Binge Eating Among Older Women: Prevalence Rates and Health Correlates Across Three Independent Samples

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Abstract

Background

Emerging research indicates that older women struggle with binge eating (BE; consuming unusually large amounts of food in one sitting while feeling a loss of control) more frequently than once thought. Yet, health correlates of BE in older adult populations are poorly understood. The original goal of the study was to investigate BE prevalence, frequency, and health correlates in a sample of older adult women. Following surprising findings in this first study, we then aimed to replicate findings in two additional samples of older adult women.

Method

Using self-reported frequencies of BE from three separate samples of older women with very different demographics, we compared BE prevalence, frequency, and health correlates among older women. Study 1 (N = 185) includes data collected online (86% White; 59% overweight/obese status). Study 2 (N = 64) was conducted in person at a local food pantry (65% Hispanic; 47% household income < $10,000/year). Study 3 (N = 100) comprises data collected online (72% White; 50% Masters/Doctoral Degree).

Results

Per DSM-5 frequency criterion of BE at least weekly, we found prevalence rates ranging from 19%-26% across the three samples. Correlates of BE frequency included elevated negative mood, worry, BMI, and less nutritious food consumption.

Conclusions

Across three very different samples in terms of race/ethnicity, education, food security status, measurements, and sampling methodology, we found fairly consistent rates of self-reported BE at least weekly (19-26%). BE is related to negative outcomes among older women, supporting the need for more research in this population.

Plain English Summary

Historically viewed as problems of youth, eating disorders are understudied in older women. Yet, disordered eating, especially binge eating (BE; eating an unusually large amount of food with loss of control), appears to be more prevalent among older women that previously thought. Importantly, BE is associated with various health problems in the general population, but less is known about health outcomes related to BE in older populations. We compared prevalence rates of weekly BE measured in three separate samples of older women, as well as various health and wellness indices. We found fairly consistent rates of BE at least weekly (19-26%) across the three samples, and that BE frequency was related to negative health outcomes among older adult women. There is still much to be learned about BE
among older adult populations, and future research is needed to better understand how aging may be a risk for and consequence of disordered eating.

**Background**

Nutrition pathology can significantly interfere with healthy aging. One form of nutrition pathology is disordered eating. Although clinical eating disorders and subclinical disordered eating are commonly viewed as problems of youth, emerging research indicates that older women struggle with the spectrum of disordered eating far more frequently than once thought (1,2). One of the most common forms of disordered eating among midlife and older women appears to be binge eating (BE,3), which refers to recurrently consuming unusually large amounts of food in one siting while simultaneously feeling a loss of control, often resulting in significant distress (4).

In the general population, BE is associated with significant medical morbidity, including sleep problems, chronic pain, dyslipidemias, and metabolic and cardiac dysfunction (5,6). BE also increases risk for poorer macronutrient intake, as binge episodes typically involve consumption of foods high in sugar, fat, and salt (7,8). Frequent consumption of such foods and in large quantities can cause spikes in blood glucose (9) and research indicates that BE is linked prospectively with both type 2 diabetes and metabolic syndrome (10,11). Additionally, BE is associated with higher levels of disability, psychosocial stress, and poorer quality of life (5,6). Importantly, BE also is closely associated with obesity and depression (12), which can amplify existing medical morbidities as well geriatric syndromes. In older women, the health consequences of any form of disordered eating may be even more severe than seen in the general population, as older women have preexisting risk for nutritional disorders (both over- and under-nutrition), sarcopenia, and frailty (13). Despite this, older women historically have been excluded from BE research, leaving a major gap in understanding the risk, maintenance, and health consequences of BE among older women.

**Aging as a Risk for Binge Eating**

Although eating disorder researchers have historically paid scant attention to older women, numerous aging-related factors may contribute to elevating risk for BE in this population. Specifically, experiences related to the menopausal transition comprise risk for BE (14,3). For instance, a recent pilot study found that elevated daily estradiol, when progesterone was also elevated, was associated with BE episodes in perimenopausal women (14). Sleep disturbances and negative affect, both of which are common experiences of women during the menopausal transition, also are well-established risk factors for BE (15). Additionally, psychosocial stressors, such as caregiving demands and interpersonal loss, may comprise further risk for dysregulated eating behaviors (16). Indeed, preliminary research suggests that older women who experience life stressors such as divorce, marital conflicts, traumatic illness, empty nest syndrome, and loss of parents, siblings or children are at increased risk for onset of disordered eating (17).
Additionally, aging-related changes in body shape/appearance (e.g., increased adipose tissue, decreased muscle mass, increased body fat distribution towards the torso, and changes in skin coloration, firmness, and elasticity) may also increase risk for disordered eating. These changes shift women's bodies further away from the thin-young-ideal standard of female beauty in Western societies (18,19,20). This increased deviation from societal standards of female beauty, in turn, further increases risk for harmful comparisons of self to media representations and/or one's younger body weight or shape (21). Such upward body comparisons often lead to or exacerbate negative body image (also referred to as body dissatisfaction), which is a well-established and robust risk factor for BE (22).

Notably, recent research indicates that older women experience high levels of body dissatisfaction. For instance, Mangweth-Matzek et al. (2) found that over 60% of women age 60-70 years endorsed body dissatisfaction. Kilpela et al. (23) found that negative body image mediated the relation between BMI and both health/wellness behaviors as well as quality of life among women aged 50 and over. Thus, negative body image appears to be prevalent among older women and increase risk for both disordered eating and poorer health outcomes. In sum, early research investigating prevalence rates of BE among older women indicate that this pathology is more pervasive than previously thought. Yet, given that the aging process poses unique risk for women with regards to BE, there is still much to learn about both prevalence and health correlates of BE among older women. Furthermore, because this is an emerging field, efforts to replicate findings in different samples of older adult women are needed.

**Replication Crisis in Psychological Science**

Recent literature has documented a "replication crisis" in psychological science highlighting the importance of replicating findings in independent studies (24). In their seminal paper, Open Science Collaboration set out to replicate 100 experiments; only 36% yielded a statistically significant effect in the replication effort. This outcome signaled a concerning lack of replication and raised significant questions regarding the validity of the original findings. In response to rising concerns about replication in psychological science and the paper by the Open Science Collaboration, Lindsay and editors at Psychological Science (24) identified three factors (referred to as the “troubling trio”) that appeared to contribute to lack of replication. These factors are: 1) low statistical power, 2) a surprising finding, and 3) a $p$ value of only slightly less than $p = .05$.

**The Present Research**

The original purpose of this research was to examine the prevalence of BE and health correlates in older women in a single study. However, the primary finding of this original study (hereafter referred to as the index study) struck both our research team and a number of colleagues as somewhat surprising, which is one of the “troubling trio” (25). This raised the specter of a spurious finding which led to the development of three specific aims for the related studies presented in this paper. First, we sought to describe the frequency of binge eating in older women. Per DSM-5 diagnostic criteria for bulimia nervosa and binge eating disorder (4), which require binge eating once per week on average, we used the frequency criterion of weekly or more BE in our descriptions of prevalence rates within each sample. Second, we sought to
identify the health behaviors correlated with binge eating in older women. Finally, we sought to determine if findings from the index study would replicate by comparing the findings of two additional samples of older women.

**Methods**

**Index Study: General Online Sample of Women**

**Participants**

Participants were 185 women recruited online. Participants ranged from 60-83 years of age ($M = 65.91$, $SD = 5.09$); 86.4% identified as White and 2.2% endorsed Hispanic/Latina ethnicity (Table 1). Over one-third of participants (36.4%) reported a BMI > 30 (i.e., obese status), while 23.2% reported a BMI in the overweight range (25-29.9).

**Procedure**

This study was deemed exempt by the Institutional Review Board (IRB) of the senior author. Participants were recruited via email using personal and professional networks (i.e., non-randomized snowball sampling) and Amazon Mechanical Turk within the United States. We recruited women, aged 60 and over, to complete an online survey on health and wellness among older women. After providing informed consent, participants completed self-report questionnaires online.

**Measures**

**Demographic Information**

Participants reported age, height, weight, race and ethnicity. Although self-report is not optimal for assessing height and weight, research indicates that self-report weights are reasonably accurate (26) and we were limited to self-report due to the online nature of the study.

**Binge Eating (BE)**

As our primary measure of BE, we used the VA-Binge Eating Screener (VA-BES; 27), which asks: “On average, how often have you eaten extremely large amounts of food at one time and felt that your eating was out of control at that time?” Response options include: Never, <1 time/week, 1 time/week, 2-4 times/week, and 5+ times/week. This measure demonstrated good psychometric properties (27).

**Eating Disorder (ED) Symptoms**

We assessed ED symptoms using the Eating Disorder Examination Questionnaire (EDE-Q Short; 28), which is a 12-item version of the full EDE-Q (29). The EDE-Q Short measures ED symptoms over the past week, using a 0-3 scale ranging from 0 days to 7 days in the past week. Within this measure, one item asks about number of BE episodes in the past week. We did not isolate this item for any inferential
statistics; however, we used self-reported BE frequency on this measure as an indicator of convergent validity participant responses to the primary measure of BE frequency (i.e., the VA-BES) to evaluate consistency of reporting. Past research demonstrated good internal consistency (Cronbach's $\alpha = .913$) and temporal stability (ICC = .93; $p < .001$; 28). Internal consistency in the current sample was good ($\alpha = .86$).

**Negative Affect**

We used the 17-items of the fear, guilt and sadness subscales of the Positive and Negative Affect Scale-revised (PANAS-X; 30) to measure negative affect over the past 3 weeks; higher scores indicate greater negative affect. This subscale has demonstrated good internal consistency in past research (current sample $\alpha = .95$).

**Consumption of Nutritious Foods**

The two-item Eating Behaviors Questionnaire (EBQ; 31) measured self-reported consumption of nutrient-dense foods. Items inquire how often participants consciously tried to increase nutrient density in meals and frequency of consuming fresh fruits and vegetables over the past week. The EBQ uses a 5-point Likert scale ($1 = \text{consume at every meal}, 5 = \text{never}$); items are summed, and higher scores indicate less consumption of nutritious foods. Internal consistency in this sample was adequate ($\alpha = .63$).

Table 1 *Participant demographics and descriptive statistics for all three samples*
|                               | Study 1 (N= 185) | Study 2 (N= 64) | Study 3 (N= 100) |
|-------------------------------|------------------|-----------------|------------------|
|                               | % or M (SD)      | %               | % or M (SD)      |
| Age                           | 65.91 (5.09)     | 84.4% (Age 66-75) | 60.57 (5.05)     |
|                               |                  | 15.6% (Age 76+)  |                  |
| **Race/Ethnicity**            |                  |                 |                  |
| Black                         | 9.2%             | 15.9%           | 16.8%            |
| White                         | 86.4%            | 14.3%           | 72.0%            |
| Hispanic/Latinx               | 2.2%             | 65.1%           | 2.0%             |
| Other/Mixed                   | 4.3%             | 4.8%            | 9.0%             |
| **Level of Education**        |                  |                 |                  |
| Grade school or less          | –                | 32.9%           | 0.0%             |
| Some high school              | –                | 15.6%           | 0.0%             |
| High school diploma/GED       | –                | 26.6%           | 5.0%             |
| Some college/technical school | –                | 23.4%           | 16.8%            |
| Bachelor’s degree             | –                | 1.6%            | 18.8%            |
| Some graduate school          | –                | 0.0%            | 9.9%             |
| Master’s degree               | –                | 0.0%            | 34.7%            |
| Doctoral degree               | –                | 0.0%            | 14.9%            |
| **Annual Household Income**   |                  |                 |                  |
| Under $10,000                 | –                | 46.9%           | –                |
| $10,000-$40,000               | –                | 37.5%           | –                |
| $40,000-$65,000               | –                | 3.1%            | –                |
| **BMI**                       | 28.29 (7.71)     | –               | 26.62 (6.04)     |
| **Binge Eating**              | 26.5%            | 20.4%           | 19.0%            |
| **Compensatory Behaviors**    |                  |                 |                  |
| Driven exercising             | 8.7%<sup>a</sup> | 12.6%<sup>b</sup> | 13.9%<sup>b</sup> |
| Self-induced vomiting         | 2.7%<sup>a</sup> | 7.9%<sup>b</sup> | 1.0%<sup>b</sup> |
| Laxatives or diuretics        | 2.7%<sup>a</sup> | 11.0%<sup>b</sup> | 3.0%<sup>b</sup> |
Note: Study 1 = General online sample; Study 2 = Women living with food insecurity; Study 3 = Women with high education levels; BMI = Body mass index; Binge Eating = binge eating at a frequency of weekly or more; Compensatory behaviors = behaviors endorsed for the purpose of weight/shape control; \( a \) = endorsed this behavior in the past week; \( b \) = endorsed this behavior in the past month.

Results

We used descriptive statistics to evaluate BE prevalence and frequency in this sample. Due to the ordinal nature of BE frequency measure, we used Spearman's rho to investigate correlations of BE frequency with BMI, ED symptoms, negative affect, and consumption of nutritious foods. Finally, we used a binomial logistic regression model to investigate the degree to which BE frequency contributed to risk for obesity status while controlling for age, race, and ethnicity. Regarding BE frequency and prevalence (Table 1), 48% of the sample reported never BE. Using the clinical frequency criterion of BE once per week or more, 26.5% of the sample reported BE at least weekly. As a secondary measure of BE frequency in this sample, we examined rates of BE using the BE item on the EDE-Q Short. One participant's answer did not align with their response on the VA-BES, resulting in 25.5% of the sample endorsing at least one BE episode in the past week. BE frequency was correlated with higher BMI (\( \rho = .40, p < .01 \)), more ED symptoms (\( \rho = .65, p < .001 \)), greater negative affect (\( \rho = .43, p < .01 \)), and less frequent consumption of nutritious foods (\( \rho = .16, p < .05 \)). Finally, BE frequency contributed significant risk for obese status based on self-reported BMI (\( OR = 2.08; 95\% CI [1.52; 2.82], p < .001 \)). Age, race, and ethnicity categories were non-significant in the model.

Study 2 (Replication): Sample Living with Food Insecurity

Participants

This sample consisted of 64 older women (ages 66+) who were clients at food pantries of the local food bank who participated in a larger study of individuals living with food insecurity (32). Age was only captured in clusters; thus, only women who selected the “age 66 or over” option were included in this study. Younger participants and men were not included. The majority of participants identified as Hispanic (65.1%; Table 1). Over a third (39.1%) reported disabled status, and 48.4% had less than a high school education or equivalent (GED). Almost half (46.9%) reported a household annual income of less than $10,000/year. Access to current health data is often low among individuals living with extreme poverty; scales are considered luxury items and often are not in the home (32). Thus, requesting current height and weight in this sample was likely to elicit inaccurate data. Therefore, we do not have BMI data in this sample.

Procedure

This study received IRB approval and was run in collaboration with the local food bank. See Becker et al. (32) for details regarding the full study and community partnership. All questionnaires were available in either English or Spanish. Following informed consent, participants completed questionnaires in person;
undergraduate research assistants facilitated reading as needed (i.e., read questions aloud in language of choice) and answered questions. Participants received a $5 gift card to a local grocery store as compensation.

**Measures**

Consistent with working with a marginalized, low-education population and incorporating a socially conscious lens (33,34), we evaluated survey complexity. Guided by a colleague with extensive experience working with marginalized populations, we employed best practices delineated by Stonewall and colleagues (35) to evaluate and modify questionnaire language. We modified or removed items based on reading level or that may impact comprehension (for detailed rationale and procedure for measures modification, see Becket et al. (32)). This process ensured that our survey used appropriate language in order to be inclusive and culturally sensitive (33).

**Food Insecurity**

To assess severity of food insecurity, we used the Radimer Cornell Food Insecurity Measure (RCFIM: 36; 37). This measure uses a Likert scale, and global scores indicate level of food insecurity: 1) not food insecure (i.e., did not meet criteria for food insecurity); 2) household food insecurity (i.e., anxiety about food, eating the same thing repeatedly due to lack of resources, and food running out but no one going hungry in the home); 3) individual food insecurity (i.e., adult reports being hungry at times because they lack food); and 4) child hunger food insecurity (i.e., adult reports inability to adequately feed their children secondary to lack of resources). For this study, we only included participants in the two highest levels of food insecurity (individual and child hunger), as these are the most severe. Internal consistency was good in our sample (Cronbach's $\alpha = .92$).

**Binge Eating (BE)**

We used the BE item from the Eating Disorder Diagnostic Scale for DSM 5 (EDDS-5) to assess frequency of BE over the past month (38). The EDDS is a brief self-report measure designed to assess the spectrum of EDs. The BE item asks, “How many times in the past month (30-31 days) on average have you eaten an unusually large amount of food and experienced a loss of control?” A report of $\geq 4$ times in the past month equated to weekly binge eating.

**Internalized Weight Stigma**

We used the Weight Self-Stigma Questionnaire (WSSQ) to assess internalization of weight bias (39). Items are rated on a 7-point Likert scale ($1 = strongly disagree$ to $7 = strongly agree$), and participants rate their level of agreement with explicit weight bias statements (e.g., “I became fat because I’m a weak person” and “People think that I am to blame for being fat.”). Scores are summed for a total score and higher scores indicate greater self-stigma; internal consistency was excellent ($\alpha = .97$).

**Anxiety**
We used eight items from the Penn State Worry Questionnaire (PSWQ; 40) to assess anxiety/worry. Items are rated on a 5-point Likert scale (1 = not at all typical of me to 5 = very typical of me); higher scores indicate more anxiety/worry. Internal consistency for this version of the PSWQ in the current sample was excellent (α = .95).

**Results**

Similar to the index study, we used descriptive statistics to evaluate BE prevalence and frequency in this replication sample. We used bivariate correlations of BE frequency with anxiety and internalized weight stigma. Finally, we examined rates of unhealthy weight control behaviors (e.g., self-induced vomiting, use of laxatives/diuretics for weight control) in this sample. Regarding BE prevalence, 20.4% of this sample reported BE on a weekly or more basis in the past month. Frequency of BE was positively correlated with higher anxiety (r = .37, p = .008) and internalized weight stigma (r = .42, p = .002). Within this sample of older women living with significant food insecurity, 7.9% of women reported self-induced vomiting, and 11% reported use of laxative or diuretics for weight control in the past month.

**Study 3 (Replication): Sample with High Education Levels**

**Participants**

Participants were 100 women recruited online for a larger study of body image in a diverse sample of adult women. Participant ages ranged from 55-79 years (M = 60.57, SD = 5.05) and reported a mean body mass index of 26.62 (SD = 6.04). The majority (72.0%) self-identified as White; 2.0% identified as Hispanic/Latina, and 72% were currently married (Table 1). Notably, 50% of women in this sample had a Masters or Doctoral degree.

**Procedure**

IRB approval was granted for this study and participants were recruited via email, social media, personal and professional networks, and by word of mouth. Recruitment emails described the study as exploring body image and wellness in a diverse population of adult women. All emails and posts requested that women forward the study invitation to their own social and professional networks (i.e., snowball sampling). After providing informed consent, participants completed self-report questionnaires online and had the option to provide their email address to enter a raffle for a $200 Amazon gift card.

**Measures**

**Binge Eating (BE)**

We assessed BE with the diagnostic items of the EDE-Q (29), which is a self-report measure of eating behaviors and attitudes over the past 28 days. The BE items inquire about frequency of BE episodes over the past 28 days. A report of ≥4 times in the past four weeks (28 days) equated to weekly BE.

**BMI**
Participants self-reported their height and weight in order to calculate BMI.

**Depressive Symptoms**

We used the Beck Depression Inventory- II (BDI-II; 41) to measure depressive symptoms. Due to liability in assessing suicidality anonymously and via online survey, we removed the suicidality item from the BDI-II. Thus, our final measure included 20 items and had good internal validity in the current sample ($\alpha = .85$).

**Body Shame**

We administered the Shame subscale of the Objectified Body Consciousness Scale (OBCS; 42). This subscale includes eight items rated from 1 (*strongly disagree*) to 7 (*strongly agree*), with a “not applicable” option for items that do not apply. Higher scores indicate greater shame, and 25% or more of items NA or missing qualifies as missing overall score. In the present sample, internal consistency was good ($\alpha = .85$).

**Results**

Similar to the previous studies, we used descriptive statistics to evaluate BE prevalence and frequency in this second replication sample. We used bivariate correlations of BE frequency with BMI, depressive symptoms, and body shame. Finally, we used a binomial logistic regression model to investigate the degree to which BE frequency contributed to risk for obesity status while controlling for age, race, and ethnicity. In this sample of women with high education levels, 19% reported BE weekly or more in the past month. BE frequency was positively correlated with greater depressive symptoms ($r = .36, p < .001$) and higher body shame ($r = .44, p < .001$), but was not correlated with BMI ($r = .20, p = .075$). Finally, BE frequency contributed a small, but statistically significant risk for obesity status ($OR = 1.12; 95\% CI [1.00, 1.24], p = .04$). Neither age nor race/ethnicity were significant in the model.

**Discussion**

The present study originally was designed to examine the frequency, prevalence, and health correlates of binge eating (BE) in a single sample of older women aged 60 and over. Findings from this index study indicated that roughly 26% of older women in our sample reported experiencing BE at a frequency of weekly or more. Notably, the clinical frequency criterion for a diagnosis of binge eating disorder or bulimia nervosa is BE weekly or more for at least 3 months (4). Thus, we found a prevalence rate of clinical-level BE frequency in this sample that exceeds those found in younger samples and those observed in past research of women in midlife or older adulthood. For instance, 11% of women in midlife reported regular BE (12), while 3.5% of women aged 50+ reported weekly BE (43). In a sample of women aged 60-70 years, 3.8% met criteria for an ED, while another 4.4% endorsed at least one core symptom of an ED (2). Additionally, 5.6% of women aged 65-94 reported BE episodes in the past month, with mean frequency of 8 episodes/month, as evaluated by structured clinical interview (1). Thus, prevalence rates of disordered eating documented in the literature ranged from roughly 4-11% and are smaller than our findings.
Of note, 59.6% of participants in the index study met BMI classification criteria for overweight (i.e., 25 < BMI < 30) or obese status (i.e., BMI > 30). To put this in context, past research investigating BE prevalence in obese patients presenting for weight loss treatment has documented clinically relevant BE at approximately 30% (44; 45). Thus, our observed prevalence data for weekly BE in the index study was slightly lower than data from general adult patients (i.e., not older adults) presenting for weight loss programs. Our sample was neither a treatment-seeking sample, nor did we conduct targeted recruitment for clinical populations.

Because the prevalence rate of weekly or more BE from this index study was surprisingly high, we were concerned about a spurious finding. Moreover, our primary result raised concerns regarding replicability. Specifically, our findings fell into one construct of the “troubling trio” (25) in the replication crisis in psychological science: a surprising result. Per recommendations from Lindsay (25), such results warrant efforts for replication. Therefore, we sought to replicate our index study results using existing data from two other samples of older adult women that included self-reported BE frequency. Results from both replications using data from two additional independent studies – with notably different demographics – were largely consistent with the index study.

We propose that the combined results strongly support the contention that BE rates in older women are markedly higher than previously thought and are deserving of further research. The primary strength of the three studies, when viewed collectively, is the ability to refute the argument that the primary findings of the index study (i.e., BE prevalence and frequency) were artificially inflated due to one or more of the following three factors: 1) sampling biases secondary to recruitment strategy; 2) measurement error (i.e., risk of inherent response biases within one measure); and 3) participant demographics (i.e., limited generalizability). Regarding the first concern of sampling bias, two of the three studies used different types of internet sampling (i.e., snowball sampling, social media, and MTurk), whereas one used in-person recruitment and data collection. Despite the different sampling methods (internet versus in-person/community), prevalence rates of BE were similar across all three studies, suggesting the rates were not unique to one sampling method.

The second potential concern pertains to the way in which BE was assessed. For instance, it could be argued that the primary measurement strategy of the index study (i.e., the VA-BES) was flawed and resulted in inflated estimates of BE in the index sample. However, we used a total of four validated measures of binge eating across the three studies and findings remained remarkably consistent. Therefore, our findings regarding prevalence rates of BE were not simply due to measurement error.

Finally, one could argue, based on the index study alone, that the representativeness of the index sample in terms of sample characteristics (i.e., participant demographics) led to elevated assessment of BE. This supposition, however, does not appear to hold water when the nature of the three samples are compared. For instance, the community sample collected at local food pantries was predominantly Hispanic (65%), predominantly very low SES (47% reported an annual household income < $10,000/year) and living with significant food insecurity. Moreover, nearly 50% reported less than a high school degree or equivalent,
and nearly 40% reported disabled status. In contrast, both of the internet samples were majority Non-Hispanic White, and one internet sample comprised women with high levels of education (50% Masters or Doctoral Degree). In summary, we found fairly consistent rates of self-reported BE at least weekly (19-26%) across three independent and very different samples in terms of race/ethnicity, education, food security status, measurements used, and data collection methods.

In addition to a high prevalence rate of weekly BE across the three samples, correlational analyses indicated that BE frequency was related to poorer psychological and physical health indices. Specifically, higher BE frequency was positively correlated with greater depression and negative affect, body shame, worry, and internalized weight stigma. Additionally, BE frequency was negatively correlated with frequency of consuming nutrient-dense foods. Lastly, results regarding BMI were mixed across two samples. In our index study, BE frequency was positively correlated with BMI, while this relation was nonsignificant in the highly educated sample. However, in both samples BE frequency increased risk for obesity status in our binomial logistic regression models. Thus, further investigation into obesity risk as a factor BE among diverse samples of older women is warranted.

Correlational findings from these three studies align with previous research on correlates of BE in younger samples. For instance, BE is consistently linked with depressive symptoms (e.g., 12) and elevated BMI (e.g., 46; 47) in prior research. Our correlational findings in this sample of older women are consistent with BE correlates observed in previous BE research conducted with more well-investigated samples (i.e., younger adults). In other words, expected BE and health correlates previously established hold true in this newer population of older adult women, which provides confidence in our interpretation of these data. Finally, these data extend prior research by documenting additional negative health correlates (e.g., internalized weight stigma, worry, and consumption of nutritious foods) of BE in older adult women.

There are numerous limitations to the present studies. First, all studies used self-report measures exclusively; we did not have objective measures of BMI nor clinical interviews to further explore clinical constructs. Second, although the three studies used different sampling methods, two of the three studies comprised minimal racial/ethnic diversity of participants and were online samples. Future research should use purposeful sampling methodology in order to evaluate more diverse samples of older adult women and therefore enhance generalizability of findings. Additionally, analyses were cross-sectional and correlative in nature, therefore we are unable to evaluate causality among variables within each study. Lastly, future research should include larger sample sizes, incorporate clinical interviews, and utilize longitudinal methodology designed to investigate causality and chronological outcomes.

Conclusions

In sum, findings indicated relatively stable rates of weekly or more BE (19-26%) among three independent and very different samples of older adult women. The rates observed across these three samples are higher than those documented in prior research and in younger samples, suggesting that older adult women may be at elevated risk for BE. Correlations indicated that BE frequency is linked with negative
health constructs, although longitudinal research is needed to better investigate the chronological effects of BE among older adult samples, as well as objective or interview methods of data collection.

**Abbreviations**

BE: binge eating

BMI: body mass index

ED: eating disorder

DSM-5: Diagnostic and Statistical Manual for Mental Disorders, 5th edition

IBR: Institutional Review Board

VA-BES: Veterans Affairs – Binge Eating Screener

EDE-Q: Eating Disorders Examination – Questionnaire

PANAS-X: Positive and Negative Affect Schedule

EBQ: Eating Behaviors Questionnaire

RCFIM: Radimer Cornell Food Insecurity Measure

EDDS-5: Eating Disorders Diagnostic Scale for DSM-5

WSSQ: Weight Self Stigma Questionnaire

PSWQ: Penn State Worry Questionnaire

BDI-II: Beck Depression Inventory-II

OBCS: Objectified Body Consciousness Scale

SES: socioeconomic status

**Declarations**

**Ethics Approval**

Study 1 was deemed exempt by the UT Health San Antonio IRB (18-268E). Studies 2 and 3 were approved by the Trinity University IRB.

**Consent for Publication**
Not applicable

**Availability of data and materials**

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

**Competing Interests**

The authors declare that they have no competing interests.

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**Authors’ Contributions**

SAW was involved in development, data collection, and data cleaning of Study 3. SAW also was instrumental in writing this manuscript. CBB was PI for Studies 2 and 3 (i.e., study conceptualization, data collection, data analyses), and she was instrumental in writing this manuscript. KEK helped with conceptualization and execution of Study 1 and editing of this manuscript. NM and SEE were both involved with conceptualization, measures selection, and data interpretation for Study 1. They also edited the manuscript. LSK was PI for Study 1 (i.e., conceptualization, data collection, data analyses), conceptualized the current manuscript, conducted data analyses for all three studies, and was instrumental in writing.

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