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Abstract

Objective—We sought to describe meal and snack frequencies of individuals with recurrent binge eating and examine the association between these eating patterns and clinical correlates.

Method—Data from 106 women with a minimum diagnosis of recurrent binge eating were utilized. Meal and snack frequencies were correlated with measures of weight, eating disorder features, and depression. Participants who ate breakfast every day (n=25) were compared with those who did not (n=81) on the same measures.

Results—Breakfast was the least, and dinner the most, commonly consumed meal. Evening snacking was the most common snacking occasion. Meal patterns were not significantly associated with clinical correlates; however, evening snacking was associated with binge eating.

Discussion—Our findings largely replicated those reported in earlier research. More research is needed to determine the role of breakfast consumption in binge eating.

Keywords

eating patterns; binge eating; obesity; eating disorders; breakfast

A core element of cognitive-behavioral treatment of bulimia nervosa is the proscription that patients adopt a pattern of regular eating involving three planned meals and two to three planned snacks spread out over the course of the day[1] in order to reduce the risk of binging in response to a perceived or real nutritional deficit.[2] Initially developed to treat the highly chaotic eating patterns commonly observed in individuals with bulimia nervosa, who report fasting or highly restrictive eating outside of binging episodes, the recommendation for regular meals and snacks also has been adopted for individuals with BED.[1]

Only two studies, with overlapping samples, have examined the relationship between general eating patterns and clinical features among persons with BED.[3,4] Masheb and Grilo (2006)[4] found that more frequent consumption of meals and snacks was associated with lower weight in a sample of male (n = 46) and female (n = 127) obese patients with BED. However, breakfast frequency was more strongly associated with lower weight than lunch frequency, and the frequency of eating dinner was not correlated significantly with weight. Of note, breakfast was the least frequently eaten meal in this sample. Although the frequency of individual meals was not associated with binge frequency, patients who

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reported regularly eating three meals a day had fewer binge eating episodes than patients who did not regularly eat three meals a day. Daily evening snacking was positively associated with binge frequency, yet surprisingly, it also was associated with lower Body Mass Index (BMI). The generalizability of these findings may be limited to patients in treatment for weight loss at specialty clinics and additional research with patients presenting at different clinical settings, or for reasons other than weight loss, is needed.[4]

The present study utilized data collected as part of the baseline assessment for the Binge Eating Self-help Treatment study (BEST)[5,6] and expands upon prior research by recruiting participants from the membership of a large Health Maintenance Organization (HMO) rather than a specialized clinic and by using broader study entry criteria. Specifically, participants were eligible if they reported a minimum average frequency of one binge eating episode per week for the past three months (recurrent binge eating; RBE) and they were not required to be obese. Hence, our sample included individuals whose clinical presentation in terms of binge frequency or degree of overweight was less severe than that represented in Masheb and Grilo (2006)[4].

Our secondary data analyses addressed three aims: (1) to describe the frequency and regularity of meals and snacks in our sample of recurrent binge eaters; (2) to examine the associations between eating patterns and clinical correlates, including BMI, dimensional measures of eating pathology, and depression; and (3) to compare clinical features of participants who reported regular eating with those who did not. Because a growing literature suggests that eating breakfast, in particular, may be helpful in managing weight or preventing weight gain,[7–9] we also compared participants who ate breakfast regularly with those who did not on the clinical measures. The present report is restricted to women because only four men (3.6%) participated in the treatment trial, precluding analyses based on sex.

Method

Sample

The sample consisted of 106 women (94.3% white, 96.2% non-Hispanic), most of whom completed at least some college (83.0%) and were married or partnered (69.8%), with a mean age of 33.9 years (SD = 7.4) and a mean BMI of 33.3 lbs/in^2 (SD = 7.2). Thirty participants (28.3%) were overweight (25 ≤ BMI < 30) and 67 (63.2%) were obese (BMI ≥ 30). Forty-eight women met full syndrome diagnostic criteria for BED and the remainder reported RBE. Compensatory behaviors were reported by 15.1% of participants, although none reported such behaviors at diagnostic thresholds.

Instruments and Procedure

Only instruments and procedures relevant to the present report are described below. Recruitment[5] and case finding[6] for BEST have been detailed in previous reports. In brief, health plan members between the ages of 18 and 50, randomly selected from the HMO database, were mailed an invitation to the clinical trial. Brochures and posters advertising the trial were also placed in HMO clinics. A two-stage case finding procedure was used in which participants completed an initial self-report screening questionnaire (the Patient Health Questionnaire[10]) followed by a confirmatory diagnostic interview and additional self-report measures. All study procedures were approved by the participating institutions' human subjects review boards.

Eating Disorder Pathology—An abbreviated version of the Eating Disorder Examination (EDE)[11] was administered by telephone to confirm study eligibility and eating

disorder diagnosis (DSM-IV[12]) and to assess meal and snack frequency during the past month. We recorded the number of objective bulimic episodes (OBEs), defined as an episode in which an individual objectively overeats while feeling a loss of control, as well as the number of days with at least one OBE. Because findings for these variables were similar, we report only the number of days with OBEs. Participants were asked on how many of the past 28 days they had consumed breakfast, lunch, and dinner, as well as had mid-morning-, mid-afternoon-, evening-, or nocturnal snacks. Nocturnal eating was defined as an episode of eating after the participant had been to sleep. We also rated meal or snack frequencies using EDE scoring procedures (0 = not eaten; 6 = meal or snack eaten every day).

The Eating Disorder Examination Questionnaire (EDE-Q)[13] was used to assess dietary restraint, eating concern, shape concern, and weight concern. In addition, two items with demonstrated validity as indicators of body checking (e.g., frequent weighing or pinching the body to measure fat) and body avoidance (e.g., wearing baggy clothing or avoiding weighing oneself)[14] were included. Participants rated, on a scale from 1 (never) to 6 (always), how often in the past 28 days they had engaged in body checking or avoidance behaviors.

Depression—Depressive symptoms were assessed by self-report using the Beck Depression Inventory (BDI).[15]

Data Analyses

Pearson product moment correlations were used to correlate meal and snack frequencies with weight and measures of eating behaviors, body image concerns, BMI, and self-reported depression. Independent samples t-tests were used to test group differences between those who ate breakfast daily versus those who did not, and between those who ate three meals per day versus those who did not, on the clinical indicators of interest. A conservative value of p < .01 was adopted in light of the large number of statistical tests and Cohen's d[16] was calculated to estimate effect size.

Results

Meal and Snack Consumption among Women with Recurrent Binge Eating

Table 1 shows the frequency of meal and snack consumption in the past 28 days. On average, lunch (mean = 24 days) and dinner (mean = 26 days) were consumed on all but one day per week. Breakfast was also consumed on a majority of days (mean = 19 days), though less often than lunch or dinner. Snacking during the evening was more common than snacking in the afternoon which, in turn, was more common than snacking mid-morning.

Employing Masheb & Grilo's (2006)[4] definition of regular eating, i.e., eating a meal every day during the past 28 days, breakfast was again the least, and dinner the most, commonly consumed meal. Daily eating was reported by less than one-quarter of the sample for breakfast, by a third of the sample for lunch, and by just under one-half for dinner. Daily snacking was reported by only a minority of participants. Daily evening snacking was the most common (14.2%) and daily mid-afternoon snacking (5.6%) or mid-morning snacking (2.4%) were reported by only a handful of participants. At least one episode of nocturnal eating (a presumably undesirable behavior) was reported by about 25% of the sample; no participant reported daily episodes of nocturnal eating.

Clinical correlates of meal and snack consumption

As shown in Table 2, neither breakfast, lunch, nor dinner frequency was associated significantly with BMI, binge eating, dimensional measures of eating disorder pathology, or

self-reported depression. No significant associations were noted between total meal frequency and any of the clinical correlates (data not shown). Correlations between snacking frequency and clinical correlates were also non-significant with the exception of evening snacking, which was associated with binge eating.

Prevalence and Clinical Correlates of Regular Eating

Only 9.4% our sample reported eating three meals a day on each of the preceding 28 days. Regular meal eaters (n = 10) did not differ from non-regular meal eaters (n = 96) on any of the dependent variables, although effect size estimates indicated differences of moderate magnitude for body checking (d = 0.59) (data not shown).

Daily breakfast eating was reported by 23.6% of participants. No reliable (p < .01) differences were observed between those who ate breakfast regularly and those who did not, although the effect size was moderate for body checking with daily breakfast eaters reporting more frequent body checking (see Table 3).

Discussion

Our principal findings were as follows. First, a majority of women in our sample reported eating breakfast, lunch and dinner and many also reported evening or mid-afternoon snacking on more days than not during the past 28 days. Dinner was the most, and breakfast the least, commonly consumed meal, snacking was most often reported during the evening time, and nocturnal eating was infrequent. In addition, when employing the strict definition of <u>regular</u> eating used by Masheb and Grilo (2006)[4], requiring daily consumption of breakfast, lunch, and dinner, fewer than one-half of participants in either study were deemed to be regular eaters, though participants in our study were especially unlikely to meet this stringent criterion. Finally, few significant associations were found between eating patterns and clinical correlates of interest.

The general meal and snack patterns we observed were consistent with those reported by Masheb & Grilo (2006)[4]: dinner was the most, and breakfast the least, commonly consumed meal, and evening snack was the most commonly reported snack. This eating pattern may be a stable feature of binge eating disorders. However, specific meal and snack frequencies were much lower in our study. Although our sample appeared to eat meals and snacks with some consistency, few participants evidenced a meal pattern that would meet the narrow definition of regularity used by Masheb & Grilo (2006).[4] Indeed, less than 10% of our participants ate all three meals daily during the past four weeks. Yet, when the definition of regularity is adjusted to include individuals who consumed meals or snacks on more than half of the days, 96.3% of our sample and 95.3% of Masheb & Grilo's (2006)[4] sample consumed dinner regularly.

Breakfast skipping is considered to be normative among adolescents,[17–19] however, health experts have noted that breakfast plays an important role in mood, cognitive functioning, and weight management.[19–22] Although a number of studies have found an inverse relationship between breakfast eating and BMI, [4,18,23–25] we did not. The cross-sectional nature of our data may have precluded the detection of a predictable long-term relationship between breakfast consumption and BMI. In addition, most of our participants (91.5%) were either overweight or obese, thus restricting the variance in BMI to detect a significant relationship.

Binge eating was not correlated with any specific meal, or pattern of meals, but was associated with evening snacking. Evening may present a vulnerable time for binge eating because snacks consumed at this time may develop into binge episodes.[4] This would suggest

that clinicians should work with clients to develop strategies to structure these eating occurrences in ways that minimize the risk that they lead to binge eating.

Neither meal nor snack frequency correlated with any other measures of weight, eating pathology, or depression. Masheb & Grilo[4] also found few significant correlations between meals and snacks and eating pathology. Our participants, however, were not symptom-free. The women in our sample scored higher than average on measures of eating disorder features.[26] The fact that these elevated scores did not correlate with eating patterns suggests that eating patterns alone do not contribute to eating disorder pathology.

Several limitations need to be noted. The sample size for some comparisons was very small; for example, only ten participants ate three meals per day every day. Our study did not assess all aspects of eating patterns which may be relevant to binge eating, such as the nutritional content[27] or types of food consumed during meals and snacks[28]. Also, our sample was restricted to women, a majority of whom were white, insured, and highly educated. Nonetheless, our study expanded upon previous work[4] on the prevalence and clinical correlates of meal frequency and regularity by recruiting participants from the membership of a large HMO and including participants with a broader range of binge eating frequency. Research with more diverse participants is still needed to ensure broader generalizability. Additionally, future research should examine the role that eating patterns may play in recovery from binge eating disorders.[2] Finally, because the nutritional content, types, and amounts of foods consumed during binges differs from non-binge eating episodes,[27,28] these variables may impact eating patterns and should be considered in examining the relationship (concurrently and, more importantly, prospectively) between eating patterns and disordered eating.

Acknowledgments

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Table 1

Frequency of meals and snacks consumed in the past 28 days

Frequency	Breakfast n (%)	Mid-morning snack n (%)	Lunch n (%)	Mid-afternoon snack n (%)	Dinner n (%)	Evening snack n (%)	Nocturnal eating n (%)
0 (Absence)	4 (3.8)	7 (6.6)	0	3 (2.8)	0	2 (1.9)	78 (73.6)
1 (1–5 days)	6 (5.7)	22 (20.8)	2 (1.9)	14 (13.2)	0	4 (3.8)	16 (15.1)
2 (6–12 days)	17 (16.0)	15 (14.2)	7 (6.6)	17 (16.0)	2 (1.9)	17 (16.0)	5 (4.7)
3 (13–15 days)	6 (5.7)	18 (17.0)	4 (3.8)	13 (12.3)	2 (1.9)	10 (9.4)	2 (1.9)
4 (16–22 days)	22 (20.8)	30 (28.3)	11 (10.4)	26 (24.5)	13 (12.3)	28 (26.4)	4 (3.8)
5 (23–27 days)	26 (24.5)	11 (10.4)	46 (43.4)	27 (25.5)	37 (34.9)	30 (28.3)	1 (0.9)
6 (28 days)	25 (23.6)	3 (2.8)	36 (34.0)	6 (5.7)	52 (49.1)	15 (14.2)	0
Mean Days	19.20	13.29	23.81	16.55	25.70	19.25	2.07

Table 2

Correlation coefficients for meal and snack frequencies with binge eating, eating disorder pathology, BMI, and self-reported depression (N=106)

Eating Related Measures	Breakfast	Mid-morning snack	Lunch	Mid-afternoon snack	Dinner	Evening snack	Nocturnal eating
Body Mass Index	−.02	.00	.08	−.08	.19	.03	.16
Number of Days with OBEs	−.06	.18	−.09	.23	.09	.29*	−.04
EDE-Q Restraint	−.17	.07	.03	−.05	−.11	−.08	−.12
EDE-Q Eating Concern	−.03	.24	.16	.17	.09	.08	−.12
EDE-Q Shape Concern	−.03	.06	.14	.09	.12	−.01	−.17
EDE-Q Weight Concern	−.13	.09	.10	.08	.04	−.05	−.11
Body Checking	.08	.12	.13	.21	.07	.00	−.22
Body Avoidance	−.08	.01	−.10	−.15	−.05	−.05	.08
Beck Depression Inventory	−.17	.05	.06	.10	−.11	−.09	−.05

OBEs = Objective bulimic episodes; EDE-Q = Eating Disorder Examination Questionnaire

*
p < .01; A conservative significance level of p < .01 was adopted to reduce type I error.

Table 3

Comparison of participants eating breakfast daily versus those eating breakfast less than every day

Eating Related Measures	Overall sample (n = 106)		Eat breakfast daily (n = 25)		Don't eat breakfast daily (n =81)		Test Statistic	Cohen's d
	Mean	SD	Mean	SD	Mean	SD		
Body Mass Index	33.28	7.17	31.80	6.18	33.73	7.42	$t(104) = 1.18$, p = .24	−.27
Number of Days with OBEs	11.65	6.84	9.80	5.47	12.22	7.14	$t(104) = 1.56$, p = .12	−.36
EDE-Q Restraint	2.68	1.45	2.50	1.31	2.74	1.50	$t(103) < 1$, *ns*	−.16
EDE-Q Eating Concern	3.75	1.21	3.87	1.15	3.72	1.23	$t(103) = −0.56$, p = .58	.13
EDE-Q Shape Concern	4.86	0.89	4.92	0.90	4.84	0.89	$t(103) = −0.35$, p = .73	.08
EDE-Q Weight Concern	4.28	0.99	4.18	1.04	4.32	0.98	$t(103) < 1$, *ns*	−.13
Body Checking	3.96	1.41	4.52	1.12	3.79	1.46	$t(103) = −2.31$, p = .02	.53
Body Avoidance	3.95	1.35	3.76	1.23	4.01	1.39	$t(103) < 1$, *ns*	−.19
Beck Depression Inventory	19.83	8.27	17.36	6.14	20.60	8.72	$t(103) = 1.73$, p = .09	−.40

Note: A conservative significance level of $p < .01$ was adopted to reduce type I error.