



NUTRITION LITERACY AND ITS INFLUENCE ON HEALTHY FOOD CHOICES AMONG RURAL FARMING FAMILIES IN SOUTH-SOUTH NIGERIA

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ABSTRACT

The study examined the nutrition literacy and its influence on healthy food choices among rural farming families in South-South Nigeria. Specifically, it determined the level of nutrition literacy, identified the types and frequency of healthy food choices and examined the relationship between nutrition literacy and healthy food choices. A multistage sampling technique was used to select 360 household heads across 12 rural communities in Akwa Ibom, Delta, and Rivers States. Data were collected using a structured questionnaire incorporating the validated Nutrition Literacy Instrument (NLit) and a food frequency questionnaire to compute the Healthy Food Choice Index (HFCI). Descriptive statistics showed that nutrition literacy was generally moderate (mean NLit = 24.6 ± 5.8), with 28.3% of households exhibiting low literacy, 49.4% moderate, and 22.3% high literacy. Consumption of healthy foods was uneven: whole grains/tubers were most frequently consumed (4.1 ± 1.6 servings/week), while dairy and legumes were least consumed. HFCI scores indicated moderate adherence to healthy diets (mean HFCI = 10.2 ± 3.2). Correlation analysis revealed a positive moderate relationship between nutrition literacy and healthy food choices ($r = 0.48, p < 0.001$), and multiple linear regression identified nutrition literacy ($\beta = 0.42, p < 0.001$) and education level ($\beta = 0.15, p < 0.001$) as significant predictors of dietary quality. The study concludes that nutrition literacy critically shapes food choices among rural farming families. It recommends community-based nutrition education programs, practical skill-building in food label interpretation and portion control, promotion of dietary diversity, integration of nutrition literacy into agricultural extension services, targeted support for low-literacy households, and policy measures to improve access to nutrient-rich foods to enhance dietary quality and health outcomes.

Keywords: Nutrition literacy, Healthy food choices, Rural farming households, Dietary behaviour, South-South Nigeria

INTRODUCTION

Nutrition literacy has increasingly emerged as a critical determinant of individuals' capacity to make informed and healthy food choices in both developed and developing countries. It encompasses the knowledge, skills, and competencies required to access, understand, interpret, and apply nutrition information for better dietary decisions (Silva, 2023; Silva,

Lopes, and Ray, 2023). As global attention shifts towards preventive health and nutrition-sensitive lifestyles, scholars argue that nutrition literacy significantly influences individuals' ability to choose balanced diets, interpret food labels, understand nutrient functions, and adopt sustainable eating behaviours (Lisciani, Camilli, and Marconi, 2024; Omokhabi, Omokhabi, and Olajide, 2024). Evidence shows

that nutrition literacy contributes to improved diet quality, healthy eating habits, and reduced risk of non-communicable diseases, underscoring its relevance for vulnerable and food-insecure populations (Maurya and Verma, 2025; Agurs-Collins *et al.*, 2024).

Healthy food choices, on the other hand, involve the selection of nutrient-dense foods that promote overall health and prevent malnutrition and diet-related diseases (Open RN, 2025). Research has consistently linked healthy eating habits to better physiological functioning, enhanced cognitive performance, and improved productivity among individuals and households (Doustmohammadian, Omidvar and Keshavarz-Mohammadi, 2022; Mancone *et al.*, 2024). For rural populations, whose livelihoods are closely tied to agriculture and manual labour, the ability to make healthy dietary choices is especially essential for maintaining well-being and sustaining work efficiency. Yet, food choices are shaped not only by availability and affordability but also by nutrition knowledge, attitudes, cultural practices, and the ability to translate dietary information into daily behaviour (Gastón, *et al.*, 2024; Meludu, Adeloye, and Abolade, 2021).

Empirical studies further demonstrate that nutrition literacy is significantly associated with diet quality and healthy food choices across diverse population groups. For instance, a study in Eastern Uganda found that higher nutrition literacy scores were strongly linked with better dietary quality among adolescents and young adults (Buyinza, Buzigi and Bukenya, 2025). Similar findings from Türkiye showed that individuals with adequate nutrition literacy demonstrated superior diet quality and improved quality of life (Alpat, Guney-Coskun, Saleki, Sezer, and Keskin, 2024). Collectively, these studies reinforce that enhancing nutrition literacy is a key pathway for improving dietary behaviour and promoting public health.

Despite growing global literature, the contextual realities in African rural settings, where malnutrition, food insecurity, and poor dietary diversification remain persistent, make nutrition literacy particularly significant. Several studies highlight that nutrition knowledge gaps continue to hinder households' ability to make informed food choices even when food resources are available (Achinihu, Mbah, and Obi-Anyanwu, 2016; Elum, Ihunwo, and Oyita, 2024). In addition, broader food system challenges such as limited access to nutrition education, fluctuating food prices, environmental instability, and inadequate rural health communication systems exacerbate poor dietary behaviours (Ariyo, 2025; Matemilola and Elegbede, 2017; Amao, Ogunniyi, Mavrotas, and Omotayo, 2023).

In South-South Nigeria, these concerns are more pronounced due to recurrent issues such as limited nutrition awareness, reliance on monotonous staple-based diets, and poor dietary diversity among farming households. Although farmers are primary producers of food, studies show that rural households in southern Nigeria often face nutritional challenges resulting from low dietary knowledge, socio-economic constraints, and limited exposure to nutrition information (Bakare, Uchendu, Omotayo, and King, 2023; Ukonu, Wallace and Lowe, 2024; Yaqoob, Muhammad, Kabir and Adeola, 2022). Consequences include increased malnutrition risks, reduced productivity, vulnerability to illnesses, and diminished quality of life. Yet, despite these realities, few empirical studies have directly examined how nutrition literacy influences healthy food choices among rural farming families in South-South Nigeria.

Existing studies have predominantly focused on food security (Uko, Inyang and Uloh, 2025; Egbetokun and Fraser, 2020), agricultural productivity and livelihoods (Ibok, Ekanem, and Umoh, 2015; Okorie, Ekanem, and Okoro,

2020; Ekanem and Uloh, 2025), feeding practices among children (Bakare *et al.*, 2023), and household nutrition status (Achinihu *et al.*, 2016), without specifically exploring how nutrition literacy predicts the nature and frequency of healthy food choices within farming contexts. Studies such as those by Meludu *et al.* (2021) on food preferences and Elum *et al.* (2024) on food and nutrition security have provided useful insights but have not addressed the direct link between nutrition literacy and healthy dietary behaviour among rural farming households. Similarly, while international evidence establishes nutrition literacy as a strong driver of diet quality (Buyinza *et al.*, 2025; Alpat *et al.*, 2024), there remains a critical gap in localized empirical data for South-South Nigeria.

Failure to address these gaps may perpetuate poor dietary habits, reduced household nutrition outcomes, and increased susceptibility to nutrition-related illnesses among rural farming families. More importantly, low nutrition literacy may undermine national and regional efforts towards improving public health, food security, and sustainable agricultural development. Therefore, understanding the level of nutrition literacy among rural farming families and how it shapes their food choices is essential for designing context-specific nutrition education interventions and rural health communication strategies. This study seeks to fill this gap by examining the influence of nutrition literacy on healthy food choices among rural farming families in South-South Nigeria.

Objectives of the Study

The broad objective of this study was to examine the influence of nutrition literacy on healthy food choices among rural farming families in South-South Nigeria. The specific objectives were to:

- i. determine the level of nutrition literacy among rural farming families in South-South Nigeria;
- ii. identify the types and frequency of healthy food choices practiced by rural farming households;
- iii. examine the relationship between nutrition literacy and healthy food choices among rural farming families.

Methodology

1. Study Area

The study was carried out in the South-South geopolitical zone of Nigeria, an agriculturally endowed region comprising Akwa Ibom, Bayelsa, Cross River, Delta, Edo, and Rivers States. The zone is characterized by high agricultural activity, diverse food systems, and a predominantly rural population whose nutrition behaviours make it a suitable context for examining the influence of nutrition literacy on healthy food choices (Asanwan and Uloh, 2025; Uloh, 2025).

2. Study Population

The study population consisted of rural farming households across the zone. These households were selected because they are directly involved in food production and household food decision-making, providing relevant insights into nutrition literacy and food choices.

3. Sampling Procedure and Sample Size

A multistage sampling technique was employed to ensure broad representativeness. First, three states, Akwa Ibom, Delta, and Rivers, were randomly selected from the six states in the zone to minimize sampling bias and enhance generalizability. From each selected state, two Local Government Areas (LGAs) were randomly chosen, followed by the purposive selection of two rural communities from each

LGA based on their predominance of active farming households. This produced a total of 12 rural communities. From each community, 30 household heads were systematically selected, giving a sample size of 360 respondents. The decision to select 360 participants is justified by similar agricultural and nutrition-related studies within Nigeria that have effectively used sample sizes between 300 and 400 to achieve adequate statistical power and robust inferential validity (e.g., Akpan, Michael, Ekanem, and Nkeme, 2023; Ekanem and Akpan, 2018; Uko *et al.*, 2025; Obinaju, Benson, Esau, and Uloh, 2025). Studies on nutrition literacy in Africa, such as Buyinza *et al.* (2025), also applied similar sample sizes, further supporting the adequacy of the chosen sample for multivariate analysis.

4. Instrument for Data Collection

Primary data were collected using a structured questionnaire deployed through the Open Data Kit (ODK) platform to ensure accuracy, completeness, and efficient data management. The questionnaire captured demographic characteristics, nutrition literacy using the validated NLit instrument, and healthy food choice behaviours through an adapted food frequency questionnaire (FFQ).

5. Method of Data Analysis

Data were analyzed using both descriptive and inferential statistics, including frequency counts, percentages, means, correlations, ANOVA, and Multiple Linear Regression (MLR). MLR was employed because the key objective required estimating the predictive influence of nutrition literacy on the Healthy Food Choice Index (HFCI) while controlling for socioeconomic covariates. The technique is appropriate when the dependent variable is continuous and the aim is to assess the independent contribution of multiple predictors. Prior to estimation, the assumptions for MLR, linearity, independence of errors, normality of

residuals, homoscedasticity, and absence of multicollinearity were assessed and met. Linearity was confirmed through scatterplots, normality through residual histograms and Shapiro–Wilk tests, homoscedasticity via Breusch–Pagan tests, and multicollinearity through variance inflation factors ($VIF < 10$), indicating that the model was suitable for the data.

6. Model Specification

The regression model specified HFCI as the dependent variable and nutrition literacy as the main predictor, with age, education level, household income, household size, and farm size included as covariates. These explanatory variables were selected based on empirical evidence showing that demographic and socioeconomic factors influence dietary behaviour and food choice quality among rural households (e.g., Elum *et al.*, 2024; Funke, Akanbi, Kikelomo, Faruq, and Abdulazeez, 2024; Egbetokun and Fraser, 2020; Ukonu *et al.*, 2024). Education is widely linked to health and nutrition decision-making, household income affects the affordability of nutritious foods, age influences dietary preferences, household size affects food allocation patterns, and farm size relates to agricultural production diversity and access to fresh foods.

The implicit form of the regression model is represented as:

$$HFCI = f(NLit, Age, Education, Income, Household Size, Farm Size)$$

The explicit form of the Multiple Linear Regression model is expressed as:

$$HFCI_i = \beta_0 + \beta_1 NLit_i + \beta_2 Age_i + \beta_3 Education_i + \beta_4 Income_i + \beta_5 HHSIZE_i + \beta_6 FarmSize_i + \varepsilon_i$$

Where $HFCI_i$ is the Healthy Food Choice Index score of the i th household, β_0 is the intercept, β_1 – β_6 are the regression coefficients for the predictor variables, and ε_i is the error term. The

model enabled the estimation of the unique effect of nutrition literacy on healthy food choices after accounting for relevant socioeconomic determinants, thereby aligning with the stated objectives of the study.

Results and Discussion

1. Level of Nutrition Literacy among Rural Farming Families

1.1 Reliability and Validity of NLit

Table 1 presents the reliability and validity indices of the Nutrition Literacy Instrument administered to 360 rural farming families. The internal consistency across the four domains ranged from $\alpha = 0.73$ to 0.80 , while the overall scale recorded $\alpha = 0.84$, indicating strong internal reliability. The KMO values (0.79 – 0.86) met the acceptable threshold for sampling adequacy, demonstrating suitability for factor analysis. Bartlett's Tests of Sphericity were significant across all domains ($p < 0.001$), confirming that the correlation matrices were factorable. Together, these results show that the NLit is a dependable and valid tool for assessing nutrition literacy in the study population (Table 1).

The reliability coefficients obtained for the NLit domains align with the performance of the instrument in earlier validation studies. Gibbs, Ellerbeck, Gajewski, Zhang, and Sullivan (2018) reported similar reliability levels when applying the NLit among adults with chronic disease, supporting its robustness across different populations. Comparable outcomes were also documented in cross-cultural validation studies such as the Italian NLit-IT (Vettori *et al.*, 2021) and the Brazilian NLit-Br

(Sarkis *et al.*, 2022), which strengthens the evidence that the NLit consistently maintains strong psychometric properties.

The suitability of the data for factor analysis, as reflected in acceptable KMO values and significant Bartlett's tests, mirrors the findings of Yan, Caihong, and Xuefeng (2023), who also observed strong factorability when applying a nutrition literacy scale among college students. These patterns suggest that respondents in the present study were able to engage meaningfully with the items, which may be linked to growing exposure to nutrition messages through formal and informal channels, as highlighted in studies exploring the increasing role of nutrition and food literacy initiatives (Silva, 2023; Hernandez, Gillis, Kevany, and Kirk, 2021).

The strong performance of the NLit in this rural Nigerian context may also be influenced by rising attention to nutrition communication and health-related extension services in parts of Nigeria, a trend similarly documented in research on nutritional information dissemination and public health communication (Fadairo and Akinbile, 2025; Silva *et al.*, 2023). These results therefore reinforce the applicability of the NLit for examining nutrition literacy within rural settings and among diverse population groups.



Table 1: Reliability and Validity of the Nutrition Literacy Instrument (NLit) (N = 360)

Domain	No. of Items	Cronbach's α	KMO	Bartlett's Test χ^2 (df)	p-value
Nutrition and Health	10	0.78	0.85	312.45 (45)	<0.001
Household Food Measurement	8	0.75	0.81	278.60 (28)	<0.001
Food Label and Numeracy	8	0.73	0.79	261.32 (28)	<0.001
Food Groups	12	0.80	0.86	345.10 (66)	<0.001
Overall NLit	38	0.84	0.87	1212.00 (167)	<0.001

Notes:

- KMO = Kaiser-Meyer-Olkin measure of sampling adequacy
- Bartlett's Test of Sphericity: significant $p < 0.05$ indicates factorability
- Cronbach's $\alpha \geq 0.70$ indicates acceptable internal consistency

1.2 Level of Nutrition Literacy

Table 2 summarizes the distribution of nutrition literacy levels among rural farming families in the study area. The mean overall NLit score was 24.6 ± 5.8 out of a possible 38, falling within the moderate range. Categorization of respondents shows that 28.3% had low nutrition literacy, 49.4% had moderate literacy, and 22.3% achieved high literacy levels.

Across domains, scores were highest for knowledge of food groups (7.7 ± 2.0) and nutrition and health (6.8 ± 2.1), while food label and numeracy skills recorded the lowest mean score (4.9 ± 1.5). This distribution suggests uneven development across nutrition literacy components within the population (Table 2).

The predominance of moderate nutrition literacy among respondents aligns with findings from other African and developing-country contexts where nutrition literacy tends to fall within the mid-range due to varying levels of exposure to nutrition education and limited access to structured nutrition information. Buyinza *et al.* (2025) similarly found moderate nutrition literacy among young people in rural Uganda, while Akinrinmade, Ogunba, Aluko,

and Adaralegbe (2024) reported comparable literacy patterns among mothers in southwestern Nigeria.

The high proportion of respondents with moderate literacy may be linked to informal learning from agricultural extension contacts, community health programmes, and increasing availability of nutrition content through local media, which has been emphasized in literature on food and nutrition literacy advancement (Silva, 2023; Silva *et al.*, 2023). However, the sizeable proportion with low literacy suggests persistent gaps that reflect broader challenges in rural nutrition education access, a concern documented in studies on rural food and nutrition security in Nigeria (Christabel, Peters, Otovwe, Browne, and Richard, 2024; Achinihu *et al.*, 2016).

The lower scores in the food label and numeracy domain are consistent with global evidence showing that numeracy-based nutrition skills typically lag behind conceptual knowledge of food groups and basic health–nutrition relationships. Similar trends have been observed in studies on food and nutrition literacy in adolescents and adults

(Mostafazadeh, Jafari, Mojebi, Nemati-Vakilabad, Mirzae, 2024; Mengi and Semerci, 2022). Limited use of packaged foods in rural farming households and low exposure to nutrition labels may contribute to this pattern.

The relatively stronger performance in food groups and nutrition–health knowledge may be linked to cultural familiarity with traditional food categories and experiential learning from farming activities, which has been highlighted

in research connecting agricultural livelihood practices with intuitive nutrition knowledge (Elum *et al.*, 2024). This distribution of literacy skills has implications for targeted interventions; improving numeracy-based nutrition literacy may enhance food choice decisions, consistent with evidence linking higher nutrition literacy with better diet quality (Alpat *et al.*, 2024; Doustmohammadian *et al.*, 2022).

Table 2: Level of Nutrition Literacy among Rural Farming Families (n = 360)

Nutrition Literacy Level	Mean Score $\pm$ SD	Score Range	F	%
Overall NLit Score	24.6 $\pm$ 5.8	8 – 38		
Categorized Levels				
Low (<50%)		0 – 18	102	28.3
Moderate (50–74%)		19 – 28	178	49.4
High ($\geq$ 75%)		29 – 38	80	22.3
Domain Scores (Mean $\pm$ SD)				
Nutrition and Health	6.8 $\pm$ 2.1	0 – 10		
Household Food Measurement	5.2 $\pm$ 1.6	0 – 8		
Food Label and Numeracy	4.9 $\pm$ 1.5	0 – 8		
Food Groups	7.7 $\pm$ 2.0	0 – 12		

Notes:

- Mean $\pm$ SD shows the central tendency and variability of scores
- Score ranges correspond to the maximum possible per domain
- Categorization: Low (<50%), Moderate (50–74%), High ($\geq$ 75%)

2. Types and Frequency of Healthy Food Choices

2.1 Consumption Patterns

Table 3 presents the frequency of consumption of key healthy food groups among rural farming households. Daily consumption was highest for whole grains/tubers (26.7%) and lowest for dairy products (6.7%). Green leafy vegetables and fruits were consumed daily by 13.3% and 20% of households, respectively. Fish and lean meat were consumed daily by 16.7%, while legumes such as beans and groundnuts were consumed daily by 10%. The mean weekly servings indicate that whole grains/tubers were the most regularly consumed (4.1 ± 1.6 servings/week), followed by fruits (3.2 ± 1.5)

and fish/lean meat (3.0 ± 1.4). Dairy products were the least consumed, averaging 1.9 ± 1.2 servings per week. These findings suggest variability in the adoption of healthy food practices, with staples such as grains and tubers dominating household diets, whereas protein-rich and micronutrient-dense foods like legumes, vegetables, and dairy were less frequently consumed.

The findings suggest that rural farming households rely heavily on staple foods, such as tubers and grains, while the intake of fruits, vegetables, legumes, and dairy is comparatively lower. This aligns with previous studies in Nigeria and similar contexts, which reported that staples form the bulk of rural diets due to

affordability, accessibility, and local production (Igbokwe, 2015; Adeyemi, Ibiyemi, Adeyemi, Taiwo, and Fasinasi, 2025; Ekerette and Sanusi, 2024). Moderate consumption of fruits and vegetables may reflect seasonal availability and limited knowledge of nutritional benefits (Sarfo, Pawelzik, and Keding, 2021; Darroudi, Soflaei, and Kamrani, 2025). The low intake of dairy and legumes may be attributed to cost constraints

and limited market access, consistent with findings by Kolliesuah, Olum, and Ongeng, (2023) and Bird, Iese, Des Combes, Alungo, and Wairiu (2023). These dietary patterns have implications for micronutrient intake and overall diet quality, indicating potential nutritional gaps despite adequate energy intake from staples.

Table 3: Frequency of Consumption of Healthy Food Groups among Rural Farming Families (n = 360)

Food Group	Daily n (%)	3–4 times/week n (%)	1–2 times/week n (%)	Rarely/Never n (%)	Mean Servings/Week ± SD
Fruits	72 (20.0)	108 (30.0)	126 (35.0)	54 (15.0)	3.2 ± 1.5
Vegetables (Green leafy)	48 (13.3)	120 (33.3)	138 (38.3)	54 (15.0)	2.9 ± 1.4
Legumes (Beans, Groundnuts)	36 (10.0)	108 (30.0)	156 (43.3)	60 (16.7)	2.6 ± 1.3
Fish / Lean Meat	60 (16.7)	132 (36.7)	120 (33.3)	48 (13.3)	3.0 ± 1.4
Whole Grains / Tubers	96 (26.7)	144 (40.0)	96 (26.7)	24 (6.7)	4.1 ± 1.6
Dairy Products	24 (6.7)	60 (16.7)	180 (50.0)	96 (26.7)	1.9 ± 1.2

Notes:

- Percentages are rounded to one decimal place.
- Mean servings/week derived from FFQ frequency categories.
- Shows variability and prevalence of consumption of healthy foods.

2.2 Healthy Food Choice Index (HFCI)

Table 4 summarizes the HFCI categorization. More than half of households (55.0%) were classified in the moderate category, indicating partial adherence to healthy dietary guidelines. About 23.3% achieved good dietary quality, while 21.7% had poor scores. The mean HFCI score was 10.2 ± 3.2 , reflecting the overall moderate quality of food choices among the sampled households. This demonstrates variability in adherence to recommended healthy food practices.

The predominance of moderate HFCI scores underscores a partial adoption of healthy eating behaviors among rural households, consistent with the findings of Uko *et al.* (2025) and

Egbetokun and Fraser (2020), who reported similar dietary diversity constraints in rural Nigerian communities. Socioeconomic factors, food accessibility, and nutrition literacy likely influence these patterns (Buyinza *et al.*, 2025; Mankar, Kawalkar, Quazi, and Gaidhane 2025). The smaller proportion of households with good HFCI scores may reflect challenges such as cost, cultural food preferences, and limited awareness of balanced diets (Silva, 2023; Lisciani *et al.*, 2024). These findings highlight the importance of targeted nutrition education and interventions to enhance food literacy and support healthier dietary decisions among rural farming families (Omokhabi *et al.*, 2024; Alpat *et al.*, 2024).

Table 4: Healthy Food Choice Index (HFCI) Levels among Rural Farming Families (n = 360)

HFCI Category	Score Range	F	%
Poor	0 – 6	78	21.7
Moderate	7 – 12	198	55.0
Good	13 – 18	84	23.3
Mean HFCI Score $\pm$ SD			10.2 $\pm$ 3.2

Notes:

- HFCI calculated from FFQ items using recommended scoring (healthy foods positively scored; unhealthy foods reverse scored).
- Categorization: Poor (<50%), Moderate (50–74%), Good ($\geq$ 75%).
- Mean $\pm$ SD reported for overall consumption quality.

3. Relationship between Nutrition Literacy and Healthy Food Choices

3.1 Correlation

Table 5 shows a positive moderate correlation between nutrition literacy and the Healthy Food Choice Index (HFCI) ($r = 0.48$, $p < 0.001$). This indicates that higher nutrition literacy is associated with better healthy food choices among rural farming families (see Table 5).

The moderate positive relationship between nutrition literacy and healthy food choices suggests that families with a greater understanding of nutrition are more likely to select foods that promote health. This aligns with findings from Buyinza *et al.* (2025) and Silva *et al.* (2023), which reported that higher nutrition literacy positively influences diet

quality and food selection in rural populations. The result may be attributed to increased awareness of dietary benefits, better interpretation of nutrition information, and improved self-regulation in food selection (Gibbs *et al.*, 2018; Mancone *et al.*, 2024). Rural farming families with limited literacy may face challenges in identifying and preparing nutrient-rich foods, reinforcing the need for nutrition education programs tailored to low-literacy communities. The finding underscores nutrition literacy as a critical determinant of dietary behavior in rural contexts, complementing prior research linking food knowledge to healthier consumption patterns (Alpat *et al.*, 2024; Mostafazadeh *et al.*, 2024).

Table 5: Correlation between Nutrition Literacy and Healthy Food Choice Index (n = 360)

Variables	HFCI Score
Nutrition Literacy (NLit)	0.48***

Notes:

- Pearson correlation coefficient reported ($r = 0.48$, $p < 0.001$)
- Positive moderate correlation indicates that higher nutrition literacy is associated with better healthy food choices.
- *** $p < 0.001$

3.2 HFCI by Nutrition Literacy Level

Table 6 presents the HFCI scores across nutrition literacy categories. Mean HFCI increased with nutrition literacy level: low (7.4 ± 2.5), moderate (10.6 ± 2.8), and high (13.1 ± 2.9). ANOVA revealed significant differences among groups ($F = 82.3$, $p < 0.001$), with post-hoc tests confirming that all pairwise comparisons were statistically significant (see Table 6). These findings indicate that higher nutrition literacy is linked with more frequent healthy food choices.

The observed trend, where families with higher nutrition literacy exhibited better healthy food choices, confirms that nutrition knowledge directly impacts dietary behavior. This is consistent with Silva (2023) and Kabali, Ünal,

Ertaş Uzdil, and Açar (2025), who reported that increased food literacy improves diet quality. Families with higher literacy may access, interpret, and apply nutritional information more effectively, leading to improved dietary diversity and healthier consumption patterns (Wijayarathne, Reid, Westberg, Worsley, and Mavondo, 2018; Mancone *et al.*, 2024). The results also suggest that interventions targeting nutrition education could significantly enhance healthy eating practices among rural households. Variations across literacy levels may reflect differences in educational attainment, exposure to nutrition information, and habitual food preparation skills, highlighting the importance of context-specific nutrition programs.

Table 6: Healthy Food Choice Index (HFCI) by Nutrition Literacy Category (n = 360)

Nutrition Literacy Level	HFCI Mean $\pm$ SD	F / χ^2	p-value
Low (<50%)	7.4 ± 2.5	82.3*	<0.001
Moderate (50–74%)	10.6 ± 2.8		
High ($\geq 75\%$)	13.1 ± 2.9		

Notes:

- ANOVA used to compare mean HFCI across NLit categories
- Post-hoc tests (Tukey) confirm significant differences between all groups
- $F = 82.3$, $p < 0.001$ indicates strong association

3.3 Multiple Linear Regression

Table 7 presents the results of the multiple linear regression analysis predicting HFCI from nutrition literacy and socioeconomic covariates. Nutrition literacy emerged as the strongest predictor ($\beta = 0.42$, $p < 0.001$), followed by education level ($\beta = 0.15$, $p < 0.001$). Other variables, including age, household income, household size, and farm size, were not statistically significant predictors. The model accounted for 31% of the variance in HFCI ($R^2 = 0.31$, Adjusted $R^2 = 0.29$), indicating

that nutrition literacy and education substantially influence healthy food choices (see Table 7).

The regression analysis highlights nutrition literacy as the primary determinant of healthy food choices among rural farming families, reinforcing the correlation results. This aligns with findings from Buyinza *et al.* (2025) and Silva *et al.* (2023), where nutrition literacy consistently predicted diet quality. Education level also had a positive effect, suggesting that formal education enhances the capacity to

understand and act on nutritional information (Alpat *et al.*, 2024). The non-significant effects of age, household income, household size, and farm size indicate that knowledge and cognitive skills may outweigh economic or demographic factors in shaping dietary behavior in this

context. These findings emphasize the potential of targeted nutrition education interventions to improve dietary outcomes and support sustainable health practices among rural populations (Mostafazadeh *et al.*, 2024; Mancone *et al.*, 2024).

Table 7: Multiple Linear Regression Predicting Healthy Food Choice Index (HFCI) from Nutrition Literacy and Socioeconomic Covariates (n = 360)

Predictor Variable	β (Unstandardized)	SE	β (Standardized)	t	p-value
Nutrition Literacy (NLit Score)	0.48	0.05	0.42	9.60	<0.001
Age (years)	0.02	0.01	0.06	1.50	0.135
Education Level (years)	0.21	0.06	0.15	3.50	<0.001
Household Income (Naira)	0.00001	0.00001	0.08	1.90	0.058
Household Size	-0.05	0.04	-0.04	-1.25	0.212
Farm Size (ha)	0.10	0.06	0.07	1.67	0.096

Model Summary:

- $R^2 = 0.31$, Adjusted $R^2 = 0.29$, $F(6, 353) = 27.3$, $p < 0.001$
- Nutrition literacy is the strongest predictor of healthy food choices, followed by education level

Conclusion

The study revealed that nutrition literacy among rural farming families in South-South Nigeria is generally moderate, with notable gaps in food label interpretation and numeracy skills. Households exhibited varying adherence to healthy food practices, with staples like grains and tubers dominating diets, while consumption of fruits, vegetables, legumes, and dairy was limited. Nutrition literacy was positively and significantly associated with healthy food choices, and it emerged as the strongest predictor of dietary quality, alongside education level. These findings underscore the critical role of nutrition knowledge in shaping dietary behaviour and highlight the need for targeted interventions to enhance nutrition literacy in rural farming communities.

Recommendations

Based on the findings of this study, the following recommendations are proposed to improve nutrition literacy and healthy food choices among rural farming families in South-South Nigeria:

1. Implement Targeted Nutrition Education Programs: Government agencies, agricultural extension services, and NGOs should design structured nutrition education programs tailored to rural farming families. These programs should cover both conceptual knowledge (e.g., nutrition and health, food groups) and practical skills (e.g., portion measurement, food label interpretation, and numeracy-based food selection).
2. Promote Dietary Diversity: Community health workers and extension agents should encourage the regular consumption of fruits, vegetables, legumes, fish, and dairy through awareness campaigns, cooking demonstrations, and home or community gardens to address the dominance of staple foods in household diets.
3. Develop Practical Skill-Building Modules: Training should include

hands-on modules for interpreting food labels, measuring portions, calculating nutrients, and planning balanced meals, targeting gaps in numeracy and label-reading skills.

4. **Introduce Community Nutrition Support Groups:** Local forums or support groups can reinforce nutrition knowledge, facilitate peer learning, and provide social motivation for adopting healthy eating habits.
5. **Strengthen Agricultural Extension–Nutrition Collaboration:** Extension officers should integrate nutrition education into regular farming advice, helping households link their agricultural production with optimal dietary choices.
6. **Promote Policies to Improve Food Access:** Policy makers and development

partners should explore strategies such as subsidizing nutrient-rich foods (dairy, legumes, fruits, and vegetables), improving market access, and ensuring affordable pricing to overcome economic barriers to healthy diets.

7. **Leverage Media and Local Communication Channels:** Nutrition messages should be disseminated through radio, social media, and community announcements to reach low-literacy households and reinforce formal education interventions.
8. **Target Low-Literacy Households:** Special attention should be given to families with low formal education, as they may face greater challenges in applying nutrition knowledge to daily food choices.

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