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Food security status of Indonesian university students and its sociodemographic factors

Helda Khusun[1,2*], Imas Arumsari[1], Izza Suraya[1], Fildzah Badzlina[1] & Ummatul Fitri[2]

[1]*Universitas Muhammadiyah Prof Dr HAMKA, Jakarta, Indonesia;* [2]*SEAMEO Regional Center for Food and Nutrition (RECFON), Jakarta, Indonesia*

ABSTRACT

Introduction: Food insecurity is increasingly recognised as a major challenge among university students, who are often more vulnerable than the general population. Limited evidence exists in low- and middle-income countries such as Indonesia, where rapid higher education expansion lacks parallel student welfare policies. This study aimed to assess the food security status among Indonesian university students and examine its sociodemographic correlates. **Methods:** This was an online study among 850 students recruited via social media. Using the short-form Household Food Security Survey Module (HFSSM), food security was categorised into high (scores 0-1), low (scores 2-4), and very low (scores 5-6). The sociodemographic characteristics included age, gender, parental education, living arrangements, and living allowance usage (main meals, other meals, entertainment, transportation, and internet). Factors associated with food security were analysed using chi-square test, followed by logistic regression. **Results:** Only 32.5% of students were food secure, while 46.1% and 21.4% experienced low and very low food security, respectively; 10.4% were severely food insecure (score = 6). Living away from family increased the odds of food insecurity (*AOR* = 1.71; p=0.004), as did higher allowance use for main meals (*AOR* = 1.44; p=0.040). Conversely, spending on entertainment was associated with lower food insecurity (*AOR* = 0.59; p<0.001), suggesting that only those with surplus funds could afford entertainment. **Conclusion:** These findings highlight the high prevalence of food insecurity among Indonesian university students, which underscores an urgent need for institutional and policy interventions targeting students living independently and facing financial constraints.

Keywords: food security, sociodemographic factors, university students

INTRODUCTION

Food insecurity, defined as the lack of reliable access to sufficient, safe, and nutritious food for an active and healthy life, remains a pressing global challenge and has reached unprecedented levels in recent years (FAO *et al.*, 2022). In 2021, it was estimated that approximately 2.3 billion people, or 29.3% of the global population, experienced moderate to severe food insecurity (FAO *et al.*, 2022). According to the 2023 Global Hunger Index, Indonesia ranked 77th of 125, reflecting continuing national challenges

*Corresponding author: Dr Helda Khusun
Universitas Muhammadiyah Prof Dr HAMKA, Faculty of Health Sciences
Jl. Limau II No.3, RT.3/RW.3, Kramat Pela, Kec. Kby. Baru, Kota Jakarta Selatan, Daerah Khusus Ibukota Jakarta 12130
Tel: (+62)8128586856; E-mail: helda_khusun@uhamka.ac.id
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in achieving food and nutrition security, driven by a stunting rate exceeding 20% among young children and dietary inadequacy affecting over 23 million people (Von Grebmer *et al.*, 2023).

Food insecurity has become a pressing issue in higher education. Evidence from high-income countries showed that university students experience substantially higher prevalence – 35-42% in the United States – compared with approximately 13% among the general household population (Nazmi *et al.*, 2019). This disparity is attributed to the unique vulnerabilities students face, such as constrained budgets, high tuition and living costs, and limited time for income-generating activities (Loofbourrow & Scherr, 2023). A comprehensive multi-institutional study by El Zein *et al.* (2019) highlighted the multifaceted nature of food insecurity among students and linked it to adverse academic and psychosocial outcomes, reinforcing the critical need for targeted policy responses in educational settings (El Zein *et al.*, 2019).

Although global awareness of student food insecurity has increased, data from Southeast Asia remains limited. University students in this region are similarly affected by socioeconomic challenges, such as financial dependence, transitional independence, and housing instability (Kendrick *et al.*, 2022; Loofbourrow & Scherr, 2023). However, the scarcity of disaggregated data makes it difficult to determine whether the elevated rates of food insecurity seen in higher education globally are replicated in Southeast Asian countries. This gap in evidence is particularly concerning in contexts like Indonesia, where rapid expansion in higher education has not been matched by systematic policies addressing student wellbeing.

Existing literature consistently points to a range of sociodemographic determinants that heighten the risk of food insecurity among university students. Lower socioeconomic status – often operationalised through financial aid dependence, limited personal income, or low parental education – is a primary risk factor (El Zein *et al.*, 2019; Fiagbor & Brown, 2025). These conditions restrict students' ability to consistently obtain nutritious food and manage competing financial demands. Parental education also functions as a proxy for broader social capital, with students from families with lower educational attainment more likely to experience food insecurity (El Zein *et al.*, 2019).

Living arrangements are a critical determinant of food insecurity. Students living independently or off-campus have a higher risk of inadequate food access and related financial strain, whereas those living with family benefit from economic support and stable food environments (Payne-Sturges *et al.,* 2018; Round *et al.,* 2024).

The implications of food insecurity in university settings extend beyond inadequate food access. Numerous studies have demonstrated its association with poor academic performance, psychological distress, and adverse health outcomes. Food-insecure students are more likely to report lower academic engagement and performance, disrupted concentration, and increased absenteeism (Hagedorn & Olfert, 2018; Loofbourrow & Scherr, 2023). The mental health consequences include elevated levels of stress, anxiety, and depression, which further impair academic and social functioning (Mihrshahi *et al.*, 2022). Physically, students may experience both undernutrition and overnutrition, as financial constraints often lead to consumption of calorie-dense, nutrient-poor foods (Bruening *et al.*, 2017). Over time, these patterns can contribute to chronic health issues and deteriorating wellbeing.

Beyond its health and academic impacts, food insecurity often leads students to adopt various coping mechanisms to manage limited food resources. These include reducing meal size or frequency, consuming cheaper and less nutritious foods, skipping meals, or relying on social networks and institutional aid when available. However, such coping strategies have not been well characterised in Indonesia, where structural and cultural factors may shape distinct responses to food scarcity. Including such an understanding is essential to capture the broader implications of food insecurity beyond its prevalence and determinants.

Given the known risks and consequences, there is a clear need for empirical data to inform campus-level interventions and broader policy frameworks in Indonesia. This study aimed to fill this gap by investigating the prevalence of food insecurity among Indonesian university students and identifying associated sociodemographic factors, including living arrangements, parental education, and allowance usage. By advancing the understanding of food insecurity in this context, the findings can support evidence-informed strategies to promote food access, health, and academic success among Indonesian university students.

METHODOLOGY

Study design and setting

This study employed a cross-sectional quantitative design, utilising an online survey platform to assess food security status and its sociodemographic correlates among Indonesian university students. The present analysis was a sub-study derived from a broader umbrella project on sustainable food consumption among young adults in Southeast Asia. This sub-analysis focused exclusively on Indonesian respondents and aimed to generate insights on food insecurity among university students.

Study population and sampling

The target population consisted of Indonesian university students aged ≥18 years, enrolled in undergraduate institutions across multiple provinces. Participants were recruited through a combination of snowball and convenience sampling using digital platforms, including social media, university mailing lists, student organisations, and academic networks. The inclusion criteria required participants to (1) be an active undergraduate student enrolled at a recognised university in Indonesia, (2) hold Indonesian citizenship, and (3) provide informed consent through the digital form embedded in the survey. Students who were pregnant, breastfeeding, or failed to complete the food security section of the questionnaire were excluded from the analysis.

The sample size was determined to assume a 95% confidence interval, a 5% margin of error, a 50% estimated prevalence to yield the maximum sample size, a design effect of 2, and an anticipated non-response rate of 10% (Lwanga & Lemeshow, 1991). For the current analysis, complete data were obtained from 850 eligible Indonesian university students.

Data collection and instruments

Data collection was conducted between April and May 2024 via an anonymous, self-administered online questionnaire. The instrument was adapted from standardised and validated tools, translated into Bahasa Indonesia and pilot-tested among a small group of university students for clarity and cultural relevance prior to deployment.

Food security assessment

Food security status was measured using the validated U.S. Household

Food Security Survey Module: Six-Item Short Form (HFSSM), which had been extensively validated in various settings, confirming its adequacy for assessing food security status (Call *et al.*, 2024; Radimer, 2002). In this study, the Cronbach's alpha value obtained for the food security scale was 0.6, indicating moderate internal consistency. Although below the conventional 0.70 threshold, this value was considered acceptable, particularly for brief instruments such as the six-item HFSSM. Cronbach's alpha is known to decrease with fewer items and when constructs encompass multiple behavioural dimensions (Tavakol & Dennick, 2011).

This module captured participants' experiences of food access limitations over the past 12 months. Scores ranged from 0 to 6 and were categorised as follows: 0–1: High or marginal food security; 2–4: Low food security; and 5–6: Very low food security. For further analysis, only binary categories of food security were used, where high or marginal food security was categorised as food secure and low/very low food security as food insecure.

Sociodemographic variables

Participants reported their age, gender, place of residence, parental educational attainment, and monthly allowance. Living arrangements were categorised as living with family, with friends, or alone. Monthly allowance usage was assessed by asking participants to allocate their average monthly spending across five categories: main meals, snacks/other foods, entertainment, transportation, and internet/data. These self-reported spending patterns served as proxy indicators of financial prioritisation.

Statistical analysis

Descriptive statistics were used to characterise the sample population and to summarise the distribution of food security status and key sociodemographic variables. Frequencies and percentages were reported for categorical variables. Bivariate associations between food security status and sociodemographic variables were assessed using binary logistic regression and presented as an unadjusted model. Food security status was dichotomised into "food secure" (scores 0–1) and "food insecure" (scores 2–6). To identify independent predictors of food insecurity, binary multiple logistic regression was conducted. Variables included in the regression model were selected based on theoretical relevance and statistical significance in bivariate analysis. Adjusted odds ratios (*AOR*s) and 95% confidence intervals (*CI*s) were reported to determine the strength of associations. Statistical significance was set at $p<0.05$. All analyses were conducted using IBM SPSS Statistics® version 25 (IBM Corp., Armonk, NY, USA).

Ethical considerations

This study was conducted in compliance with ethical principles for human subject research and received ethical approval from the Ethical Committee for Health Studies, Universitas Muhammadiyah Prof. Dr. HAMKA No. 03/24/02/031450. Participation was voluntary; all respondents provided written informed consent before beginning the survey. Data were collected anonymously, and only aggregated results were reported. Respondents were informed that they could discontinue the survey at any point without penalty.

RESULTS

Table 1 presents the sociodemographic characteristics of the 850 university students included in this study. The majority of participants were aged between 21 and 22 years (45.3%). A significant gender imbalance was

Table 1. Sociodemographic characteristics of Indonesian university students in the study (*N*=850)

Characteristics	*Percentage (%) (N=850)*
Age	
18-20 years	40.2
21-22 years	45.3
≥ 23 years	14.5
Gender	
Male	10.1
Female	89.9
University location	
Jakarta	28.4
Java Island (non-Jakarta)	53.8
Non-Java Island	17.8
Type of District/City	
City	82.4
District	17.6
Year of study	
< 4 years	59.7
≥ 4 years	40.3
Current types of residence	
Living with parents/direct family	64.5
Living with extended families/relatives	5.4
Living apart from family (Dormitory/Boarding House)	30.1
Father's education background	
≤ Junior High School	12.9
Senior High School	45.4
Bachelor's degree	34.9
Postgraduate degree	6.7
Mother's education background	
≤ Junior High School	19.9
Senior High School	41.5
Bachelor's degree	35.3
Postgraduate degree	3.3
Main use of daily pocket money	
Full meal (breakfast, lunch, dinner)	74.1
Other foods (including snacks/beverages)	79.4
Internet quota	63.9
Entertainment (recreation, going to the cinema, etc.)	57.4
Transportation	66.9

observed, with females comprising 89.9% of the sample. Over half of the respondents (53.8%) were from Java Island (excluding Jakarta), while 28.4% were from Jakarta and 17.8% from non-Java regions. Most students resided in urban areas (82.4%) and were in their first three years of study (59.7%). Regarding living arrangements, 64.5% lived with their parents or direct family, while 30.1% lived apart from their family. Parental education showed that 45.4% of fathers and 41.5% of mothers had completed senior high school. The majority allocated their daily pocket money to food (74.1% for full meals, 79.4% for snacks), with substantial spending also on internet (63.9%) and transportation (66.9%).

Table 2. Food security situation of Indonesian university students in Indonesia (*N*=850)

Food security indicators	*Percentage experiencing (%)*
The food that I bought just didn't last and I didn't have money to get more	79.5
I couldn't afford to eat balanced meals	62.0
In the last 12 months, I ever cut the size of my meals or skip meals because there wasn't enough money for food	37.9
In the last 12 months, I ever cut the size of my meals or skip meals because there wasn't enough money for food almost every month or some months but not every month	27.1
In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food?	36.0
In the last 12 months, were you ever hungry but didn't eat because there wasn't enough money for food?	17.9

Table 2 and Figure 1 illustrate the food security status among Indonesian university students According to the USDA Six-Item Short Form, only 32.5% of students reported high food security, whereas 46.1% experienced low food security, and 21.4% were classified as having very low food security. Alarmingly, 10.4% of the respondents scored the maximum (6), indicating severe food insecurity, highlighting a critical public health concern.

The individual food security indicators revealed substantial challenges. Approximately 79.5% of students reported that the food they

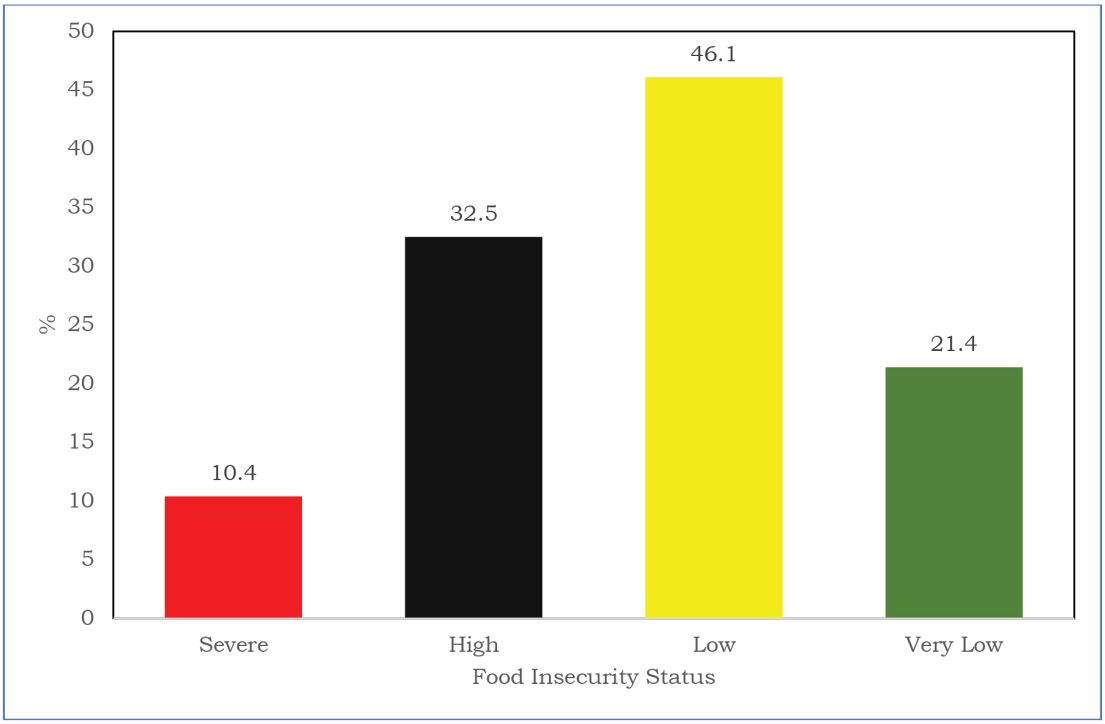

Figure 1. Food insecurity status of Indonesian university students
Note: Severe food insecurity was part of high food insecurity

Table 3. Factors associated with food insecurity among Indonesian university students (*N*=850)

Variable	*n*	*Unadjusted Model*			*Adjusted Model*		
		OR	*CI*	*p*	*OR*	*CI*	*p*
Age younger than 20 years	342	1.28	0.95-1.73	0.099	1.16	0.85-1.58	0.341
Female	792	0.95	0.59-1.53	0.822			
University location in rural district	148	1.21	0.82-1.79	0.329			
Father non-university education	354	1.33	1.00-1.78	0.053	1.09	0.74-1.59	0.664
Mother non-university education	328	1.45	1.08-1.94	0.013	1.27	0.86-1.86	0.229
Living away from family	261	1.94	1.39-2.71	<0.001	1.71	1.19-2.45	0.004
Living allowance usage							
For full meal	630	1.88	1.37-2.59	<0.001	1.44	1.02-2.05	0.040
For snacks	675	0.82	0.57-1.18	0.292			
For internet	543	0.98	0.73-1.33	0.917			
For entertainment	488	0.53	0.39-0.71	<0.001	0.59	0.43-0.81	<0.001
For transport	569	1.10	0.81-1.48	0.560			

purchased did not last and they lacked the financial means to obtain more; 62.0% indicated that they could not afford to consume balanced meals and 37.9% admitted to cutting the size of their meals or skipping meals due to insufficient funds for food. Of these, 27.1% reported that this occurred almost every month or some months but not every month. Additionally, 36.0% of respondents acknowledged eating less than they felt necessary because of financial constraints, and 17.9% reported having been hungry without eating due to a lack of money for food.

Table 3 presents the factors associated with food insecurity among Indonesian university students, as determined through unadjusted and adjusted logistic regression analyses. In the unadjusted model, several variables were significantly associated with food insecurity. Students living away from family exhibited a significantly higher risk of food insecurity (*OR*=1.94, 95% *CI*: 1.39–2.71, *p*<0.001). Additionally, students whose mothers had not attained university-level education were more likely to be food insecure (*OR*=1.45, 95% *CI*: 1.08–1.94, *p*=0.013). Regarding living allowance usage, allocating funds primarily for full meals was positively associated with food insecurity (*OR*=1.88, 95% *CI*: 1.37–2.59, *p*<0.001), while spending on entertainment had an inverse association (*OR*=0.53, 95% *CI*: 0.39–0.71, *p*<0.001).

In the adjusted model, living away from family remained a significant predictor of food insecurity, with students in this category having 1.71 times higher odds of food insecurity (95% *CI*: 1.19–2.45, *p*=0.004) compared to those living with family. Furthermore, allocating a greater proportion of allowance for full meals was significantly associated with higher food insecurity (*AOR*=1.44, 95% *CI*: 1.02–2.05, *p*=0.040). Conversely, expenditure on entertainment was associated with a lower likelihood of food insecurity (*AOR*=0.59, 95% *CI*: 0.43–0.81, *p*<0.001), suggesting that students with surplus funds for non-essential items were less vulnerable. These results indicated that living arrangements and financial prioritisation were significant determinants of food security among university students.

DISCUSSION

The study sample was predominantly female (89.9%), considerably higher than the national proportion of female

university students 55%) (Pangkalan Data Pendidikan Tinggi Indonesia, 2025), suggesting potential selection bias related to recruitment or gender-based participation differences. Geographically, most participants were from Java Island (53.8%) and Jakarta (28.4%), while only 17.8% represented non-Java regions. Compared to national data, where 36.82% of university students are located in non-Java regions and only 9.08% in Jakarta (Biro Pusat Statistik Indonesia, 2025), this sample over-represented urban Java-based students, particularly those from Jakarta. Parental education among participants also diverged from national patterns. In this study, 41.6% of fathers and 38.6% of mothers held at least a bachelor's degree, whereas nationally, only 6.4% of the general population has attained higher education (Biro Pusat Statistik Indonesia, 2024). This indicates that the study population largely comprised students from relatively more educated and possibly higher socioeconomic backgrounds.

This study revealed a high prevalence of food insecurity among Indonesian university students, with 67.5% experiencing either low (46.1%) or very low (21.4%) food security, and 10.4% reaching the maximum threshold on the USDA HFSSM, indicating severe deprivation. Many faced difficulties affording balanced meals and maintaining adequate food supplies, reflecting financial constraints. These rates align with global evidence showing university students experiencing disproportionately higher food insecurity than the general population. However, evidence from Indonesia and Southeast Asia remains scarce, highlighting a critical research gap, as existing research has predominantly focused on family-level food insecurity rather than the university student population (Hidayah *et al.*, 2024; Septiani *et al.*, 2021). The present study therefore fills an important gap, showing that students, particularly those living independently, are at risk.

The current study identified living arrangements and financial prioritisation as key sociodemographic determinants of food insecurity among Indonesian university students. Living away from family significantly increased the odds of food insecurity, as students residing independently often faced higher living costs and reduced access to familial food resources, resulting in diminished food stability (Seivwright *et al.*, 2020). While household food security remains an important contextual determinant, the transition to independent living introduces individual-level vulnerabilities, such as limited financial autonomy and inadequate budgeting, that distinctly affect students' food access and choices.

Students who allocated their daily allowance primarily for full meals rather than discretionary spending had a greater likelihood of food insecurity, suggesting constrained financial conditions. Conversely, students who could afford spending on entertainment were significantly less likely to be food insecure, reflecting relatively greater financial stability and resilience. This indicates that discretionary income serves as a protective buffer. This is in line with a U.S. study that found economic spending as a predictor of food insecurity among students (Hagedorn & Olfert, 2018). These results also align with general findings that economic hardship is related to food security, with studies from Indonesia and other countries emphasising the intersection of economic hardship, inadequate support systems, and sociocultural barriers in shaping food access (El Zein *et al.*, 2019; Hidayah *et al.*, 2024; Loofbourrow & Scherr, 2023; Seivwright *et al.*, 2020).

While the absolute prevalence may differ due to contextual factors, the

underlying drivers—such as limited financial resources, rising living costs, and transitional life circumstances—appear to be consistent across both high-income and low- to middle-income settings (El Zein *et al.*, 2019; Hagedorn & Olfert, 2018; Nazmi *et al.*, 2019). These economic pressures are frequently compounded by low employment opportunities and reduced financial aid, thus intensifying food insecurity in the higher education context (Hall *et al.*, 2024; Kent *et al.*, 2022).

In contrast with some international findings, parental education and university location (urban/rural) were not significant predictors in the adjusted models. This discrepancy may be attributed to Indonesia's diverse educational landscape, where even students from higher-educated families face structural economic challenges in urban university settings. Moreover, factors such as age and gender, though frequently cited in global literature, did not emerge as significant correlations in this study. This suggests that food insecurity among Indonesian students may be more directly linked to immediate financial constraints and living arrangements than to broad demographic profiles.

The similarity of structural drivers of food security among university students between Indonesia and other countries supports a broader recognition of a global public health issue, while the lack of regional surveillance highlights the urgent need for localised interventions, research, and policy responses tailored to Southeast Asian contexts. Furthermore, like their counterparts in developed nations, Indonesian students reported consequences including compromised dietary quality and experiences of hunger (Hagedorn & Olfert, 2018; Matias *et al.*, 2021). Further adverse effects of food insecurity may go beyond nutrition, as students experiencing food insecurity frequently report lower academic achievements, compromised mental health, and impaired social functioning (Bruening *et al.*, 2017; Hagedorn & Olfert, 2018; Kendrick *et al.*, 2022; Mihrshahi *et al.*, 2022).

This study provides a timely contribution to the limited literature on food insecurity among university students in Southeast Asia, particularly Indonesia. Using the validated USDA Six-Item Short Form Household Food Security Survey Module ensured methodological rigour and comparability across contexts. The large, diverse sample (N=850) strengthens representativeness, while analysis of financial behaviour offers novel insights into determinants of food insecurity among students.

Several limitations should be noted. The use of non-probability online sampling may introduce self-selection bias and limit representativeness, as evidenced by the predominance of female respondents (89.9%) and students from Java-based universities, thus restricting the generalisability of findings to the broader Indonesian student population, particularly in rural or under-represented regions. The cross-sectional design precludes causal inference, while the exclusion of variables such as household income, employment, and institutional support may limit understanding of factors moderating food security outcomes.

Additionally, this study did not collect information on students' other sources of income, such as part-time or freelance work. The questionnaire was designed to capture allowance allocation patterns as a proxy for students' financial behaviour, an approach commonly used in similar research assessing food security among students (El Zein *et al.,* 2019; Kent *et al.,* 2022). However, the absence of data on secondary income sources may limit the full interpretation of students'

financial capacity and coping strategies. Future studies should consider including these variables to provide a more comprehensive understanding of economic factors influencing food security among university students. Lastly, the use of the six-item short form has been shown to over-represent those with marginal food insecurity (Call *et al.*, 2024). Future studies should use the ten-item food security measure to categorise more specific levels of food insecurity among university students. Moreover, studies with face-to-face interviews for exploring the impact of food insecurity among university students are needed, especially using a longitudinal design.

CONCLUSION

This study underscores a pressing public health issue—the high prevalence of food insecurity among Indonesian university students. Nearly two-thirds were food insecure, including 21.4% with very low food security and 10.4% reporting severe deprivation. Significant correlates included living away from family and financial prioritisation of essential meals. These findings reveal that structural financial vulnerability and reduced familial support substantially increase students' risk of inadequate food access. Conversely, discretionary spending on entertainment, reflecting relative financial stability, was inversely associated with food insecurity. Overall, the results suggest that food insecurity among students arises from constrained financial autonomy and competing spending priorities rather than absolute poverty.

Given its potential impact on academic performance, mental health, and long-term wellbeing, universities and policymakers should implement integrated and innovative strategies to address food insecurity among university students. Possible measures include subsidised campus meals, food-sharing initiatives, digital platforms for financial and nutrition literacy, and early identification of at-risk students. At the policy level, expanding financial aid, institutionalising meal subsidy schemes, and supporting continuous monitoring of food insecurity are crucial to safeguard students' health and promoting equitable academic achievement.

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Authors' contributions

Khusun H, principal investigator, conceptualised and designed the study, led the data collection and analysis, prepared the draft of the manuscript, and reviewed the manuscript; Arumsari I, co-principal investigator, co-led the data collection, led data management, and reviewed the manuscript; Suraya I, assisted in data collection and reviewed the manuscript; Badzlina F, assisted in data collection and reviewed the manuscript; Fitri U, supervised the field team during data collection, assisted in management and analysis, and reviewed the manuscript.

Conflict of interests

The authors state no conflict of interest.

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