

## ORIGINAL RESEARCH ARTICLE

# Maternal financial literacy as a determinant of household food security: Evidence from a cross-sectional study in Padang Lawas Regency, Indonesia

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## Abstract

Household food security remains a major challenge in Indonesia and is closely linked to maternal and child health. Low maternal financial literacy can exacerbate food insecurity due to poor budget management. This study examined the effect of maternal financial literacy on household food security in Padang Lawas Regency, Indonesia. A total of 384 mothers with children aged 6–59 months participated in this cross-sectional study conducted between October 2024 and February 2025 using a multistage cluster sampling method. Data were analyzed with chi-square tests and binary logistic regression. Results showed that mothers with good financial literacy were 26 times more likely to achieve household food security (OR = 26.044; 95% CI: 7.044–96.297;  $p < 0.001$ ). Maternal age and household size were also significant factors. These findings highlight the need to integrate financial literacy education into public health programs to strengthen food security, improve nutrition, and support reproductive health. (*Afr J Reprod Health 2025; 29 [10]: 125-132*).

**Keywords:** Financial capability; mothers with under-fives; family food resilience

## Résumé

La sécurité alimentaire des ménages reste un défi majeur en Indonésie et est étroitement liée à la santé maternelle et infantile. Une faible littératie financière maternelle peut aggraver l'insécurité alimentaire en raison d'une gestion budgétaire sous-optimale. Cette étude a évalué l'effet de la littératie financière maternelle sur la sécurité alimentaire des ménages dans le district de Padang Lawas, au nord de Sumatra, Indonésie. Au total, 384 mères d'enfants âgés de 6 à 59 mois ont participé à cette étude transversale (octobre 2024–février 2025) utilisant un échantillonnage en grappes à plusieurs degrés. Les données ont été analysées à l'aide de tests du chi-deux et de la régression logistique binaire. Les résultats ont montré que les mères ayant une bonne littératie financière étaient 26 fois plus susceptibles d'atteindre la sécurité alimentaire des ménages (OR = 26,044; IC 95 % : 7,044–96,297;  $p < 0,001$ ). L'âge maternel et la taille du ménage étaient également associés de manière significative. Ces résultats soulignent la nécessité d'intégrer l'éducation financière dans les programmes de santé publique afin d'améliorer la sécurité alimentaire, l'état nutritionnel et la santé maternelle et infantile. (*Afr J Reprod Health 2025; 29 [10]: 125-132*).

**Mots-clés:** Capacité financière ; mères d'enfants de moins de cinq ans ; résilience alimentaire familiale

## Introduction

Household food security remains a critical issue in many countries worldwide, particularly in low and middle-income countries, as it directly affects health, well-being, and quality of life, thereby contributing to human resource development in the future.<sup>1-3</sup> According to the Global Food Security

Index (GFSI) 2022, Finland ranked as the most food-secure country with a score of 83.7, while Indonesia, with a score of 60.2, was ranked 63rd out of 113 countries, highlighting serious challenges in food availability, affordability, and distribution.<sup>4</sup> The government has undertaken various initiatives, including the food estate program, local food diversification, and family social assistance through

the Family Hope Program. However, most of these policies focus more on production and food availability, while the aspect of household budget management, which is crucial in determining family nutritional consumption, remains underemphasized.

Food security, as defined by the Food and Agriculture Organization (FAO), is a condition in which all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life.<sup>5</sup> Household food security is not only determined by income levels and food availability but also by how household finances are managed. Mothers, as the primary managers of household finances and key decision-makers in family consumption patterns, play a central role in determining budget priorities, food consumption behavior, and the nutritional status of the family.<sup>6-8</sup>

Indonesia is classified as an upper middle-income country, with a Gross National Income (GNI) per capita of US\$4,870. However, more than 60% of its population still lives below the poverty line, with an average income of US\$6.85 per day. This indicates the persistence of significant socioeconomic disparities within the country.<sup>9</sup> Financial literacy refers to the knowledge and skills required to apply financial management concepts, including wealth and investment, as well as the ability to make sound decisions in planning expenditures and managing debt, which ultimately affects food access and the quality of household nutritional intake.<sup>10,11</sup> Thus, understanding maternal financial behavior and literacy levels provides a potential pathway for improving household food security. Adequate financial literacy enables mothers to allocate their household budgets more wisely, select nutritious foods, and mitigate economic risks that may threaten their household's food stability. Conversely, low maternal financial literacy may hinder their ability to allocate resources appropriately, choose nutritious foods, and anticipate economic risks that affect household food security.<sup>10</sup>

According to Indonesia's Financial Services Authority (OJK) in 2022, the financial literacy rate of women aged 15 years and above was only 50.33%,<sup>12</sup> categorized as low.<sup>13</sup> This low level

of literacy is one of the factors that may influence household food security. Previous studies have primarily focused on the relationship between household income and food security.<sup>14-16</sup> However, income alone does not guarantee food sufficiency if not accompanied by effective financial management skills.<sup>17</sup> Households with similar income levels may experience different levels of food security depending on how household finances are managed.<sup>18</sup> This underscores the argument that financial literacy should not only be viewed as a general economic skill but also as a social determinant of public health, especially when possessed by mothers, who serve as the primary decision-makers in family food management. Poor budget management often results in unbalanced dietary patterns, low dietary diversity, and limited access to nutritious foods, thereby increasing the risk of malnutrition and stunting, particularly during the first 1,000 days of life. A study in Ghana demonstrated that good financial literacy is associated with improved food security and child nutritional status.<sup>8</sup>

Although global attention toward the social determinants of food security and family nutrition is growing, research on the role of financial literacy, particularly among mothers, remains very limited in Southeast Asia. Prior studies have largely focused on household income, food assistance, and maternal education, while financial literacy and household budget management have not been extensively examined. Evidence from India and Africa suggests that women's financial management skills and autonomy in household budget decisions can improve food access and reduce the risk of child malnutrition.<sup>19,20</sup> However, empirical evidence from Indonesia remains scarce. Most studies emphasize income, education, or food assistance without thoroughly exploring financial literacy as a determinant of household food security. This represents an important research gap, particularly in the local context of North Sumatra.

This study aimed to address this gap by analyzing the relationship between maternal financial literacy and household food security in Padang Lawas Regency, Indonesia. The findings are expected to contribute to strengthening policy formulation, particularly by integrating financial literacy into public health programs and social

protection efforts to support food security, nutritional status, and reproductive health of families.

## Methods

### *Study population*

This study was conducted in Padang Lawas Regency, North Sumatra Province, Indonesia, where the total number of children under five years of age (6–59 months) was 9,181. The research was carried out in six sub-districts: (1) Sosa, (2) Hutaraja Tinggi, (3) Barumon, (4) Barumon Selatan, (5) Batang Lubu Sutam, and (6) Sosa Julu. The selection of these six sub-districts was based on the following considerations: (1) they had the highest number of children under five compared to other sub-districts, (2) to increase the likelihood of capturing households with potential food insecurity, and (3) to represent the diversity of geographic areas. The sample size was determined using the Slovin formula, resulting in a sample of 384 children under five. A multistage cluster sampling technique was employed. The respondents were biological mothers, selected based on their primary role in managing household finances and meeting family food needs. Children under five were used as the entry point to identify households with potential food insecurity.

Sample criteria were divided into inclusion and exclusion categories. The inclusion criteria were: (1) children raised by their biological mothers, and (2) families willing to participate. The exclusion criteria were: (1) children with comorbidities such as diarrhea, (2) mothers who were not present during the data collection period, and (3) children with developmental disorders such as autism or intellectual disabilities. The study was conducted from October 2024 to February 2025.

Maternal financial literacy was assessed using the Questionnaire and Guidance Notes for Conducting an Internationally Comparable Survey of Financial Literacy (OECD), while household food security was measured using the Household Food Insecurity Access Scale (HFIAS). The content validity of both instruments was evaluated by four experts (financial economics, public health, nutrition, and food security), while face validity

was tested on 30 mothers to ensure clarity and readability. The reliability of the instruments was assessed using Cronbach's Alpha, yielding values  $>0.7$  across the three dimensions of financial literacy (knowledge, attitude, and behavior) as well as HFIAS, indicating good internal consistency.

Prior to data collection, enumerators ( $n = 10$ ) underwent a three-day intensive training on interview techniques, research ethics, and questionnaire administration simulations. The principal investigator conducted spot checks on 10% of respondents to ensure data quality.

### *Maternal characteristics*

Questions in this section collected the data regarding the age, education background, employment status and the family size.

### *Maternal financial literacy*

The instrument encompasses three dimensions; knowledge, attitudes, and behavior, each consisting of 10 items assessed using a Likert-type scale. The knowledge dimension measures mothers' understanding of household financial management with response options scored as "Yes" (2) and "No" (1). The attitude dimension evaluates perspectives on household budgeting, with scores of Agree (3), Somewhat Agree (2), and Disagree (1). The behavior dimension captures daily financial practices, scored as Yes (3), Sometimes (2), and Never (1). The maximum total score is 80, with financial literacy categorized as Good ( $\geq 68$ ) and Poor ( $< 68$ ).

### *Food security*

The instrument measured four key dimensions: food availability (access to food through production, purchase, or aid), food access (economic and social capacity to acquire nutritious food), food utilization (food preparation practices, dietary diversity, and nutritional adequacy), and food stability (sustained food access, food reserves, and income stability). The instrument consists of 22 items, each scored on a 3-point Likert scale (1–3), with higher scores indicating better food security. The maximum total score is 56, with food security categorized as Secure ( $\geq 42$ ) and Insecure ( $< 42$ ).

**Statistical analysis**

Bivariate analysis using the Chi-square test was conducted to examine the associations between mothers’ financial literacy, mothers’ characteristics, and household food security. Subsequently, binary logistic regression was employed to assess the effect of mothers’ financial literacy on household food security, controlling for mothers’ age, education, employment status, and family size. This method was chosen due to the dichotomous nature of the dependent variable. Prior to regression, multicollinearity was tested using the Variance Inflation Factor (VIF) values, all of which were below 10, indicating no significant multicollinearity among independent variables. Results are presented as Odds Ratios (ORs) with 95% Confidence Intervals (CIs) and significance levels ( $p < 0.05$ ). All analyses were performed using SPSS Statistics version 25.0

**Ethical considerations**

This research was conducted in accordance with the Declaration of Helsinki. The rights of the mothers who participated in the research were protected throughout the data collection process. Ethical approval was obtained prior to data collection from the Ethics Committee of the Faculty of Medicine, Andalas University, Padang, West Sumatra, under

approval number No: 523 / UN.16.2 / KEP-FK / 2024.

**Results**

**Characteristics of the study population**

Maternal characteristics, including age (OR = 0.146,  $p < 0.001$ ), education (OR = 25.027,  $p = 0.001$ ), employment status (OR = 5.616,  $p = 0.001$ ), and family size (OR = 0.114,  $p < 0.001$ ) were found to have a statistically significant relationship with household food security, as shown in Table 1.

Mothers’ financial literacy dimensions, including financial knowledge (OR = 64.958,  $p < 0.001$ ), financial attitude (OR = 4.490,  $p = 0.001$ ), and financial behavior (OR = 29.213,  $p = 0.001$ ) were found to have a significant relationship with household food security, as presented in Table 2.

All variables had Variance Inflation Factor (VIF) values ranging from 1.197 to 2.161, and tolerance values above 0.1, indicating that there was no multicollinearity issue in the regression model. The variables of mothers’ age, education, employment status, family size, and the dimensions of financial literacy (knowledge, attitude, and behavior) were found to have statistically independent relationships with one another, as shown in Table 3

**Table 1:** Maternal characteristics (n = 384)

Determinants	Food Security		P Value	OR
	Insecure n (%)	Secure n (%)		
<b>Mother’s Age</b>				
< 25 years old	2 (5.6)	34 (94.4)	0.0005***	0.146
≥ 25 years old	100 (28.7)	248 (71.3)		
<b>Education</b>				
Low	101 (30.9)	226 (69.1)	0.001***	25.027
High	1 (1.8)	56 (98.2)		
<b>Employment Status</b>				
Unemployed	84 (39.6)	128 (60.4)	0.001***	5.616
Employed	18 (10.5)	154 (89.5)		
<b>Family Size</b>				
Large	15 (8.1)	170 (91.9)	0.0001***	0.114
Small	87 (43.7)	112 (56.3)		

\* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$ ; tested using  $\chi^2$

**Table 2:** Mothers' financial literacy (n = 384)

Mothers' Financial Literacy	Food Security		P Value	OR
	Insecure n (%)	Secure n (%)		
Mothers' Financial Knowledge				
Poor	99 (51.0)	95 (49.0)	0.0001***	64.958
Good	3 (1.6)	187 (98.4)		
Mothers' Financial Literacy Attitude				
Poor	59 (47.2)	66 (52.8)	0.001***	4.490
Good	43 (16.6)	216 (83.4)		
Mothers' Financial Literacy Behavior				
Poor	100 (36.0)	178 (64.0)	0.001***	29.213
Good	2 (1.9)	104 (98.1)		

\*P<0.05, \*\*P<0.01, \*\*\*P<0.001; tested using  $\chi^2$

**Table 3:** Multicollinearity Test (Variance Inflation Factor/ VIF Value)

Variables	Tolerance	VIF
Mother's age	0.836	1.197
Mother's education	0.674	1.484
Mother's employment status	0.716	1.397
Family size	0.624	1.603
Financial literacy Knowledge	0.463	2.161
Financial literacy Attitude	0.721	1.387
Financial literacy Behavior	0.503	1.989

**Table 4:** Effect of Maternal Financial Literacy on Household Food Security

Variable	Beta	S.E.	Wald	Df	p	OR	95% CI
Constant	2.975	2.100	2.007	1	0.015*	19.581	
Mothers' age	-1.677	0.811	4.278	1	0.039*	0.187	0.038-0.916
Mothers' education	1.202	1.142	1.108	1	0.292	3.326	0.355-31.167
Mothers' employment status	0.507	0.373	1.848	1	0.174	1.660	0.799-3.447
Family size	-1.109	0.387	8.216	1	0.004**	0.330	0.155-0.704
Financial literacy knowledge	3.260	0.667	23.872	1	0.001**	26.044	7.044-96.297
Financial literacy attitude	0.472	0.322	2.147	1	0.143	1.602	0.853-3.011
Financial literacy behavior	0.881	0.900	.958	1	0.328	2.413	0.414-14.075

\*P<0.05, \*\*P<0.01, \*\*\*P<0.001; tested using binomial logistic regression analysis

Multivariate logistic regression analysis (Table 4) showed that maternal age, family size, and financial literacy knowledge were significantly associated with household food security. Mothers aged  $\geq 25$  years and households with larger family size had higher odds of achieving food security, while good financial literacy knowledge emerged as the strongest predictor (OR = 26.044;  $p < 0.001$ ).

## Discussion

This study confirms that maternal financial literacy, maternal age, and household size are key determinants of household food security in Padang Lawas Regency. These findings are consistent with several previous studies demonstrating that sociodemographic factors and maternal financial

behaviors significantly influence household food access and stability, while also providing new contextual evidence from rural Indonesia.<sup>21</sup>

Maternal age was positively associated with household food security (OR = 0.187, reference <25 years), indicating that mothers aged 25 years or older were significantly more likely to achieve household food security compared with younger mothers.<sup>22</sup> This is consistent with the notion that maturity and life experience enhance economic decision-making. The finding suggests that maternal age may serve as an important indicator of household food security, reinforcing the idea that maturity and life experience contribute to economic decision-making, including long-term planning for food availability during both productive and non-productive life stages.<sup>8</sup>

Family size (OR = 0.330) was also positively associated with household food security. While many previous studies have linked larger household size with increased risk of food insecurity due to limited resources, the local context of Padang Lawas may indicate otherwise.<sup>23</sup> In many households in this region, extended families often include multiple income earners, thereby balancing consumption needs. Consequently, the effect of household size is dualistic; on one hand, it may pose a burden, but on the other, it may strengthen food security depending on the household's economic structure.<sup>24,25</sup>

The strongest determinant identified in this study was maternal financial literacy (OR = 26.044), indicating that mothers with good financial management skills were 26 times more likely to achieve household food security. Skills such as budgeting, prioritizing essential needs, and planning expenditures make families more resilient to the risks of food insecurity. Positive financial knowledge and behaviors enable households to make appropriate decisions regarding resource allocation for food needs. This aligns with previous research emphasizing the strong influence of financial literacy on family well-being.<sup>7,8,17</sup> These findings highlight the critical role of maternal financial literacy in improving household food security. Weak household food security, in turn, contributes to poor dietary diversity, which is a major risk factor for stunting and malnutrition among children under five.<sup>26-28</sup> A study by Fatmah

found a significant relationship between household food insecurity and stunting in Indonesia.<sup>21</sup>

In the context of reproductive health, maternal financial literacy exerts a dual impact. Mothers with strong financial understanding are more likely to meet nutritional needs during pregnancy and breastfeeding, thereby preventing stunting and undernutrition in early childhood.<sup>8,29,30</sup> In addition, they are more likely to regularly access maternal and child health services, make healthier consumption decisions, and prepare emergency funds for medical needs. This indicates that financial literacy not only supports household economic stability but also plays a crucial role in sustaining maternal and child health.<sup>13,31,32</sup>

The novelty of this study lies in providing empirical evidence from Indonesia, where maternal financial literacy has rarely been examined as a determinant of food security. Most local studies have emphasized income, education, or food assistance, while overlooking mothers' financial skills in household budget management. The policy implication of these findings is the need to integrate maternal financial literacy into public health and social protection programs. Financial literacy modules can be incorporated into maternal classes at Posyandu (Integrated Health Posts), training programs for PKK (Family Welfare Movement) cadres, and assistance initiatives such as the Family Hope Program (PKH). Such interventions would not only provide temporary solutions but also empower mothers to manage household budgets effectively. This policy direction supports the achievement of SDG 2 (Zero Hunger) and SDG 3 (Good Health and Well-being), while simultaneously strengthening family capacity to prevent stunting and improve child health outcomes.

## Limitations

This study has several limitations. First, the cross-sectional design limits the ability to draw causal inferences. Second, the geographic coverage was restricted to a single regency with specific socioeconomic and cultural characteristics. Third, recall bias may have occurred in reporting food consumption and household expenditures due to the use of memory-based questionnaires. Future

research employing a longitudinal design and broader geographic coverage is recommended to strengthen these findings.

## Conclusion

This study demonstrates that maternal financial literacy plays a significant role in improving household food security in Padang Lawas Regency. Mothers with good financial literacy have a much a significantly higher likelihood of achieving food security, with maternal age and family size also contributing substantially. Enhancing maternal financial literacy not only impacts household economic stability but also contributes to prevention of stunting, reduction of malnutrition, and improvement in child health. Financial literacy is not merely an economic issue, but an integral component of family health strategies. Therefore, maternal financial literacy should be integrated into public health and social protection programs to strengthen household food security, improve family nutritional status, and support sustainable reproductive health, ultimately generating long-term impacts that contribute to the achievement of Sustainable Development Goal (SDG) 2, Zero Hunger, and SDG 3, Good Health and Well-being.

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## Conflict of interest

The authors declare that there is no conflict of interest.

## Authors contribution

Sri Melda Br Bangun conceived and designed the study, collected and analyzed the data, and prepared the manuscript. Nur Indrawati Lipoeto provided scientific supervision, conceptual guidance, and critical review. Novizar Nazir contributed methodological guidance, validated the analysis, and provided substantive input. Rosfita Rasyid contributed to the conceptual framework and offered important revisions. Masrul gave an

academic evaluation and constructive suggestions that enriched the discussion. Hardisman provided critical input, particularly on public health aspects. Yonariza contributed to the conceptual review and provided academic insights to refine the discussion. Firdawati refined the discussion and reviewed the final manuscript version. All authors read and approved the final manuscript prior to submission.

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