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Financial Literacy and Household Food Insecurity in Urban Somaliland: Evidence from a Large-Scale Survey in Hargeisa

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Abstract

Household food insecurity remains a persistent development challenge in urban Somaliland, yet research on its household-level financial determinants is limited. This study examined the association between financial literacy and household food insecurity in Hargeisa, Somaliland, disaggregating financial literacy into knowledge, behavior, and attitude components. A quantitative cross-sectional design was used, with primary data collected via structured questionnaires from 5,762 households selected through stratified multistage urban cluster sampling. Data were analyzed using descriptive statistics, chi-square tests of association, Pearson correlation, and multivariable binary logistic regression. The overall regression model was statistically significant ($\chi^2(13) = 360.947$, $p < 0.001$) and correctly classified 78.5% of cases. Each one-point increase in the financial literacy score was associated with a 40.2% reduction in the odds of food insecurity (AOR = 0.598, 95% CI: 0.543–0.659, $p < 0.001$), and households that had saved money in the previous 12 months had 46.6% lower odds of food insecurity (AOR = 0.534, 95% CI: 0.426–0.670, $p < 0.001$). Subjective financial stress was the strongest correlate of food insecurity, while nominal income category showed no significant bivariate association. Notably, 73.0% of respondents were classified as having low financial literacy despite 52.8% holding a university-level education, revealing a financial literacy paradox in which formal schooling does not translate into functional financial capability. These findings indicate that household financial behavior, rather than income alone, is a key lever for reducing urban food insecurity in Somaliland, and they support integrating financial education into food security and nutrition-sensitive policy and programming.

1. Introduction

1.1 Background

Household food insecurity affects millions of households across both developed and developing regions, and interventions have traditionally emphasized income, social safety nets, and food production as the principal levers for improving food security [1]. Beyond its immediate effects on nutrition, food insecurity is also linked to a range of adverse health outcomes among affected household members [19]. A growing body of literature, however, indicates that material resources alone do not guarantee nutritional well-being. The Food and Agriculture Organization (FAO) [2] has emphasized that resource utilization and household decision-making are central to translating food availability into actual nutrition, since the ability of households to allocate resources efficiently, budget effectively, and make informed consumption choices contributes substantially to food security outcomes.

In Sub-Saharan Africa, where macroeconomic shocks, climate variability, and volatile food prices frequently disrupt livelihoods, income alone is often insufficient to protect households from hunger [3]. This context has brought financial literacy – defined as the knowledge, behaviors, and confidence related to financial management – into focus as a non-economic tool for reducing household vulnerability. In Somaliland, urban assessments conducted between 2023 and 2026 indicate that inflation and

macroeconomic volatility have strongly shaped household consumption patterns [4], and in a rapidly urbanizing economy such as Hargeisa, understanding how financial knowledge shapes household coping mechanisms is increasingly important, since financial literacy may help households smooth consumption during periods of economic stress [5]. Hargeisa's broader socioeconomic profile – characterized by youth-dominated informal employment and constrained public infrastructure – further underscores the financial vulnerability of urban households in this setting [18].

1.2 Problem Statement

Despite sustained humanitarian and governmental efforts to reduce poverty, household food insecurity remains a major challenge across East Africa. Conventional policy responses have prioritized food aid and income-support programs, yet evidence indicates that increases in household income do not consistently translate into improved food security [1]. This disconnect points to an important knowledge gap regarding the role of human capital – particularly financial management skills – in converting available household resources into improved food security outcomes.

In Hargeisa, households operate within complex financial environments characterized by unstable business income, dependence on mobile money systems, and irregular remittance flows [6]. Local studies conducted between 2023 and 2026 suggest that limited financial literacy contributes to poor budgeting, ineffective debt management, and weak food-purchasing decisions, thereby increasing household vulnerability to food insecurity [7]. However, localized empirical research examining how financial knowledge, behavior, and attitude jointly influence food security outcomes in Somaliland has remained limited, leaving policymakers and development organizations without sufficient evidence to integrate financial education into nutrition and social protection programming [2].

1.3 Research Gap

Existing research leaves three specific gaps unaddressed. First, studies on food insecurity in Somalia and Somaliland have concentrated almost exclusively on macro-level and humanitarian drivers – drought, displacement, unemployment, and income poverty [8, 9] – while treating household financial behavior as a peripheral, largely unmeasured factor rather than a testable determinant of food access.

Second, where financial literacy has been examined in relation to household welfare in Sub-Saharan Africa, studies have generally relied on small, purposive, or qualitative samples of fewer than 1,000 respondents [10, 11]. This leaves the financial literacy–food security association statistically underpowered and difficult to generalize to a rapidly urbanizing, mobile-money-dependent economy such as Hargeisa, where 63.2% of households now hold an active bank account and financial behavior is evolving quickly.

Third, and most critically, no known study has disaggregated financial literacy into its component dimensions – financial knowledge, financial behavior, and financial attitude – and tested each dimension's independent, multivariable association with a validated food insecurity indicator while simultaneously controlling for income, education, household size, and subjective financial stress. This

omission leaves policymakers unable to determine which specific dimension of financial literacy should be prioritized when designing interventions: whether to invest in financial education (knowledge), behavior-change programming (budgeting and saving), or attitudinal messaging around future planning.

This gap is compounded by an unexamined paradox in the local context: high formal educational attainment coexists with low practical financial literacy. As this study shows, 52.8% of respondents held university-level education, yet 73.0% were classified as having low financial literacy – a divergence that, to our knowledge, has not been empirically documented for Somaliland and that challenges the assumption that formal schooling alone equips individuals with practical money-management capability.

The present study addresses these gaps using a large-scale (N = 5,762), stratified multistage cluster survey and multivariable binary logistic regression to isolate the net contribution of financial literacy and its behavioral components to household food insecurity in Hargeisa, net of income, education, household size, and financial stress.

1.4 Objectives, Hypotheses, and Research Questions

General objective: To examine the association between financial literacy and household food insecurity among households in Hargeisa, Somaliland.

Specific objectives: (1) to evaluate the level of financial literacy among households in Hargeisa; (2) to measure the prevalence of household food insecurity in Hargeisa; and (3) to analyze the effect of financial literacy on household food insecurity, net of relevant socioeconomic controls.

Hypotheses:

H_0 (Null): There is no statistically significant relationship between financial literacy and household food insecurity among households in Hargeisa, Somaliland.

H_1 (Alternative): There is a statistically significant relationship between financial literacy and household food insecurity among households in Hargeisa, Somaliland.

Research questions:

1. What is the current level of financial literacy – in terms of budgeting knowledge, saving behavior, and debt management – among household heads in Hargeisa?
2. What is the prevalence and severity of household food insecurity in Hargeisa, as measured through a validated food insecurity indicator?
3. How do the key dimensions of financial literacy – knowledge, behavior, and attitude – influence household food security status in Hargeisa, net of income, education, and household size?

2. Literature Review

2.1 Theoretical Perspectives on Financial Literacy and Food Insecurity

Financial literacy is widely recognized as an important factor shaping household welfare, consumption behavior, and economic resilience. The OECD [12] defines financial literacy as the knowledge, attitudes, and behaviors that enable individuals to make effective financial decisions and improve financial well-being, commonly encompassing budgeting, savings management, debt management, and financial planning. Lusardi and Mitchell [13] show that financially literate households are better able to manage expenditures, cope with economic shocks, and make informed consumption decisions than households with poor financial knowledge. Household Resource Management Theory further suggests that households draw on available knowledge and resources to satisfy essential needs such as food, shelter, and healthcare, implying that households with stronger financial management skills should allocate resources more efficiently and sustain better food consumption patterns.

Food insecurity remains a major socioeconomic and public health challenge globally and particularly in the Horn of Africa. The FAO [14] defines food insecurity as the lack of consistent physical, social, and economic access to adequate, safe, and nutritious food required for healthy living, commonly understood through four dimensions: availability, access, utilization, and stability. In Somalia and Somaliland, food insecurity has been associated with poverty, drought, unemployment, inflation, displacement, and dependence on imported food commodities [8].

2.2 Empirical Evidence

Empirical studies in developing countries indicate that financial literacy may positively influence household food security by improving budgeting practices, savings behavior, and expenditure planning. Anson and Greencare [10] found that financially literate households in Ghana demonstrated better expenditure management and welfare outcomes, while Miller et al. [11] reported that financial education improved household resilience and consumption management during economic shocks. Similarly, Amirah Taurasi et al. [20] found that financial literacy was significantly associated with reduced food insecurity across a multi-country African sample, reinforcing the plausibility of this relationship beyond isolated case studies. These findings suggest that financial literacy may support food security by helping households prioritize food expenditure, manage limited income, and reduce financial vulnerability – though, as noted in Section 1.3, this evidence base remains thin, geographically narrow, and rarely tested with the statistical power or component-level detail applied in the present study.

3. Conceptual Framework

The conceptual framework guiding this study, illustrated in Fig. 1, draws on Human Capital Theory [15] and the food security framework developed by the FAO [16]. The framework proposes that higher levels of financial literacy improve household financial outcomes – such as emergency savings and effective

budgeting – which in turn reduce the likelihood of a household experiencing food insecurity, net of household income, education level, and household size.

3.1 Variable Definitions

Independent variable – financial literacy: Following Lusardi and Mitchell [13], financial literacy was operationalized across three dimensions: financial knowledge (understanding of inflation, interest rates, and purchasing power); financial behavior (practices such as keeping a monthly budget and avoiding high-interest informal debt); and financial attitude (the household head's orientation toward saving for future shocks versus immediate consumption).

Dependent variable – household food insecurity: Following the Household Food Insecurity Access Scale (HFIAS) [17], household food insecurity was measured using a single indicator derived from the survey question: "In the past 30 days, did anyone in your household skip meals because there was not enough money for food?" This variable captures the insufficient-quantity dimension of food insecurity. Households reporting that at least one member skipped meals due to lack of money for food were classified as food insecure; others were classified as food secure.

Control variables: household income level (the primary driver of purchasing power); household size (larger households face greater competition for limited resources); education level of the household head (correlated with both literacy and earning potential); employment status; demographic characteristics (age and gender of the household head); and location within Hargeisa.

4. Materials and Methods

4.1 Study Design

This study adopted a quantitative cross-sectional research design [21] to investigate the relationship between financial literacy and household food insecurity in Hargeisa, Somaliland. The cross-sectional design was appropriate as it enabled data collection from participants at a single point in time and facilitated efficient analysis of relationships among variables; this design is commonly applied in social science research owing to its cost-effectiveness and its capacity to reflect real-world conditions [25].

4.2 Data Source

Primary data were obtained through structured questionnaires administered to households in Hargeisa. The questionnaire was organized into three sections: (i) demographic characteristics, including age, gender, education level, income, and employment status; (ii) financial literacy, covering knowledge, attitudes, and behaviors; and (iii) household food insecurity status.

4.3 Sample Size Determination

The sample size was determined using the standard formula for proportion-based studies, accounting for the desired confidence level and statistical power:

$n = (Z\alpha/2 + Z\beta)^2 \, p(1 - p) / d^2$

where n is the required sample size; Zα/2 is the standard normal deviate for a 95% confidence level (1.96); Zβ is the standard normal deviate for 80% statistical power (1.2816); p is the assumed population proportion (0.50); and d is the margin of error (0.05). This yielded a base estimate of n = 1,050.7, which was adjusted for a design effect (DEFF) of 3.0 and an expected 30% non-response rate to give a minimum required sample of 4,500. A final achieved sample of 5,762 respondents was obtained through stratified multistage urban cluster sampling across business centers, commercial zones, and SME clusters in Hargeisa (Table 1), exceeding the minimum requirement and strengthening the statistical power of the analysis.

Table 1
Sample Size and Sampling Strategy

Confidence & Power	Assumed Proportion (p)	DEFF	Non-response	Minimum Required Sample	Final Achieved Sample	Sampling Strategy
95% confidence, 80% power	50%	3.0	30%	4,500	5,762	Stratified multistage urban cluster sampling across business centers, commercial zones, and SME clusters

4.4 Variables and Measurement

Financial literacy served as the primary independent variable and was analyzed as a composite index derived from structured items measuring financial knowledge, financial behavior, and financial attitude (Section 3.3). Household food insecurity, the dependent variable, was operationalized using the HFIAS-based single indicator described above (Table 4), consistent with established guidelines for constructing welfare and consumption-based indicators in household survey research [22]. To isolate the net effect of financial literacy, the study controlled for household income, education level of the household head, household size, employment status, demographic characteristics (age and gender), and location.

4.5 Statistical Model

To examine the relationship between financial literacy and household food insecurity, a binary logistic regression model was applied, appropriate given the binary nature of the dependent variable [24]:

$Food\ insecurity = \beta_0 + \beta_1(Financial\ Literacy) + \beta_2(Income) + \beta_3(Education) + \beta_4(Household\ size) + \varepsilon$

where β_0 is the intercept, β_1–β_4 are the coefficients of the explanatory variables, and ε is the error term.

4.6 Data Analysis Plan

Data analysis was conducted using SPSS [23] and proceeded through descriptive analysis (frequencies, percentages, means, and standard deviations), followed by inferential analysis comprising Pearson chi-square tests of association, Pearson product-moment correlation analysis, and multivariable binary logistic regression to assess the independent effect of financial literacy on household food insecurity.

4.7 Validity, Reliability, and Ethical Considerations

The survey instrument was developed from recognized tools, including the OECD Financial Literacy Questionnaire and the HFIAS, and its content validity was evaluated through expert consultation and a pilot study. Internal consistency was assessed using Cronbach's alpha, with a coefficient of 0.70 or higher considered satisfactory. Ethical approval and informed consent were obtained from all respondents; participation was voluntary, anonymity and confidentiality were maintained, and respondents retained the right to withdraw at any time (see Declarations).

5. Results

5.1 Demographic Characteristics of Respondents

Table 2 presents the demographic and socioeconomic characteristics of the 5,762 respondents. The sample was predominantly young, with 68.9% aged 18–32 years and 23.7% aged 33–47 years; only 7.5% were aged 48 years and above. Males constituted 68.4% of respondents and females 31.6%. Most respondents were single (59.0%), followed by married (37.5%); divorced (2.5%) and widowed (1.1%) respondents made up a small share of the sample.

Educational attainment was relatively high: 52.8% had completed university education and 24.2% secondary education, with smaller shares reporting primary education (8.9%), Qur'anic education (5.9%), vocational/college education (3.7%), or no formal education (4.6%). Business owners were the largest employment group (45.6%), followed by employed respondents (36.7%) and the self-employed (14.8%); students (1.5%), the unemployed (1.1%), and retirees (0.2%) made up small shares. Business activity was the primary income source for 58.7% of respondents, and salaries for 38.3%; other sources (agriculture, casual labor, remittances) accounted for under 3% combined. The large majority of respondents (93.8%) earned between $50 and $2,100 per month, indicating that most fall within lower-income categories, and 63.2% held an active bank account.

Table 2. Demographic and Socioeconomic Characteristics of Respondents (N = 5,762)

Variable	Category	Count	Column N %
Age group	18–32	3,968	68.9%
	33–47	1,367	23.7%
	48–62	374	6.5%
	63–77	44	0.8%
	78–92	9	0.2%
Gender	Male	3,940	68.4%
	Female	1,822	31.6%
Marital status	Single	3,401	59.0%
	Married	2,158	37.5%
	Divorced	142	2.5%
	Widowed	61	1.1%
Education level	None	264	4.6%
	Qur’anic	340	5.9%
	Primary	510	8.9%
	Secondary	1,397	24.2%
	Vocational/College	211	3.7%
	University	3,040	52.8%
Employment status	Employed	2,117	36.7%
	Self-employed	855	14.8%
	Unemployed	64	1.1%
	Student	89	1.5%
	Retired	10	0.2%
	Business owner	2,627	45.6%
Main income source	Salary	2,205	38.3%
	Business	3,382	58.7%
	Agriculture	21	0.4%
	Casual labor	28	0.5%
	Remittances	19	0.3%

Variable	Category	Count	Column N %
	Other	107	1.9%
Monthly income	$50–$2,100	5,406	93.8%
	$2,101–$4,150	226	3.9%
	$4,151–$6,200	88	1.5%
	$6,201–$8,250	30	0.5%
	$8,251–$10,300	11	0.2%
	≥10,301	1	0.0%
Active bank account	Yes	3,640	63.2%
	No	2,122	36.8%

5.2 Financial Literacy Variable Description

Table 3 presents the financial literacy variables and their coding. Most items – household budgeting, savings behavior, active bank account ownership, and emergency savings – are binary indicators (Yes = 1, No = 0) capturing key dimensions of financial practice and inclusion. Household budgeting reflects whether respondents actively plan and manage income and expenditure, savings behavior indicates whether individuals regularly set money aside, active bank account ownership measures formal financial inclusion, and emergency savings captures the capacity to absorb financial shocks. In addition, a continuous financial literacy score was constructed to capture variation in overall financial capability beyond simple binary responses.

Table 3. Financial Literacy Variables: Description and Coding

Variable	Coding
Household Budgeting	Yes = 1, No = 0
Savings Behavior	Yes = 1, No = 0
Active Bank Account	Yes = 1, No = 0
Emergency Savings	Yes = 1, No = 0
Financial Literacy Score	Continuous

5.3 Food Insecurity Indicators

Table 4 summarizes the food insecurity indicators. Meal skipping (a binary indicator, Yes = 1/No = 0) captures a direct behavioral response to inadequate food access. The ability to meet basic needs is measured on a four-point Likert scale from 1 (“Always”) to 4 (“Never”), with higher scores reflecting greater difficulty meeting essential needs. Financial stress category is an ordinal variable (low, moderate, high) capturing perceived economic pressure. Food insecurity status, the primary dependent variable, is a derived binary outcome (1 = food insecure, 0 = food secure) summarizing overall food security condition.

Table 4. Food Insecurity Indicators: Description and Coding

Variable	Description	Coding
Meal Skipping	Q79	Yes = 1, No = 0
Ability to Meet Basic Needs	Q78	1 = Always to 4 = Never
Financial Stress Category	Low, Moderate, High	Ordinal
Food Insecurity Status	Derived outcome variable	1 = Food insecure, 0 = Food secure

5.4 Descriptive Statistics

Table 5 presents descriptive statistics for key continuous variables. Respondents' mean age was 31.20 years (range 18–80), indicating a relatively young sample with moderate variation. Household size ranged from 1 to 22 members, with a mean of 7.70, indicating relatively large households. Monthly income ranged from $50 to $25,000, with a mean of $700.99, reflecting substantial income dispersion. The financial literacy score (measured for 5,517 valid respondents) ranged from 4 to 8, with a mean of 4.99, indicating moderate financial literacy on average. The financial shock score ranged from 0 to 6, with a mean of 1.03, indicating relatively few financial shocks on average, though with some variability.

Table 5. Descriptive Statistics of Continuous Study Variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Age (years)	5,762	18	80	31.20	9.334
Household Size	5,762	1.00	22.00	7.7000	3.26300
Monthly Income (USD)	5,762	50	25,000	700.99	1104.426
Financial Literacy Score	5,517	4	8	4.99	1.135
Financial Shock Score	5,762	0	6	1.03	1.133

5.5 Financial Literacy Score Categories

Table 6 presents the distribution of respondents by financial literacy score category. The majority of respondents fell within the low financial literacy category (69.9% of the total sample; 73.0% of valid responses). Respondents with moderate financial literacy made up 14.0% of the total sample (14.6% of valid responses), while those with high financial literacy accounted for 11.9% (12.5% of valid responses); cumulatively, 87.5% of respondents fell within the low-to-moderate categories. Financial literacy score data were missing for 4.3% of respondents (n = 245), reducing the valid sample for this variable to 5,517.

Table 6. Distribution of Respondents by Financial Literacy Score Category

Category	Frequency	Percent	Valid Percent	Cumulative Percent
Low literacy	4,025	69.9	73.0	73.0
Moderate literacy	805	14.0	14.6	87.5
High literacy	687	11.9	12.5	100.0
Total (valid)	5,517	95.7	100.0	–
System missing	245	4.3	–	–
Total	5,762	100.0	–	–

5.6 Bivariate Analysis

Table 7 presents bivariate associations between demographic, socioeconomic, and financial indicators and household food insecurity status, assessed using Pearson chi-square tests. Baseline demographics – gender ($\chi^2 = 4.957$, $p = 0.026$), marital status ($\chi^2 = 13.517$, $p = 0.004$), education ($\chi^2 = 18.732$, $p = 0.002$), and employment status ($\chi^2 = 12.317$, $p = 0.031$) – were all significantly associated with food insecurity. Notably, nominal income category showed no statistically significant association ($\chi^2 = 5.217$, $p = 0.390$). By contrast, core financial literacy indicators were strongly associated with food insecurity: bank account ownership ($\chi^2 = 103.517$, $p < 0.001$), emergency savings access ($\chi^2 = 43.270$, $p < 0.001$), and financial literacy category ($\chi^2 = 94.249$, $p < 0.001$). The strongest association was observed for subjective financial stress category ($\chi^2 = 196.254$, $p < 0.001$).

Table 7. Bivariate Associations Between Study Variables and Food Insecurity Status (Chi-Square Test Results)

Variable	χ^2	df	p-value
Gender	4.957	1	0.026
Marital Status	13.517	3	0.004
Education	18.732	5	0.002
Employment Status	12.317	5	0.031
Income Category	5.217	5	0.390
Bank Account	103.517	1	<0.001
Emergency Savings	43.270	1	<0.001
Financial Literacy Category	94.249	2	<0.001
Financial Stress Category	196.254	2	<0.001

5.7 Correlation Matrix of Study Variables

Table 8 presents Pearson correlations among continuous study variables. Age and monthly income were strongly and positively correlated ($r = 0.800$, $p < 0.01$), while both showed weak negative associations with formal educational attainment. Financial literacy score showed a prominent, highly significant positive relationship with proactive saving behavior ($r = 0.692$, $p < 0.01$) and negative correlations with the household coping strategy index ($r = -0.117$, $p < 0.01$) and perceived financial stress ($r = -0.108$, $p < 0.01$). The correlation between the coping strategy index and financial stress was exceptionally high ($r = 0.920$, $p < 0.01$), signaling potential multicollinearity between these two measures; this was addressed in the regression model by including financial stress category rather than both overlapping measures.

Table 8. Pearson Correlation Matrix of Continuous Study Variables

Variable	1	2	3	4	5	6	7	8
1. Age	1							
2. Monthly Income	.800**	1						
3. Household Size	.059**	.089**	1					
4. Financial Literacy Score	−.060**	−0.019	0.013	1				
5. Coping Strategy Index	.027*	0.015	0.002	−.117**	1			
6. Financial Stress	0.023	0.013	−0.002	−.108**	.920**	1		
7. Education Level	−.311**	−.262**	−.035**	−.260**	.030*	0.016	1	
8. Savings Behavior	.034*	.033*	0.007	.692**	−.073**	−.066**	−.170**	1

*Note: Values are Pearson correlation coefficients. *p < 0.05; **p < 0.01.*

5.8 Binary Logistic Regression Results

Table 9 presents results of the multivariable binary logistic regression estimating the adjusted net effects of predictors on household food insecurity. A one-unit increase in the continuous financial literacy score reduced the odds of food insecurity by 40.2% (AOR = 0.598, 95% CI: 0.543–0.659, p < 0.001). Proactive saving behavior was also a strong protective factor, lowering the odds of food insecurity by 46.6% (AOR = 0.534, 95% CI: 0.426–0.670, p < 0.001). Households reporting no financial stress (AOR = 0.216, p < 0.001) and moderate financial stress (AOR = 0.694, p = 0.048) were, respectively, 78.4% and 30.6% less likely to be food insecure than households reporting high financial stress. Regarding education, vocational/college graduates were 42.3% more likely to experience food insecurity than university graduates (AOR = 1.423, p = 0.038). Age, monthly income, household size, and the coping strategy index showed no statistically significant net effects once financial literacy and financial stress were accounted for.

Table 9. Binary Logistic Regression Results for Predictors of Household Food Insecurity

Variable	B	SE	Wald χ²	p-value	AOR (Exp(B))	95% CI
Age (years)	−0.001	0.007	0.033	0.855	0.999	0.985–1.013
Monthly Income (USD)	0.000	0.000	1.084	0.298	1.000	1.000–1.000
Household Size	−0.009	0.010	0.802	0.370	0.991	0.971–1.011
Financial Literacy Score	−0.514	0.049	109.125	<0.001***	0.598	0.543–0.659
Coping Strategy Index	−0.124	0.075	2.735	0.098	0.883	0.762–1.023
Financial Stress: No Stress vs High (Ref.)	−1.534	0.279	30.178	<0.001***	0.216	0.125–0.373
Financial Stress: Moderate vs High (Ref.)	−0.366	0.185	3.900	0.048*	0.694	0.483–0.997
Education: None vs University (Ref.)	0.120	0.182	0.430	0.512	1.127	0.788–1.611
Education: Qur'anic vs University (Ref.)	0.179	0.158	1.280	0.258	1.196	0.877–1.631
Education: Primary vs University (Ref.)	−0.197	0.139	2.005	0.157	0.821	0.625–1.079
Education: Secondary vs University (Ref.)	0.070	0.084	0.695	0.405	1.072	0.910–1.263
Education: Vocational/College vs University (Ref.)	0.353	0.170	4.310	0.038*	1.423	1.020–1.984
Saved Money in Last 12 Months (Yes vs No, Ref.)	−0.627	0.116	29.368	<0.001***	0.534	0.426–0.670

5.9 Model Fit Statistics

Table 10 summarizes model fit diagnostics. Of 5,762 records, 5,517 valid observations were retained for the regression; 245 observations (4.3%) had missing financial literacy scores and were excluded via listwise deletion, a proportion below the 5% threshold generally considered unlikely to materially affect validity. The Omnibus Test of Model Coefficients was highly significant ($\chi^2(13) = 360.947$, $p < 0.001$), confirming that the combined predictors substantially outperformed an intercept-only baseline. The non-significant Hosmer–Lemeshow test ($\chi^2 = 11.33$, $df = 8$, $p = 0.184$) indicated good calibration between predicted and observed outcomes. Pseudo-R^2 values ranged from 0.063 (Cox & Snell) to approximately 0.098 (Nagelkerke), and the model achieved an overall classification accuracy of 78.5%.

Table 10. Model Fit Statistics for the Binary Logistic Regression Model

Model Fit Indicator	Value
Number of Observations (N)	5,517
Missing Cases	245 (4.3%)
Omnibus Test of Model Coefficients, $\chi^2(13)$	360.947***
Hosmer–Lemeshow χ^2 (df = 8)	11.33
Hosmer–Lemeshow p-value	0.184
−2 Log Likelihood	5384.508
Cox & Snell R^2	0.063
Nagelkerke R^2	0.098
Overall Classification Accuracy	78.5%

6. Discussion

This study examined the socio-demographic and financial drivers of household food insecurity using a large, statistically powered sample (N = 5,762) from Hargeisa, Somaliland. The demographic profile – predominantly young, male, single, and highly educated, with most respondents engaged in business activity and concentrated in the lowest income bracket ($50–$2,100 per month) – depicts a dynamic urban population that nonetheless remains financially vulnerable, consistent with broader patterns of youth-driven informal entrepreneurship in urban East Africa.

6.1 The Financial Literacy Paradox

A central and previously undocumented finding is the financial literacy paradox in Hargeisa: despite 52.8% of respondents holding university-level education, 73.0% of the valid sample was classified as having low financial literacy. This pattern indicates that formal schooling does not automatically confer practical money-management, budgeting, or saving skills, directly addressing the third gap identified in Section 1.3 and suggesting that financial education must be delivered as a distinct, targeted intervention rather than assumed as a by-product of general schooling.

6.2 Bivariate Associations

The chi-square results reinforce this interpretation. Financial stress category, bank account ownership, and financial literacy category were all strongly associated with food insecurity ($p < 0.001$), while nominal income category was not significantly associated with food security status ($p = 0.390$). This divergence suggests that how households manage and allocate money is more consequential for food security than

the sheer volume of income received – a finding that echoes but substantially extends prior Sub-Saharan African evidence [10, 11], which was based on smaller and less statistically powered samples.

6.4 Net Predictors of Food Insecurity

The logistic regression results provide the study's central evidence and directly address the second gap identified in Section 1.3 by isolating the net, independent contribution of financial literacy from income, education, household size, and financial stress in a single, adequately powered model. Financial literacy score (AOR = 0.598, $p < 0.001$) and saving behavior (AOR = 0.534, $p < 0.001$) emerged as the strongest protective predictors of food security, while subjective financial stress showed a strong graded association with food insecurity. These findings support the alternative hypothesis (H_1) and indicate that financial literacy and disciplined saving behavior function as structural interventions that can shield households from food insecurity, independent of income level.

6.5 Model Robustness

Model fit diagnostics confirm the reliability of these conclusions: the omnibus test ($\chi^2(13) = 360.947$, $p < 0.001$) and non-significant Hosmer–Lemeshow test ($p = 0.184$) indicate that the model fits the data well, and a classification accuracy of 78.5% indicates strong predictive utility, providing a sound empirical basis for the policy recommendations that follow.

7. Conclusion and Recommendations

7.1 Conclusion

This study examined the association between financial literacy and household food insecurity in Hargeisa, Somaliland, using a large-scale primary survey and multivariable logistic regression. The findings show that financial literacy – encompassing financial knowledge, behavior, and attitude – is a significant, independent determinant of household food security, net of income, education, and household size. Households with stronger financial knowledge, better budgeting practices, and consistent saving behavior were significantly less likely to experience food insecurity, while nominal income alone was not a significant predictor.

These results indicate that food insecurity in Hargeisa cannot be addressed through income-focused interventions alone. Because household financial behavior shapes how limited resources are used, improving financial literacy can complement broader efforts to reduce hunger and improve nutrition. Financial literacy should therefore be viewed not only as a personal finance skill, but as a practical tool for strengthening household resilience and welfare, and interventions aimed at improving household welfare should combine economic support with financial education and practical money-management training.

7.2 Recommendations

Government institutions and local authorities should integrate financial literacy programs into community development and household welfare initiatives, particularly in urban areas such as Hargeisa.

Non-governmental organizations and development partners should incorporate budgeting, saving, and debt-management training into food security and poverty-reduction programs.

Financial institutions and mobile money providers should design simple financial education campaigns addressing saving habits, spending discipline, and emergency planning.

Schools, universities, and vocational centers should strengthen financial education so that young people develop sound financial habits before assuming household decision-making roles – directly addressing the financial literacy paradox identified in this study.

Household heads should be encouraged to maintain basic budgets, set aside savings where possible, and prioritize essential food purchases during periods of economic pressure.

7.3 Policy Implications

These findings imply that food security policy in Somaliland should move beyond emergency food aid alone to address household financial capability. A combined strategy of financial education, income support, and nutrition-sensitive interventions is likely to be more effective in reducing household food insecurity than income-focused approaches alone. Policymakers should therefore recognize financial literacy as a development issue linked to welfare, resilience, and food access.

7.4 Limitations

This study has several limitations that should inform interpretation of the findings and future research. First, the cross-sectional design precludes causal inference; the direction of association between financial literacy and food insecurity cannot be firmly established, and reverse causality (for example, food-insecure households curtailing savings) cannot be ruled out. Second, food insecurity was operationalized using a single self-reported indicator (meal skipping) rather than the full multi-item HFIAS scale, which may understate the severity or multidimensionality of food insecurity. Third, self-reported financial behavior and food insecurity measures are subject to social-desirability and recall bias. Fourth, 4.3% of respondents had missing financial literacy scores, and although listwise deletion is unlikely to have materially biased the results given this modest proportion, it cannot be entirely excluded. Finally, as the study was confined to Hargeisa, generalization to rural Somaliland or other Horn of Africa contexts should be made cautiously.

7.5 Suggestions for Future Research

Future research should employ longitudinal or panel designs to test the temporal and potentially causal relationship between financial literacy and household food insecurity, and should apply the full multi-item HFIAS scale to capture the severity and multiple dimensions of food insecurity. Future studies could also examine which specific dimension of financial literacy – knowledge, behavior, or attitude – exerts the

strongest independent effect on food security, and extend this analysis to rural and peri-urban Somaliland populations to test the generalizability of the urban findings reported here.

Declarations

Ethics Approval Statement

This study involving human participants was reviewed and approved by the University of Hargeisa Institutional Research Ethics Committee (IREC), Hargeisa, Somaliland. All procedures performed in this study were conducted in accordance with the ethical principles of the Declaration of Helsinki and the institutional guidelines for research involving human participants. Written informed consent was obtained from all participants prior to their participation, and participation was voluntary. All data were collected anonymously, and participant confidentiality and privacy were strictly maintained throughout the study.

Ethics approval and consent to participate: This study was conducted with appropriate ethical approval from the University of Hargeisa, College of Business and Public Administration. Informed consent was obtained from all respondents prior to participation; participation was voluntary, respondent information was kept confidential, and no personal identifying information was disclosed. Respondents retained the right to withdraw at any time.

Consent for publication: Not applicable (no individual person's data, images, or identifying details are presented in this manuscript).

Availability of data and materials: The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests: The authors declare that they have no competing interests.

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Authors' contributions: M.A. conceived the study, led data analysis, and drafted the manuscript and N.A.A. contributed to data collection, questionnaire design, literature review, and manuscript revision. All authors read and approved the final manuscript.

Author Contribution

M.A. conceived and designed the study, developed the methodology, collected and curated the data, performed the statistical analyses, interpreted the results, prepared the figures and tables, and wrote the original manuscript draft. N.A.A. contributed to the study design and methodology, provided critical interpretation of the findings, reviewed and edited the manuscript, and supervised the research process.

Both authors read and approved the final manuscript and agree to be accountable for all aspects of the work.

Data Availability

Data is availabe upon formal request.

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Figures

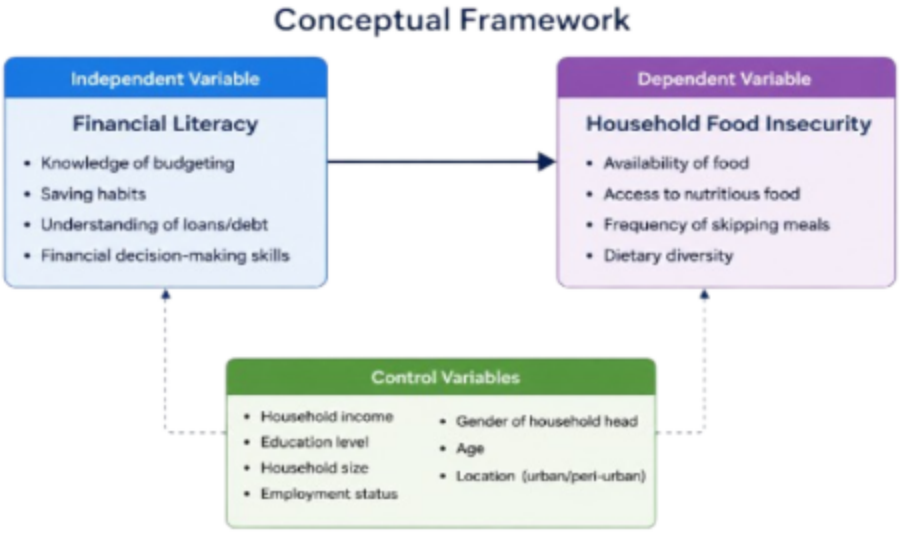


Figure 1

Conceptual framework: financial literacy, financial outcomes, and household food insecurity.