for beauty". Furthermore, Myers and Rosen also reported that stigmatization is a common experience in overweight and obese people. Overweight people were frequently found to have low self-directedness and low persistence personality characteristics, which correlated with the process of developing obesity, and often engaged in strong efforts to cope with these stigmas, leading to atypical eating attitudes and behaviors.¹⁸ A study of the American Academy of Child and Adolescent Psychiatry found that obese people usually face job discrimination and social exploitation, leading to body dissatisfaction and atypical eating attitudes and behaviors.¹⁹ These studies may also help explain the strong associations between overweight and obesity BMIs and atypical eating behaviors.

There were no correlations between sex, faculty, targeted body weight, biological disease, psychological disease and current medication with atypical eating attitudes and behaviors. Both males and females showed concern about their shape, indicating “the gender-neutral nature of eating disorders”.²⁰ The common psychiatric disorders related to eating disorders are major depressive disorder, anxiety disorder, and bipolar disorder.^{15,21}

Our study had several limitations. Firstly, due to the cross-sectional design, the results cannot conclusively show any causality of the factors associated with eating disorders. Secondly, this study was done during the summer holidays, so 60.0% of the participants were first and second year undergraduates, therefore our result might not be representative for the third year and fourth year undergraduates. Third, the Thai EAT-26 questionnaire only examines eating attitudes and behaviors, and cannot be used to suggest a definite diagnosis for eating disorders. Eating disorders must be diagnosed by a psychiatrist based on the fifth revision of the Diagnostic and Statistical Manual of Mental Disorders criteria.

Conclusion

Regarding the screening of PSU students with the EAT-26 (Thai version), 37.2% of the undergraduate students were found to have atypical attitudes towards their eating behaviors. We believe these findings were due to this study using a cut-off-point lower than other similar studies, and the present widespread use of online social media, through which there is extensive and rapid sharing of data and pictures about nutrition and atypical eating behaviors.

The overweight and obese BMI groups showed increasing risks of atypical eating attitudes and behaviors, compared to the normal weight group, due to the trend in the present rewarding and encouraging thinness for beauty and stigmatizing obesity, so obese people want

to be thinner. Obese people have higher atypical eating attitudes and behaviors than normal.

We found no correlations between sex, faculty, targeted body weight, biological or psychological diseases or current medications and atypical eating attitudes and behaviors.

Conflict of interest

No potential conflict of interest relevant to this article was reported.

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