Research article

Body Image Perception and Eating Disorder Risks: Unexpected Patterns among Female University Students in Botswana

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ABSTRACT

Body image perception plays a complex role in the development of eating disorder risks among female university students in Botswana. Increasing concerns over body image dissatisfaction, especially unexpected patterns such as negative body image among individuals with a normal body mass index (BMI), motivated this study. The research aims to understand better the potential links between body image perceptions and disordered eating behaviors within this population. A total of 328 female students residing on campus at the University of Botswana participated in the study. Data were collected using a self-administered questionnaire, which included the Stunkard Figure Rating Scale to assess body image perception and the Eating Disorder Examination Questionnaire (EDE-Q) to evaluate eating disorder risks. A total of 59.5% of participants reported negative body image perceptions, and 27.4% were identified as being at risk for eating disorders. Among those at risk, 21.5% also exhibited negative body image. Notably, 42.1% of students with a normal BMI perceived their body image negatively. Interestingly, students with a positive body image were found to have a higher likelihood of eating disorder risk, with a relative risk of 1.725 (p = 0.041). Analysis of the EDE-Q subscales revealed elevated concerns related to shape and weight, with mean scores of 2.160 and 1.982, respectively. The overall EDE-Q mean score was 1.61, indicating a slight but notable level of concern regarding the risk of eating disorders among the participants. Although body image dissatisfaction predicted disordered eating behaviors, this study also revealed an unexpected association between positive body image and elevated eating-disorder risk among female students in Botswana. The mean overall EDE-Q score was 1.61 (±1.20), indicating a slight level of concern regarding eating-disorder risk. Participants with positive body image were more likely to exhibit eating-disorder risk (RR = 1.725, 95% CI: 1.022–2.909, p = 0.041). These findings underscore the complex relationship between perceived body satisfaction and disordered eating within this population. Unexpected trends, such as negative body image among normal-weight students and the complex association between positive body image and eating disorder risk, highlight the need for further research and targeted interventions in university settings.

Key words: Body Image, Eating Disorder Risk, University Students, Body Mass Index, Eating Behaviors

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INTRODUCTION

Body image perception (BIP), which refers to how individuals view and feel about their own bodies, plays a critical role in shaping mental and physical health, influencing dietary behaviors and weight-related practices that can lead to nutritional problems such as underweight, obesity, and eating disorders. Although the association between BIP and eating-disorder (ED) risks has been widely studied in Western populations[1], research exploring these dynamics in African contexts remains scarce[2,3]. This study addresses this gap by investigating the complex relationship between BIP and ED risks among female university students in Botswana, a context where cultural, social, and psychological factors interact uniquely. Female undergraduate students residing on the University of Botswana campus were chosen because women worldwide are disproportionately affected by body dissatisfaction and eating disorder risk[4]. However, the negative association between BIP and disordered eating behaviors is well-documented; unexpected patterns, such as negative BIP among individuals with normal body mass index (BMI), remain underexplored, particularly in African settings[13]. Traditionally, fuller body types in Botswana symbolized health and prosperity; however, increasing exposure to Western thin-ideal imagery through social and digital media[5–7] has reshaped local beauty standards and contributed to rising body-image dissatisfaction. Furthermore, social-media comparisons amplify appearance pressure and perfectionism[8, 9]. Even individuals with apparently positive body-image perception may still experience internalized cultural or aesthetic demands that elevate their risk for disordered eating[10]. University students, in particular, face compounded pressures from academic demands, social comparisons, and transitioning lifestyles, which heighten vulnerability to negative BIP and ED risks[2].

Despite growing global awareness of eating disorders, research in African regions remains limited[3]. In Botswana, eating disorders are under-recognized and often overlooked in healthcare and public health discussions. The lack of attention underscores the urgent need for culturally relevant research to understand the unique dynamics influencing body image perceptions and eating behaviors in African university students. Without such understanding, early identification, prevention strategies, and effective interventions remain difficult to implement. BIP encompasses both perceptual and emotional evaluations of one's physical appearance[4], with dissatisfaction often leading to harmful behaviors such as restrictive dieting, binge eating, and purging[5]. These behaviors are closely tied to efforts to meet unrealistic societal beauty standards, contributing to mental health challenges including depression, anxiety, and low self-esteem[6,7]. Media influences, particularly via social media, intensify these pressures by promoting unattainable body ideals[8,9], disproportionately affecting young women[5]. Furthermore, even individuals with seemingly positive BIP may face contradictory pressures that elevate their risk for disordered eating behaviors[2].

By focusing on female university students in University of Botswana, this study not only highlights the prevalence of negative BIP but also determines the trends, including dissatisfaction among normal-weight individuals, and evaluate

the complex associations between positive body image and ED risks. In doing so, the research contributes new, culturally relevant insights essential for informing public health policies, mental health strategies, and campus wellness initiatives in African contexts, where understanding, early identification, prevention, and effective interventions remain difficult to implement.

MATERIALS AND METHODS

Study design

This study employed a cross-sectional research design from September 2022 to August 2023 to determine the students' body image perception, as a subjective variable among young females of University of Botswana students living in a campus residence. Participants were screened through an online questionnaire (Google Forms) that automatically excluded those who did not meet the inclusion criteria. Eligible participants completed the full questionnaire, which collected demographic information (e.g., gender, age, GPA), assessed body image perception using the Figure Rating Scale (FRS) and Eating Disorder Risks (ED) were assessed via the Eating Disorder Examination Questionnaire (EDE-Q). A mean score >2.3 indicated elevated ED risk.

Study participants

The participants were female undergraduate students of the University of Botswana who lived in campus residences aged 18 to 25 years. Students who were pregnant, diagnosed with a mental disorder, or had incomplete questionnaire responses were excluded. Recruitment was conducted through physical posters placed at dormitory entrances, student centers, and dining halls, as well as digital posters shared via the university's Facebook page.

The sample size was estimated according to the Dobson formula[10], assuming a prevalence of negative BIP among females in colleges or universities to be 29%[11], which assumed maximum variability and provided the largest sample size, as there are literally no research studies that have measured this prevalence using this population in Botswana. Based on 5% type 1 error, the sample size was 317.

$$\text{Sample size equation} = \frac{Z_1-\alpha/_2{}^2 P(1-P)}{0.05^2}$$

Z_1-$\alpha_2{}^2$: Standard normal variate corresponding to the desired confidence level. At a 5% type I error (α = 0.05), Z = 1.96.

p: Expected proportion in the population, derived from previous or pilot studies. In this case, p = 0.29, representing the prevalence of females with poor body image perception[11].

d: Absolute error or margin of precision, set at 0.05.

Sample size =

$$\frac{1.96^{\,2} * 0.29\,(1-0.29)}{0.05^{\,2}} = 316.4 = 317$$

A total of 452 students initially volunteered to participate in the study; however, only 328 met the inclusion criteria and provided complete data. Responses with incomplete or inaccurate information were excluded. Participants were female undergraduate students residing on the University of Botswana campus, recruited through physical and digital posters

placed in dormitory areas, student centers, and dining halls, and shared via the university's Facebook page. Facebook's promotional tools were also used to broaden outreach. Data collection began in September 2022 and concluded in August 2023, allowing for over-recruitment to account for potential data loss during cleaning.

Data collection

An online structured self-administered questionnaire was utilized to gather data on demographic information, BIP and ED risks. The survey included a consent form, and declining it would result in the survey closing automatically, preventing further participation. Respondents shared demographic information such as age, academic year, field of study, weight, and height figures.

Body Image Perceptions (BIP)

The Stunkard Figure Rating Scale (FRS) was used to assess BIP. This scale involves a series of silhouette figures ranging from 1 = very thin to 9 = very obese. The participants were asked to select the figure they felt best represented their current body shape and the figure that they would like to look like. This method effectively captures perceived body image (BI) and BID. Body image perception was categorized according to the difference between the participant's current and ideal figure ratings on the Stunkard Figure Rating Scale (FRS). A higher current than ideal rating indicated negative BIP (body dissatisfaction), whereas an equal or lower current score indicated positive BIP (body satisfaction).

Eating Disorders (ED)

The Eating Disorder Examination Questionnaire (EDE-Q) was used to screen for disordered eating behaviors. The EDE-Q is a self-report instrument that assesses the range of ED symptoms, including dietary restraint, eating concern, shape concern, and weight concern. This tool helps identify participants who may be at risk for eating disorders. Mean scores close to or above 2.3 show a risk of ED pathology.

Study outcomes and statistical analysis

The statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 22.0 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics, including frequencies, means, standard deviations, and percentages, were used to summarize participant responses across all questionnaire sections. To examine relationships between variables, Pearson's Chi-Square test was employed to assess the association between BIP, as measured by the Stunkard Figure Rating Scale (FRS). Relative risks (RR) and 95% confidence intervals were calculated to evaluate the association between BMI, BIP, and ED risk, as recommended for cross-sectional designs.

Ethical consideration

The study received approval from both Mahidol University's Institutional Review Board (MU-CIRB 2022/136.1205) and the University of Botswana Research Ethics Department. All procedures conducted followed the ethical standards of the IRB and the Helsinki Declaration of 1975, as revised in 2000.

RESULTS

A response rate of 92.9% was attained, with 452 participants submitting the questionnaire. However, following data cleaning and screening procedures, only 328 participants met the inclusion criteria. **Table 1** summarizes participants' demographic and anthropometric characteristics by BIP category. Of the 328 participants, 59.5% (n = 195) exhibited a negative BIP, while 40.5% (n = 133) exhibited a positive BIP. Most students (66.2%) were aged between 18 and 21 years, with no significant differences in age or year of study between negative and positive BIP groups ($p > 0.05$).

However, a significant association was observed between BMI category and BIP ($p < 0.001$); students who were underweight or obese were more likely to report negative BIP than those with normal BMI. In addition, faculty of study was significantly associated with BIP ($p = 0.008$), with a higher proportion of negative BIP among students from the Science, Social Sciences, and Engineering faculties, whereas positive BIP was more common among students in Business and Health Sciences. Finally, a significant relationship was found between BIP and eating-disorder risk ($p = 0.004$): 36.1% of students with positive BIP were at risk of an eating disorder, compared with 21.5% of those with negative BIP.

Table 1. Descriptive statistics of the students by body image perception (BIP)

Characteristics	Total (N=328)	Negative BIP (N=195)	Positive BIP (N=133)	*p*-value
Age group:				0.153†
18-21 years	217 (66.2)	123 (63.1)	94 (70.7)	
22-25 years	111 (33.8)	72 (36.9)	39 (29.3)	
Year of study:				0.852†
First year	91 (27.7)	56 (28.7)	35 (26.3)	
Second year	94 (28.7)	51 (26.2)	43 (32.3)	
Third year	88 (26.8)	53 (27.2)	35 (26.3)	
Fourth Year	40 (12.2)	26 (13.3)	14 (10.5)	
Fifth year	11 (3.4)	7 (3.6)	4 (3.0)	
Sixth year	4 (1.2)	2 (1.0)	2 (1.5)	
Body Mass Index Category¥:				<0.001†**
Underweight	69 (21.0)	54 (27.7)	15 (11.3)	
Normal	169 (51.5)	82 (42.1)	87 (65.4)	
Overweight	65 (19.8)	37 (19.0)	28 (21.1)	
Obese	25 (7.6)	22 (11.3)	3 (2.3)	
Faculty of Study:				0.008†*
Science	54 (16.5)	43 (22.1)	11 (8.3)	
Humanities	16 (4.9)	12 (6.2)	4 (3.0)	

Characteristics	Total (N=328)	Negative BIP (N=195)	Positive BIP (N=133)	*p*-value
Social Sciences (including Law)	44 (13.4)	27 (13.8)	17 (12.8)	
Business	69 (21.0)	34 (17.4)	35 (26.3)	
Health Sciences	30 (9.1)	12 (6.2)	18 (13.5)	
Medicine	30 (9.1)	18 (9.2)	12 (9.0)	
Engineering and Technology	42 (12.8)	26 (13.3)	16 (12.0)	
Education	43 (13.1)	23 (11.8)	20 (15.0)	
Eating Disorder Risk:				0.004†*
At Risk	90 (27.4)	42 (21.5)	48 (36.1)	
No Risk	238 (72.6)	153 (78.5)	85 (63.9)	

Qualitative data is expressed as n (%). Percentages may not total exactly 100 % because of rounding.

† Statistical differences were determined using Pearson's Chi-Square test.

¥ BMI category is based on WHO criteria.

**p*-value < 0.05, **p-value < 0.001

Table 2 presents the Eating Disorder Examination Questionnaire (EDE-Q) scores among the participants. Using a mean score of greater than 2.3 as the threshold for elevated concern, none of the subscales exceeded this level. However, subscales related to BI—specifically shape concern and weight concern—showed relatively higher mean scores of 2.16 and 1.98, respectively, indicating moderate levels of body dissatisfaction among the students. In contrast, subscales related to eating habits (EH), including restraint (Mean = 1.18) and eating concern (mean = 1.10), reflected lower levels of concern. The overall global EDE-Q score was 1.61 (SD = 1.20), suggesting a slight but notable level of concern regarding the participants' risk of developing eating disorders.

Table 2. Eating Disorder Examination Questionnaire Scores

Measure	Mean	SD
Global EDE (4 subscales)	1.61	1.20
Restraint subscale	1.18	1.22
Eating Concern subscale	1.10	1.22
Shape Concern subscale	2.16	1.57
Weight Concern subscale	1.98	1.62

Scores > 2.3 indicate elevated concern

Table 3 displays the relative risks (RR) estimating the relationship between BMI, BIP, and the risk of developing an eating disorder. When compared to individuals with normal BMI (reference group), participants classified as underweight (RR = 0.423, 95% CI: 0.106–1.684,

p = 0.294), overweight (RR = 0.306, 95% CI: 0.082–1.134, p = 0.222), and obese (RR = 0.396, 95% CI: 0.099–1.588, p = 0.191) were less likely to be at risk of an eating disorder; however, these associations were not statistically significant.

In contrast, BIP showed a significant association with eating-disorder risk. Participants with positive BIP had a significantly higher risk of disordered eating compared to those with negative BIP (RR = 1.725, 95% CI: 1.022–2.909, p = 0.041). This finding highlights an unexpected pattern in which students who perceived their body image positively were more likely to be at risk for disordered-eating behaviors than those with a negative perception.

Table 3. Body Image Perception, and Body Mass Index concerning Eating Disorder (ED) Risk

Variable	RR	95% CI	*p*-value
Body Mass Index (BMI):			
Normal *(Ref)*	-	–	-
Underweight	0.423	0.106 – 1.684	0.294
Overweight	0.306	0.082 – 1.134	0.222
Obese	0.396	0.099 – 1.588	0.191
Body Image Perception:			
Negative Body Image Perception *(Ref)*	-	-	-
Positive Body Image Perception	**1.725**	1.022 – 2.909	**0.041***

**p*-value < 0.05

DISCUSSION

This study aimed to explore BIP and its association with ED risks among female students residing on campus at the University of Botswana. The findings reveal complex patterns that emphasize the psychological and sociocultural dimensions of body image and eating behaviors in this population. Negative BIP was highly prevalent, with 59.5% of participants expressing dissatisfaction with their body image. Notably, 42.1% of students with a normal BMI also reported negative BIP, indicating that distorted body perception is not limited to those who are underweight or overweight. These findings suggest that media portrayals, peer comparisons, and internalized appearance ideals may contribute to body dissatisfaction regardless of actual body size. The globalization of beauty standards, particularly the promotion of thinness in Western media, has been shown to influence body image concerns in various non-Western populations[12,13]. Social media further exacerbates these issues by encouraging appearance-based comparisons and promoting unrealistic beauty ideals[14,15].

The mean EDE-Q global score of 1.61 indicates a slight overall concern regarding ED risk. The mean of subscale analysis revealed that shape concern (2.16) and weight concern (1.98) were more elevated than eating restraint (1.18) and eating concern (1.10), suggesting that participants were more affected by body-related

anxieties than by disordered eating behaviors themselves. A surprising result was the significant positive association between positive BIP and increased ED risk (RR = 1.725; 95% CI: 1.022 – 2.909; p = 0.041). The positive correlation suggests that students who report body satisfaction may still experience ED risks, possibly due to pressures to perfectionistic tendencies or sociocultural pressures to maintain perceived ideals[6,7]. This finding aligns with emerging evidence that even individuals satisfied with their bodies may engage in restrictive behaviours to preserve that satisfaction[6-8]. Such dynamics underscore the complexity of body image and challenge the binary classification of BIP as simply 'positive' or 'negative'. These complexities underscore the limitations of categorizing BIP as simply positive or negative. No significant relationship was found between BMI and ED risk, reinforcing the view that ED risk cannot be fully predicted by body size alone. This association aligns with prior studies advocating for a multidimensional understanding of eating behaviors that considers cognitive and emotional factors alongside physical indicators[16]. Collectively, these results highlight the need for interventions that target not only those who express body dissatisfaction but also those who display perfectionistic concern with maintaining a desired appearance. Programs integrating media literacy, self-esteem enhancement, and stress-management strategies may be particularly beneficial for university students[3,5].

Although this study provides valuable insights into the relationship between body-image perception and eating-disorder risk among female university students, several limitations should be acknowledged. Firstly, the cross-sectional design restricts causal inference; therefore, it is not possible to determine whether body-image perception leads to changes in eating behaviour or vice versa. Secondly, the study relied on self-reported questionnaires, which may have been influenced by recall bias or social desirability, leading participants to under- or over-report eating-related behaviours. Thirdly, the sample was drawn exclusively from one university and included only female students residing on campus, which may limit the generalisability of the findings to other populations or educational settings. Finally, certain relevant psychological variables, such as self-esteem, anxiety, or perfectionism, were not directly assessed and may further explain the observed associations. Future research should therefore consider longitudinal and mixed-method designs, incorporating both male and female participants from diverse cultural and institutional backgrounds. Including qualitative interviews could also provide a deeper understanding of the cognitive and emotional processes linking body-image perception to disordered-eating risk.

In conclusion, this study revealed a high prevalence of negative body-image perception together with an unexpected pattern of increased eating disorder risk among students reporting positive body-image perception. These findings demonstrate that both dissatisfaction and overvaluation of appearance can heighten vulnerability to disordered eating among female university students in Botswana. Culturally sensitive health-promotion strategies should therefore broaden beauty ideals, foster healthy body acceptance and integrate psycho-educational components that address perfectionistic and appearance-based pressures.

Universities could also incorporate routine screening for body-image and eating-behaviour concerns within student-health services to ensure early identification and support.

Overall, the results highlight the importance of adopting a multidimensional approach to body-image research and intervention, one that recognises both the protective and risk-bearing aspects of perceived body satisfaction within the contemporary sociocultural environment.

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