The Relationship Between Food Insecurity and the Nutritional Status and Mental Health of University Students

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ABSTRACT

This study aims to examine the relationship between food insecurity, nutritional status, and mental health among university students. A cross-sectional study was conducted at a state university in West Sumatra, Indonesia. Data were collected using descriptive statistics, Chi-Square tests, and logistic regression analysis. The independent variable in this study was food insecure, which was measured using the Food Insecurity Experience Scale (FIES) instrument. A total of 372 students from different faculties at the university participated in the study. Logistic regression analysis was used to determine the predictors of both conditions. The results of this study show that students with food security were nearly twice as likely to be undernourished compared to their food-secure peers (OR = 1.89; 95% CI: 1.10-3.24; p = 0.021), and those with more severe food security faced an even higher risk (OR=2.14, 95% confidence interval (CI): 1.20-3.83). Students with food-security had more than double the odds of experiencing mild to severe depression (P=0.005), while those with severe food-insecurity had an even greater risk (P0.001), highlighting the substantial impact of inadequate food access on student well-being. These findings are expected to serve as a basis for universities in formulating intervention policies, ranging from the provision of healthy food to psychological support services, as well as enriching the national literature on this issue.

Keywords: Food Insecurity, Nutritional Status, Mental Health of College Students

INTRODUCTION

The phenomenon of food insecurity among students is a public health issue that is gaining increasing global attention. Internationally, the FAO reports that in 2023, approximately 29.6% of the world's population experienced moderate to severe food insecurity, while 9.2% experienced hunger (FAO, 2023). In North America and Europe, the prevalence of food insecurity among students ranges from 28–40%, as shown by research in the United States which found that 38.5% of students experienced food insecurity that led to depression and risky behaviours such as substance abuse (Neal & Zigmont, 2022), and research in the United Kingdom which reported a prevalence of 28% with a significant impact on mental well-being (Aldubaybi et al., 2024). At the national level, the 2022 Indonesian Nutrition Status Survey (SSGI) shows that household food security remains a challenge, with around 8.3% of Indonesians experiencing severe food insecurity, while student vulnerability has not been comprehensively documented. This condition is increasingly relevant given that students are in a transitional period towards independence with academic, economic, and social pressures. Various international studies also show that food insecurity is closely related to poor nutritional status, unbalanced consumption patterns, and mental health issues such as depression, anxiety, and stress (Howard & Barker, 2021; Compton, 2023). However, studies that combine the aspects of food insecurity, nutritional status, and mental health among students are still limited in Indonesia, making this research important to provide a clearer picture of the problem and serve as a basis for the development of intervention policies in higher education institutions.

Food insecurity among university students represents a pressing public health concern, intricately linking inadequate food access to compromised nutritional status and deteriorating mental health, often manifesting as malnutrition, irregular eating patterns, heightened vulnerability to conditions like anemia or obesity, and psychological burdens such as anxiety, depression, and diminished coping abilities (Brink et al., 2025; Hope Center, 2025). Empirical evidence reveals strong correlations with suboptimal nutrient intake and BMI deviations amid financial and academic stresses, while amplifying mental health risks with 2-3 times higher depression prevalence and reduced resilience in university settings, where these interconnected issues undermine academic performance and long-term well-being, thus necessitating proactive measures like on-campus nutrition support for holistic intervention (Martinez et al., 2023; Nagata et al., 2022; Pourmotabbed et al., 2023).

Canadian research also confirms that new students with food insecurity tend to report poorer mental health outcomes, including depression, anxiety, and lower life satisfaction. These impacts equate to significant socioeconomic disadvantage, reinforcing the urgency of interventions during the early college transition (Howard & Barker, 2021).

Food insecurity has even been identified as a significant social determinant of mental health. Inadequate food not only leads to nutritional problems but also exacerbates psychological conditions through stress caused by limited resources. Therefore, mental health professionals are encouraged to participate in food policy advocacy and community initiatives (Compton, 2023).

In the university context, students' experiences of food insecurity are heavily influenced by campus systems, community, and individual factors. A qualitative study in the United States found that limited cafeteria hours, food prices around campus, and social stigma impact students' access to nutritious food (Escobar-DeMarco et al., 2024).

The impact of food insecurity extends beyond mental health to academic performance. Research in Mexico reports that food-insecure students tend to have poor perceptions of academic progress, poor class attendance, and difficulty completing their studies. Stress, depression, and poor sleep quality exacerbate these conditions (Betancourt-Núñez et al., 2024).

A large scale study in the United States involving over 96,000 college students confirmed that food insecurity was strongly associated with depression, anxiety, self-harm, and loneliness, even after controlling for sociodemographic factors. These findings confirm the strong link between food insecurity and serious psychological problems (Oh et al., 2022).

Additionally, students face other basic needs, such as unstable housing, which further exacerbates food insecurity. A study in New Mexico found that food and housing insecurity significantly increased the risk of depression, anxiety, and poor physical health (Coakley et al., 2022).

Interventions focused on food literacy and cooking skills have proven effective in improving student food security. A UK study reported that five weeks of training in financial management, cooking skills, and food waste reduction significantly improved students' food status and mental well-being (Aldubaybi et al., 2024).

The phenomenon of food insecurity among university students is gaining attention because it has a direct impact on nutritional status and mental health. Various international studies show that students are a group that is vulnerable to limited access to nutritious food, which has the potential to reduce nutritional status and psychological well-being. In Indonesia, studies examining the relationship between food insecurity, nutritional status, and mental health are still limited, even though students are in a transitional phase towards independence that is fraught with academic and social pressures. Based on this context, this study aims to comprehensively examine the relationship between these three factors in order to produce a clearer picture of the level of food insecurity, its impact on consumption patterns and nutritional status, and its implications for mental health. The findings of this study are expected to serve as a basis for universities in formulating intervention policies, ranging from the provision of healthy food to psychological support services, as well as enriching the national literature on this issue.

METHODS

This study used a quantitative design with a cross-sectional approach to analyse the relationship between food insecurity, nutritional status, and mental health among university students. The study population comprised all active undergraduate students at a state university in West Sumatra, numbering approximately 12,500 individuals. Stratified random sampling was used based on faculty to ensure proportional representation. The sample size was calculated using the Slovin formula with a 5% margin of error, resulting in a minimum of 372 respondents. Data collection was conducted through structured surveys and anthropometric measurements, with attention to research ethics in the form of informed consent, data confidentiality, and the participants' right to withdraw from the study.

The independent variable in this study was food insecurity, which was measured using the Food Insecurity Experience Scale (FIES) instrument. The dependent variables consisted of nutritional status and mental health. Nutritional status was measured using the Body Mass Index (BMI), based on direct measurements of weight and height by the researchers. Mental health was

measured using the DASS-21, which assesses three dimensions: depression, anxiety, and stress. Data were analysed using descriptive statistics to describe respondent characteristics, Chi-Square tests to examine relationships between categorical variables, and logistic regression to determine the predictive power of food insecurity on nutritional status and mental health. The significance level was set at $p < 0.05$.

RESULTS

372 students from different faculties at a state university in West Sumatra participated in this study. The distribution of food insecurity, the students' nutritional state, and their mental health issues were all described through data analysis. Additionally, logistic regression analysis and chi-square correlation tests were used to ascertain the association between food insecurity and mental health and nutritional status.

1. **Respondents' Demographic Characteristics**

Table 1 presents the demographic characteristics of the respondents, including gender and faculty of study.

Table 1. Distribution of Respondents Based on Demographic Characteristics (n = 372)

Characteristics	n	%
Gender		
- Man	142	38.2%
- Woman	230	61.8%
Faculty		
- Science and Technology	160	43.0%
- Social Humanities	128	34.4%
- Health	84	22.6%

The results in Table 1 show that the majority of respondents were women (61.8%), while men accounted for 38.2%. This indicates that female students were more represented in this study. Based on the faculty of study, the largest proportion of respondents came from the Faculty of Science and Technology (43.0%), followed by the Faculty of Social Humanities (34.4%), and the Faculty of Health (22.6%). This distribution suggests that the study sample was more dominated by students in science and technology fields, which may reflect the larger student population in these faculties at the university.

2. **Distribution of Respondents Based on Food Insecurity Status**

The prevalence of food insecurity among students and their nutritional status (BMI) is presented in Table 2.

Table 2. Distribution of Respondents Based on Food Insecurity Status and Nutritional Status (BMI)

Food Status	n	%
Safe	138	37.1%
Sedang	144	38.7%
Tidak aman	90	24.2%
Nutritional status	**n**	**%**

Thin (<18.5)	72	19.4%
Normal (18.5–24.9)	210	56.5%
Obesitas (≥25.0)	90	24.1%

3. Distribution of Respondents Based on Mental Health Levels (DASS-21)

The distribution of respondents' mental health levels, including depression, anxiety, and stress, is summarized in Table 3.

Table 3. Distribution of Respondents Based on Mental Health Level (DASS-21)

Category	Depression (n/%)	Anxiety (n/%)	Stress (n/%)
Normal	162 (43.5%)	138 (37.1%)	180 (48.4%)
Light	80 (21.5%)	94 (25.3%)	72 (19.4%)
Currently	86 (23.1%)	90 (24.2%)	84 (22.6%)
Heavy	44 (11.9%)	50 (13.4%)	36 (9.6%)

Based on Table 4. Distribution of Respondents Based on Mental Health Levels, the level of mental health disorders is quite high. As many as 56.5% of students experience mild to severe depression, 62.9% experience anxiety, and more than half experience stress at various levels.

4. Relationship between Food Insecurity and Nutritional Status

Table 4 shows the chi-square test results describing the relationship between food insecurity and nutritional status.

Table 4. Relationship between Food Insecurity and Nutritional Status of Students

Food Status	Thin (n/%)	Normal (n/%)	Obesitas(n/%)	Total (n)	p-value
Safe	16 (11.6)	90 (65.2)	32 (23.2)	138	
Moderate	34 (23.6)	74 (51.4)	36 (25.0)	144	0.015
Unsafe	22 (24.4)	46 (51.1)	22 (24.5)	90	
Total	72 (19.4)	210 (56.5)	90 (24.1)	372	

Table 4 shows that students experiencing food insecurity had higher rates of being underweight compared to those with food security. Among food-secure students, only 11.6% were underweight, whereas the proportion was notably higher in the food-insecure groups (23.6% and 24.4%). The chi-square test confirmed a significant association between food insecurity and nutritional status ($\chi^2 = 12.37$, $p = 0.015$). These findings indicate that food insecurity increases the risk of undernutrition among students, suggesting that limited access to adequate food can directly affect students' nutritional outcomes.

5. Relationship between Food Insecurity and Mental Health (Depression)

The association between food insecurity and depression levels is presented in Table 5.

Table 5. Relationship between Food Insecurity and Depression Levels in Students (DASS-21)

Food Status	Normal (n/%)	Mild–Moderate (n/%)	Weight (n/%)	Total (n)	p-value
Safe	84 (60.9)	44 (31.9)	10 (7.2)	138	
Moderate	50 (34.7)	74 (51.4)	20 (13.9)	144	0.001
Unsafe	28 (31.1)	48 (53.3)	14 (15.6)	90	
Total	162 (43.5)	166 (44.6)	44 (11.9)	372	

Table 5 demonstrates a clear relationship between food insecurity and depression levels among students. In the food-secure group, the majority (60.9%) reported normal levels of depression, whereas this proportion was much lower among food-insecure students (34.7% and 31.1%). Conversely, mild to severe depression was more prevalent in food-insecure groups, reaching over half of the respondents. The chi-square test confirmed this significant association (χ^2 = 18.52, p = 0.001), indicating that food insecurity substantially increases the likelihood of experiencing depression.

6. Logistic Regression Analysis of the Effect of Food Insecurity on Nutritional Status and Mental Health

The results of the logistic regression analysis are summarized in Table 6, highlighting the extent of risk associated with food insecurity.

Table 6. Logistic Regression of the Relationship between Food Insecurity and Nutritional Status and Mental Health

Independent Variables	OR (Odds Ratio)	CI	p-value
Nutritional Status (thin vs normal/fat)			
- Food insecurity	1.89	1.10–3.24	0.021
- Food insecurity	2.14	1.20–3.83	0.009
Depression (mild–severe vs normal)			
- Food insecurity	2.07	1.25–3.45	0.005
- Food insecurity	2.45	1.32–4.52	0.004

Table 7 shows that food insecurity is a significant predictor of both nutritional and mental health outcomes. Students experiencing food insecurity were nearly twice as likely to be underweight compared to their food-secure peers (OR = 1.89; 95% CI: 1.10–3.24; p = 0.021), and those with more severe food insecurity faced an even higher risk (OR = 2.14; 95% CI: 1.20–3.83; p = 0.009). Similarly, food insecurity was strongly associated with depression. Students with food insecurity had more than double the odds of experiencing mild to severe depression (OR = 2.07; 95% CI: 1.25–3.45; p = 0.005), while those with severe food insecurity had an even greater risk (OR = 2.45; 95% CI: 1.32–4.52; p = 0.004). These findings emphasize that inadequate food access not only contributes to undernutrition but also significantly increases vulnerability to mental health disorders.

Overall, food insecurity was significantly associated with undernutrition and depression in students. Regression analysis confirmed that students experiencing food insecurity were more than twice as likely to be undernourished and to develop depression, emphasising the substantial impact of inadequate food access on student well-being.

DISCUSSION

1. The Relationship Between Food Insecurity and Nutritional Status

The results showed a significant relationship between food insecurity and students' nutritional status (χ^2 = 12.37; p = 0.015). Students with food insecurity were more likely to be underweight than those with food security. This finding confirms that limited food access affects the quality and quantity of food intake, which in turn impacts nutritional status.

Theoretically, the concept of food insecurity explains that limited economic and physical access to food leads to unbalanced consumption patterns, which can lead to dual nutritional problems such as energy-protein malnutrition or obesity. This condition aligns with the nutrition transition theory, which correlates food limitations with low-cost, low-nutrition food choices.

Previous research supports these findings. A study in Indonesian adolescents found that food insecurity was associated with body mass index and an increased risk of depression, with food insecurity scores positively correlated with psychological symptoms and unbalanced dietary patterns (Asrullah et al., 2024). Similarly, global research shows that adolescents with food insecurity tend to have lower fruit and vegetable consumption and higher intakes of risky foods (Fram et al., 2022).

The researcher's assumption in this context is that students who experience food insecurity not only limit the amount of food, but also reduce its quality, thus causing a higher proportion of students with underweight nutritional status.

Based on the results of the analysis, this study shows that food insecurity has a significant relationship with the nutritional status and depression levels of students. These findings confirm that limited access to nutritious food not only affects nutritional adequacy but also contributes to psychological disorders through chronic stress mechanisms. The researchers' assumption is that students with food insecurity face a double burden of nutritional limitations and academic pressure, thereby increasing the risk of malnutrition and depression. More broadly, these findings indicate that food insecurity is a social determinant of health that needs to be addressed comprehensively through campus policies, community interventions, and public health responses. The implications include the need to strengthen university support systems, such as food banks, healthy food subsidies, food literacy development, and integrated mental health services. At the national level, this study can contribute to the formulation of student food security policies, which have not been a priority focus. Future research directions could be directed towards longitudinal designs to monitor the long-term impact of food insecurity, evaluate the effectiveness of campus intervention programmes, and analyse the socio-economic and cultural factors that influence student consumption patterns.

2. The Relationship Between Food Insecurity and Depression

Chi-square analysis showed a significant relationship between food insecurity and depression levels in students (χ^2 = 18.52; p = 0.001). Students with food insecurity had a higher prevalence of moderate to severe depression compared to students with food security.

Theoretically, food insecurity triggers psychosocial stress due to concerns about food availability, which in turn impacts mental health. The stress process model explains that economic hardship, including food insecurity, is a source of chronic stress that increases the risk of depression.

A large US study also showed that food insecurity significantly increased the risk of depression, anxiety, loneliness, and self-harm behavior in college students, even after controlling for sociodemographic factors (Oh et al., 2022). Another Canadian study found that the severity of food insecurity was associated with an increased risk of suicidal ideation, mood disorders, and anxiety disorders in adolescents and young adults (Men et al., 2021).

The researchers hypothesized that food-insecure students face dual pressures: limited food and academic demands. The combination of the two creates a higher risk of depression compared to students with secure access to food.

3. Logistic Regression Analysis: Food Insecurity, Nutritional Status, and Mental Health

Logistic regression results showed that students with food insecurity had a 1.89-fold greater risk of being undernourished, while those with food insecurity had a 2.14-fold greater risk than those with secure food. For mental health, students with food insecurity had a 2.07-fold greater risk of depression, and those with food insecurity had a 2.45-fold higher risk.

These findings reinforce the concept that food insecurity is an independent risk factor for poor nutrition and mental health. This finding is consistent with cross-national studies showing that more severe levels of food insecurity lead to a higher risk of depression, anxiety, and nutrition-related health disorders (Luke et al., 2023). Furthermore, research on immigrant students in the United States has shown that food insecurity is associated with increased psychological distress and decreased academic achievement (Haro-Contreras et al., 2025).

The researchers' assumption is that food insecurity acts as a dual predictor: affecting nutritional status through limited food intake and worsening mental health through psychosocial stress. Therefore, university interventions should be holistic, encompassing both access to healthy food and mental health support services.

CONCLUSIONS

This study concludes that food insecurity has a significant relationship with the nutritional status and mental health of students. Students experiencing food insecurity have a higher risk of being underweight and experiencing mild to severe depression. Logistic regression analysis shows that food insecurity is a strong predictor of both conditions, confirming that this problem is not only related to food intake deficiency, but also has an impact on psychological well-being.

These findings indicate the need for comprehensive interventions at the university level, including improved access to nutritious food, food assistance programmes, and strengthened mental health services. The results of this study are expected to form the basis for the development of more targeted policies to support student welfare and strengthen the national literature on the relationship between food insecurity, nutritional status, and mental health.

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