

Original Research Article

Magnitude and factors associated with emotional eating among pre-university students: a cross-sectional study in urban Mysuru, Karnataka

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ABSTRACT

Background: Emotional eating is a phenomenon in which individuals use food as a way of coping with negative emotions such as depression, anxiety, and stress. This study aimed to estimate the magnitude of emotional eating among pre-university students of urban Mysuru, to assess the factors associated with it, and to evaluate its relationship with anthropometric parameters and academic performance of the study participants.

Methods: A cross-sectional study was conducted among 460 pre-university students in urban Mysuru. 5 out of 8 colleges were selected through simple random sampling and the number of participants to be included from each college through probability proportionate to size technique. At the college level, participants were selected through simple random sampling using their attendance register. Students assenting and whose college principals consented were included while students diagnosed with and/or on treatment for eating disorders and neurotic psychiatric disorders were excluded.

Results: The magnitude of emotional eating was found to be 49.8%. Associated factors included gender, monthly allowance, screen time, frequency of skipping meals, food frequency of sweets, snacks, ice-cream, chocolates, and fast food, and stressors such as relations with people, personal, academic, and environmental factors. No correlation was found between emotional eating and body mass index, female waist-to-hip ratio, and examination results. In contrast, a positive correlation was found with male waist-to-hip ratio.

Conclusions: With emotional eating being distinctly prevalent among pre-university students, students must be educated to identify their stress triggers and effectively manage them with positive coping techniques to establish healthy relationships with food.

Keywords: Academic performance, Adolescents, Anthropometry, Emotional eater questionnaire, Emotional eating, Stress eating

INTRODUCTION

Adolescence is the stage of development between 10-19 years of age, characterized by several physical, physiological, and psychological changes. Some of the most neglected issues among adolescents are mental health and nutritional health.¹ College life encourages the

development of unhealthy habits such as a sedentary lifestyle, poor diet, and substance abuse that, if left unaddressed may lead to increased morbidity and mortality in the future. Some contributory factors include increased autonomy, ineffective coping strategies for managing stressful situations, and increased susceptibility to peer influence.²

The ecological system theory proposed by Bronfenbrenner gives an all-inclusive approach to the network of relationships that could impact the level of stress and overall well-being of adolescents. These extend to various levels: from more direct factors at the microsystem level, including family, friends, and college environment, to factors from the macrosystem level, including wider social structures, cultural ideologies, attitudes, and economic conditions. This heterogeneity of forces will either serve as a source of stress or a potential source of strength and resilience for adolescents going through the rigors of higher education.³

Emotional eating is a phenomenon in which individuals use food as a way of coping with negative emotions such as depression, anxiety, and stress.⁴ It is not an eating disorder in itself but rather a behaviour that falls into the broader array of eating patterns that is influenced by emotions, habits, and personal attitudes to food. It is subject to the influence of various factors. Classical conditioning, or learning to attribute specific foods to specific emotional states may result in the appearance of automatic processes, such as reaching for comfort foods when one is down. Reduced inhibitory control and an impaired capacity to distinguish between internal physiological cues of hunger and emotional hunger also contribute to emotional eating. Perceived stress can act as a trigger for emotional eating by making individuals turn to food for comfort or to distract themselves from emotional turmoil. Persons engaged in intuitive eating or eating in response to hunger and fullness will be more prone to emotional eating since they are unlikely to detect when their hunger is actually driven by emotional suffering. Finally, people with problems or no strategies for emotion regulation may more frequently engage in emotional eating as a way of dealing with their negative emotions.⁵

People under chronic stress tend to consume more during acute episodes of stress and prefer highly palatable, energy-dense foods rich in sugar and fat content. The consumption of hyperpalatable food is associated with short-term pleasure and relief of discomfort and thus may lead an individual to use these foods as a source of comfort during stress.⁶ Secondly, the consumption of energy-dense foods daily is likely to desensitize the brain's reward system over time. Larger portions will be required to experience the same rewarding effect, thereby strengthening the food craving and eventually leading to more craving episodes. In the long term, this vicious circle will continue since individuals become more fixated on consuming these foods to quench their overwhelming urges.⁷

Despite various studies indicating the prevalence of stress-related health problems in adolescents, little has been done to investigate the implications of chronic stress, and the effects of their coping strategies, on academic achievement.⁸ The research findings also

indicate mixed conclusions, where some studies have been unable to find a clear relationship between emotional eating and weight gain measured by body mass index.⁹ Since emotional eating appears to be a relatively common occurrence during childhood and adolescence, identifying its determinants in adolescents can contribute to its effective prevention. Hence, it is important to study emotional eating in the critical years of adolescence.¹⁰

Thus, this study aimed to estimate the magnitude of emotional eating among pre-university students of urban Mysuru, assess the factors associated with it, and evaluate its relationship with their anthropometric parameters and academic performance.

METHODS

Study setting and participants

A cross-sectional study was conducted in JSS Pre-University Colleges of urban Mysuru from September 2023 to January 2024. The study sample included adolescents enrolled in the first and second years of pre-university colleges. The eligibility criteria included students of selected JSS Pre-University Colleges who assent to participate in the study. Students diagnosed with and/or treated for eating disorders such as anorexia nervosa, bulimia nervosa and any neurotic psychiatric disorders were excluded.

Sample size

Aneesh et al reported an overall magnitude of emotional eating of 11.7%, which was used to determine the sample size for the study.¹¹ Assuming a confidence level of 95% and an absolute precision of 3%, the sample size was calculated using the following formula: $n = 4 * p * q / d^2$, where $Z = 1.96$ (for 95% confidence level), $p = 11.7$, $q = 88.3$ (calculated as $100 - 11.7$), and $d = 3$. Substituting these values, the final sample size was estimated to be 460 participants.

Sampling technique and data collection

Five colleges were selected from the list of Pre-University Colleges under the administration of JSS Mahavidyapeeta using simple random sampling through a lottery method. The number of students required to be included from each college was determined using the probability proportionate to size technique. At the college level, the study participants were chosen by simple random sampling, using the attendance register through the lottery method (Figure 1).

Students who met the inclusion and exclusion criteria were identified from each of the five colleges and their written informed assent was obtained. Information regarding sociodemographic characteristics, dietary practices, physical activity, screen time, academics, and

stressors were collected using a pre-tested questionnaire. Emotional Eater Questionnaire (EEQ) was employed to collect data on emotional eating. Following that, their height, weight, waist, and hip circumference were measured.

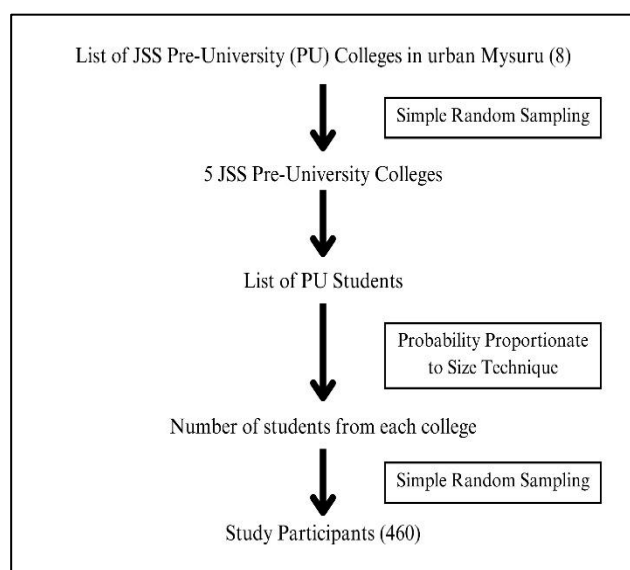


Figure 1: Sampling technique.

Ethical considerations

Ethical clearance was obtained from the Institutional Ethical Committee of JSS Medical College and Hospital, Mysuru. Informed consent was obtained from the principals of the colleges.

Statistical analysis

The collected data was entered and coded in Microsoft Excel 2021 and then analysed using SPSS version 25 (licensed to JSS AHER). Descriptive statistical measures were expressed as mean and standard deviation for continuous data, and as frequencies and percentages for categorical data respectively. Cross-tabulations were constructed, and inferential statistics such as the Chi-square test and Fisher's exact test were applied to categorical variables. Normality was checked using Shapiro-Wilk's test. Non-parametric tests such as Spearman's rank correlation test were used for continuous variables. Data were presented as tables and graphs as appropriate. P value less than 0.05 was considered statistically significant.

RESULTS

The majority of the participants in the study, 235 (51.1%) were 16 years old with females having a higher representation [304 (66.1%)]. Hindus formed the vast majority of the religion at 94.3%. 237 (51.5%) participants were in their first year of Pre-University. 341 (74.1%) belonged to nuclear families and 300 (65.2%) hailed from urban areas. 279 (60.7%) of them stayed at home. 139 (30.2%) participants' fathers had completed secondary school, 117 (25.4%) were skilled agricultural and fishery workers, and 32 (7%) had expired. 194 (42.2%) participants' mothers had completed secondary school, 307 (66.7%) were unemployed and 7 (1.5%) had expired. 375 (81.5%) participants were Below Poverty Line (BPL) with 175 (38%) receiving 100 Rupees or less as a monthly allowance (Table 1).

Table 1: Distribution of the study participants based on the sociodemographic characteristics (n=460).

Variable	Categories	Frequency	Percentage (%)
Age (in completed years)	15	128	27.8
	16	235	51.1
	17	86	18.7
	18	11	2.4
Gender	Male	156	33.9
	Female	304	66.1
Religion	Hindu	434	94.3
	Muslim	24	5.2
	Christian	2	0.4
Year of study	1 st PU	237	51.5
	2 nd PU	223	48.5
Paternal education	Not literate	62	13.5
	Lower primary	33	7.2
	Upper primary	50	10.9
	Secondary	139	30.2
	Pre-university/diploma	96	20.9
	Undergraduate	72	15.7
	Postgraduate/PhD/M.Phil	8	1.7
Maternal education	Not literate	43	9.3
	Lower primary	20	4.3

Continued.

Variable	Categories	Frequency	Percentage (%)
	Upper primary	63	13.7
	Secondary	194	42.2
	Pre-university/diploma	96	20.9
	Undergraduate	31	6.7
	Postgraduate/PhD/M.Phil	13	2.8
Paternal occupation	Unemployed	4	0.9
	Elementary occupation	72	15.7
	Plant and machine operators and assemblers	46	10
	Craft and related trades workers	44	9.6
	Skilled agricultural and fishery workers	117	25.4
	Service workers/shop and market sales workers	79	17.2
	Clerks	9	2
	Technicians/associate professionals	27	5.9
	Professionals	17	3.7
	Legislators/senior officials/managers	13	2.8
Maternal occupation	Unemployed	307	66.7
	Elementary occupation	38	8.3
	Plant and machine operators and assemblers	3	0.7
	Craft and related trades workers	30	6.5
	Skilled agricultural and fishery workers	40	8.7
	Service workers/shop and market sales	9	2
	Clerks	10	2.2
	Technicians/associate professionals	9	2
	Professionals	6	1.3
	Legislators/senior officials/managers	1	0.2
Family type	Nuclear	341	74.1
	Joint	47	10.2
	Three-generation	72	15.7
Poverty line	Below poverty line	375	81.5
	Above poverty line	85	18.5
Monthly allowance (in rupees)	100 or less	175	38
	101 to 500	165	35.9
	501 to 1000	67	14.6
	1001 to 5000	48	10.4
	More than 5000	5	1.1
Area of residence	Rural	300	65.2
	Urban	160	34.8
Place of stay	Home	279	60.7
	Hostel	158	34.3
	With relatives	16	3.5
	Paying Guest (PG)	7	1.5

229 (49.8%) participants were identified as emotional eaters with 121 (26.3%) being low emotional eaters, 103 (22.4%) being emotional eaters, and 5 (1.1%) being very emotional eaters (Figure 2).

The factors associated with emotional eating were gender (p value 0.022), monthly allowance (p value 0.027), frequency of skipping meals (p value 0.002), daily consumption of sweets, snacks, ice-cream, chocolates, and fast food (p value <0.001), stressors such as relations with people, personal, academic and environmental factors (p value <0.001), and screen time (p value <0.001). 163 (53.6%) females and 66 (42.3%) males were

identified as emotional eaters with 41 (61.2%) receiving a monthly allowance of 501 to 1000 rupees and 31 (64.6%) receiving 1001 to 5000 rupees. 43 (59.7%) students who skipped meals 3 to 5 times a week, and 19 (73.1%) skipped 6 to 7 times a week were emotional eaters. 11 (68.8%) participants who consumed sweets, 109 (59.6%) consumed snacks, 51 (62.2%) consumed ice-cream and chocolates, and 21 (72.4%) consumed fast-food daily were found to be emotional eaters. 105 (68.2%) participants experienced severe stress concerning their relations with people, 90 (66.2%) participants concerning their personal factors, 110 (61.5%) participants concerning their academic factors, and 68 (65.4%)

participants concerning their environmental factors and were identified as emotional eaters. 110 (61.1%) had a screen time of two to four hours and 19 (63.3%) had five to seven hours and were also emotional eaters (Table 2).

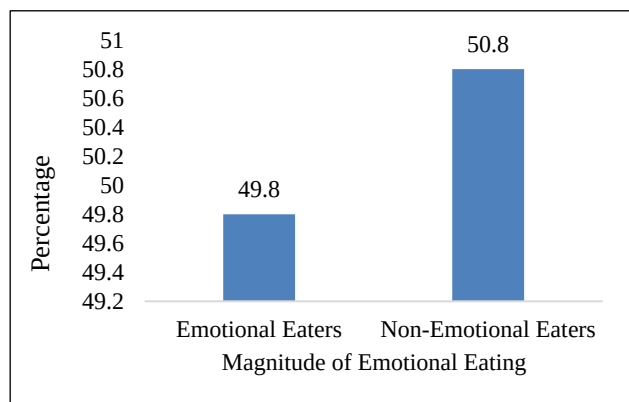


Figure 2: Magnitude of emotional eating among study participants (n=460).

Table 2: Factors associated with emotional eating among study participants (n=460).

Variable	Non-Emotional Eater N (%)	Emotional Eater N (%)	P value
Gender			
Male	90 (57.7)	66 (42.3)	0.022
Female	141 (46.4)	163 (53.6)	
Year of study			
1 st PU	126 (53.2)	111 (46.8)	0.192
2 nd PU	105 (47.1)	118 (52.9)	
Monthly allowance			
100 or less	99 (56.6)	76 (43.4)	0.027
101 to 500	86 (52.1)	79 (47.9)	
501 to 1000	26 (38.8)	41 (61.2)	
1001 to 5000	17 (35.4)	31 (64.6)	
More than 5000	3 (60)	2 (40)	
Meal consumption			
1 meal	2 (25)	6 (75)	0.054*
2 meals	37 (40.2)	55 (59.8)	
3 meals	187 (53.1)	165 (46.9)	
More than 3 meals	5 (62.5)	3 (37.5)	
Meal skipping			
No	147 (51.8)	137 (48.2)	0.4
Yes	84 (47.7)	92 (52.3)	
Frequency of meal skipping			
1-2 times a week	48 (61.5)	30 (38.5)	0.002
3-5 times a week	29 (40.3)	43 (59.7)	
6-7 times a week	7 (26.9)	19 (73.1)	
Food frequency			
Sweets			
Never	16 (66.7)	8 (33.3)	<0.001
Seldom	22 (73.3)	8 (26.7)	
1-3 times a month	95 (53.1)	84 (46.9)	
1-2 times a week	83 (50.6)	81 (49.4)	
3-5 times a week	10 (21.3)	37 (78.7)	
Daily	5 (31.3)	11 (68.8)	

Continued.

79 (50.6%) underweight, 99 (48.5%) normal weight, 24 (50%) overweight, and 27 (51.9%) obese participants were identified as emotional eaters. The mean BMI of emotional and non-emotional eaters was 20.80 ± 5.4 and 20.51 ± 3.7 respectively. 20 (51.3%) out of 39 males who had a waist-hip ratio of more than or equal to 0.90, and 99 (52.1%) out of 190 females who had a waist-hip ratio of more than or equal to 0.85, indicating a substantially higher risk of metabolic complications, were identified as emotional eaters. The mean waist-hip ratio of male emotional and non-emotional eaters was 0.87 ± 0.05 and 0.84 ± 0.07 respectively, and of female emotional and non-emotional eaters was 0.857 ± 0.05 and 0.859 ± 0.05 respectively. 35 (57.4%) students secured distinction, 71 (44.4%) secured first class, 35 (44.3%) secured second class, 62 (57.4%) secured third class, and 26 (50%) failed their recent examination and were identified as emotional eaters. The mean percentage of examination results of emotional and non-emotional eaters was 59.43 ± 20.57 and 59.49 ± 20.23 respectively (Table 3).

Variable	Non-Emotional Eater N (%)	Emotional Eater N (%)	P value
Snacks			
Never	4 (100)	0 (0)	<0.001*
Seldom	18 (94.7)	1 (5.3)	
1-3 times a month	29 (60.4)	19 (39.6)	
1-2 times a week	69 (56.6)	53 (43.4)	
3-5 times a week	37 (44)	47 (56)	
Daily	74 (40.4)	109 (59.6)	
Ice-cream and chocolates			
Never	8 (80)	2 (20)	<0.001
Seldom	21 (77.8)	6 (2.6)	
1-3 times a month	54 (23.4)	36 (15.7)	
1-2 times a week	87 (49.4)	89 (50.6)	
3-5 times a week	30 (40)	45 (60)	
Daily	31 (37.8)	51 (62.2)	
Fast food			
Never	11 (84.6)	2 (15.4)	<0.001
Seldom	35 (74.5)	12 (25.5)	
1-3 times a month	79 (51.3)	75 (48.7)	
1-2 times a week	88 (49.2)	91 (50.8)	
3-5 times a week	10 (26.3)	28 (73.7)	
Daily	8 (27.6)	21 (72.4)	
Stressors			
Relations with people			
No stress	82 (70.1)	35 (29.9)	<0.001
Mild stress	75 (52.4)	68 (47.6)	
Moderate stress	25 (54.3)	21 (45.7)	
Severe stress	49 (31.8)	105 (68.2)	
Personal factors			
No stress	90 (68.2)	42 (31.8)	<0.001
Mild stress	77 (55)	63 (45)	
Moderate stress	18 (34.6)	34 (65.4)	
Severe stress	46 (33.8)	90 (66.2)	
Academic factors			
No stress	67 (57.8)	49 (42.2)	0.001
Mild stress	51 (55.4)	41 (44.6)	
Moderate stress	44 (60.3)	29 (39.7)	
Severe stress	69 (38.5)	110 (61.5)	
Environmental factors			
No stress	22 (62.9)	72 (37.1)	<0.001
Mild stress	49 (43.4)	64 (56.6)	
Moderate stress	24 (49)	25 (51)	
Severe stress	36 (34.6)	68 (65.4)	
Physical activity			
No	84 (45.4)	101 (54.6)	0.09
Yes	147 (53.5)	128 (46.5)	
Screen time			
1 hour or less	148 (60.2)	98 (39.8)	<0.001*
2-4 hours	70 (38.9)	110 (61.1)	
5-7 hours	11 (36.7)	19 (63.3)	
8 hours or more	2 (50)	2 (50)	

*Fisher's Exact Test

Table 3: Association between anthropometry, academic performance and emotional eating among study participants (n=460).

Variable	Non-emotional eater, N (%)	Emotional eater, N (%)	P value
Body mass index			
Underweight	77 (49.4)	79 (50.6)	0.966
Normal	105 (51.5)	99 (48.5)	
Overweight	24 (50)	24 (50)	
Obese	25 (48.1)	27 (51.9)	
Male waist-to-hip ratio			
Normal	71 (60.7)	46 (39.3)	0.19
High risk	19 (48.7)	20 (51.3)	
Female waist-to-hip ratio			
Normal	50 (43.9)	64 (56.1)	0.495
High risk	91 (47.9)	99 (52.1)	
Examination result			
Distinction	26 (42.6)	35 (57.4)	0.15
First class	89 (55.6)	71 (44.4)	
Second class	44 (55.7)	35 (44.3)	
Third class	46 (42.6)	62 (57.4)	
Fail	26 (50)	26 (50)	

Spearman's rank correlation test revealed no correlation between emotional eating and body mass index ($r=-0.016$, p value 0.735), waist-to-hip ratio among females ($r=-0.075$, p value 0.191), and academic performance ($r=-0.052$, p value 0.264). In contrast, a weak positive correlation ($r=0.105$, p value 0.193) was found between emotional eating and waist-to-hip ratio among males, indicating that the higher the EEQ scores, the higher the waist-to-hip ratio.

DISCUSSION

Emotional eating is one of the escape mechanisms whereby food is used to suppress negative emotions. The stress response is suppressed and feelings of pleasure are derived from eating highly palatable, calorie-dense foods through its action on dopamine, which mediates the rewarding effect. This creates a vicious cycle by positively reinforcing the behavior with food to deal with emotions.¹²

The total magnitude of emotional eating in the present study was determined to be 49.8% among which 121 (26.3%) were classified as low emotional eaters, 103 (22.4%) as emotional eaters, and 5 (1.1%) as very emotional eaters. A high prevalence of 73.1% emotional eating was also found in a study by Skolmowska et al conducted among 1126 Polish adolescents.⁹ Radzi et al found a prevalence of 47.5% among pre-university and undergraduate students.¹³ The difference in the prevalence rates could be attributed to variations in factors such as regional demographics, year of study, and sample size.

In the current study, females had a higher tendency of emotional eating than males. This finding has been supported by many previous studies by Radzi et al.¹³, Mohapatra et al and Skolmowska et al.^{14,9} Females reported more stress, exhibited more negative feelings, and had less impulsive control over their food choices, making them more likely to use emotional eating as a coping mechanism during stressful situations.¹³ This may also be due to the significant difference in the number of male and female participants in this study.

Our study revealed that nearly one-third of emotional eaters received a monthly allowance ranging between 500 to 5000 rupees. Al-Musharaf reported that emotional eating was highly prevalent in those with high family income.⁴ Receiving a monthly allowance provides students the financial freedom to purchase unhealthy foods. This in turn increases the likelihood of emotional eating.

The current study found a significant association between emotional eating and the frequency of skipping meals, where the majority of emotional eaters skipped meals at least 3 to 5 times a week. Chavez-Hernandez reported that meal skipping was positively correlated with ultra-processed food intake which in turn had a significant positive correlation with emotional overeating.¹⁵ Choi et al also reported that highly stressed college students had a tendency to skip meals and overeat snacks, fast food, and ready-to-eat meals.¹⁶

In the present study, daily and weekly consumption of sweets, snacks, ice cream, chocolates, and fast food were significantly higher in emotional eaters. Frequent consumption of hyperpalatable foods during negative

emotions brings about a positive feedback loop and reinforces eating to distract from these emotions.¹² Such foods are often seen as comfort foods which emphasize on mood, sensory appeal, convenience, price, and familiarity while disregarding the aspect of nutrition and health.¹⁷ These foods were often seen being sold near the colleges at low prices. Gemesi et al identified chocolate and coffee as the two favourite comfort foods among adults.¹⁸ Caso et al reported that university students consumed sweets and junk food once a week while snacks were consumed more than once a week.¹⁹ Yang et al also found a positive association between perceived stress and unhealthy food preferences of salty snacks, fast food, and soft and sugary drinks.²⁰

The current study found a significant association between stressors such as relations with people, personal, academic, and environmental factors with emotional eating. This finding is consistent with the stressors identified in the study by Yumba et al.²¹ Radzi et al also determined that academic stress was positively correlated with emotional eating.¹³

More than half of the participants had a screen time of more than 2 hours a day. Screen time was found to be significantly associated with emotional eating. This can be related to boredom eating which is used as a way to pass unengaged time. It was the most significant emotion associated with eating in a study by Guerrero Hreins et al.¹² Shaikh and Bellare reported that boredom eating constituted 19% of all the types of emotional eating.²²

While many studies conducted on adults have confirmed the association between emotional eating and increased BMI, very few studies have been conducted on adolescents and their findings have been contradictory. Our study too did not find a significant association between emotional eating and anthropometric measurements such as body mass index and waist-to-hip ratio. This has been supported by a systematic review that found no association between emotional eating and increased or decreased weight status in adolescents.²³ One possible explanation for this finding could be that more than half of the emotional eaters in the present study engaged in regular physical activity. However, Skolmowska et al and Chavez-Hernandez reported higher emotional overeating among overweight and obese adolescents and university students in their studies respectively.^{9,15} Shaikh and Bellare found a significant positive correlation between emotional eating, perceived stress, and BMI among adults.²² Hence, it can be concluded that emotional eating may have an impact on weight status in adulthood.

Not many studies have been conducted to find the relationship between emotional eating and its impact on academic performance in adolescents. Our study did not find a statistical difference in the examination results of emotional and non-emotional eaters. This finding is consistent with the study by Chamberlin et al and

Schraml et al who found no statistical difference in the GPA among emotional and non-emotional eaters, although the chronically stressed group achieved worse grades.^{10,8} Contrary to our study, Chamberlin et al reported that as academic stress increased, emotional eating increased, and so did the GPA while Pascoe et al reported that poorer academic performance is linked with higher levels of perceived stress.^{10,24}

However, the current study was limited by its cross-sectional design which could not establish causal relationships between the variables and the unequal gender distribution of participants.

CONCLUSION

The present study concluded that emotional eating is distinctly prevalent among pre-university students of urban Mysuru. Therefore, students must be educated on identifying their stress triggers and how to manage them with positive coping techniques to establish healthy relationships with food since eating behaviors established in this crucial stage will likely be carried over to young adulthood and consequently to adulthood. Longitudinal studies would be beneficial in assessing the development of obesity among emotional eaters during adulthood.

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Conflict of interest: None declared

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