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Associations between meal patterns, binge eating and weight for Latinas

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Abstract

Establishing a regular pattern of eating is a core element of treatment for binge eating, yet no research to date has examined meal patterns of Latina women.

Objective—Compare eating patterns of Latinas who binge eat and those who do not, and examine associations between meal patterns and binge episodes, associated distress and concerns, and body mass index (BMI).

Method—One-hundred fifty-five Latinas (65 BED, 22 Bulimia Nervosa [BN], 68 with no eating disorder) were assessed with the Eating Disorder Examination.

Results—There were no significant differences in eating patterns between groups. Breakfast was the least and dinner the most consumed meal. For the BED group: greater frequency of lunch consumption was associated with higher BMI while more frequent evening snacking was associated with lower BMI and with less weight importance; more frequent breakfast consumption, mid-morning snack consumption and total meals were associated with greater distress regarding binge eating. For the BN group: evening snack frequency was associated with less dietary restriction and more weight and shape concern; total snack frequency was associated with more weight concern. Regular meal eaters reported more episodes of binge eating than those who did not eat meals regularly.

Discussion—Associations with meal patterns differed by eating disorder diagnosis. Study findings mostly are not consistent with results from prior research on primarily White women. CBT treatments may need to be tailored to address the association between binge eating and regular meal consumption for Latinas. Culturally appropriate modifications that address traditional eating patterns should be considered.

Keywords

binge eating; eating disorder; Latina; meal patterns; weight

Research has identified Binge Eating Disorder (BED) as the most prevalent eating disorder among Latinos (1). Binge eating is commonly associated with chronic conditions such as obesity and diabetes. Obese patients who binge eat have a higher BMI than obese patients

who do not binge eat (2), and the prevalence of binge eating amongst individuals with diabetes may be as high as 25.6% (3–4). Obesity is more prominent among Latinos as compared to Whites in the United States (5). At the same time, Latinas report more frequent binge eating and higher levels of associated depressive symptoms as compared to White women (6). These findings highlight the importance of providing appropriate treatment for Latinas.

Several established treatments for binge eating have yielded positive results. Of these treatments, cognitive-behavioral therapy (CBT) is widely considered the most efficacious intervention, as evidenced by maintained treatment effects after 12 months (7–9). Establishing a regular pattern of eating, such that daily eating is confined to three planned meals and two or three planned snacks is a core element of CBT treatment for binge eating (10–11). The implementation of this pattern of eating is designed to change irregular, erratic eating patterns that often facilitate and maintain the restrict/binge cycle characteristic of binge eaters. Research on predominantly White samples of obese patients with BED has demonstrated that eating at least three meals per day is associated with significantly fewer binge episodes as compared to eating less than three meals per day (12–13). Furthermore, regular consumption of breakfast, lunch, and dinner was also significantly correlated with lower BMI in obese individuals with BED (12). These data provide preliminary evidence for the specific efficacy of establishing a regular pattern of eating to treat binge eating. However, since eating and meal patterns are culturally influenced behaviors, similar studies that focus on ethnically diverse samples are warranted to determine the effectiveness of regular meal consumption for reducing binge episodes in Latinos and other at-risk populations.

While no research to date has focused specifically on meal patterns in Latinas with binge eating, the research on predominantly White individuals has yielded some important findings related to meal patterns and binge eating outcomes. First, studies found that more frequent evening snacking was significantly correlated with increased binge eating (12, 14). Although these data seem to contradict the finding that more frequent meals and snacks were related to lower weight (12), some researchers speculate that the evening may be a particularly vulnerable time for binge eating, thus explaining why evening snack frequency has been found to be positively correlated with binge episodes in at least one study (14). Furthermore, frequency of breakfast consumption alone has been associated with a lower BMI (12, 13, 15) and with decreased impulsive snacking among individuals who binge eat (16).

The purpose of this study was two-fold. Our first aim was to compare the eating patterns of Latinas who binge eat and those who do not. Less is known about eating disorders among Latinas due to their underrepresentation in the existing literature; therefore examining their eating patterns could help determine if they differ from White women. Our second aim was to examine systematically the associations between meal patterns and binge episodes, associated distress and concerns, and BMI. Based on the prior research with predominantly White samples (12–14), we predicted that Latinas with binge eating would exhibit patterns of eating pathology such that: (1) total meal frequency would be negatively associated with binge episodes and BMI, (2) breakfast frequency would be negatively associated with BMI, and (3) evening snack frequency would be positively associated with binge episodes.

Additionally, we predicted (12) that binge eaters who regularly ate three meals per day would have significantly lower BMI and report fewer binges than those who did not regularly eat three meals per day.

Methods

Participants

A case-finding procedure, targeting individuals who self-identified as having problems with binge eating or overeating, was used to recruit participants by posting flyers and ads in educational and community organizations. Recruitment materials asked for Latinas experiencing problems with overeating or binge eating to participate in a women's health study. Respondents meeting eligibility criteria (i.e., female, Latina, ages 18–55, BMI 18, self-report of regular overeating quantified as eating in one sitting the equivalent of 2–3 meals or a bag of groceries) were assessed for current and past history of eating disorder (Eating Disorder Examination; 17). Exclusion criteria were current pregnancy, brain injury or impairment affecting recall or ability to complete assessments, or serious medical condition or medical risk that would require immediate hospitalization.

Two-hundred and sixty-five individuals were screened for eligibility over a six-year period. The resulting sample consisted of 155 individuals: 65 who met DSM-5 diagnostic criteria (18) for current Binge Eating Disorder (BED), 22 who met diagnostic criteria for Bulimia Nervosa (BN), and 68 who did not meet criteria for current or past eating disorder (no ED). Average age for the sample was 26.9 years old (range 18 to 55), average level of education was some college (ranging from less than 8th grade to graduate degree), and the majority (71%) of the sample was single. Mean BMI was 30.2 (SD = 7.5, range 18 to 57), and 70.1% of participants were overweight or obese (BMI > 24.9). Each participant was compensated for her time with a \$25 gift card. Informed consent was obtained from all participants in writing, and American Psychological Association (19) and University IRB requirements for the ethical treatment of human subjects in research were followed.

Procedures

Interview assessments were conducted on the phone in English or Spanish, depending on language preference of the participant (in total 13 interviews were conducted in Spanish). Interview assessments included the following:

Demographic information—Participants self-reported ethnicity, generational status, age, marital status, level of education, occupation, and height and weight. *Body Mass Index* (BMI) was calculated as weight in kilograms/height² in meters. Self-reported height and weight are largely reliable and accurate for overweight and obese women and few under-report their weight by > 10% (20).

Eating Disorder Examination, 12th edition (EDE;17)—The EDE is a well-established, standardized, investigator-based interview that measures the frequency of binge eating (OBE; Objective Bulimic Episodes) during the past 3 months, with particular attention to the past 28 days, as well as frequency of any compensatory behaviors. Degree of

dietary restriction is rated on a 3-point scale (0–2), and items measuring distress regarding (binge) eating, weight and shape concern are rated on 7-point scales (0–6), with higher scores reflecting greater severity or frequency. Information regarding eating patterns over the past 28 days is collected; each participant reports on how many days out of the past 28 days she has eaten breakfast, mid-morning snack, lunch, mid-afternoon snack, evening meal, evening snack, and a nocturnal snack. The EDE has high discriminant and concurrent validity and reliability, and is considered to be the most reliable and comprehensive interview for assessing eating problems (21). Internal consistency of the EDE is good, with Cronbach's alpha of the five subscales ranging from .67 to .90 in White samples (22). Inter-rater reliability has been reported to be very good in several studies with predominantly White samples, both for individual items ($r = .69$ to 1.00) and for the subscales ($r = .83$ to $.99$). All subscales are highly correlated ($r = .78$ to $.82$) with other measures of weight and shape control (22). The reliable use of the EDE with Latina samples has been established, with intraclass correlation coefficients (ICCs) for the subscales assessing core ED psychopathology (objective bulimic episodes, restraint, eating concern, weight concern, shape concern) ranging from .67 to .99 (23), and with Cronbach's alpha of the subscales ranging from .80 to .85 (24). In our sample, inter-rater reliability for the items of interest was good to excellent, with ICCs ranging from .77 to .95.

Statistical Analyses

For aim one, chi-square comparisons of meal and snack frequencies were used to describe the eating patterns of Latinas who binge eat (BED, $n = 65$; BN, $n = 22$) and those who do not (i.e., no current or past history of eating disorder, $n = 68$). To address aim two, we conducted correlational analyses within the samples of BED and BN to examine associations between meal and snack frequencies and BMI, binge episodes (OBEs), and associated features – distress regarding eating, dietary restriction, and shape and weight concern. Additionally, following Masheb and Grilo’s analytical strategy (12), one-way ANOVAs were conducted within the binge-eating group (BED and BN combined) to compare those who regularly ate three meals per day versus those who did not on the variables of interest (BMI, OBEs, distress, restriction, shape and weight concern). All tests were two-tailed and p -value of .05 was used to indicate statistical significance. Data analyses were conducted with SPSS for Windows, version 21 (IBM Corp, 2012).

Results

With respect to demographic variables, there were few differences between groups. Not surprisingly, the BED group (Mean BMI = 32.9, $SD = 8.4$) weighed more than the BN (Mean BMI = 28.3, $SD = 5.6$) and no ED groups (Mean BMI = 28.2, $SD = 6.2$), $F(2, 153) = 8.18$, $p < .001$. Individuals with BN were more likely to be 2nd generation U.S. immigrants (10.5% 1st generation, 68.4% 2nd generation, 21.1% 3rd or higher generation), while those with no ED were more likely to be 1st generation U.S. immigrants (56.7% 1st generation, 36.7% 2nd generation, 6.7% 3rd or higher generation) and those with BED were roughly split between being 1st or 2nd generation U.S. immigrants (38.2% 1st generation, 47.3% 2nd generation, 14.5% 3rd or higher generation), $\chi^2(4) = 10.79$, $p = .029$. The three groups were similar in terms of age, marital status, and education level (all p values $> .05$).

What are the eating patterns of Latinas who binge eat and those who do not?

Chi-square analyses revealed no significant differences in frequency of meal or snack consumption between Latinas with BED, BN and those with no history of eating disorder (all p values $> .05$), with one exception: the BN group reported more nocturnal eating than the other two groups (BN: 18.2%; BED: 3.1%; no ED: 1.5%), $\chi^2(12) = 21.04$, $p = .05$. Table 1 shows the frequency of meals and snacks consumed in the past 28 days for all participants. Breakfast was the least consumed meal for all three groups, with less than one-fifth of the sample reporting having eaten breakfast every morning during the past 28 days. Dinner was the most frequently consumed meal for the BED group (44.6%), while lunch and dinner were consumed on most days by the no ED comparison group (68% and 69%, respectively) but less regularly by the BN group (45%). Although none of the women in any of the groups reported skipping lunch or dinner every day, a few women ($n = 3$) did report skipping breakfast every day. Evening snacks were the most commonly consumed snack for those with BED or BN; 48% of those with BED and 68% of those with BN reported having an evening snack on more than half of the past 28 days.

For binge eaters, is meal, snack and breakfast consumption related to BMI, binge frequency and associated features?

Tables 2 and 3 show for BED and BN the Pearson product moment correlations between each of the meals, snacks, total meals and total snacks with BMI, frequency of binge eating and associated features. For the BED group, greater frequency of lunch consumption was associated with higher BMI ($r = .25$, $p = .044$). Conversely, more frequent evening snacking was associated with lower BMI ($r = -.33$, $p = .008$) and correspondingly with less weight concern ($r = -.30$, $p = .016$). More frequent breakfast consumption ($r = .36$, $p = .004$), mid-morning snack consumption ($r = .30$, $p = .016$) and total meals ($r = .31$, $p = .013$) were associated with greater distress regarding binge eating. Contrary to prediction, there were no significant associations between total meal frequency and binge eating or BMI, between breakfast frequency and BMI, or between evening snack frequency and binge episodes. All remaining correlations were nonsignificant (see Table 2).

For the BN group, evening snack frequency was negatively correlated with dietary restriction ($r = -.55$, $p = .008$), and positively correlated with weight concern ($r = .49$, $p = .020$) and shape concern ($r = .54$, $p = .009$). Total snacks was also positively correlated with weight concern ($r = .44$, $p = .038$). All remaining correlations were nonsignificant (see Table 3). For the no ED comparison group, the only significant associations were between BMI and evening meal frequency ($r = .30$, $p = .014$) and between BMI and total meals ($r = .26$, $p = .031$).

What percentage of Latinas with binge eating regularly eats three meals per day, and is meal regularity associated with weight and binge eating?

Participants with binge eating (BED/BN, $N = 87$) were categorized based on or not they reported eating three meals per day on 23 or more of the past 28 days (i.e., reported at least a "5" on each of the three EDE items corresponding to breakfast, lunch and dinner frequency). A little over 1/3 (38%) of the participants ($n = 33$) regularly ate three meals per day, and 62% ($n = 54$) did not regularly eat three meals per day. Results from a one-way ANOVA

comparison of the two groups on BMI, binge eating and associated features as well as the means and standard deviations for the overall sample are shown in Table 4. Participants who regularly ate three meals per day reported significantly more episodes of binge eating (OBE *Mean* = 21.3, *SD* = 23.2) than those who did not regularly eat three meals per day (OBE *Mean* = 12.0, *SD* = 9.3), $F(1, 86) = 6.97, p = .01$. The two groups were otherwise similar on mean BMI and the remaining eating and weight related variables. In examining the BED and BN groups separately, a similar pattern of results emerged with the only significant difference between regular meal eaters and non-regular meal eaters occurring in frequency of OBEs: for the BED group, those who regularly ate three meals per day ($n = 27$) reported significantly more episodes of binge eating (OBE *Mean* = 18.3, *SD* = 16.1) than those ($n = 38$) who did not regularly eat three meals per day (OBE *Mean* = 11.9, *SD* = 8.5), $F(1, 64) = 4.28, p = .04$; for the BN group, those who regularly ate three meals per day ($n = 6$) reported significantly more episodes of binge eating (OBE *Mean* = 35.0, *SD* = 42.6) than those ($n = 16$) who did not regularly eat three meals per day (OBE *Mean* = 12.2, *SD* = 11.2), $F(1, 21) = 4.15, p = .05$.

Post-hoc analyses

To understand better the eating patterns of Latinas we conducted post-hoc analyses examining the context of binge eating episodes. An examination of the criteria associated with binge episodes (17–18) showed that only 50.6% (44/87) of Latinas with BED or BN endorsed binge eating when alone, while 75.9% (66/87) endorsed eating rapidly, 90.8% (79/87) endorsed eating until full, 87.4% (76/87) eating large amounts, and 96.6% (84/87) feeling disgusted with self after binge eating. There were no differences in endorsement of criteria by diagnostic group (BED vs. BN), all p values > .05.

Discussion

This study presents the first descriptive picture of the eating patterns of an overweight and obese sample of Latinas who binge eat. Our finding that breakfast was the least consumed meal and dinner was the most consumed meal amongst the BED group is consistent with the meal patterns reported among predominantly White BED samples (12, 14). Surprisingly, we found no clear differences in eating patterns between those with BED or BN and a matched sample of Latinas with no history of eating disorder. Both groups reported eating lunch and dinner regularly, and breakfast was the only meal skipped every day by some individuals. This pattern may be attributed to the social context surrounding meals in the Latino culture where meals, particularly lunch and dinner, are typically eaten in a familial context and therefore perhaps less likely to be skipped. Descriptions of binge eating episodes by participants suggest that Latinas binge eat in social contexts, and not alone as is often typical for White women with BED or BN (18). Example OBE descriptions from study participants highlight this potential difference: “I wanted to stop but I couldn’t, I always have to get extra servings with my family,” and “There is no other option during a family meal; I have to overeat when my family is around.”

Additionally, post-hoc examination of the associated features of binge eating assessed by the EDE (17) further support the indication that eating when alone may not be a typical

characteristic of Latinas' binge episodes as it is for White samples (18). Thus, eating patterns should be considered within the larger sociocultural context.

Our results also indicate that predictions based on predominantly White samples from other studies mostly are not supported within this sample. In fact, we found that Latinas who were regular meal eaters reported significantly more episodes of binge eating than those who did not eat meals regularly. One possibility is that binges are occurring in social or familial contexts as part of regularly eaten meals. Latinas do report social and familial pressure to eat (25), which might in turn trigger binge-eating episodes during mealtimes.

Our a priori hypotheses for this study were only partially supported. While total meal frequency was not associated with binge episodes or BMI, we did find that more frequent lunch consumption was associated with higher BMI for the BED group, which was also found by Masheb and Grilo (12). We did not find an association between breakfast and BMI or between evening snack consumption and binge eating. However, we did find for the BED group that more frequent breakfast and mid-morning snack consumption was associated with higher levels of distress regarding binge eating, and that evening snack frequency was actually associated with lower BMI (also reported by Masheb and Grilo [12]) and less weight concern. This pattern of findings suggests that consumption of an evening snack may serve a protective function for this group, decreasing the likelihood of daytime overeating or binge eating and associated weight gain. Further studies that examine binge eating in the context of traditional eating patterns are needed to help determine the most effective guidelines for Latinas suffering from BED.

Studies specifically examining meal patterns in BN indicate that individuals with BN eat fewer meals, particularly lunches, than those with BED or no eating disorder (26), and that regular evening meal consumption may be important for reducing binge eating and purging (27). Our results with this Latina sample did not support these prior observations from research conducted with predominantly White female samples. We did observe differences in results between our BED and BN samples, with more frequent evening snack consumption being associated with greater weight and shape concerns, and less dietary restriction within the BN group only. Overvaluation of shape and weight are core characteristics of BN but are not necessarily reported by individuals with BED (18), therefore the identified differences between the two diagnostic groups are not surprising. Furthermore, our BN individuals were more likely to be 2nd generation U.S. immigrants and therefore could be considered to be more acculturated to U.S. society. The relationship between increased drive for thinness and acculturation to Western ideals is well documented in the literature (28). By contrast, our non-ED individuals were primarily 1st generation U.S. immigrants, supporting the existence of a relationship between acculturation and the development of eating disorders for Latinas. Future studies need to further examine differences in meal patterns and binge eating between BN and BED and consider specific cultural practices and values that influence these behaviors. For example, amongst Latina women individual dietary restriction and overvaluation of shape and weight might impact the binge eating of those with BN while family meal patterns may have stronger influence on the binge eating of those with BED. Such information can have clinical utility for the tailoring of behavioral interventions for subgroups of those with eating disorders.

Knowledge of meal patterns can be utilized to adapt therapeutic and preventive approaches for individuals based on both diagnosis and cultural background. For instance, our results suggest that evening snacking may serve a protective function for Latinas with BED, while it may present a period of vulnerability for those with BN and therefore should be specifically addressed as part of guidance on healthy eating. Changes in meal and snack patterns potentially could be used to predict treatment outcome and prognosis. At-risk populations may benefit from greater understanding of when to eat and when best to avoid overeating. Finally, if further research in this area demonstrates distinct differences in meal patterns between BED and BN (e.g., presence of nocturnal snacking), such information can be used to support differential diagnoses.

Furthermore, adaptations to CBT for this population of Latinas might be indicated. Rather than an emphasis on establishing a regular pattern of meals, a programmatic focus on portion size, type of food and nutritional content may be helpful when treating Latinas with binge eating. Psychoeducational materials may also be of use, to educate the client and family members on the presence of disordered eating and the principles of healthy eating. Some components of interpersonal therapy can be helpful; particularly assertiveness training may help clients exert portion control during family meal times (29). Relationship issues and communication difficulties with family members might be especially important to tackle for CBT to be effective. The role of the family and family meals in exposure to triggers might also be important to consider.

This study is the first of its kind with a sample of Latinas who binge eat. The findings should be viewed as preliminary given the relatively small sample size, descriptive nature of the study, and largely correlational results. Based on such correlational findings it is not known whether prescriptive changes in eating (e.g., recommendation that those with BED should eat an evening snack) would produce the desired effect (e.g., decrease in binge eating). Additionally, the sample was restricted to women and findings cannot be generalized to men with binge eating problems or to other cultural groups. Nevertheless, the findings extend the limited literature on eating disorders in Latinas and begin to shed light on potential cultural and generational differences in meal and overeating patterns. Importantly, our findings suggest that for evidence-based interventions such as CBT to be maximally effective for treating binge eating in the Latina population, modifications that address traditional eating patterns, and social and cultural meanings and practices around eating, need to be considered.

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Table 1

Frequency of meals and snacks for BED, BN and the comparison group (no eating disorder)

BED											
Frequency	Breakfast	Mid-morning snack	Lunch	Mid-afternoon snack	Dinner	Evening snack	Nocturnal eating				
	n	%	n	%	n	%	n	%	n	%	%
0 (Absence)	2	3.1	4	6.2	0	0.0	4	6.2	37	56.9	
1 (1–5 days)	5	7.7	9	13.8	2	3.1	5	7.7	11	16.9	9
2 (6–12 days)	13	20.0	17	26.2	5	7.7	17	26.2	2	3.1	10
3 (13–15 days)	8	12.3	14	21.5	8	12.3	13	20.0	5	7.7	2
4 (16–22 days)	17	26.2	12	18.5	17	26.2	7	10.8	10	15.4	4
5 (23–27 days)	8	12.3	7	10.8	12	18.5	11	16.9	18	27.7	1
6 (28 days)	12	18.5	2	3.1	21	32.3	8	12.3	29	44.6	2
Total (N = 65)	65		65		65		65		65		65

BN											
Frequency	Breakfast	Mid-morning snack	Lunch	Mid-afternoon snack	Dinner	Evening snack	Nocturnal eating				
	n	%	n	%	n	%	n	%	n	%	%
0 (Absence)	0	0.0	1	4.5	0	0.0	0	0.0	1	4.5	8
1 (1–5 days)	2	9.1	1	4.5	1	4.5	2	9.1	0	0.0	3
2 (6–12 days)	3	13.6	7	31.8	4	18.2	4	18.2	2	9.1	3
3 (13–15 days)	4	18.2	0	0.0	2	9.1	3	13.6	6	27.3	1
4 (16–22 days)	7	31.8	8	36.4	5	22.7	6	27.3	4	18.2	1
5 (23–27 days)	2	9.1	4	18.2	3	13.6	3	13.6	4	18.2	2
6 (28 days)	4	18.2	1	4.5	7	31.8	4	18.2	6	27.3	4
Total (N = 22)	22		22		22		22		22		22

No ED Comparison													
Frequency	Breakfast	Mid-morning snack	Lunch	Mid-afternoon snack	Dinner	Evening snack	Nocturnal eating						
	n	%	n	%	n	%	n	%	n	%	n	%	%
0 (Absence)	1	1.5	8	11.8	0	0.0	6	8.8	45	66.2			
1 (1–5 days)	6	8.8	13	19.1	1	1.5	12	17.6	3	4.4	15	22.1	11.8
2 (6–12 days)	15	22.1	18	26.5	5	7.4	15	22.1	1	1.5	16	23.5	7.4
3 (13–15 days)	4	5.9	9	13.2	4	5.9	8	11.8	3	4.4	3	4.4	7.4
4 (16–22 days)	16	23.5	8	11.8	12	17.6	12	17.6	14	20.6	10	14.7	4.4
5 (23–27 days)	12	17.6	7	10.3	15	22.1	7	10.3	15	22.1	11	16.2	1.5
6 (28 days)	14	20.6	5	3.2	31	45.6	9	13.2	32	47.1	7	10.3	1.5
Total (N = 68)	99		68		68		68		68		68		

Table 2

Correlation coefficients for eating pattern variables with BMI, OBE frequency and associated features for BED group

Measures	Total Meals	Total Snacks	Breakfast	Mid-morning snack	Lunch	Mid-afternoon snack	Dinner	Evening snack
BMI	.18	-.19	.13	-.001	.25 [*]	-.11	.03	-.33 ^{**}
OBE frequency	.17	.19	.16	.22	.10	.10	.14	.02
Distress	.31 [*]	.08	.36 [*]	.30 [*]	.20	.08	.10	-.04
Dietary restriction	.03	-.04	-.05	.03	-.01	.10	.16	-.15
Weight concern	.14	-.13	.11	.06	.09	.10	.12	-.30 [*]
Shape concern	.16	-.01	.12	.09	.12	.04	.15	-.13

Note: BMI= body mass index; Total Meals = frequency of breakfast, lunch, and dinner in the past 28 days; Total Snacks = frequency of mid-morning snacks, mid-afternoon snacks, and evening snacks in the past 28 days; OBE frequency = frequency of objective bulimic episodes in past 28 days. *N* = 65.

^{**}

Correlation is significant at the .01 level (2-tailed)

^{*}

Correlation is significant at the .05 level (2-tailed)

Table 3

Correlation coefficients for eating pattern variables with BMI, OBE frequency and associated features for BN group

Measures	Total Meals	Total Snacks	Breakfast	Mid-morning snack	Lunch	Mid-afternoon snack	Dinner	Evening snack
BMI	.05	.40	-.25	.13	.28	.32	.09	.14
OBE frequency	.33	.32	.26	.33	.33	.29	.22	.24
Distress	-.16	.01	-.02	-.24	-.08	.11	-.35	.18
Dietary restriction	-.24	-.39	-.25	-.24	-.10	-.18	-.27	-.55**
Weight concern	.14	.44*	-.03	.02	.12	.28	.30	.49*
Shape concern	.16	.42	-.02	-.001	.12	.14	.34	.54**

Note: BMI= body mass index; Total Meals = frequency of breakfast, lunch, and dinner in the past 28 days; Total Snacks = frequency of mid-morning snacks, mid-afternoon snacks, and evening snacks in the past 28 days; OBE frequency = frequency of objective bulimic episodes in past 28 days. $N = 22$.

** Correlation is significant at the .01 level (2-tailed)

* Correlation is significant at the .05 level (2-tailed)

Table 4

Means, standard deviations and ANOVA results for regular versus nonregular three-meal per day eaters

Eating-related measures	Overall sample (N=87)		Regular meal eaters (n=33)		Nonregular meal eaters (n=54)		ANOVA	
	Mean	(SD)	Mean	(SD)	Mean	(SD)	F	p
BMI	31.7	(8.0)	32.2	(7.9)	31.4	(8.1)	0.22	.639
OBE frequency	15.5	(16.5)	21.3	(23.2)	12.0	(9.3)	6.97	.010
Distress	3.7	(0.9)	3.8	(0.7)	3.7	(1.0)	0.30	.585
Dietary restriction	0.2	(0.4)	0.1	(0.3)	0.3	(0.5)	3.27	.074
Weight concern	4.0	(1.4)	4.2	(1.3)	3.9	(1.6)	0.42	.520
Shape concern	4.5	(1.4)	4.8	(1.3)	4.3	(1.3)	2.62	.109

Note: BMI = Body Mass Index; OBE frequency = frequency of objective bulimic episodes in past 28 days.