Journal of Asian-African focus in Health

ISSN: 2987-9418
Vol. 4 No. 1, 2026
Page: 189-202

Disordered Eating Attitudes among Undergraduate Students in Indonesia: Associations with Food Insecurity, Perceived Stress, and Sleep Quality

Netta Meridianti Putri[1], Resti Kurnia Triastanti[1]

[1]Program Studi Gizi, Universitas Tidar, Magelang, Indonesia

*Corresponding Author: Netta Meridianti Putri

Email:

Article Info

Article History:

Received March 23, 2026
Revised April 13, 2026
Accepted: May 21, 2026

Keywords:

Disordered Eating, Food Insecurity, Perceived Stress, University Students, Indonesia.

Abstract

Disordered eating is an under-recognised problem among university students, and its links to social and economic adversity remain understudied in Indonesia. This study aimed to estimate the prevalence of disordered eating attitudes among undergraduate students in Indonesia and to examine its associations with food insecurity, perceived stress, and sleep quality. Methods: A cross-sectional survey was conducted in November 2024 among 635 undergraduate students from several institutions, predominantly Universitas Tidar. Disordered eating attitudes were assessed with the Eating Attitudes Test-26 (EAT-26; at-risk score ≥20), food insecurity with the United States Department of Agriculture Adult Food Security Survey Module, perceived stress with the Perceived Stress Scale-10, and sleep quality with the Pittsburgh Sleep Quality Index. Body-mass index was classified using Asia-Pacific cut-offs. Associations were examined using chi-square tests, Spearman correlations, and multivariable logistic regression adjusted for sex and body-mass index. The EAT-26 showed good internal consistency (Cronbach's α = 0.82). Overall, 22.2% of students (95% CI 19.0–25.4) were at risk of disordered eating. EAT-26 scores correlated positively with food insecurity, perceived stress, and body-mass index. In the adjusted model, disordered-eating risk was independently associated with food insecurity (adjusted odds ratio 1.99; 95% CI 1.34–2.96) and high perceived stress (adjusted odds ratio 2.40; 95% CI 1.32–4.37), and with higher body-mass index, but not with poor sleep quality. Food insecurity and perceived stress are salient correlates of disordered eating among Indonesian undergraduates, supporting integrated screening and support.

Introduction

Disordered eating refers to a range of attitudes and behaviours, such as preoccupation with weight and shape, dietary restriction, binge eating, and compensatory behaviours, that fall short of a formal eating-disorder diagnosis but carry meaningful risk to physical and psychological health. University students are a recognised high-risk group: a global systematic review and meta-analysis of undergraduate students estimated the pooled prevalence of screen-based disordered eating at 19.7%, with an estimate of about 22% for studies using the Eating Attitudes Test (Alhaj et al., 2022). Evidence from Southeast Asia is more limited; a multi-country study using the Eating Attitudes Test-26 (EAT-26) across Indonesia, Malaysia, Myanmar, Thailand, and Vietnam classified 11.5% of students as at risk, with the lowest rates (below 10%) reported in Indonesia (Pengpid & Peltzer, 2018; Wongprachum et al., 2026; Bhaumik, 2025). The public-health relevance of these attitudes is considerable: eating disorders are disabling and frequently under-counted, and revised global estimates that incorporated binge-eating disorder and other specified feeding or eating disorders added 41.9 million cases worldwide (Santomauro et al., 2021; Giel et al., 2022; Dane & Bhatia, 2023; Liu et al., 20225). Screening instruments such as the EAT-26 identify individuals at elevated risk of disordered eating rather than establishing a clinical eating-disorder diagnosis; throughout this article, disordered-eating

DOI: https://doi.org/10.71435/738852

risk denotes this screened elevated-risk status (M Aljehani & Alabdrabalnabi, 2025; Kovács et al., 2025; Al-Bawah et al., 2026).

Research on disordered eating has traditionally emphasised body-image concerns, female sex, and elevated body weight as risk factors. More recently, attention has turned to social and economic adversity. A growing body of evidence links food insecurity, limited or uncertain access to adequate food, to elevated eating-disorder pathology, including dietary restriction, binge eating, and compensatory behaviours (Becker et al., 2017; Hazzard et al., 2020), and a meta-analysis confirmed that food insecurity is associated with higher odds of binge eating (Abene et al., 2023). Proposed mechanisms include the cyclical pattern of food deprivation followed by overeating when food becomes available, the multiple functions of dietary restraint, and the role of psychological stress (Hazzard et al., 2020; Papalini, 2024). Perceived stress is itself a plausible correlate of disordered eating, while poorer sleep quality has been linked to some forms of disordered eating, although associations with attitudinal measures such as the EAT-26 have been inconsistent (Suna & Ayaz, 2022; Wu et al., 2021; Gürbüz & Bayram, 2025).

In Indonesia, food insecurity is an emerging concern even among students and adolescents, and has been associated with adverse mental-health outcomes (Asrullah et al., 2024; Saputra et al., 2025; Rahman & Siu, 2025). Yet few studies have examined disordered eating among Indonesian undergraduates, and fewer still have considered food insecurity, perceived stress, and sleep quality together within the same sample. Clarifying these associations is important because food insecurity and stress are potentially modifiable, and because eating-disorder screening rarely incorporates them. To our knowledge, no Indonesian study has yet examined food insecurity, perceived stress, and sleep quality together as correlates of disordered-eating risk within a single undergraduate sample, and national data on disordered eating in this population remain limited. These factors were considered jointly because they are interrelated: economic hardship, psychological stress, and disrupted sleep may reinforce one another and converge on eating behaviour, while body-mass index reflects the weight-related concerns central to the EAT-26. This study therefore had two aims: to estimate the prevalence of disordered-eating risk (screened, not clinically diagnosed) among Indonesian undergraduates, and to examine whether food insecurity, perceived stress, poor sleep quality, and body-mass index are associated with that risk. We hypothesised that food insecurity, higher perceived stress, poorer sleep quality, and higher body-mass index would each be associated with greater odds of disordered-eating risk, independent of sex.

Method

Study design and participants

This cross-sectional study was conducted in November 2024 among 635 undergraduate students from several Indonesian higher-education institutions, predominantly Universitas Tidar in Magelang, Central Java. Participation was voluntary and all respondents provided informed consent before completing a self-administered online questionnaire. The study was approved by the Health Research Ethics Committee, Faculty of Medicine, Universitas Jenderal Soedirman (KEPK FK UNSOED), No. 100/KEPK/PE/X/2024. Respondents were enrolled through a non-probability strategy combining convenience and snowball sampling: the online questionnaire was disseminated through student and peer networks, and early respondents were invited to share it with others. Because dissemination began at the investigators' home institution, Universitas Tidar contributed the largest number of respondents (432 of 635, 68.0%), while the remaining 203 (32.0%) came from a range of other Indonesian universities; the sample is therefore interpreted as describing these participating students rather than a

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nationally representative population. Eligible participants were actively enrolled Diploma or undergraduate (S1) students who provided informed consent; postgraduate students and submissions with incomplete responses were excluded. Because the questionnaire was shared through open online networks, a denominator-based response rate could not be calculated. Repeat participation was discouraged by collecting respondent identifiers (including email address) and screening the dataset for duplicate entries, and only complete responses were analysed, yielding 635 usable records. No a priori power calculation guided recruitment; however, 635 respondents estimate a 22% prevalence with a 95% confidence half-width of about three percentage points (above the roughly 609 required for that precision) and provide about 28 outcome events per model predictor, comfortably above the conventional minimum of ten, corresponding to approximately 91% power to detect the observed association between food insecurity and disordered-eating risk.

Disordered eating attitudes

Disordered eating attitudes were assessed using the 26-item Eating Attitudes Test (EAT-26), a widely used screening instrument (Garner et al., 1982). Items are rated on a six-point scale and summed (range 0–78); a total score of 20 or above indicates being at risk of disordered eating. Internal consistency in this sample was good (Cronbach's $\alpha = 0.82$). Only the 26 attitudinal items were administered; the supplementary behavioural-frequency items sometimes accompanying the test were not included, so the EAT-26 was used purely as an attitudinal screen, and a score of 20 or above was interpreted as screening-level risk rather than a diagnosis. The instrument was administered in Indonesian.

Food insecurity, stress, and sleep

Food insecurity over the preceding 12 months was measured with the ten-item USDA Adult Food Security Survey Module and scored according to standard conventions, with students classified as food insecure when the raw score was 3 or above (Bickel et al., 2000). Perceived stress was measured with the 10-item Perceived Stress Scale (PSS-10), with positively worded items reverse-scored; a total score of 27 or above was classified as high stress (Cohen et al., 1983). Sleep quality was assessed with the Pittsburgh Sleep Quality Index (PSQI); a global score above 5 indicated poor sleep quality (Buysse et al., 1989). Body-mass index (BMI) was computed from self-reported weight and height and classified using Asia-Pacific cut-offs (WHO Expert Consultation, 2004). All instruments were administered in Indonesian. Respondents answered the USDA items with reference to their own food situation over the preceding 12 months and, in addition to the food-insecure versus food-secure split, were also classified into the standard categories of food secure, low food security, and very low food security. Internal consistency in this sample was acceptable to good for the USDA module (Cronbach's $\alpha = 0.80$), the PSS-10 ($\alpha = 0.71$), and the EAT-26 ($\alpha = 0.82$); the PSQI yields a weighted composite global score rather than simple summed items, so coefficient alpha is less directly interpretable and is not reported for it. Because the PSS-10 has no universally accepted diagnostic threshold, perceived stress was analysed primarily as a continuous score, and the classification of a score of 27 or above as high stress is reported only as a secondary, descriptive categorisation.

Statistical analysis

Prevalence is reported with 95% confidence intervals (CI). Associations between disordered-eating risk and categorical variables were examined using the chi-square test with crude odds ratios (cOR), and Spearman correlations were used for continuous variables. A multivariable binary logistic regression model estimated adjusted odds ratios (aOR) for disordered-eating

DOI: https://doi.org/10.71435/738852

risk, with food insecurity, high perceived stress, and poor sleep quality as predictors of interest, adjusted for sex and BMI. A two-sided p-value below 0.05 was considered significant. Sex and body-mass index were selected a priori as adjustment variables because both are well-established correlates of disordered eating. Other potential confounders, including age, academic year, institution, study programme, and living arrangement, were examined but did not materially change the associations of interest and were not retained. Crude odds ratios were computed with a continuity correction (adding 0.5 to each cell) to stabilise estimates in sparsely populated categories. Model adequacy was assessed using the variance inflation factor for multicollinearity, the Hosmer–Lemeshow test for goodness-of-fit, the area under the receiver-operating-characteristic curve for discrimination, and the Box–Tidwell procedure for the linearity of continuous predictors in the logit; influential observations were inspected, and missing data were handled by complete-case analysis. Because most respondents came from a single institution, a sensitivity analysis using institution-clustered robust standard errors was also performed. Analyses were conducted in IBM SPSS Statistics version 26.

Results And Discussion

Prevalence of disordered eating

Among the 635 students (mean age 19.99 ± 1.29 years; 82.8% female), the mean EAT-26 score was 13.82 ± 10.05, and 141 students (22.2%; 95% CI 19.0–25.4) were at risk of disordered eating. This estimate is virtually identical to the pooled prevalence of approximately 22% reported for EAT-based studies of undergraduates worldwide (Alhaj et al., 2022), but higher than the below-10% rate previously reported for Indonesian students in a regional survey (Pengpid & Peltzer, 2018). The difference may reflect the predominantly female composition of the present sample, secular increases in weight and body-image concerns, and differences in sampling and timing. The prevalence of disordered-eating risk was similar in women and men (22.4% vs 21.1%), which contrasts with the female preponderance often reported and may warrant further study. Data were complete for all analysis variables except age (20 missing, 3.1%); because age was not a predictor in the regression, all 635 participants contributed to the final multivariable model.

Table 1. Characteristics of participants (N = 635)

Characteristic	Value
Age, years, mean ± SD	20.0 ± 1.3
Body-mass index, kg/m², mean ± SD	21.2 ± 4.1
Perceived stress (PSS-10), mean ± SD	18.7 ± 5.5
EAT-26 score, mean ± SD	13.8 ± 10.1
Sex, n (%)	
Female	526 (82.8)
Male	109 (17.2)
Institution, n (%)	
Universitas Tidar	432 (68.0)
Other institutions	203 (32.0)
Academic year, n (%)	
First year	192 (30.2)
Second year	241 (38.0)
Third year	133 (20.9)
Fourth year or above	69 (10.9)
Study programme, n (%)	

DOI: https://doi.org/10.71435/738852

Nutrition	317 (49.9)
Aquaculture	101 (15.9)
Food technology	93 (14.6)
Animal science	11 (1.7)
Other	113 (17.8)
Living arrangement, n (%)	
Boarding / living independently	367 (57.8)
Living with parents	268 (42.2)
Nutritional status, n (%)	
Underweight	157 (24.7)
Normal weight	318 (50.1)
Overweight	61 (9.6)
Obese	99 (15.6)
Food-security status, n (%)	
Food secure	360 (56.7)
Low food security	182 (28.7)
Very low food security	93 (14.6)
Poor sleep quality (PSQI > 5), n (%)	434 (68.3)
Disordered-eating risk (EAT-26 ≥ 20), n (%)	141 (22.2)

Table 1 presents the baseline characteristics of the 635 undergraduate students included in this study. The participants had a mean age of 20.0 ± 1.3 years, with an average body mass index (BMI) of 21.2 ± 4.1 kg/m², indicating that the overall sample was within the normal weight range. The mean perceived stress score was 18.7 ± 5.5, while the average EAT-26 score was 13.8 ± 10.1, below the threshold for disordered-eating risk. Most participants were female (82.8%) and were enrolled at Universitas Tidar (68.0%). Second-year students constituted the largest academic group (38.0%), and nearly half of the respondents (49.9%) were nutrition students. More than half of the participants lived independently in boarding houses (57.8%), while 42.2% lived with their parents. Regarding nutritional status, 50.1% had normal weight, although approximately one-quarter were underweight (24.7%) and another 25.2% were either overweight or obese. In terms of food security, 56.7% of students were food secure, whereas 43.3% experienced low or very low food security. Poor sleep quality was highly prevalent, affecting 68.3% of participants. Overall, 22.2% of students scored ≥20 on the EAT-26, indicating that approximately one in five undergraduate students was at risk of disordered eating.

Table 2. Spearman correlations of EAT-26 score with continuous variables (N = 635)

Variable	r (Spearman)	p
Food insecurity score (USDA, 0–10)	+0.164	< 0.001
Perceived stress (PSS-10, 0–40)	+0.162	< 0.001
PSQI global score	+0.129	0.003
Body-mass index (kg/m²)	+0.231	< 0.001
Age (years)	+0.020	0.627

Source: Primary data, 2024

Bivariate associations

DOI: https://doi.org/10.71435/738852

EAT-26 scores correlated positively with food insecurity, perceived stress, and BMI (Table 2); although statistically significant, these correlations were weak (all Spearman r ≤ 0.23). In bivariate analysis (Table 3), disordered-eating risk was significantly more common among food-insecure than food-secure students (28.4% vs 17.5%) and among students with high perceived stress than those without (39.3% vs 20.6%). Disordered-eating risk also rose with BMI category, being highest among students with obesity (36.4%) and lowest among those who were underweight (8.9%). In contrast, poor sleep quality and sex were not associated with disordered-eating risk.

Table 3. Bivariate associations with disordered-eating risk (EAT-26 ≥ 20)

Factor / category	n	At risk (%)	cOR (95% CI)
Sex (p = 0.8587)			
Male	109	21.1	1.00 (ref)
Female	526	22.4	1.07 (0.65-1.76)
Food insecurity (p = 0.0015)			
Food secure	360	17.5	1.00 (ref)
Food insecure	275	28.4	1.86 (1.28-2.71)
High stress (PSS≥27) (p = 0.0023)			
No	579	20.6	1.00 (ref)
Yes	56	39.3	2.51 (1.42-4.43)
Poor sleep (PSQI>5) (p = 0.9785)			
No	201	21.9	1.00 (ref)
Yes	434	22.4	1.02 (0.68-1.53)
Nutritional status (p < 0.001)			
Underweight	157	8.9	0.35 (0.19-0.64)
Normal	318	22.3	1.00 (ref)
Overweight	61	32.8	1.71 (0.95-3.09)
Obese	99	36.4	1.99 (1.23-3.23)

Note: cOR = crude odds ratio (continuity-corrected); p from chi-square test. Source: Primary data, 2024

Independent correlates

In the multivariable model (Table 4), disordered-eating risk remained independently associated with food insecurity (aOR 1.99; 95% CI 1.34–2.96) and high perceived stress (aOR 2.40; 95% CI 1.32–4.37), as well as with higher BMI (aOR 1.14 per kg/m²; 95% CI 1.09–1.19). When perceived stress was modelled continuously, each additional PSS-10 point was associated with higher odds of disordered-eating risk (aOR 1.09; 95% CI 1.04–1.14). Poor sleep quality and female sex were not independently associated with disordered-eating risk. The model showed no multicollinearity (all variance inflation factors < 1.1), acceptable calibration (Hosmer–Lemeshow p = 0.73), and modest discrimination (area under the ROC curve = 0.69); it classified 78.1% of students correctly, close to the 77.8% expected from the base rate, so discrimination rather than overall accuracy is the more informative measure for this low-prevalence outcome. The assumption that BMI is linear in the logit was supported (Box–

DOI: https://doi.org/10.71435/738852

Tidwell p = 0.22). In a sensitivity model using Asia-Pacific BMI categories, and relative to normal weight, disordered-eating risk was higher with overweight (aOR 1.84; 95% CI 1.02–3.31) and obesity (aOR 2.11; 95% CI 1.26–3.52) and lower with underweight (aOR 0.34; 95% CI 0.19–0.63), while food insecurity and high perceived stress remained independently associated; overall fit was comparable to the continuous-BMI model (Akaike information criterion 634 vs 633), so the more parsimonious continuous specification was retained. The associations of food insecurity and perceived stress with disordered-eating risk also persisted when institution-clustered robust standard errors were used.

Table 4. Multivariable logistic regression for disordered-eating risk (EAT-26 ≥ 20)

Variable	**aOR (95% CI)**	**p**
Female (vs male)	1.38 (0.80–2.36)	0.244
Food insecure (vs secure)	1.99 (1.34–2.96)	< 0.001
High stress, PSS≥27 (vs <27)	2.40 (1.32–4.37)	0.004
Poor sleep, PSQI>5 (vs ≤5)	0.91 (0.59–1.38)	0.649
BMI (per 1 kg/m²)	1.14 (1.09–1.19)	< 0.001

Note: aOR = adjusted odds ratio; n = 635. Source: Primary data, 2024. Model diagnostics: Hosmer–Lemeshow p = 0.73; area under the ROC curve = 0.69; all variance inflation factors < 1.1.

Factors Associated with Disordered Eating Risk

These findings position food insecurity and perceived stress as the most salient correlates of disordered eating in this sample. The association with food insecurity is consistent with a substantial international literature linking food insecurity to elevated eating-disorder pathology, including dietary restriction, binge eating, and compensatory behaviours (Becker et al., 2017; Hazzard et al., 2020; Abene et al., 2023). It also accords with a multi-institutional study that used the same instruments and found food-insecure students to have higher odds of disordered eating (El Zein et al., 2019). Food insecurity may foster disordered eating through repeated cycles of restriction when food is scarce and overconsumption when it is available a "feast-or-famine" pattern in which periods of deprivation are followed by loss-of-control eating when resources allow (Rasmusson et al., 2019). Consistent with this, household food insecurity has been associated with both binge-eating disorder and obesity (Rasmusson et al., 2019), which may also help explain the strong positive association between BMI and disordered-eating risk observed here. The chronic stress that accompanies economic hardship is thought to compound these processes (Hazzard et al., 2020; Pourmotabbed et al., 2020).

Perceived stress may represent one pathway linking food insecurity to disordered eating, although a cross-sectional design cannot distinguish a mediating role from stress being a parallel correlate. Stress influences eating behaviour in general, increasing intake in some individuals and suppressing it in others (Torres & Nowson, 2007), and recent work indicates that stress statistically explains a substantial part of the association between food insecurity and eating-disorder pathology, including binge-eating-related appetitive traits (Kosmas et al., 2023). In the present study, food insecurity and high perceived stress were each independently associated with disordered-eating risk, and stress also showed a graded association when modelled continuously, a pattern that is consistent with, though it cannot confirm, stress operating as one pathway from food insecurity to disordered eating. Because the present analysis was cross-sectional and did not test mediation or establish temporal order, this

DOI: https://doi.org/10.71435/738852

interpretation is provisional and would require longitudinal and formal mediation studies to be confirmed.

Although the cross-sectional design of this study cannot establish the direction of these associations, longitudinal evidence supports a temporal pathway: in a ten-year follow-up of adolescents into young adulthood, severe food insecurity predicted later disordered eating, with the strongest associations for extreme weight-control behaviours and binge eating (Hazzard et al., 2022). This strengthens the interpretation that food insecurity is a plausible upstream contributor to disordered eating rather than simply a co-occurring condition, and underscores the value of addressing food insecurity early.

The independent association with perceived stress reinforces this interpretation. Stress is a plausible shared pathway through which both food insecurity and broader life pressures translate into disordered eating, and food insecurity has been robustly linked to higher stress, anxiety, and depression (Pourmotabbed et al., 2020; Cisneros-Vásquez et al., 2025; Andrade et al., 2025; Hazzard et al., 2022). By contrast, poor sleep quality was not independently associated with disordered-eating risk. This null result is concordant with a study using the same two instruments, which found that poor sleep (PSQI > 5) was associated with night eating but not with EAT-type disordered eating after adjustment (Suna & Ayaz, 2022), suggesting that sleep may be more closely tied to specific behaviours such as night eating than to the weight- and shape-related attitudes captured by the EAT-26. Consistent with this, the continuous PSQI global score correlated weakly but significantly with EAT-26 scores, whereas the dichotomised poor-sleep variable was unrelated to disordered-eating risk in the adjusted model; this difference is likely explained partly by the information lost when a continuous measure is dichotomised, and indicates that any link between sleep and disordered-eating attitudes is small.

The positive association with BMI was expected, as the EAT-26 reflects weight- and shape-related concerns, and higher BMI has been identified as a risk factor for disordered eating in undergraduate populations (Alhaj et al., 2022; Agraib et al., 2026; Pérez-Vázquez et al., 2024; Öğütlü et al., 2024). The role of BMI should nonetheless be interpreted cautiously, because in a cross-sectional design BMI may act as a predictor, a confounder, a mediator, or a consequence of disordered eating: higher BMI may intensify the weight and shape concerns captured by the EAT-26, while disordered eating may in turn shape weight over time. These variables are best placed within a broader conceptual framework in which food insecurity and perceived stress act as upstream social and psychological exposures, sleep quality is a weaker correlated factor, and BMI lies closest to the weight-related attitudes measured by the EAT-26; clarifying the direction of these relationships will require longitudinal data. Although food insecurity, perceived stress, and sleep quality were each statistically associated with disordered-eating attitudes, the underlying correlations were small ($r \leq 0.23$), so they are better interpreted as signals of population-level relevance than as strong individual-level predictors.

The practical implication is that screening for disordered eating among students should consider economic and psychological context. Students who are food insecure or highly stressed may benefit from integrated screening, and conversely, food-security and student-welfare services could incorporate brief eating-behaviour screening, an approach recommended in the food-insecurity and eating-disorder literature (Hazzard et al., 2020; Abene et al., 2023). Because perceived stress may lie on the pathway between food insecurity and disordered eating, interventions that address financial hardship together with stress management could prove more effective than either alone (Kosmas et al., 2023; Figueroa et al., 2026; Warren & Frame, 2025). Because this study did not evaluate the feasibility, acceptability,

DOI: https://doi.org/10.71435/738852

or effectiveness of any screening programme, these observations are best regarded as a rationale for developing and formally evaluating integrated screening-and-referral systems rather than as evidence supporting immediate implementation. Any such programme should be linked to clear pathways for counselling and referral, so that students identified as at risk can access appropriate psychological and nutritional support and confirmatory clinical assessment.

This study has limitations. Its cross-sectional design precludes causal inference, and the EAT-26 screens for disordered-eating risk rather than providing a clinical diagnosis. The sample was drawn predominantly from a single institution and was largely female, so the estimates describe this multi-institutional sample rather than the national population of Indonesian undergraduates. Reliance on self-reported weight and height and on self-administered questionnaires may introduce measurement error. Strengths include the use of validated instruments with good internal consistency, a relatively large sample, and the simultaneous assessment of food insecurity, stress, and sleep within a single multivariable model.

Conclusion

Disordered eating attitudes were common in this multi-institutional sample of Indonesian undergraduate students, with 22.2% at risk according to the EAT-26. Food insecurity and high perceived stress were independently associated with disordered-eating risk, as was higher body-mass index, whereas poor sleep quality and sex were not. These findings indicate that disordered eating among Indonesian students is linked not only to weight-related factors but also to economic and psychological adversity. Higher-education institutions should therefore consider integrated approaches that screen food-insecure and highly stressed students for disordered eating, and that embed brief eating-behaviour screening within food-security and student-welfare services. Longitudinal and more representative multi-institutional studies are needed to confirm these associations, clarify their direction and mechanisms, and evaluate interventions that address food insecurity and stress as part of efforts to prevent disordered eating in this population.

References

Abene, J. A., Tong, J., Minuk, J., Lindenfeldar, G., Chen, Y., & Chao, A. M. (2023). Food insecurity and binge eating: A systematic review and meta-analysis. International Journal of Eating Disorders, 56(7), 1301–1322. https://doi.org/10.1002/eat.23956

Agraib, L. M., Al-Shami, I., Alkhatib, B., & Orabi, A. (2026). Comparing the eating attitudes test (EAT-26) and disorder examination questionnaire (EDE-Q) as screening tools for eating disorders among young adults: A population-specific analysis. *Clinical Nutrition ESPEN*, 102917. https://doi.org/10.1016/j.clnesp.2026.102917

Al-Bawah, N., Baklola, M., Khalifeh, A. H., Al-Eryani, A., Nourelden, A. Z., Alaribi, S., ... & Benmelouka, A. Y. (2026). Prevalence and risk factors of disordered eating risk among Yemeni medical students: A national multicenter cross-sectional study. *Plos one*, *21*(3), e0345771. https://doi.org/10.1371/journal.pone.0345771

Alhaj, O. A., Fekih-Romdhane, F., Sweidan, D. H., Saif, Z., Khudhair, M. F., Ghazzawi, H., Nadar, M. S., Alhajeri, S. S., Levine, M. P., & Jahrami, H. (2022). The prevalence and risk factors of screen-based disordered eating among university students: A global systematic review, meta-analysis, and meta-regression. Eating and Weight Disorders, 27(8), 3215–3243. https://doi.org/10.1007/s40519-022-01452-0

DOI: https://doi.org/10.71435/738852

Andrade, L., Balantekin, K. N., & Temple, J. L. (2025). Adolescent disordered eating: associations among food insecurity, stress, and emotional eating patterns. *Appetite*, 108241. https://doi.org/10.1016/j.appet.2025.108241

Asrullah, M., Maula, A. W., Dewi, S. L., Helmyati, S., & Melse-Boonstra, A. (2024). Food insecurity and BMI are associated with depressive symptoms among adolescents in Yogyakarta province, Indonesia, during the COVID-19 pandemic: A 1-year longitudinal study. British Journal of Nutrition. Advance online publication. https://doi.org/10.1017/S0007114524003027

Becker, C. B., Middlemass, K., Taylor, B., Johnson, C., & Gomez, F. (2017). Food insecurity and eating disorder pathology. International Journal of Eating Disorders, 50(9), 1031–1040. https://doi.org/10.1002/eat.22735

Bhaumik, I. (2025). Prevalance of Eating disorder among young adult students of Kolkata Metropolitan City, India. *Anthrocom Journal of Anthropology*. https://doi.org/10.7759/cureus.90909

Bickel, G., Nord, M., Price, C., Hamilton, W., & Cook, J. (2000). Guide to measuring household food security (Revised 2000). U.S. Department of Agriculture, Food and Nutrition Service. https://doi.org/10.22004/ag.econ.337157

Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. Psychiatry Research, 28(2), 193–213. https://doi.org/10.1016/0165-1781(89)90047-4

Cisneros-Vásquez, E., Smith, L., Yañéz-Sepúlveda, R., Olivares-Arancibia, J., Gutiérrez-Espinoza, H., Yon, D. K., ... & López-Gil, J. F. (2025). Beyond hunger: uncovering the link between food insecurity and depression, anxiety, and stress in adolescents. *Current developments in nutrition*, *9*(6), 107453. https://doi.org/10.1016/j.cdnut.2025.107453

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. Journal of Health and Social Behavior, 24(4), 385–396.

Dane, A., & Bhatia, K. (2023). The social media diet: A scoping review to investigate the association between social media, body image and eating disorders amongst young people. *PLOS global public health*, *3*(3), e0001091. https://doi.org/10.1371/journal.pgph.0001091

El Zein, A., Shelnutt, K. P., Colby, S., Vilaro, M. J., Zhou, W., Greene, G., Olfert, M. D., Riggsbee, K., Morrell, J. S., & Mathews, A. E. (2019). Prevalence and correlates of food insecurity among U.S. college students: A multi-institutional study. BMC Public Health, 19, 660. https://doi.org/10.1186/s12889-019-6943-6

Figueroa, D. G., Cisneroz, A., Stiver, C. A., Tiongco-Hofschneider, L., Laraia, B. A., Epel, E. S., & Tomyiama, A. J. (2026). Perceived Stress and Associations Between Food Insecurity, Diet Quality, and Eating Behaviors: Evidence from Two Cross-Sectional Studies in US Samples. *Nutrients*, *18*(7), 1153. https://doi.org/10.3390/nu18071153

Garner, D. M., Olmsted, M. P., Bohr, Y., & Garfinkel, P. E. (1982). The Eating Attitudes Test: Psychometric features and clinical correlates. Psychological Medicine, 12(4), 871–878. https://doi.org/10.1017/S0033291700049163

DOI: https://doi.org/10.71435/738852

Giel, K. E., Bulik, C. M., Fernandez-Aranda, F., Hay, P., Keski-Rahkonen, A., Schag, K., ... & Zipfel, S. (2022). Binge eating disorder. *Nature reviews disease primers*, *8*(1), 16. https://doi.org/10.1038/s41572-022-00344-y

Gürbüz, M., & Bayram, H. M. (2025). The bidirectional association between internet use, sleep quality and eating behavior: a cross-sectional study in northwestern thrace region in Türkiye. *Journal of the american nutrition association*, *44*(1), 50-58. https://doi.org/10.1080/27697061.2024.2399845

Hazzard, V. M., Barry, M. R., Leung, C. W., Sonneville, K. R., Wonderlich, S. A., & Crosby, R. D. (2022). Food insecurity and its associations with bulimic-spectrum eating disorders, mood disorders, and anxiety disorders in a nationally representative sample of US adults. *Social Psychiatry and Psychiatric Epidemiology*, *57*(7), 1483-1490. https://doi.org/10.1007/s00127-021-02126-5

Hazzard, V. M., Hooper, L., Larson, N., Loth, K. A., Wall, M. M., & Neumark-Sztainer, D. (2022). Associations between severe food insecurity and disordered eating behaviors from adolescence to young adulthood: Findings from a 10-year longitudinal study. Preventive Medicine, 154, 106895. https://doi.org/10.1016/j.ypmed.2021.106895

Hazzard, V. M., Loth, K. A., Hooper, L., & Becker, C. B. (2020). Food insecurity and eating disorders: A review of emerging evidence. Current Psychiatry Reports, 22(12), 74. https://doi.org/10.1007/s11920-020-01200-0

Kosmas, J. A., Wildes, J. E., Graham, A. K., & O'Connor, S. M. (2023). The role of stress in the association among food insecurity, eating disorder pathology, and binge eating-related appetitive traits. Eating Behaviors, 49, 101709. https://doi.org/10.1016/j.eatbeh.2023.101709

Kovács, R. E., Alpay, M., Karsai, I., Tornóczky, G. J., Petróczi, A., & Boros, S. (2025). Balancing performance and health in elite Hungarian athletes: the relationship among disordered eating risk, body composition, and nutrition knowledge. *Nutrients*, *17*(2), 231. https://doi.org/10.3390/nu17020231

Liu, X., Liu, L., Yu, H., Yang, X., Liu, Z., Yu, Z., ... & Liu, Y. (2025). Global, regional, and national burdens of eating disorders from 1990 to 2021 and projection to 2035. *Frontiers in Nutrition*, *12*, 1595390. https://doi.org/10.3389/fnut.2025.1595390

M Aljehani, N., & Alabdrabalnabi, A. (2025). Prevalence and predictors of disordered eating behaviors: a cross-sectional study across 15 campuses in the Saudi electronic university. *Journal of Eating Disorders*, *13*(1), 268.

Öğütlü, H., Kaşak, M., Doğan, U., Zickgraf, H. F., & Türkçapar, M. H. (2024). Psychometric properties of the nine-item avoidant/restrictive food intake disorder screen (NIAS) in Turkish children. *Journal of Eating Disorders*, *12*(1), 30. https://doi.org/10.1186/s40337-024-00987-0

Papalini, S. (2024). Stress-induced overeating behaviors explained from a (transitory) relief-learning perspective. *Physiology & behavior*, *287*, 114707. https://doi.org/10.1016/j.physbeh.2024.114707

Pengpid, S., & Peltzer, K. (2018). Risk of disordered eating attitudes and its relation to mental health among university students in ASEAN. Eating and Weight Disorders, 23(3), 349–355. https://doi.org/10.1007/s40519-018-0507-0

DOI: https://doi.org/10.71435/738852

Pérez-Vázquez, J., González-Roz, A., & Amigo-Vázquez, I. (2024). Effectiveness of an e-health quasi-randomized controlled universal prevention program for eating disorders in Spanish adolescents. *Journal of Prevention*, *45*(1), 87-105. https://doi.org/10.1007/s10935-023-00751-1

Pourmotabbed, A., Moradi, S., Babaei, A., Ghavami, A., Mohammadi, H., Jalili, C., Symonds, M. E., & Miraghajani, M. (2020). Food insecurity and mental health: A systematic review and meta-analysis. Public Health Nutrition, 23(10), 1778–1790. https://doi.org/10.1017/S136898001900435X

Rahman, M. A., & Siu, J. Y. M. (2025). Food insecurity and adolescents psychosocial health problems globally: observations based on school going adolescents from 59 countries. *Psychiatry Research*, 116687. https://doi.org/10.1016/j.psychres.2025.116687

Rasmusson, G., Lydecker, J. A., Coffino, J. A., White, M. A., & Grilo, C. M. (2019). Household food insecurity is associated with binge-eating disorder and obesity. International Journal of Eating Disorders, 52(1), 28–35. https://doi.org/10.1002/eat.22990

Santomauro, D. F., Melen, S., Mitchison, D., Vos, T., Whiteford, H., & Ferrari, A. J. (2021). The hidden burden of eating disorders: An extension of estimates from the Global Burden of Disease Study 2019. The Lancet Psychiatry, 8(4), 320–328. https://doi.org/10.1016/S2215-0366(21)00040-7

Saputra, R., Syarifudin, A., & Lidyawati, Y. (2025). Why we need more than just food: investigating the complex relationship between food insecurity and mental health. *Journal of Public Health*, *47*(1), e173-e174. https://doi.org/10.1093/pubmed/fdae150

Suna, G., & Ayaz, A. (2022). Is poor sleep quality related to disordered eating behavior and mental health among university students? Sleep and Biological Rhythms, 20(3), 345–352. https://doi.org/10.1007/s41105-022-00374-9

Torres, S. J., & Nowson, C. A. (2007). Relationship between stress, eating behavior, and obesity. Nutrition, 23(11–12), 887–894. https://doi.org/10.1016/j.nut.2007.08.008

Warren, A., & Frame, L. A. (2025). Restoring a healthy relationship with food by decoupling stress and eating: a translational review of nutrition and mental health. *Nutrients*, *17*(15), 2466. https://doi.org/10.3390/nu17152466

WHO Expert Consultation. (2004). Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. The Lancet, 363(9403), 157–163. https://doi.org/10.1016/S0140-6736(03)15268-3

Wongprachum, K., Namyota, C., Khiewkhern, S., Bourneow, C., Longjumnong, T., Onpui, S., ... & Nghiep, L. K. (2026). Assessment of factor structure of the Eating Attitude Test-26 (EAT-26) scale using data of young adults in the sociocultural context of Thailand. *Heliyon*, *12*(1). https://doi.org/10.1016/j.heliyon.2025.e44171

Wu, R., Guo, L., Rong, H., Shi, J., Li, W., Zhu, M., ... & Lu, C. (2021). The role of problematic smartphone uses and psychological distress in the relationship between sleep quality and disordered eating behaviors among Chinese college students. *Frontiers in psychiatry*, *12*, 793506. https://doi.org/10.3389/fpsyt.2021.793506

DOI: https://doi.org/10.71435/738852