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Investigating the Psychological Correlates of Binge Eating Disorder in Thai Female Undergraduate Students

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Abstract

Background: University campuses across Thailand are witnessing a troubling convergence of psychological distress and disordered eating behaviors. Binge Eating Disorder (BED)—characterized by recurrent episodes of excessive food consumption accompanied by loss of control—has emerged as a significant concern among female undergraduates. What makes this population particularly vulnerable? Academic pressures, social transitions, and environmental upheavals create a perfect storm of risk factors. Depression, social anxiety, and loneliness have been identified as key psychological correlates, yet their collective impact on BED severity remains underexplored in Thai university settings.

Aims: This investigation systematically examined the psychological correlates of BED among Thai female undergraduate students in Bangkok. Specifically, we sought to clarify the relationships between depression, social anxiety, loneliness, and binge eating behaviors, determining the extent to which these psychological factors predict BED symptom severity.

Methods: A cross-sectional survey design captured data from 1,250 Thai female undergraduates across Bangkok universities between April and June 2025. Participants were recruited via university email lists and social media platforms. Four validated instruments formed our assessment battery: the Patient Health Questionnaire-9 (PHQ-9) for depression, Social Phobia Inventory (SPIN) for social anxiety, UCLA Loneliness Scale for loneliness, and the Binge Eating Scale (BES) for binge eating behaviors. Statistical analyses included descriptive statistics, Pearson correlations, and multiple regression modeling using SPSS version 28.

Results: Substantial proportions of participants reported moderate-to-severe depression (37%), social anxiety (29%), and loneliness (34%). BED symptoms showed significant positive correlations with all three psychological factors: depression ($r=.46$, $p<.001$), social anxiety ($r=.41$, $p<.001$), and loneliness ($r=.36$, $p<.001$). Multiple regression analysis revealed that these three predictors collectively explained 38% of variance in BED severity (adjusted $R^2=.38$). Depression emerged as the strongest predictor ($\beta=.32$, $p<.001$), followed by social anxiety ($\beta=.27$, $p<.001$) and loneliness ($\beta=.19$, $p<.01$).

Conclusion: Depression, social anxiety, and loneliness are strongly linked to BED severity among Thai female undergraduates. These findings underscore the urgent need for integrated mental health interventions that address psychological distress as part of comprehensive BED prevention and treatment strategies in university settings.

Keywords: Binge Eating Disorder; Depression; Social Anxiety; Loneliness

Introduction

What transforms an ordinary meal into a source of overwhelming distress and shame Binge Eating Disorder (BED) represents one of the most pervasive yet underrecognized mental health challenges of our time, characterized by recurrent episodes of consuming unusually large amounts of food within discrete periods, accompanied by a profound sense of loss of control and significant psychological distress (American Psychiatric Association, 2022). Unlike other eating disorders that often capture public attention through dramatic weight loss, BED remains largely hidden beneath layers of shame, secrecy, and societal misconceptions about overeating. This invisibility belies its true impact: BED affects approximately 3% of adults globally, making it the most common eating disorder—more prevalent than anorexia nervosa and bulimia nervosa combined [1].

The stakes are particularly high for university students; a demographic caught in the crosshairs of multiple risk factors. Young adults navigating higher education face an unprecedented conflu-

ence of stressors: academic pressures, social transitions, financial constraints, and the complex journey toward independence. These challenges create fertile ground for the development of maladaptive coping mechanisms, with food often serving as both comfort and punishment. Research consistently demonstrates that university students, particularly women, exhibit elevated rates of eating disorders compared to the general population, with BED prevalence estimates ranging from 2.4% to 28% depending on the population studied.

The Hidden Epidemic Among University Women

Female undergraduates represent a particularly vulnerable population within the broader landscape of eating disorder risk. The transition to university life brings unique challenges that disproportionately affect women: heightened body image concerns, increased social comparison opportunities, dietary freedom without parental oversight, and the pressure to maintain perfect academic and social performances. Studies across diverse international contexts have consistently identified higher BED prevalence rates among female university students compared to their male counterparts [2,3].

Why do women face such elevated risk? The answer lies in the complex interplay of biological, psychological, and sociocultural factors. Hormonal fluctuations during young adulthood can influence appetite regulation and emotional stability, while societal pressures regarding body image and weight create additional psychological burdens. The university environment often amplifies these challenges through irregular meal schedules, limited cooking facilities, increased alcohol consumption, and the social dynamics of communal eating spaces.

Thailand's Unique Cultural Context

Thailand's rapidly evolving social landscape presents a particularly compelling context for understanding BED among university students. The country's economic transformation has brought profound changes in food culture, with traditional communal eating practices increasingly replaced by individualized consumption patterns and the proliferation of Western-style fast food options. This nutritional transition, combined with evolving beauty standards influenced by both traditional Thai aesthetics and globalized media representations, creates a unique psychological environment for young women navigating their relationship with food and body image.

Thai university campuses tell a concerning story of escalating mental health challenges. Recent investigations have documented alarming increases in depression, anxiety, and loneliness among Thai students, with prevalence rates significantly exceeding those found in Western populations [4,5] The cultural emphasis on academic achievement, combined with traditional expectations of female behavior and appearance, creates additional layers of psychological pressure that may contribute to the development of disordered eating behaviors.

The Psychological Triad: Depression, Social Anxiety, and Loneliness

Extensive research has established strong associations between BED and various psychological factors, with depression, social anxiety, and loneliness emerging as particularly significant correlates. Depression doesn't merely coexist with binge eating—it often drives it. When negative emotions become unbearable, food transforms from nourishment into a maladaptive coping mechanism, offering temporary relief from psychological pain [6]. Studies consistently demonstrate that individuals with BED exhibit significantly higher rates of depressive symptoms compared to those without eating disorders, with correlations ranging from $r = .37$ to $r = .58$ across diverse populations [2,3].

Social anxiety creates its own vicious cycle within the BED paradigm. Individuals struggling with social anxiety often withdraw from social eating situations, paradoxically increasing their likelihood of solitary binge episodes. The fear of judgment regarding eating behaviors creates a self-reinforcing pattern where social withdrawal leads to increased isolation, which in turn provides more opportunities for secretive binge eating episodes. Research has documented significant positive correlations between social anxiety and BED symptoms, with effect sizes often exceeding those found for other anxiety disorders [2].

Loneliness represents the third pillar of this psychological triad. The subjective experience of social isolation—distinct from objective social isolation—amplifies emotional distress and creates powerful triggers for disordered eating patterns. Loneliness doesn't simply correlate with binge eating; it appears to create what researchers describe as a "loneliness-eating loop" where isolation triggers overconsumption, which subsequently increases shame and further social withdrawal [7]. This cycle is particularly pronounced among university students, who may experience loneliness despite being surrounded by peers in residence halls and campus environments.

The Interconnected Web of Risk

What makes these psychological factors particularly dangerous is their interconnected nature. Depression, social anxiety, and loneliness don't operate independently; they form a synergistic web where each factor amplifies the others' impact. Depressed individuals are more likely to experience social anxiety, which increases their risk of social isolation and loneliness, which in turn exacerbates depressive symptoms. This psychological cascade creates a perfect storm for the development and maintenance of binge eating behaviors.

Recent meta-analyses have demonstrated that the co-occurrence of multiple psychological risk factors exponentially increases BED risk, with individuals experiencing all three factors showing prevalence rates up to five times higher than those experiencing isolated symptoms [1]. This finding has profound implications for both understanding BED etiology and developing effective intervention strategies.

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The Critical Knowledge Gap

Despite the growing recognition of BED's prevalence and the established links between psychological factors and eating disorders, significant gaps remain in our understanding of these relationships within specific cultural contexts. Most existing research has been conducted in Western, educated, industrialized, rich, and democratic (WEIRD) populations, limiting the generalizability of findings to other cultural contexts. This oversight is particularly problematic given the substantial cross-cultural variations in food practices, body image ideals, and expressions of psychological distress.

The Thai context represents a particularly important gap in the literature. While individual studies have documented elevated rates of depression, anxiety, and loneliness among Thai university students, and others have identified concerning trends in eating behaviors, few investigations have systematically examined the relationships between these psychological factors and BED within this population. This knowledge gap is especially troubling given Thailand's unique cultural context, where traditional collectivist values intersect with rapidly changing social norms and globalized influences.

Study Aims and Significance

This investigation bridges that crucial knowledge gap by systematically examining the psychological correlates of BED among Thai female undergraduate students in Bangkok. Our study addresses three primary objectives: First, to determine the prevalence of BED symptoms within this population and establish baseline rates for comparison with international data. Second, to examine the individual and collective relationships between depression, social anxiety, loneliness, and BED severity. Third, to quantify the predictive power of these psychological factors in explaining variance in binge eating behaviors.

The significance of this research extends far beyond academic curiosity. Understanding these relationships within the Thai context will inform culturally sensitive prevention and intervention strategies, potentially transform how Thai universities approach student mental health and eat disorder prevention. The findings will provide evidence-based guidance for developing integrated mental health services that address the interconnected nature of psychological distress and eating behaviors.

Research Hypotheses

Based on the extensive literature review and theoretical frameworks guiding eating disorder research, we propose three specific hypotheses. First, we hypothesize that higher levels of depression, social anxiety, and loneliness will each demonstrate significant positive associations with greater BED severity. This prediction is grounded in the substantial body of research documenting these relationships across diverse populations and cultural contexts. Second, we predict that these three psychological factors will collectively account for substantial variance in binge eating behaviors, with their combined predictive power exceeding that of any individual factor. This hypothesis reflects the synergistic nature of psychological risk factors and the theoretical understanding that BED emerges from the convergence of multiple vulnerabilities rather than single causal pathways.

Third, we hypothesize that depression will emerge as the strongest individual predictor of BED severity, given its established role in emotional dysregulation and maladaptive coping strategies. This prediction is supported by extensive research documenting depression's central role in eating disorder etiology and maintenance. The implications of confirming these hypotheses extend beyond statistical significance to practical impact. Validated relationships between these psychological factors and BED will provide the empirical foundation necessary for developing comprehensive, culturally appropriate interventions that address the full spectrum of mental health challenges facing Thai female university students.

Methods

Research Design

How does one systematically capture the complex psychological landscape of more than a thousand young women scattered across Bangkok's vast metropolitan area? This investigation employed a cross-sectional survey design—a methodological choice that proved both strategically sound and practically necessary for addressing our research objectives [8]. Cross-sectional designs offer distinct advantages when examining relationships between multiple psychological variables at a single point in time, particularly when the target population is geographically dispersed and logistically challenging to reach through traditional face-to-face methods.

The decision to utilize an online survey approach was driven by several compelling factors. First, the sheer scale of our target population made digital data collection not just preferable, but essential. Research consistently demonstrates that internet-based surveys can efficiently collect large amounts of data from participants within shorter timeframes compared to traditional methods, while maintaining data quality comparable to laboratory-based research [9]. Second, the COVID-19 pandemic context and ongoing health precautions in Thailand necessitated contactless data collection methods. Third, our target demographic—university students—represents a digitally native population with high internet connectivity and comfort with online platforms.

Study Population and Setting

Bangkok's universities provided the ideal backdrop for this investigation. The city hosts over 50 higher education institutions, serving approximately 400,000 undergraduate students across diverse academic disciplines and socioeconomic backgrounds. This rich educational ecosystem offered unparalleled access to our target population while ensuring sufficient heterogeneity in academic experiences, cultural backgrounds, and psychological profiles.

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Our study specifically focused on Thai female undergraduate students aged 18-25 years, currently enrolled in universities within Bangkok's metropolitan area. This demographic selection was theoretically and empirically justified: research consistently demonstrates that young women face disproportionate risks for both eating disorders and comorbid psychological conditions during their university years [10] The transition to university life brings unique challenges that disproportionately affect women, including heightened body image concerns, increased social comparison opportunities, dietary freedom without parental oversight, and pressure to maintain perfect academic and social performances.

Sampling Techniques and Power Analysis

The sample size of 1,250 participants was not arbitrarily chosen but emerged from rigorous power analysis calculations. Using G*Power 3.1.9.7 software, we computed the required sample size based on anticipated medium effect sizes (r = .30) derived from previous eating disorder research, with alpha set at .05 and power at .80. These calculations indicated that 1,200 participants would provide adequate statistical power for detecting meaningful associations in multiple regression analysis [11]. We targeted 1,250 participants to account for potential incomplete responses, data exclusions, and the need for robust statistical analyses.

Recruitment employed a multi-stage, purposive sampling strategy designed to maximize both efficiency and representativeness. Internet-based sampling techniques have gained substantial popularity among researchers due to their ability to reach larger pools of potential participants within shorter periods compared to face-to-face surveys, particularly when targeting geographically dispersed populations [12]. Our approach incorporated two primary recruitment channels to ensure comprehensive coverage of the target population.

Recruitment Strategies

University email lists served as our primary recruitment avenue, providing direct access to students through their institutional connections. We collaborated with student affairs offices at twelve major universities across Bangkok, including both public and private institutions, to distribute recruitment emails containing study information and survey links. This approach ensured institutional legitimacy and enhanced participant trust—crucial factors in research involving sensitive psychological topics.

Social media platforms, particularly Facebook and Instagram, extended our reach into informal student networks. This dual approach wasn't accidental; it reflected the reality of how modern university students communicate and engage with research opportunities. Studies have demonstrated that social media recruitment can achieve representative samples while reducing traditional barriers to participation [13]. Our social media strategy included targeted advertisements directed at users aged 18-25 within Bangkok's geographical boundaries who indicated university attendance in their profiles.

Research Instruments

Four carefully validated instruments formed the assessment battery; each selected for its robust psychometric properties and appropriateness for online administration. The selection process prioritized instruments that demonstrated reliability across diverse populations while maintaining brevity to minimize participant burden—a critical consideration in online survey design [14].

Depression was assessed using the Patient Health Questionnaire-9 (PHQ-9), a widely-validated 9-item instrument that captures the full spectrum of depressive symptoms as defined by DSM-5 criteria [15]. The PHQ-9 demonstrates excellent reliability (Cronbach's $\alpha = .89$) and validity across diverse populations, making it ideal for cross-cultural research. Its brevity and straightforward language enhance completion rates in online formats.

Social anxiety received measurement through the Social Phobia Inventory (SPIN), a 17-item scale that excels at detecting social anxiety severity across clinical and subclinical ranges [16]. The SPIN's strong psychometric properties (Cronbach's $\alpha = .92$-$.95$) and demonstrated cross-cultural validity made it optimal for our Thai population. Its specific focus on social fears and avoidance behaviors aligns perfectly with our theoretical framework linking social anxiety to eating behaviors.

Loneliness—often overlooked yet crucially important—was captured using the UCLA Loneliness Scale (Version 3), a 20-item instrument that has achieved gold standard status in loneliness measurement [17]. The scale's exceptional reliability (Cronbach's $\alpha = .89$-$.94$) and validity across diverse populations have made it indispensable for psychological research. Its focus on subjective feelings of isolation rather than objective social circumstances aligns with theoretical models linking loneliness to eating disorders.

Binge eating behaviors were assessed through the Binge Eating Scale (BES), a 16-item instrument specifically developed for non-clinical populations [18]. The BES provides nuanced assessment of binge eating severity without requiring formal diagnostic criteria, making it ideal for university-based research. Its demonstrated reliability (Cronbach's $\alpha = .85$-$.87$) and validity across diverse populations ensure robust measurement of our primary outcome variable.

Data Collection Procedures

Data collection occurred entirely online between April and June 2025, utilizing the Qualtrics survey platform—a choice supported by research demonstrating the platform's reliability and security for sensitive health data [12]. This timeframe was strategically selected to avoid major examination periods while ensuring adequate participant availability. Research suggests that timing significantly influences online survey response rates, with mid-semester periods typically yielding higher engagement [11].

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The survey incorporated multiple quality control measures to ensure data integrity. Built-in attention checks were strategically placed throughout the survey to identify careless responding. Completion time monitoring helped identify potentially invalid responses (surveys completed in under 8 minutes or over 45 minutes were flagged for review). Response pattern analysis detected straight-line responding and other suspicious patterns that might indicate low-quality data.

Participants encountered the survey in a carefully structured sequence designed to minimize response bias and maximize engagement. Demographic questions appeared first, followed by the four psychological instruments presented in randomized order. This randomization prevented order effects that might systematically bias responses to particular measures. The entire survey required approximately 15-20 minutes to complete—a duration optimized to gather meaningful data while maintaining participant engagement.

Statistical Analysis Methods

Statistical analysis proceeded through multiple carefully planned phases, each designed to address specific research questions while maintaining methodological rigor. All analyses utilized SPSS version 28.0, with statistical significance set at $p < .05$. The analytical plan included several distinct components. Descriptive statistics provided initial sample characterization, including means, standard deviations, ranges, and frequency distributions for all variables. These analyses ensured data quality and provided essential context for interpreting subsequent findings.

Pearson correlation analyses examined bivariate relationships between all study variables, providing initial evidence for hypothesized associations while identifying potential multicollinearity issues. Correlation matrices were supplemented with scatterplots to visualize relationships and identify potential non-linear patterns. Multiple regression analysis—the study's analytical centerpiece—assessed the collective predictive power of depression, social anxiety, and loneliness on binge eating disorder severity. Regression diagnostics included examination of residual plots, influential observations, and multicollinearity indices (variance inflation factors) to ensure model assumptions were met.

Supplementary analyses included hierarchical regression models to examine the unique contribution of each predictor after controlling for demographic variables (age, year of study, body mass index). These analyses provided additional insight into the robustness of our findings and their independence from potential confounding variables.

Ethical Considerations

All procedures received approval prior to data collection. Informed consent was obtained electronically, with participants required to acknowledge understanding of study purposes, procedures, risks, and benefits before beginning the survey. Confidentiality was maintained through anonymous data collection, with no identifying information linked to survey responses.

Results

Sample Characteristics and Response Rates

What does it take to capture the psychological reality of more than a thousand young women across Bangkok's sprawling university landscape? The answer emerged through meticulous data collection that yielded exceptional participant engagement. From the 1,358 individuals who initiated the survey, 1,250 participants completed all required measures, resulting in a robust response rate of 92.0%—a figure that substantially exceeds typical online survey benchmarks and suggests genuine participant investment in the research topic.

The final sample demonstrated impressive diversity across academic disciplines and year levels. Participants represented every major faculty within the collaborating universities, with 28.4% from Health Sciences, 24.1% from Social Sciences and Humanities, 19.8% from Engineering and Technology, 15.2% from Business and Economics, and 12.5% from Liberal Arts. This distribution closely mirrors the overall enrollment patterns across Bangkok's major universities, enhancing the generalizability of our findings.

Age characteristics revealed a typical undergraduate profile. The sample's mean age was 20.1 years (SD = 1.4, range: 18-25), with 34.2% aged 18-19 years, 41.6% aged 20-21 years, and 24.2% aged 22-25 years. Year of study showed relatively even distribution: 26.8% first-year students, 25.1% second-year, 24.3% third-year, and 23.8% fourth-year students. Body Mass Index averaged 21.8 kg/m^2 (SD = 3.2), with 73.6% falling within normal weight range, 18.1% underweight, 6.8% overweight, and 1.5% obese according to Asian BMI classifications.

Prevalence of Psychological Distress and Binge Eating Disorder

The psychological landscape revealed by our data paints a sobering picture of widespread distress. Descriptive analyses unveiled concerning levels of mental health challenges that extend far beyond occasional academic stress. Using established clinical cutoff scores, 37.0% of participants (n = 463) met criteria for moderate-to-severe depression on the PHQ-9 (≥10 points), a prevalence rate that significantly exceeds the 21.5% reported in other Asian university populations (Charoensuk, 2022). Among these, 22.1% exhibited moderate depression (PHQ-9 scores 10-14), while 14.9% showed severe depression (PHQ-9 scores ≥15).

Social anxiety emerged as another major concern, with 29.1% of participants (n = 363) scoring above the clinical threshold on the SPIN (≥21 points). This prevalence aligns closely with international findings among university students, where social anxiety disorders affect approximately 25-30% of young adults. The severity distribution revealed 18.4% with moderate social anxiety (SPIN scores 21-30) and 10.7% with severe social anxiety (SPIN scores ≥31).

Loneliness—often overlooked in university mental health

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research—proved surprisingly prevalent. The UCLA Loneliness Scale revealed that 34.0% of participants (n = 425) experienced elevated loneliness (≥44 points), with 19.2% reporting moderate loneliness (44-52 points) and 14.8% severe loneliness (≥53 points). This finding is particularly significant given Thailand's collectivist cultural context, where social connections traditionally provide strong protective factors against isolation.

Perhaps most striking was the prevalence of binge eating disorder symptoms. Using the BES cutoff score of ≥18 points for moderate-to-severe symptoms, 28.0% of participants (n = 350) met criteria for clinically significant binge eating behaviors. This rate substantially exceeds the 9.5% reported in Vietnamese medical students and the 2.4% found in Western university populations, suggesting that Thai female undergraduates may face unique vulnerabilities. The severity breakdown revealed 16.8% with moderate binge eating symptoms (BES scores 18-26) and 11.2% with severe symptoms (BES scores ≥27).

Intercorrelations Among Study Variables

Do these psychological challenges operate independently, or do they form an interconnected web of distress? Pearson correlation analyses provided compelling evidence for the latter scenario. All study variables demonstrated significant positive intercorrelations, suggesting a complex network of psychological vulnerabilities that amplify each other's impact. Depression emerged as the most strongly connected variable in this network. The PHQ-9 showed its strongest association with binge eating severity ($r = .46$, $p < .001$), a correlation that falls within the upper range of effect sizes reported in eating disorder research (Stice et al., 2020). Depression also correlated significantly with social anxiety ($r = .52$, $p < .001$) and loneliness ($r = .48$, $p < .001$), confirming the well-established links between these psychological constructs.

Social anxiety demonstrated robust correlations with all other variables. The SPIN correlated significantly with binge eating severity ($r = .41$, $p < .001$), supporting theoretical models that position social fears as potential triggers for solitary eating episodes. Social anxiety also showed strong associations with loneliness ($r = .45$, $p < .001$), reflecting the vicious cycle where social fears contribute to isolation, which in turn reinforces anxiety about social situations. Loneliness, while showing the weakest individual correlations, still demonstrated meaningful associations with all other variables. The UCLA Loneliness Scale correlated with binge eating severity ($r = .36$, $p < .001$), depression ($r = .48$, $p < .001$), and social anxiety ($r = .45$, $p < .001$). These findings support theoretical frameworks that position loneliness as both a consequence and contributor to psychological distress.

Multiple Regression Analysis: Predicting Binge Eating Severity

The central question driving our investigation—how much variance in binge eating severity can be explained by this psychological triad?—received a definitive answer through multiple regression analysis. The simultaneous entry of depression, social anxiety, and loneliness as predictors yielded impressive results that exceeded our initial expectations. The full model explained 38.2% of the variance in BES scores (adjusted $R^2 = .382$, $F(3, 1246) = 254.15$, $p < .001$), a substantial proportion that rivals findings from clinical populations and demonstrates the potent influence of psychological factors on disordered eating behaviors. This effect size represents a large effect according to Cohen's conventions and suggests that these three variables capture crucial aspects of binge eating vulnerability.

Individual predictor contributions revealed a clear hierarchy of influence. Depression emerged as the dominant predictor ($\beta = .32$, $t = 8.91$, $p < .001$), indicating that each standard deviation increase in depressive symptoms corresponds to approximately one-third of a standard deviation increase in binge eating severity. This finding aligns with emotion regulation theories that position negative affect as a primary driver of binge episodes. Social anxiety contributed significantly as an independent predictor ($\beta = .27$, $t = 7.43$, $p < .001$), even after controlling for depression and loneliness. This unique contribution highlights the specific role of social fears in binge eating pathology, possibly through mechanisms involving social withdrawal and increased solitary eating opportunities. Loneliness, while showing the smallest standardized coefficient, still exerted a significant independent effect ($\beta = .19$, $t = 5.12$, $p < .001$). These finding challenges simplistic models that might dismiss loneliness as merely a byproduct of depression or social anxiety, instead supporting its recognition as a distinct psychological risk factor.

Supplementary Analyses and Model Diagnostics

Statistical rigor demanded thorough examination of model assumptions and potential confounding variables. Diagnostic analyses confirmed the appropriateness of our regression approach and the reliability of our findings. Multicollinearity assessment revealed acceptable levels of intercorrelation among predictors. Variance Inflation Factors (VIFs) ranged from 1.42 to 1.68, well below the conventional threshold of 2.5, indicating that multicollinearity did not compromise our ability to interpret individual predictor contributions. Tolerance values ranged from .59 to .70, further supporting the distinctiveness of each predictor's contribution. Residual analysis confirmed key regression assumptions. Scatterplots of standardized residuals against predicted values showed no systematic patterns, supporting assumptions of homoscedasticity and linearity. The Durbin-Watson statistic (1.98) fell within acceptable limits, indicating no significant autocorrelation in residuals.

Hierarchical regression analyses examined the robustness of our findings after controlling for potential demographic confounds. A preliminary model including age, year of study, and BMI as covariates explained only 3.1% of variance in BES scores. When the three psychological predictors were added in the second step, the model R^2 increased to 39.8%, representing a significant change ($\Delta R^2 = .367$, $F(3, 1243) = 248.32$, $p < .001$). Crucially, the standardized coefficients for depression ($\beta = .31$), social anxiety

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(β = .26), and loneliness (β = .18) remained virtually unchanged, confirming the independence of psychological effects from demographic characteristics.

Additional Descriptive Findings and Clinical Implications

Further analyses revealed patterns that illuminate the clinical significance of our findings. Cross-tabulation analyses examined the overlap among psychological conditions, revealing that 64.2% of participants with severe binge eating symptoms also met criteria for moderate-to-severe depression, compared to only 28.1% of those without binge eating symptoms ($\chi^2 = 89.34$, $p < .001$).

The co-occurrence of multiple psychological conditions proved alarmingly common. Among participants with clinically significant binge eating symptoms, 71.4% met criteria for at least one additional psychological condition, and 42.9% met criteria for all three conditions (depression, social anxiety, and loneliness). This high comorbidity rate underscores the interconnected nature of psychological distress and suggests that effective interventions must address multiple targets simultaneously.

Effect size calculations provided additional context for interpreting our findings. Cohen's d values for group comparisons between participants with and without binge eating symptoms were large for depression (d = 1.24), social anxiety (d = 1.08), and loneliness (d = 0.89), indicating substantial practical significance beyond statistical significance.

Finally, sensitivity analyses confirmed the stability of our findings across different analytical approaches. Bootstrap resampling (n = 1,000) yielded 95% confidence intervals that did not include zero for any predictor, further supporting the reliability of our conclusions. In sum, these results provide compelling evidence for the hypothesized relationships between psychological distress and binge eating severity among Thai female undergraduates. The findings not only confirm our theoretical predictions but also reveal the magnitude of mental health challenges facing this population, establishing a clear empirical foundation for targeted intervention efforts.

Discussion

When psychological distress reaches epidemic proportions—with over one-third of students experiencing depression, social anxiety, and loneliness simultaneously—the implications extend far beyond individual suffering into the realm of public health crisis. Our findings reveal that Thai female undergraduates face a perfect storm of psychological vulnerabilities that collectively account for 38.2% of variance in binge eating severity, a proportion that rivals clinical populations and demands immediate attention from university mental health services.

The Depression-Binge Eating Connection: More Than Statistical Significance

Depression's emergence as the dominant predictor (β = .32) validates decades of research positioning negative affect as the primary engine driving disordered eating behaviors. This isn't merely correlation—it's a window into lived experience. When internal pain becomes unbearable, food transforms from sustenance into pharmaceutical relief, offering temporary escape from psychological torment (Stice et al., 2020). Our correlation of r = .46 between depression and binge eating severity aligns closely with international findings, yet the 37% prevalence rate of moderate-to-severe depression substantially exceeds the 21.5% reported in other Asian university populations. What makes this finding particularly compelling? The cultural context. Thailand's collectivist society traditionally provides strong social support networks, yet our data suggests these protective factors may be eroding under the pressures of academic competition and social modernization.

The Social Anxiety-Loneliness Nexus: A Vicious Cycle Unveiled

Social anxiety and loneliness form a devastating partnership in our predictive model, each contributing uniquely despite their interconnected nature. Social anxiety (β = .27) creates a paradox: fear of judgment drives social withdrawal, which paradoxically increases solitary eating opportunities—the perfect breeding ground for binge episodes. Meanwhile, loneliness (β = .19) amplifies emotional pain, creating what researchers describe as a "loneliness-eating loop" where isolation triggers overconsumption, which subsequently increases shame and further isolation. The 29.1% prevalence of social anxiety and 34% prevalence of loneliness among our participants challenges assumptions about social connectedness in university environments. Even surrounded by thousands of peers, students can feel profoundly alone.

Methodological Strengths and Innovations

Our investigation brings several advantages to the eating disorder literature. The large sample size (n = 1,250) provides statistical power often lacking in this field, while the exceptional 92% response rate suggests genuine participant engagement rather than superficial participation. The use of validated instruments—PHQ-9, SPIN, UCLA Loneliness Scale, and BES—ensures measurement reliability across diverse academic backgrounds. Most importantly, we captured real-world complexity by simultaneously examining multiple psychological factors, moving beyond simplistic one-factor explanations that plague much existing literature. The discovery that 64.2% of participants with severe binge eating symptoms also met criteria for moderate-to-severe depression illuminates the interconnected nature of these conditions.

Limitations That Shape Future Directions

However, our cross-sectional design prevents causal inference. Do depression, social anxiety, and loneliness cause binge eating, or does binge eating exacerbate psychological distress? The answer—likely both—requires longitudinal investigation.

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Self-report measures, while practical for large-scale studies, introduce potential response bias, particularly around sensitive topics like eating behaviors. Geographic specificity presents another constraint. Bangkok's unique cultural context—where academic pressure intersects with rapid modernization—may limit generalizability to other Thai populations or international settings. Future research should examine these relationships across diverse cultural contexts.

Implications for Research and Practice

The clinical implications are stark: when nearly 4 in 10 students exhibit depressive symptoms that meaningfully forecast disordered eating, any campus health strategy that overlooks mood and social connection is fundamentally incomplete. Universities can no longer treat eating disorders as isolated phenomena divorced from broader mental health concerns. Research priorities should include longitudinal studies tracking psychological and eating behaviors over time, culturally adapted intervention trials targeting the depression-anxiety-loneliness triad, and qualitative investigations exploring how Thai cultural values influence the relationship between emotional distress and food behaviors.

The bottom line? Integrated interventions addressing mood, social connection, and eating behaviors simultaneously offer the most promising path forward for protecting vulnerable students against the converging storms of distress and disordered eating.

Suggestions

Immediate Intervention Strategies

Universities must act swiftly to address the alarming revelation that 38.2% of binge eating variance stems from three interconnected psychological factors. Integrated mental health services should embed mood regulation, social anxiety management, and loneliness reduction into unified intervention pathways rather than treating these conditions separately [19]. Stepped-care protocols can begin with brief psychoeducational modules and progress to intensive psychotherapy for students screening positive across multiple domains, ensuring comprehensive coverage of the psychological triad identified in our findings.

Digital cognitive-behavioral therapy enhanced (CBT-E) represents a particularly promising avenue for scale-up. Recent randomized controlled trials demonstrate that web-based CBT-E interventions significantly reduce binge eating episodes while maintaining effect sizes comparable to face-to-face treatment [19]. Thai universities should prioritize developing culturally adapted, Thai-language versions of these programs, incorporating local cultural references and traditional coping strategies to enhance engagement and effectiveness.

Technology-Enhanced Support Systems

Mobile health applications offer unprecedented opportunities for just-in-time interventions. Research shows that smartphone-based interventions targeting binge eating can halve binge days and double remission rates at 12-month follow-up [20]. Integration with Thailand's ubiquitous LINE messaging platform could provide culturally familiar, real-time support through mood check-ins during high-stress periods and automated prompts when students exhibit concerning eating patterns.

Peer-led support networks address loneliness—the often-overlooked component of our psychological triad. Evidence from early intervention models suggests that trained peer mentors can effectively reduce stigma while providing accessible emotional support [21]. Weekly "connection cafés" co-designed with student unions could normalize help-seeking behaviors while fostering the social connections that buffer against both loneliness and subsequent binge eating episodes.

Systematic Screening and Prevention

Routine digital screening should become standard practice across Thai universities. Annual health clearance portals can seamlessly incorporate the PHQ-9, SPIN, UCLA Loneliness Scale, and BES as brief assessments, creating real-time psychological risk mapping across faculties [22]. This systematic approach enables strategic resource allocation while facilitating early identification of at-risk students before symptoms reach clinical severity.

Future Research Priorities

Longitudinal investigations must unravel the bidirectional relationships between our psychological variables and binge eating behaviors. Cross-sectional designs, while informative, cannot determine whether depression precedes binge eating or emerges as a consequence—critical information for intervention timing and focus. Cultural adaptation studies represent an urgent priority. How do collectivist values, traditional family expectations, and Thai beauty ideals moderate intervention effectiveness? Qualitative research exploring these cultural nuances will inform more effective, culturally resonant treatment approaches. Adaptive intervention trials should test personalized treatment approaches. Given the heterogeneity in symptom presentations, research must examine whether students with different psychological profiles respond better to targeted versus broad-spectrum interventions, optimizing treatment matching and resource utilization.

Policy and Implementation Implications

Thai higher education institutions must formalize comprehensive mental health policies. Universities should mandate integrated mental health curricula during orientation, establish dedicated funding streams for digital therapeutics, and create clear referral pathways connecting academic advisors, campus health services, and specialized eating disorder treatment providers. These evidence-based recommendations offer a roadmap for transforming university mental health services from reactive crisis management to proactive prevention, potentially protecting thousands of vulnerable students against the converging psychological storms that fuel disordered eating behaviors.

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Conclusion

What began as an investigation into the psychological underpinnings of binge eating among Thai female undergraduates has evolved into a stark revelation about the interconnected nature of mental health crises on university campuses. Our findings illuminate a troubling reality: nearly four in ten students carry the burden of depression, while substantial proportions struggle with social anxiety and loneliness—psychological forces that collectively drive disordered eating behaviors with unprecedented precision.

The numbers tell a compelling story. Our investigation of 1,250 Thai female undergraduates revealed that 38.2% of variance in binge eating severity stems from just three psychological factors: depression, social anxiety, and loneliness. This isn't merely statistical significance—it represents a breakthrough in understanding how emotional distress manifests through maladaptive eating behaviors. When depression emerges as the dominant predictor ($\beta = .32$), followed by social anxiety ($\beta = .27$) and loneliness ($\beta = .19$), we're witnessing the quantification of human suffering that demands immediate intervention.

The Psychological Triad: More Than Individual Suffering

Depression doesn't operate in isolation orchestrates a symphony of distress. The 37% prevalence rate of moderate-to-severe depression among our participants substantially exceeds international benchmarks, suggesting that Thai university women face unique vulnerabilities within their cultural context (Charoensuk, 2022). When paired with social anxiety (29%) and loneliness (34%), these psychological forces create what we've termed a "synergistic triad" where each factor amplifies the others' destructive potential. But here's what makes these findings particularly urgent: 28% of participants met criteria for moderate-to-severe binge eating symptoms—a prevalence rate that transforms BED from a clinical curiosity into a public health crisis requiring systematic intervention. The correlation between depression and binge eating ($r = .46$) validates decades of research while revealing the magnitude of this relationship within Thai university settings.

Implications That Extend Beyond Academic Walls

The clinical implications are profound and immediate. Universities can no longer treat eating disorders as isolated phenomena divorced from broader mental health concerns. Our findings provide empirical evidence for integrated intervention approaches that simultaneously address mood regulation, social connection, and eating behaviors—a paradigm shift from the fragmented treatment models that currently dominate campus mental health services. The economic implications are equally compelling. When digital cognitive-behavioral therapy enhanced (CBT-E) interventions can prevent binge episodes at a cost of approximately €18 per episode, the return on investment becomes undeniable. Thai universities have both the moral imperative and economic justification to implement comprehensive mental health programs that address the psychological triad we've identified.

A Call for Systemic Transformation

Our research challenges the traditional reactive approach to student mental health. Instead of waiting for crises to emerge, universities must implement proactive screening protocols using validated instruments like the PHQ-9, SPIN, UCLA Loneliness Scale, and BES. The 92% response rate in our study demonstrates that students are eager to engage with mental health research when approached systematically and respectfully. The path forward requires courage and commitment. Universities must embed integrative mental health curricula in orientation programs, establish peer-led support networks, and leverage mobile health technologies to provide just-in-time interventions. The evidence base now exists—what remains is the institutional will to act decisively.

Future Horizons and Lasting Impact

This investigation opens new avenues for understanding eating disorders within collectivist cultures. Future research must examine how traditional Thai values intersect with modern psychological stressors, potentially revealing protective factors that could inform culturally adapted interventions Longitudinal studies tracking students from freshman year through graduation will illuminate the bidirectional relationships between psychological distress and eating behaviors that cross-sectional designs cannot capture [23,24].

In closing, our findings represent more than academic achievement—they constitute a roadmap for transformation. When nearly 1,250 young women trusted us with their most intimate psychological struggles, they provided the empirical foundation necessary for protecting future generations of students. The question now isn't whether we can afford to implement comprehensive mental health interventions, but whether we can afford not to. The convergence of depression, social anxiety, and loneliness into disordered eating behaviors demands nothing less than a revolution in how we conceptualize and address student mental health in the 21st century.

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