

Sleep, Psychological Status, Eating Behaviors and Activity Pattern among Adults with Varying Body Weight - A Comparison between Emotional and Non-Emotional Eaters

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ABSTRACT

Background: Psychological status exerts profound influence on food choices and eating behaviors of people. Especially stress causes distress leading to eating problem, the most prevailing is emotional eating.

Objective: This study aimed to identify associative psychological status, eating and lifestyle pattern of the emotional eaters in an urban population from south India.

Method: This is a quantitative observational study, 161 men, and 283 women (total 444) aged 27 to 47 years with BMI varied between 18.5 and 40 participated. Purposive sampling method was adopted; information regarding demographic details, psychological status, eating and lifestyle patterns and health habits of participants were obtained using suitable standardized questionnaires.

Result: More than 50% of the study population both men and women was inflicted with emotional eating. Emotional eaters exhibited a greater propensity to develop obesity, higher percentage of emotional eater were overweight and obese as against non-emotional eater. Majority of emotional eater had higher scores for anxiety, stress, and depression. They had sedentary lifestyle and exhibited snacking behavior, eating outside home, munching in significantly higher proportion. Emotional eaters had liking for calorie-rich foods such as fried foods, chocolate/toffee, sweets, ice cream and pizza.

Conclusion: Emotional eating among population in developing countries like India is on rise, this indicates the risk for increase in obesity among population. Emotional eating was found to be associated with anxiety, stress and depression. Emotional eaters tend to develop poor eating habits and also have unhealthy food choices. This calls for an intense exercise to create awareness about the eating problems among the general population. A multi-disciplinary integrated approach should be adopted to achieve effective behavior change among target population.

Keywords: Emotional eating; eating behaviors; psychological status; food choice; snacking and munching behaviors.

INTRODUCTION

Obesity prevalence is growing with a continuous upsurge trend in India and varies from 8 to 38% in rural and 13 to 50% in urban areas. ^[1] Obesity is an important etiological factor for metabolic and degenerative diseases such as diabetes mellitus, hypertension, cardiovascular disease and dyslipidemia. ^[1,2] Obesity epidemic can have multifactorial etiology

and be the result of interactions of intrinsic (such as genetic) and extrinsic factors such as environmental, and lifestyle factors. ^[3] Behavioral factors are equally important in the etiology of obesity; especially the eating behaviors are influenced by environmental and emotional settings. Association between emotion and eating behaviors has always attracted the attention of behavior scientists. Intra and inter individual eating behaviors

vary enormously; eating patterns are influenced by individuals' traits, physical and mental health particularly the emotional status. [4] Negative emotions are inevitable and add unwanted elements to life package; food ingestion influenced by negative emotions lead to over or under eating among individuals, it is referred as emotional eating. [5] This phenomenon is significantly associated to obesity. [5,6] Basically, it is assumed that eating in response to stress or sad mood is a maladaptive 'Emotion regulated mechanism', and affects eating behavior. Emotional eaters are supposed to be less successful in dieting and are therefore considered to be at higher risk for developing obesity. [6]

Negative emotions (stress, depression) have been the prime focus to study its relation to food intake. [7] In a wider context, dietary patterns of an individual are influenced by psychological stress and propel towards unhealthy food choices and eating behaviors. It is established that both unwholesome emotional eating behaviors and unbalanced dietary pattern have association to stress. [8] Likewise, research has shown an association between short sleep duration and increased food intake among individuals susceptible to develop emotional eating. [9] Principally sedentary behavior is the cause for obesity, research evidences suggest an inverse association between physical activity with weight gain or the obesity development. [8] Physical activity contributes to sound health in a variety of ways most importantly its effectiveness in ameliorating emotional distress. Research reports have documented that physically active individuals have better emotional status and subsequently be free of the consequences of negative emotions. [10] Hence, the association between emotional eating and obesity signify the importance of investigating the prevalence of emotional eating among the urban population in developing countries like India. Therefore the study aims to identify associative psychological status, eating and lifestyle

pattern of the emotional eaters in an urban population from south India.

METHODOLOGY

Study Design: A quantitative observational study was conducted in urban area of Mysore, a major city from south India.

Study population:

444 men and women aged 27 to 47 years having BMI varying between 18.5 and 40 formed the study population, among them 146 subjects had normal BMI, 134 and 146 were overweight and obese respectively.

Sampling design and Techniques:

Purposive sampling method was adopted for selection of subjects; a total of 900 men and women were approached; out of whom, 161 men and 283 women (total 444) who met the inclusion criteria charted for the study gave their consent to participate. Inclusion criteria were as following: educated married and unmarried men and women (non-pregnant and lactating) in the age group of 27 to 47 years; having BMI between 18.5-40 (weight classifications considered- 18.5-23.99 as normal, 24-26.99 as Overweight and 27-40 obese); non-diabetic, non-hypertensive and euthyroid subjects without long-term sickness (6 months) or under medical treatment that could affect appetite or body weight.

The study was approved by the Institutional Human Ethics Committee for Human Research (IHEC), University of Mysore (reference number (IHEC-UOM No.148/Ph.D./2016-2017)).

Tools used for data collection: Previously standardized questionnaires were employed to obtain information such as demographic details including age, gender, religion, marital status, education, occupation, job status, family type, number of children, and socioeconomic status. It also included information about health habits such as smoking and drinking. Body weight(kg) and height(cm) of each participant was measured using a digital electronic balance (Karada Scan Body composition monitor; Model: HBF-735) and anthropometric rod (PRESTIGE; Measuring Range 0-2000mm;

graduation of 1mm) implementing standard methods as described in WHO monograph 53. [11]

Eating pattern and eating behavior: three different questionnaires were used for this purpose; i. Assessment of eating pattern and eating habit – this included information regarding the type of diet, number of meals consumed per day, skipping meals, munching habit and frequency of eating outside home; ii. snacking was assessed using the “Eating behavior pattern questionnaire” and modified to suit our population [12] and; iii. Food frequency questionnaire- this elicited information about the frequency of consuming common foods and drinks.

Maladaptive emotional eating: Emotional eating was assessed using the Three-Factor Eating Questionnaire -TEFQ-18. [13]

Sleep and physical activity pattern: sleep pattern and physical activity pattern of the participants were assessed using the Pittsburgh Sleep Quality Index Questionnaire-PSIQ [14] and Global Physical activity Questionnaire –GPAQ. [15]

Statistical analysis:

The data was first computed and then analyzed for statistical significance; SPSS version 16 used for preliminary statistical analysis. The descriptive statistical analysis was implemented and results were presented as numbers and percentages. For making a comparison between the means the Chi-square test was applied.

Table1. Personal information and percent distribution of body weight status into normal, overweight and obese

Variables	Characteristics	Gender		
		Number (%)	Males	Females
	-	444	161	283
Age (yrs.)	27-36	64.1 (285)	65.2 (105)	63.6 (180)
	37-47	35.9 (159)	34.8 (56)	36.4 (103)
Religion	Hindu	68.2 (303)	75.8 (122)	64.0 (181)
	Muslims	11.9 (53)	11.8 (19)	12.0 (34)
	Christians	19.8 (88)	12.4 (20)	24.0 (68)
Education	SSLC + diploma	12.4 (55)	11.3 (23)	11.3 (32)
	Graduates	17.3 (77)	10.6 (17)	21.2 (60)
	Higher education	50.7 (225)	50.3 (81)	50.9 (144)
	Professionals	19.6 (87)	24.8 (40)	16.6 (47)
Job status	On Job	86.9 (386)	93.8 (151)	83.0 (235)
	Unemployed/retired	13.2 (58)	6.2 (10)	17.0 (48)
Marital status	Married	77.9 (346)	66.5 (107)	84.5 (239)
	Unmarried/Divorces	22.1 (98)	33.5 (54)	15.5 (44)
Type of family	Nuclear	70.7 (314)	62.1 (100)	75.6 (214)
	Joint	26.4 (117)	34.8 (56)	21.6 (61)
	Extended	2.7(13)	3.1(5)	2.8(8)
Number of children	No child	32.9 (146)	49.1 (79)	23.7 (67)
	1 to 2	62.4 (277)	47.8 (77)	70.7 (200)
	3 to 4	4.3 (21)	3.1 (5)	5.6 (16)
Socio-Economic Status (SES)	Low	26.4 (117)	31.1 (50)	23.7 (67)
	Middle	58.1 (258)	54.0 (87)	60.4 (171)
	High	15.5 (69)	14.9 (24)	15.9 (45)
Weight status- BMI	Normal	36.9 (164)	29.8 (48)	41.0 (116)
	Overweight	30.2 (134)	34.2 (55)	27.9 (79)
	Obese	32.9 (146)	36.0 (58)	31.1 (88)
Emotional Eating	Non-Emotional eaters	41.9(186)	36.6 (59)	44.9 (127)
	Emotional eaters	58.1 (258)	63.4 (102)	55.1 (156)

Subjective information of the participants is presented in table1. It is evident that higher percentages (68.2%) of the participants were from Hindu religion and those aged 27-36 years formed 64.1% of the study population. Majority of the participants (70.3%) were highly qualified

and held professional degrees, 86.9% were employed in various government and private organizations. Nuclear family system predominated, 70.7% of participants belonged to nuclear families. Higher proportion (54-60%) of the participants belonged to middle socioeconomic status,

while lower socioeconomic status formed 24-31%. On an average 64 % of the participants reported to have 1-2 children.

Table 2. Percent occurrence of emotional eating among men and women with varying body mass index

Emotional eating	Total		Male			Female		
	Male	Female	Normal	Overweight	Obese	Normal	Overweight	Obese
	n-161	n-283	N=48	N=55	N=58	N=116	N=79	N=88
Non-emotional eater	36.6(59)	44.9(127)	32.2(19)	42.4(25)	25.4(15)	47.2(60)	26.0(33)	26.8(34)
Emotional eater	63.4(102)	55.1(156)	28.4(29)	29.4(30)	42.2(43)	35.9(56)	29.5(46)	34.6(54)
Chi-square	$\chi^2 = 2.856$; P=0.091		$\chi^2 = 4.922$; P=0.085			$\chi^2 = 3.892$; P=0.143		

Percent occurrence of emotional eating among men and women is presented in table 2. Emotional eating appears to be common among the study population since more than fifty percent of men and women were found to be emotional eaters. A higher percentage of male as compared to the female participants were emotional eaters although not significant statistically. The pattern of distribution of body weight

status of men and women with and without emotional eating varied markedly. Distinctly higher percentages of men with emotional eating were obese as compared to women participants. Differences in body weight status of men and women from non-emotional eaters were different; relatively higher percentages of men were overweight while higher proportion of women had normal body weights.

Table 3. Sleep quality, activity pattern and psychological status of the participants with and without emotional eating problem (%)

Sleep/ activity patterns	Males- 161			Females- 283		
	Total	Emotional eaters	Non-emotional eaters	Total	Emotional eaters	Non-emotional eaters
	N=161	N=102	N=59	N=283	N=156	N=127
Quality of Sleep						
Good	97.5(157)	97.1(99)	98.3(58)	94.3(267)	94.9(148)	93.7(119)
Poor	2.5(4)	2.9(3)	1.7(1)	5.7(16)	5.1(8)	6.3(8)
Chi-square	$\chi^2 = 0.240$, P=0.624			$\chi^2 = 0.180$, P=0.671		
Activity pattern						
Active	52.8(85)	46.1(47)	64.4(38)	50.5(143)	53.8(84)	46.5(59)
Sedentary	47.2(76)	53.9(55)	35.6(21)	49.5(140)	46.2(72)	53.5(68)
Chi-square	$\chi^2 = 5.038$, P=0.025			$\chi^2 = 1.529$, P=0.216		
Psychological status						
Depression	32.9(53)	39.2(40)	22.0(13)	37.8(107)	44.9(70)	29.1(37)
Without-Depression	67.1(108)	60.8(62)	78.0(46)	62.2(176)	55.1(86)	70.9(90)
Chi-square	$\chi^2 = 4.997$, P=0.025			$\chi^2 = 7.374$, P=0.007		
Anxiety	39.1(63)	43.1(44)	32.2(19)	37.8(107)	44.9(70)	29.1(37)
Without-anxiety	60.9(98)	56.9(58)	67.8(40)	62.2(176)	55.1(86)	70.9(90)
Chi-square	$\chi^2 = 1.876$, P=0.171			$\chi^2 = 7.374$, P=0.007		
Stress	28.0(45)	32.4(33)	20.3(12)	30.7(87)	35.9(56)	24.4(31)
Without-stress	72.0(116)	67.6(69)	79.7(47)	69.3(196)	64.1(100)	75.6(96)
Chi-square	$\chi^2 = 2.679$, P=0.102			$\chi^2 = 4.339$, P=0.037		

Influence of emotional eating on sleep, activity pattern and the psychological status of the participants is presented in table 3. It reveals that good sleep is evidently a predominant sleep pattern among the participants (men emotional eaters=97.5%; women emotional eaters=94.3%), hence participants regardless of being or not being emotional eaters, reported to have good sleep. Activity pattern of participants with and without emotional eating is also presented in table 3. It is apparent that participants in general both males and females have essentially similar

activity pattern, wherein a higher percentage of emotional eaters reported to be sedentary and the non-emotional eaters had active lifestyle. The percent differences in activity pattern among men (physically active=53.9% emotional eaters- vs 64.4% non-emotional eaters) were statistically significant (P=0.025). However the matter of concern is that sedentary lifestyle was found common among 47.2 and 49.5 % of men and women respectively.

Occurrence of psychological problems among subjects with emotional and non-emotional eating behavior provides

interesting observation. It can be perused that higher percentage of (34.5 to 44.2) emotional eaters were found to be inflicted with stress, anxiety and depression as compared to non-emotional eaters (23.1 to 30.1%). Among the three forms of

psychological disturbances highest occurrence was anxiety among emotional and the non-emotional eaters followed by depression and stress. The occurrence rate was consistently higher in women with or without emotional eating behaviors.

Table4. Prevalence of smoking and general pattern of eating behaviors among the participants: comparison between emotional and non-emotional eaters. (n= male-161; female-283)

Variables	Emotional Eaters (EE) n=258			Non- Emotional Eaters (NEE) n=186		
	Normal	Overweight	Obese	Normal	Overweight	Obese
	N=85	N=76	N=97	N=79	N=58	N=49
SMOKING percentage of smokers- (EE)=3.5 (9) (NEE)=2.7 (5)						
Male						
Smokers	0.0 (0)	6.7 (2)	11.6 (5)	15.8 (3)	4.0 (1)	6.7 (1)
Non-smokers	100.0(29)	93.3(28)	88.4(38)	84.2(16)	96.0(24)	93.3(14)
Chi-square	$\chi^2=0.141$; P=0.708					
Female						
Smokers	1.8 (1)	2.2 (1)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Non-smokers	98.2(55)	97.8(45)	100.0(54)	100.0(60)	100.0(33)	100.0(34)
Chi-square	$\chi^2=1.103$, P=0.576					
ALCOHOL CONSUMPTION						
percentage of participants consuming alcohol- (EE)= 17.4 (45) (NEE)=12.4 (23)						
Male						
Drinkers	34.5 (10)	23.3(7)	37.2 (16)	21.1 (4)	28.0 (7)	53.3(8)
Teetotaler	65.5(19)	76.7(23)	62.8(27)	78.9(15)	72.0(18)	46.7(7)
Chi-square	$\chi^2=2.708$; P=0.984					
Female						
Drinkers	5.4 (3)	8.7 (4)	9.3 (5)	5.0 (3)	3.0 (1)	0.0 (0)
Teetotaler	94.6(53)	91.3(42)	90.7(49)	95.0(57)	97.0(32)	100.0(34)
Chi-square	$\chi^2=2.708$; P=0.100					
EATING BEHAVIOR						
TYPE OF DIET*						
Vegetarian	31.8(27)	28.9(22)	24.7(24)	38.0 (30)	41.4(24)	38.8(19)
non-vegetarian	68.2(58)	71.1(54)	75.3(73)	62.0(49)	58.6(34)	61.2(30)
Chi-square	$\chi^2=5.875$; P=0.015					
NUMBER OF MEALS/DAY*						
2-3	72.9 (62)	81.6(62)	75.3(73)	88.6(70)	81.0(47)	73.5(36)
4-5	25.9(22)	18.4(14)	22.7(22)	11.4(9)	19.0(11)	26.5(13)
6-7	1.2(1)	0.0(0)	2.1(2)	-	-	-
Chi-square	$\chi^2=2.971$; P=0.563			$\chi^2=4.835$;P=0.089		
SKIPPING MEALS percentage of participants who skipped meals - (EE):33.3 (86) ; (NEE)=32.8 (61)						
Male						
Yes	20.7 (6)	30.0(9)	23.3 (10)	21.1(4)	16.0(4)	20.0 (3)
No	79.3(23)	70.0(21)	76.7(33)	78.9(15)	84.0(21)	80.0(12)
Chi-square	$\chi^2=0.741$;P=0.389					
Female						
Yes	33.9 (19)	47.8 (22)	37.0(20)	36.7 (22)	39.4(13)	44.1(15)
No	66.1(37)	52.2(24)	63.0(34)	63.3(38)	60.6(20)	55.9(19)
Chi-square	$\chi^2=0.002$; P=0.963					
MUNCHING HABIT: percentage of participants who munched- (EE)=42.6 (110) ; (NEE)=19.3 (36)						
Male						
Yes	24.1(7)	26.7(8)	60.5(26)	15.8(3)	20.0 (5)	6.7 (1)
No	75.9(22)	73.3(22)	39.5(17)	84.2(16)	80.0(20)	93.3(14)
Chi-square	$\chi^2=10.860$;P=0.001					
Female						
Yes	28.6 (16)	34.8(16)	68.5 (37)	20.0(12)	18.2(6)	26.5 (9)
No	71.4(40)	65.2(30)	31.5(17)	80.0(48)	81.8(27)	73.5(25)
Chi-square	$\chi^2=16.480$;P=0.001					
SNACKING: percentage of participants who snacked- (EE)=87.2 (225) ; (NEE)=54.8 (102)						
Male						
Snackers	100.0 (29)	86.7 (26)	95.3 (41)	21.1 (4)	36.0 (9)	26.7 (4)
Non-snackers	0.0(0)	13.3(4)	4.7(2)	78.9(15)	64.0(16)	73.3(11)
Chi-square	$\chi^2=16.052$; P=0.001					
Females						
Snackers	83.9 (47)	78.3 (36)	85.2 (46)	70.0 (42)	60.6 (20)	67.6 (23)
Non-snackers	16.1(9)	21.7(10)	14.8(8)	30.0(18)	39.4(13)	32.4(11)
Chi-square	$\chi^2=9.435$; P=0.002					

Table 4 to be continued...						
EATING OUTSIDE HOME: percentage of participants who ate outside home- (EE)=89.1 (230); (NEE)=87.6 (163)						
Male						
Yes	89.7 (26)	96.7(29)	95.3 (41)	89.5(17)	92.0(23)	100.0(15)
No	10.3(3)	3.3(1)	4.7(2)	10.5(2)	8.0(2)	0.0(0)
Chi-square	$\chi^2=1.513$;P=0.469			$\chi^2=1.572$;P=0.456		
Female						
Yes	83.9 (47)	84.8 (39)	88.9 (48)	90.0 (54)	78.8(26)	82.4(28)
No	16.1(9)	15.2(7)	11.1(6)	10.0(6)	21.2(7)	17.6(6)
Chi-square	$\chi^2=0.625$;P=0.732			$\chi^2=2.367$;P=0.306		
FREQUENCY OF EATING OUTSIDE HOME						
Male						
Once /week	44.8(13)	46.7(14)	30.2(13)	52.6(10)	40.0(10)	73.3(11)
2-4 /week	37.9(11)	33.3(10)	32.6(14)	15.8(3)	40.0(10)	26.7(4)
Daily	6.9(2)	16.7(5)	32.6(14)	21.1(4)	12.0(3)	0.0(0)
0/week	10.3(3)	3.3(1)	4.7(2)	10.5(2)	8.0(2)	0.0(0)
Chi-square	$\chi^2=8.981$;P=0.175			$\chi^2=8.808$;P=0.185		
Female						
Once /week	58.9(33)	45.7(21)	33.3(18)	63.3(38)	45.5(15)	47.1(16)
2-4 /week	21.4(12)	34.8(16)	48.1(26)	26.7(16)	27.3(9)	29.4(10)
Daily	3.6(2)	4.3(2)	7.4(4)	0.0(0)	6.1(2)	5.9(2)
0/week	16.1(9)	15.2(7)	11.1(6)	10.0(6)	21.2(7)	17.6(6)
Chi-square	$\chi^2=10.980$;P=0.089			$\chi^2=7.362$;P=0.289		

(EE): emotional Eaters ;(NEE): Non-emotional eaters; *data is presented for gender together

Eating behaviors as well as alcohol consumption and smoking habit prevalent among men and women participants presented in table 5, an attempt was made to compare prevalence of these behaviors among emotional and non-emotional eaters. Smoking was prevalent negligibly, a total of 3.2 percent of all the participants claimed to smoke, the matter of concern is that, more number of individuals (both men and women) with emotional eating (3.5%) smoked as against the non-emotional eaters (2.7%). Alcohol consumption specially in Indian culture has poor receptiveness, although 17.4 and 12.4 percent of emotional eaters and non-emotional eaters reported to be habitual drinkers. Evidently higher percentage of men claimed to drink as against women. It is also evident that relatively higher percentage of obese individuals with emotional eating consumed alcohol as compared to their counterparts. Nonvegetarianism appears to be the practice of choice since markedly higher proportion of participants were nonvegetarians. Significantly (P = 0.001) higher percentage of emotional eaters (68-75%) practiced non-vegetarianism as compared to non-emotional eaters (58-62%). Two and three meals a day was found in common practice since 73 to 88% participants mentioned to consume 2 to 3 meals daily, while

considerable percentage of participants also mentioned to consume 4-5 meals a day. Among these, percentages were higher for emotional eaters (18.6-25.9%) as well as the obese individuals among non-emotional eaters (26.5%). An insignificant percent (1.2 - 2.2%) of emotional eaters also claimed to have 6-7 meals a day.

Skipping meals was not a common practice among participants from both emotional and non-emotional eaters. Nonetheless, greater percentages of females skipped meals. Munching habit was prevalent in small percentage of the participants, wherein 8.1% of non-emotional and 24.8% of the emotional eaters mentioned to munch. Interestingly munching habit was seen predominantly among females, although obese subjects both males and females munched in significantly higher percentages (P =0.001).

Majority of the participants from both emotional (89.1%) and non-emotional eaters (87.6%) stated to eat outside home. Likewise, snacking was an overriding eating behavior among both emotional and non-emotional eaters. Snacking was also found to be a popular eating activity among the participants, 87.2 and 54.8% of EE and NEE claimed to snack. Significantly higher percentage of participants (male- P= 0.001; females- P = 0.002) with emotional eating

snacked, wherein female participants snacked in higher frequency.

Table5. Consumption pattern of staple cereals: comparison among emotional and non-emotional eaters with differing body weight status

Food items	Emotional Eaters			Non-emotional eaters		
	Normal N=85	Overweight N=76	Obese N=97	normal N=79	overweight N=58	Obese N=49
Rice						
1/day	44.7 (38)	30.2 (23)	29.8(29)	26.6(21)	27.6(16)	40.8 (20)
2-3/day	51.7 (44)	61.8 (47)	64.9 (63)	72.1 (57)	65.5 (38)	55.1 (27)
Occasionally	3.5(3)	7.8(6)	5.1(5)	1.2(1)	6.8(4)	4.1(2)
Chi-square	$\chi^2=1.157$; P=0.282					
Wheat						
1/day	40.0 (34)	46.1(35)	52.6(51)	44.3(35)	31.0 (18)	44.9 (22)
2-3/day	23.5(20)	23.7(18)	22.7(22)	17.7(14)	29.3(17)	25.3(16)
Occasional	36.5(31)	30.3(23)	24.7(24)	38.0(30)	39.7(23)	22.4(11)
Chi-square	$\chi^2=1.714$; P=0.424					
Refined flour						
1/day	16.5 (14)	15.8 (12)	16.5(16)	3.8 (3)	8.6 (5)	0.0(0)
2-3/day	7.1 (6)	2.6 (2)	11.3 (11)	7.6 (6)	6.9 (4)	8.2(4)
Occasional	76.5(65)	81.6(62)	72.2(70)	88.6(70)	84.5(49)	91.8(45)
Chi-square	$\chi^2=15.630$; P=0.001					
Ragi						
1/day	27.1(23)	25.0(19)	13.4(13)	21.5(17)	24.1(14)	24.5(12)
2-3/day	12.9(11)	10.5(8)	4.1(4)	5.1(4)	5.2(3)	18.4(9)
Occasional	60.0(51)	64.5(49)	82.5(80)	72.2(57)	70.7(41)	57.1(28)
Chi-square	$\chi^2=1.622$; P=0.654					
Jowar						
1/day	5.9 (5)	5.3 (4)	6.2 (6)	3.8(3)	1.7(1)	4.1(2)
2-3/day	7.1 (6)	3.9 (3)	2.1 (2)	1.3(1)	1.7(1)	2.0(1)
Occasional	87.1(74)	90.8(69)	91.8(89)	94.9(75)	96.6(56)	93.9(46)
Chi-square	$\chi^2=4.261$; P=0.119					

Table6. Preference of snack foods when eating outside home: comparison among participants with and without emotional eating

Food items	Non-emotional eaters		Emotional eaters	
	Male N=59	Female N=127	Male N=102	Female N=156
Pizza/Burger				
Yes	15.3 (9)	11.0 (14)	21.6 (22)	25.0(39)
Chi-square	$\chi^2=8.962$; P=0.003			
Fried foods				
Yes	28.8 (17)	13.4 (17)	39.2 (40)	27.6 (43)
Chi-square	$\chi^2=10.746$; P=0.001			
Sweets				
Yes	8.5 (5)	9.4 (12)	33.3 (34)	25.0 (39)
Chi-square	$\chi^2=24.537$; P=0.001			
Ice cream				
Yes	27.1 (16)	30.7 (39)	41.2 (42)	46.2 (72)
Chi-square	$\chi^2=9.794$; P=0.002			
Indian snacks				
Yes	39.0 (23)	39.4 (50)	54.9 (56)	44.2 (69)
Chi-square	$\chi^2=3.704$; P=0.054			
Panipuri				
Yes	37.3 (22)	51.2 (65)	47.1 (48)	51.3 (80)
Chi-square	$\chi^2=0.349$; P=0.555			

Indian dietaries are primarily cereal based hence cereal forms the major portion of a meal. The most popular is rice followed by wheat, certain minor millets such as ragi and jowar are also used. Cereals provide 65 to 70 percent carbohydrates and interms of quantity 246 to 350g is consumed per day by adults. [16] Nutritional contribution of millets and wheat to the diet accounts most

for its fiber content. The pattern of consuming cereals was elicited from the participants, also comparisons were made among those with and without emotional eating as well as based on body weight status (table 5). It is obvious from the table that rice was the popular cereal and consumed 2 to 3 times a day by 60 to 70 % participants. Further, higher percentage of NEE consumed rice 2-3 times daily as compared to the EE. Wheat was next cereal of choice, 31 to 53% participants both with and with emotional eating consumed wheat once a day while 22 to 25% consumed 2-3 times daily. Higher percentage of EE consumed wheat than those with NEE. Use of refined flour was found to be less frequent. Wheat was followed by ragi, 21 to 24 % participants consumed it once a day while 5 to 12 % mentioned to use ragi more than once a day. Jowar consumption is markedly limited varying from 2 to 6%, this is by virtue of the regional differences since Jowar is not popular in the southern parts of Karnataka. The pattern of consumption of cereals was essentially similar among the

NEE and EE, the obese individuals exhibited a small difference. Wherein, rice consumption was lower and wheat and ragi consumption was higher, although no statistical significance was observed.

Snackis variedly defined in literature because of the variety, nature and vastness of food items consumed as snacks. Overweight and obese tended to eat more snack foods such as “crisps, chocolates, ice cream, and sweets” and less “yogurt and nuts” than the normal weight participants. [17] Reports also indicate that emotional eaters generally have liking for high energy foods. Therefore it was considered important to investigate the preferences for food made by participants when eating outside home. Table 6 presents the information; it is obvious that 40 to 50% of both male and females inflicted with emotional eating problem preferred to consume foods such as fried foods (P = 0.001), ice cream (0.002), Indian snack (P = 0.054) and panipuri, followed by sweets (P = 0.001), pizza and burgers (21 to 33%) (P = 0.003). Although the foods listed appeared to be popular among participants with NEE, the percentages were significantly lower as compared to those with EE. Gender-based preferences are obvious in both NEE and EE groups, it is noteworthy that pizza/burger and fried foods were preferred more by men while panipuri, sweets and ice

cream were preferred by females. Small differences seen were among the EE. Men exhibited relatively higher preference for sweets and Indian snacks.

Foods that are known to add calories such as jam, toffee, chocolate, fried foods, chips and soft drinks and high-calorie foods were listed to study the frequency of their consumption. It was considered imperative to understand the food preferences and frequency of intake of such foods by individuals with EE for the reason that overweight and obesity prevalence is relatively higher among them. A perusal of table 7 suggests a marked difference in the frequency of eating these foods between subjects with emotional eating as compared to NEE. Further, females exhibited a distinct pattern of eating, females with NEE consumed energy-rich foods including nuts in higher frequencies as compared to their male counterparts. Participants both males and females with EE consumed the energy-rich foods such as jam, peanut butter, sweets, fried foods, chocolate/ toffee and nuts in markedly higher percentages and more frequently. It is important to note that the characteristic gender effect in consumption remained obvious in both groups with and without emotional eating. Soft drinks consumption was moderate in all the participants.

Table7.Frequency of eating selected foods: a comparison between emotional and non-emotional eaters

Frequency of Food Items	Non-emotional eaters		Emotional eaters	
	Male N=59	Female N=127	Male N=102	Female N=156
Jam				
Daily	0.0 (0)	10.2 (13)	3.9 (4)	10.3 (16)
Weekly	27.1 (16)	21.3 (27)	24.5 (25)	31.4 (49)
Occasionally / not consumed	72.9(43)	68.5(87)	71.6(73)	58.3(91)
Chi-square	$\chi^2 = 6.748, P=0.034$		$\chi^2 = 5.916, P=0.052$	
Peanut Butter				
Daily	0.0 (0)	3.1 (4)	10.8 (11)	7.7(12)
Weekly	18.6 (11)	20.5 (26)	29.4 (30)	19.9(31)
Occasionally / not consumed	81.4(48)	76.4(97)	59.8(61)	29.4(30)
Chi-square	$\chi^2 = 2.054, P=0.358$		$\chi^2 = 4.495, P=0.106$	
Pizza/ Burger /Chats				
Daily	5.1 (3)	7.9 (10)	7.8 (8)	10.3 (16)
Weekly	32.2 (19)	29.1 (37)	39.2 (40)	36.5(57)
Occasionally / not consumed	62.7(37)	63.0(80)	52.9(54)	53.2(83)
Chi-square	$\chi^2 = 0.575, P=0.750$		$\chi^2 = 0.505, P=0.777$	
Fried Foods/Chips				
Daily	8.5 (5)	10.2 (13)	19.6(20)	16.0 (25)
Weekly	40.7(24)	48.8 (62)	48.0 (49)	44.2 (69)
Occasionally / not consumed	50.8(30)	40.9(52)	32.4(33)	39.7(62)
Chi-square	$\chi^2 = 1.603, P=0.449$		$\chi^2 = 0.1564, P=0.457$	

Table 7 to be continued...				
Sweets (Indian Deserts)				
Daily	10.2 (6)	7.9 (10)	20.6 (21)	21.2 (33)
Weekly	47.5 (28)	50.4 (64)	56.9 (58)	49.4(77)
Occasionally / not consumed	42.4(25)	41.7(53)	22.5(23)	29.5(46)
Chi-square	$\chi^2 = 0.321, P=0.852$		$\chi^2 = 1.783, P=0.410$	
Toffee/Chocolate, etc.				
Daily	5.1 (3)	11.8 (15)	16.7 (17)	19.9(31)
Weekly	39.0 (23)	33.9 (43)	42.2 (43)	40.4(63)
Occasionally / not consumed	55.9(33)	54.3(69)	41.2(42)	39.7(62)
Chi-square	$\chi^2 = 2.200, P=0.333$		$\chi^2 = 0.419, P=0.811$	
Soft Drinks				
Daily	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Weekly	35.6 (21)	24.4 (31)	47.1 (48)	34.6 (54)
Occasionally / not consumed	64.4(38)	75.6(96)	52.9(54)	65.4(54)
Chi-square	$\chi^2 = 2.502, P=0.114$		$\chi^2 = 3.995, P=0.046$	
Nuts				
Daily	10.2 (6)	16.5 (21)	19.6 (20)	23.1 (36)
Weekly	49.2 (29)	47.2 (60)	53.9 (55)	43.6 (68)
Occasionally / not consumed	40.7(24)	36.2(46)	26.5(27)	33.3(52)
Chi-square	$\chi^2 = 1.368, P=0.505$		$\chi^2 = 2.672, P=0.263$	

DISCUSSION

Eating behavior is a dependent variable that gets influenced by a variety of environmental and subjective characteristics. Literature provides abundantly about the eating disorders prevalent among populations worldwide, very few among them have been studied to greater extent. Emotional eating is one of the most prevailing eating problems and less is known about it. It is assumed that stress as one of the psychological factors example, living in an environment surrounded by various stress-inducing factors, anxiety and depressive circumstances; that may affect eating pattern and lead to overeating in order to cope with that stressful condition. Alterations in eating habit could be one of the behavioral consequences of chronic stress. Cortisol is a stress hormone released in response to chronic stress resulting in overeating in some individuals. [18] Hence, it is presumed that stress and other psychological factors have an association with emotional eating.

Emotional eating does not always imply that individuals with elevated levels of depressive symptoms are vulnerable to overeating in response to negative emotions. Higher depressive symptoms were shown to cause both weight gain and loss among middle-aged men and women who participated in a follow-up study. Hence it is understandable that certain individuals with

negative emotions have higher BMI, WC, and fat mass. [19] Consistent with this, studies have documented that emotional eating accounted for the positive associations between depressive symptoms and the consumption of sweets energy-dense foods in both sexes. One of the explanations proposed for this effect is the inability of individuals to distinguish hunger from other aversive internal states and use eating as an emotion-regulation strategy. Overeating is, therefore, a consequence to escape from aversive self-awareness. [19] Emotional eaters are assumed to show interest to eat appetitive food stimuli including high calorie, high carbohydrate foods such as fried foods, chips, sweets, chocolate, cake and ice cream etc. [20,21]

Our study also endorses overweight and obesity among participants with emotional eating (overweight and obese men- 42.4 and 25.4% NEE vs. 29.4 and 42.2% EE; females- 26.0 and 26.8 NEE vs. 29.5 and 34.6% EE respectively). Studying lifestyle characteristics of the subjects with emotional eating is required to understand their general behaviors if corrective measures have to be undertaken. Quality of sleep and psychological status of individuals are reported to influence each other. [22,23] A study reported by Dweck and Jenkins 2014 revealed an association between poor sleep quality with higher scores of emotional eating among women. [9] Nevertheless, in

the present study majority (96-97%) of both male and female reported to have good quality sleep. Literature provides sufficient evidence to indicate that psychological state is a major factor in the development of emotional eating. Stress, anxiety and depression are commonly prevalent in the population worldwide. Our results also support such findings, among the three forms of psychological disturbances the highest occurrence was anxiety among emotional and the non-emotional eaters followed by depression and stress in the study population, the differences were statistically significant ($P=0.007$). It is worthwhile to mention that the occurrence rate was higher in women with or without emotional eating behaviors, indicating susceptibility of females to psychological trauma.

Nutrition concern of the individuals with emotional eating should be considered most important since the risk for developing nutritional problems appears to be high. The occurrence of emotional eating is high among the general population,^[5] and also as evidenced by our results wherein more than 50% of the participants were found to be afflicted by emotional eating. In this context providing them the opportunity for correction should be prioritized. Information regarding basic pattern of eating, food choices and environment they choose for eating should be clearly understood. Our results indicate that certain eating and drinking characteristics of emotional eaters are distinctly different. Alcohol consumption was found to be in higher percentage among EE (17.4) as compared to NEE (12.4), munching habits was also present in significantly higher proportion among EE (42.6 EE vs 19.3% NEE) so also snacking habit (87.2 vs 54.8% EE and NEE). Particularly munching and snacking habits points to a greater risk for developing obesity and other metabolic disorders. Our results provide evidence for a positive significant association between emotional eating and munching habit and elevated level of body mass index (males- $P=0.002$;

females- $P=0.001$). Eating outside home has been documented to give rise to disproportionate eating and increase the risk for obesity.^[24] We found eating outside home to be a common practice among study population, however, markedly higher percentage of obese and overweight individuals among the emotional and non-emotional eaters (men and women) preferred to eat (meal) outside home at least once a day.

Preferences for high energy snacks among emotional eaters have been studied.^[20,25] Foods like chocolate, fried foods, chips etc. are reported as the preferred snacks, a similar observation have been obtained in our study. We considered important to identify food preferences as well as frequency of their intake among subjects afflicted with EE since overweight and obesity was found to be relatively high. Participants both males and females with EE consumed energy-rich foods such as jam, peanut butter, sweets, fried foods, chocolate/toffee and nuts in markedly higher percentages. Female participants exhibited distinct pattern of eating, regardless of eating problems all females consumed energy-rich foods including nuts in higher frequencies as compared to their male counterparts. The pattern of consuming cereals remained essentially similar among all the participants. Marked differences in cereal intake and their frequency of intakes did not occur. Similar to other reports our results also endorse a significantly ($P=0.025$) higher percentage of EE follow a sedentary lifestyle, especially male participants. This is also an important contributor to increased body weights. Our study contribute significantly to the pattern of eating prevalent among individuals with emotional eating, which is essential to consider in planning the education program or other services directing towards EE.

CONCLUSION

Globalization has led to changes in lifestyle factors affecting perceptions, needs, availability, and demands in populations.

“Global transition” is the concept introduced to acquaint with the current status of transitional affairs: transition, in turn, has familiarized people to the cross-cultural and cross-continental behaviors and therefore generated admiration for the change. In this bargain, certain serious health-related issues have surfaced, importantly psychological problems and obesity. Eating behaviors are influenced by individuals’ traits, physical and mental health particularly the emotional status. Emotional eating is an eating disorder that occurs in response to negative emotions or emotional cues, causing over or under eating among individuals. This stressful condition tends to propel individuals towards unhealthy food choices and eating behaviors. Hence certain individuals with negative emotions have higher BMI, WC, and fat mass.

Emotional eating also is of common occurrence in populations from developing countries. Data regarding occurrence rate, eating behaviors and food choices are scanty, there is an urgent need to develop the database. Our results indicate that occurrence of emotional eating among the adult population in India is high, and people with emotional eating have a propensity to develop obesity. Majority of the people who had emotional eating problem exhibited higher scores for anxiety, stress and depression. They were overweight and obese in higher proportion as compared to the non-emotional eater. Certain dietary characteristics important to understand their basic behaviors that increase the susceptibility to weight gain were investigated. The crucial behaviors are: sedentary lifestyle, more snacking behavior, frequently eating outside home, munching behavior, selection of calorie-rich foods like sweets, chocolates/ toffee, fried foods, ice cream, pizza and other Indian snacks. It is essential that awareness about the danger of psychological status, health complications due to obesity, healthy food choices and coping with such condition is created among general population. A multidisciplinary

integrated approach should be adopted to achieve effective behavior change among target population.

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