Journal of Applied Food and Nutrition

Journal homepage:
https://ejournal.upi.edu/index.php/JAFN/index

Food Insecurity, Nutritional Quality, and Health Risks among Urban Poor Households in Samarinda: Evidence from a Multi-Domain Assessment

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ABSTRACT

Background: Food insecurity remains a major public health concern in rapidly urbanizing developing countries, particularly among urban poor households with limited access to adequate, safe, and nutritious food. This study examined food insecurity, nutritional quality, and health risks among urban poor households in Samarinda, Indonesia.

Research Methods: A descriptive cross-sectional study was conducted among 86 households selected through a two-stage cluster sampling technique from three vulnerable urban settlements in Samarinda. Data were collected using ten standardized instruments assessing food system functioning, household food security, dietary diversity, food safety, and health indicators. Data were analyzed descriptively using SPSS version 26.

Research Result: Urban poor households showed substantial multidimensional vulnerability. Moderate conditions were observed in food system functioning, food security, and food safety (64–71%). Although dietary diversity was generally adequate, nutritional quality remained suboptimal. More than 80% of households experienced food insecurity, including 28% classified as severely food insecure. Health assessments identified elevated risks of non-communicable diseases (43%) and exposure to communicable disease-related health risks (35%).

Conclusion: Urban poor households in Samarinda face overlapping challenges related to unstable food access, poor nutritional quality, and increased health risks. Integrated multisectoral interventions are needed to strengthen food security, improve nutrition, and enhance disease prevention in vulnerable urban populations.

ARTICLE INFO

Article History:
Submitted/Received Feb 2026
First Revised May 2026
Accepted June 2026
First Available online June 2026
Publication Date June 2026

Keyword:
Food Security; Urban Community Nutrition; Slum Areas; Samarinda

1. INTRODUCTION

Food insecurity remains a critical public health challenge in rapidly urbanizing regions of developing countries, where socioeconomic inequalities often restrict access to adequate, safe, and nutritious food. Urbanization, while contributing to economic growth, can simultaneously intensify disparities in living conditions, food access, and health outcomes among vulnerable populations. In Indonesia, food insecurity extends beyond the issue of food availability, encompassing dimensions of household access, food utilization, affordability, and nutritional quality. These challenges are particularly evident among low-income urban households, where unstable income, inadequate housing conditions, and limited access to health-supportive environments contribute to persistent nutritional and health vulnerabilities (FAO, 2022; FAO, 2023; BPS, 2024).

Samarinda City, one of the major economic centers in East Kalimantan, reflects these urban inequalities. Although local government interventions have reduced the physical extent of slum settlements from 539.18 hectares in 2015 to 38.22 hectares in 2020, an additional 32.29 hectares of new informal settlements emerged during the same period, leaving approximately 70.51 hectares categorized as vulnerable urban residential areas. Several of these settlements, including Sungai Kapih, Sidodamai, and Loa Janan Ilir, continue to experience socioeconomic deprivation and environmental limitations that may compromise household food security and health conditions. Improvements in physical infrastructure alone may not adequately address broader determinants of health, particularly among urban poor households facing limited access to nutritious food, sanitation, and preventive healthcare services.

Previous studies in major Indonesian cities such as Jakarta and Surabaya have shown that households living in densely populated low-income urban areas experience higher levels of food insecurity and poorer dietary diversity compared with households in more advantaged residential settings (Kharisma & Abe, 2020). Similar findings have also been reported internationally, where urban poverty has been associated with unhealthy dietary patterns, constrained food choices, and increased health risks. Households experiencing food insecurity often rely on inexpensive energy-dense foods with low nutritional value, increasing susceptibility to obesity, hypertension, diabetes, and other nutrition-related disorders. At the same time, poor environmental sanitation and overcrowded living conditions may heighten vulnerability to communicable diseases, creating a compounded public health burden among disadvantaged urban populations (Rezaei et al., 2024; Lee et al., 2024; Carvajal-Aldaz et al., 2022).

Despite growing evidence on urban food insecurity, research integrating food insecurity, nutritional quality, and health risks within a multidimensional household-level assessment remains limited, particularly in secondary urban settings such as Samarinda. Most previous studies have examined these issues separately, focusing either on food access, dietary diversity, or specific disease outcomes, thereby providing only a partial understanding of the interconnected vulnerabilities experienced by urban poor households.

To address this gap, the present study employed a multi-domain assessment framework encompassing food insecurity, food and nutrition systems, socioeconomic conditions, and health-related indicators. Using standardized household-level assessment instruments, this study examined food insecurity, nutritional quality, and health risks among urban poor households residing in vulnerable settlements in Samarinda. The findings are expected to provide empirical evidence to inform integrated public health and nutrition interventions

DOI: https://doi.org/10.17509/jafn.v7i1.97105
p- ISSN 2797-068X e- ISSN 2797-0698

aimed at strengthening household resilience and improving health outcomes in vulnerable urban communities.

2. METHODS

This study employed a quantitative descriptive design with a cross-sectional approach to assess food insecurity, nutritional quality, and health risks among urban poor households residing in vulnerable settlements in Samarinda City. The research process included selection of study locations, respondent recruitment using a two-stage cluster sampling technique, household-level data collection through structured interviews, and verification of data completeness and consistency prior to statistical analysis.

Data collection was conducted from October to December 2024 through face-to-face interviews after respondents provided written informed consent. The study adhered to ethical principles of social research, including voluntary participation, confidentiality, anonymity, and the right to withdraw from participation at any stage. The study locations included three vulnerable urban settlements in Samarinda, namely Sungai Kapih, Sidodamai, and Loa Janan Ilir. Ten neighborhood units (Rukun Tetangga/RT) were selected as sampling clusters, with household respondents recruited proportionally from each cluster.

A total of 86 household respondents met the inclusion criteria and participated in the study. Eligible respondents were adults aged over 18 years, married, had resided in the study area for at least six months, were involved in household food management, and were willing to participate. Individuals with severe physical or mental impairments, unstable residence status, or those not living in family-based households were excluded. Given the exploratory nature of the study and the field-based accessibility constraints in vulnerable urban settlements, the findings should be interpreted within the contextual limitations of the study area.

A multi-domain assessment framework was applied using ten standardized instruments to capture key dimensions of household vulnerability. Food insecurity was assessed using the Household Food Insecurity Access Scale (HFIAS), Food Insecurity Experience Scale (FIES), Household Food Security Questionnaire (KKP-RT), and the food security module adapted from SUSENAS. Nutritional quality and dietary diversity were evaluated using the Food Consumption Score (FCS), Dietary Diversity Score (DDS), and Household Dietary Diversity Score (HDDS). Health risks were assessed using the General Health Questionnaire (GHQ-12/28) and WHO STEPS, while socioeconomic conditions were measured using the Family Affluence Scale (FAS) and Wealth Index.

All instruments used in this study had previously demonstrated validity and reliability in public health and nutrition research contexts. Data were analyzed using SPSS version 26. Descriptive statistical analysis included frequency distributions, percentages, means, and standard deviations to characterize respondent demographics and multidimensional conditions related to food insecurity, nutritional quality, and health risks.

Several methodological limitations should be acknowledged. The relatively small sample size, limited geographic coverage restricted to three vulnerable settlements, and the reliance on self-reported responses may affect the generalizability of the findings. Nevertheless, the study provides an exploratory multidimensional overview of household food and health vulnerabilities among urban poor populations in Samarinda.

3. RESULTS AND DISCUSSION

3.1. Respondent Characteristics

This study involved 86 respondents representing urban poor households residing in vulnerable settlements in Samarinda City. The characteristics analyzed included age,

DOI: https://doi.org/10.17509/jafn.v7i1.97105
p- ISSN 2797-068X e- ISSN 2797-0698

occupation, educational attainment, household income, marital status, and household size. Several variables were grouped into broader categories to facilitate interpretation in relation to household food insecurity, nutritional quality, and health risks. The characteristics of respondents are presented in Table 1.

Table 1. Characteristics of Respondents

Variable	Category	n	%
Age	20–34 years	24	27.9
	35–49 years	29	33.7
	50–64 years	24	27.9
	≥ 65 years	9	10.5
Occupation	Unemployed	2	2.3
	Housewife	24	27.9
	Civil servant	7	8.1
	Private employee	14	16.3
	Farmer/Fisherman	5	5.8
	Entrepreneur (including others)	34	39.6
Education	No formal education	6	7.0
	Primary–Senior high school or equivalent	57	66.3
	Diploma–Bachelor's degree	18	20.9
	Postgraduate	5	5.8
Household Income	< IDR 1,000,000	13	15.1
	IDR 1,000,000–3,000,000	42	48.8
	IDR 3,000,000–5,000,000	20	23.3
	> IDR 5,000,000	11	12.8
Marital Status	Married	67	77.9
	Divorced (living)	10	11.6
	Widowed	9	10.5
Household Size	1–2 persons	33	38.4
	3–4 persons	39	45.3
	5–6 persons	14	16.3
Total		86	100

Analysis of respondent characteristics showed that the majority of respondents were in the productive age group (35–49 years; 33.7%) and were predominantly engaged in informal or economically unstable occupations, including entrepreneurship (39.6%) and household domestic roles (27.9%). This occupational profile suggests dependence on irregular income sources, which may increase vulnerability to household food insecurity and reduce the ability to maintain consistent access to nutritious food. These findings are consistent with Vilar-Compte et al. (2021), who reported that unstable employment and fluctuating income significantly contribute to food insecurity among urban poor households.

Most respondents had relatively low educational attainment, with 66.3% completing only primary to senior secondary education, while nearly half of households (48.8%) reported monthly incomes ranging from IDR 1,000,000 to 3,000,000. These socioeconomic conditions may constrain nutrition literacy, food purchasing power, and the capacity to adopt healthier

DOI: https://doi.org/10.17509/jafn.v7i1.97105
p- ISSN 2797-068X e- ISSN 2797-0698

dietary practices. Similar findings were reported by Martínez et al. (2024), who identified low education and limited household income as significant determinants of poor nutritional quality and unhealthy food consumption patterns among low-income urban populations.

Although most respondents were married (77.9%) and lived in relatively small households consisting of three to four members (45.3%), these demographic characteristics did not necessarily translate into improved food security. Household size alone may not determine food adequacy when economic resources remain constrained. This observation aligns with Bagchi (2023), who noted that even smaller households in low-income urban settings may continue to experience food insecurity due to structural economic limitations and restricted access to healthy food options.

3.2. Food System, Household Food Security, and Food Safety

This section presents the condition of the household food system, food security, and food safety among urban poor households residing in vulnerable settlements in Samarinda City. The findings provide a basis for assessing the capacity of households to meet their needs for nutritious and safe food.

Table 2. Distribution of Household Food System, Food Security, and Food Safety Categories among Urban Poor Households in Samarinda City

Variable	Category	n	%	Mean ± SD
Food System and Nutrition	Low	13	15.1	5.17 ± 0.75
	Moderate	58	67.4	7.33 ± 0.91
	High	15	17.4	9.53 ± 0.76
Food Security	Insecure	12	14.0	19.25 ± 0.80
	Vulnerable	61	70.9	22.31 ± 1.41
	Secure	13	15.1	25.23 ± 0.93
Food Safety	Low	16	18.6	3.41 ± 0.66
	Moderate	55	64.0	5.03 ± 0.94
	High	15	17.4	7.14 ± 0.73

Descriptive analysis revealed that urban poor households in Samarinda continue to experience multidimensional constraints related to food systems, food security, and food safety. In terms of the food and nutrition system, the majority of households (67.4%) were classified in the moderate category (Mean ± SD = 7.33 ± 0.91), indicating moderate food system functioning with some degree of dietary diversity, although overall nutritional quality remained suboptimal. This condition reflects a consumption pattern dominated by carbohydrates, with limited intake of animal protein, vegetables, and fruits, similar to the findings of Kushitor et al. (2023) among low-income urban households.

Regarding food security, 70.9% of households fell into the moderate category (Mean ± SD = 22.31 ± 1.41), suggesting that food availability and access remain unstable and are still highly influenced by income fluctuations and food price volatility. This finding is consistent with reports by FAO (2022) and Indonesia's National Food Agency (2023), which noted that urban poor households in Indonesia generally experience mild to moderate levels of food insecurity due to economic instability.

Meanwhile, for food safety, most households (64.0%) were in the moderate category (Mean ± SD = 5.03 ± 0.94), indicating that food hygiene and storage practices remain inadequate. The main contributing factors include limited access to clean water and proper sanitation facilities, as also identified by Corburn (2022) in the context of urban poor

DOI: https://doi.org/10.17509/jafn.v7i1.97105
p- ISSN 2797-068X e- ISSN 2797-0698

communities.

Overall, these conditions highlight that urban poor households in Samarinda face overlapping food-related vulnerabilities characterized by constrained nutritional quality, fragile food security, and suboptimal food safety practices. Integrated interventions are required, focusing not only on improving access to nutritious food but also on strengthening household-level sanitation systems and food hygiene education.

3.3. Nutritional Quality, Health Risks, and Food-Related Behavioral Patterns

This section presents the results of the analysis of the relationships between nutritional quality, non-communicable disease (NCD) risks, communicable disease vulnerabilities, and food-related behavioral patterns among urban poor households in Samarinda City.

Table 3. Distribution of Nutritional Quality, Health Risk, and Food-Related Behavioral Variables among Urban Poor Households in Samarinda City

Variable	Category	n	%	Mean ± SD
Nutritional Quality and NCD Risk	Low	33	38.4	6.95 ± 1.20
	Moderate	16	18.6	7.85 ± 1.75
	High	37	43.0	8.72 ± 1.30
Nutritional Quality and Communicable Disease Risk	Low	30	34.9	36.12 ± 6.10
	Moderate	26	30.2	40.92 ± 7.12
	High	30	34.9	45.31 ± 6.85
Food-Related Behavioral Patterns	Low	41	47.7	19.22 ± 1.50
	Moderate	0	0.0	-
	High	45	52.3	22.12 ± 1.70

Descriptive analysis revealed substantial variation across the three dimensions. For nutritional quality and non-communicable disease risk, 43.0% of respondents were classified in the high category, 38.4% in the low category, and 18.6% in the moderate category. This pattern suggests elevated vulnerability to nutrition-related chronic conditions, including obesity, hypertension, and diabetes, potentially associated with dietary transitions from traditional eating patterns toward greater consumption of foods high in fats, sugars, and processed ingredients. These findings align with the concept of the nutrition transition described by Varre et al. (2025), as well as Dinu and Martini (2023), who reported that increased consumption of ultra-processed foods among low-income urban households is associated with a growing burden of non-communicable diseases

Regarding communicable disease-related health risks, the proportions of low and high categories were comparable (34.9% each), with 30.2% classified in the moderate category. This finding suggests persistent vulnerability to infectious disease exposure, which may be influenced by environmental sanitation constraints, household crowding, and limited access to primary healthcare services. This pattern is consistent with Hussein et al. (2024), who emphasized that inadequate nutrition and unsanitary living conditions contribute to the persistence of infectious disease burdens in vulnerable urban populations.

For food-related behavioral patterns, 52.3% of households were categorized as high and 47.7% as low, with no respondents classified in the moderate category, indicating a polarized distribution of dietary behaviors. This pattern may reflect disparities in socioeconomic conditions, differential access to nutritious food, and variation in the persistence of

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p- ISSN 2797-068X e- ISSN 2797-0698

traditional food practices among urban poor households. Some households may continue to maintain relatively nutritious food habits based on local food resources, whereas others may increasingly adopt convenience-based dietary practices associated with lower nutritional quality. This finding supports Nurhasan et al. (2024), who reported that food modernization in urban settings contributes to changing dietary behaviors and weakened food security among low-income households.

Overall, urban poor households in Samarinda experience overlapping nutritional and health vulnerabilities characterized by elevated non-communicable disease risks alongside continued exposure to communicable disease threats. These findings reflect an ongoing nutrition transition occurring in the context of environmental and socioeconomic constraints. Therefore, effective interventions should adopt an integrated approach encompassing culturally appropriate nutrition education, improved access to nutritious food, and preventive strategies addressing both communicable and non-communicable health risks (Mathews et al., 2025).

3.4. Socioeconomic Conditions, Food Consumption, Nutritional Diversity, and Household Food Insecurity

This section describes the socioeconomic conditions, food consumption patterns, nutritional diversity, and household food insecurity status of the respondents. The following table presents the categorical distribution, frequency, percentage, and mean (Mean ± SD) scores of the Socioeconomic Index, Food Consumption Score (FCS), Household Dietary Diversity Score (HDDS), and Household Food Insecurity indicators.

Table 4. Distribution and Descriptive Statistics of Socioeconomic Conditions, Food Consumption, Dietary Diversity, and Household Food Insecurity

Variable	Category	n	%	Mean ± SD
Socioeconomic Conditions	Low	25	29.1	18.3 ± 1.8
	Medium	42	48.8	19.7 ± 1.0
	High	19	22.1	21.5 ± 1.2
Food Consumption Score (FCS)	Poor	20	23.3	14.3 ± 2.9
	Borderline	50	58.1	29.0 ± 6.4
	Acceptable	16	18.6	41.5 ± 4.9
Household Dietary Diversity (HDDS)	Low	18	20.9	22.1 ± 1.1
	Medium	44	51.2	25.3 ± 0.9
	High	24	27.9	27.8 ± 1.2
Household Food Insecurity	Food Secure	17	19.8	23.7 ± 2.0
	Mildly Food Insecure	45	52.3	30.5 ± 3.1
	Severely Food Insecure	24	27.9	36.2 ± 3.9

Descriptive analysis revealed that the majority of urban poor households in Samarinda were classified in the medium socioeconomic category (48.8%; Mean ± SD = 19.7 ± 1.0), while 29.1% fell into the low category, reflecting economic vulnerability associated with unstable income sources and constrained access to nutritious food.

Based on the Food Consumption Score (FCS), most households (58.1%) were categorized as borderline (Mean ± SD = 29.0 ± 6.4), indicating that although the quantitative adequacy of food consumption may be relatively sufficient, nutritional quality remained suboptimal, particularly with respect to animal protein, fruit, and vegetable intake. These findings are

DOI: https://doi.org/10.17509/jafn.v7i1.97105
p- ISSN 2797-068X e- ISSN 2797-0698

consistent with Hoy et al. (2022) and Pine (2022), who reported that low-income urban households often exhibit borderline food consumption scores due to heavy reliance on carbohydrate-based staple foods.

The Household Dietary Diversity Score (HDDS) showed that the majority of respondents were in the medium category (51.2%; Mean ± SD = 25.3 ± 0.9), while only 27.9% achieved high dietary diversity. This suggests that household food variety remains limited, which may increase vulnerability to micronutrient inadequacy, particularly among nutritionally vulnerable household members.

In terms of household food insecurity, the Household Food Insecurity Access Scale (HFIAS) indicated that over 80% of households experienced some degree of food insecurity, with 52.3% classified as mildly food insecure and 27.9% as severely food insecure. This pattern reflects fragile food access conditions among urban poor households, largely influenced by economic instability and food price fluctuations. Similar patterns have been reported by FAO (2023) and Nakamura et al. (2023), indicating that low-income urban households in Indonesia remain highly vulnerable to both economic and environmental shocks.

Overall, these findings demonstrate that food insecurity among urban poor households is shaped by interconnected socioeconomic and nutritional constraints rather than income limitations alone. Effective interventions should therefore adopt a multidimensional approach, including household economic empowerment, nutrition education to improve dietary diversity, and community-based food system strengthening initiatives such as urban agriculture and improved access to affordable nutritious foods (Doustmohammadian et al., 2022; FAO, 2023).

4. CONCLUSION

This study found that urban poor households in Samarinda experience fragile food insecurity conditions, suboptimal nutritional quality, and elevated health risks, including vulnerability to both communicable and non-communicable diseases. The findings highlight the multidimensional interconnections among household food systems, nutritional practices, socioeconomic conditions, and urban health vulnerabilities. Recommended interventions include improving access to nutritious food and adequate sanitation, providing culturally appropriate nutrition education, promoting urban agriculture initiatives, and strengthening preventive strategies for both communicable and non-communicable diseases. Future studies are recommended to involve larger and more diverse populations and to adopt longitudinal approaches in order to better understand the dynamics of urban food insecurity and its implications for public health among vulnerable urban populations.

5. ACKNOWLEDGMENT

The authors would like to express their sincere gratitude to the Government and the Health Office of Samarinda City, as well as to all respondents from the Sungai Kapih, Sidodamai, and Loa Janan Ilir areas, for their support and participation in this study. This research was self funded and received no external financial support.

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DOI: https://doi.org/10.17509/jafn.v7i1.97105
p- ISSN 2797-068X e- ISSN 2797-0698