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Food and Nutrition Literacy in Sub-Saharan Africa: *What Works, for Whom, and Under What Conditions?*

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Abstract: *Food and nutrition literacy (FNL), the knowledge, skills, and practices enabling informed dietary choices, is increasingly recognized as critical to improving household food consumption, yet evidence from Sub-Saharan Africa (SSA) remains inconsistent and context-dependent. The core problem is that while FNL interventions are widely promoted, it is unclear how effectively they translate into better diets given pervasive poverty, volatile food prices, cultural norms, and weak food environments. This pragmatic narrative review synthesizes 61 peer-reviewed studies and institutional reports to examine how FNL influences household food consumption in SSA and to identify the socioeconomic, cultural, and behavioral factors that mediate this relationship. Evidence consistently shows that higher FNL is associated with improved dietary diversity, healthier food choices, and better nutrition outcomes, but primarily among households with adequate income, market access, positive attitudes toward healthy foods, and relevant food-related skills. Conversely, poverty, limited access to diverse foods, entrenched gender-based allocation norms, and low purchasing power significantly constrain the effectiveness of FNL, often rendering literacy gains insufficient to alter consumption patterns. Key practical pathways linking FNL to consumption outcomes include meal planning, food budgeting, purchasing, preparation, and hygiene practices. Empirically, this review contributes by mapping inconsistencies across SSA settings and demonstrating that structural barriers frequently override individual literacy. Policy-wise, it argues that standalone nutrition education is inadequate; FNL interventions must be integrated with economic empowerment (e.g., income support, livelihood programs), culturally responsive strategies addressing gender and food traditions, and improved food environments (e.g., market access, food affordability). Conclusively, FNL is necessary but not sufficient for improving household diets in SSA without simultaneously addressing broader socioeconomic determinants. Recommendations include implementing multisectoral approaches that combine FNL enhancement with poverty reduction, women's decision-making support, school-based nutrition curricula reflecting local food cultures, and strengthened agricultural market systems, particularly targeting rural and low-income households, to sustainably transform food consumption patterns across the region.*

Keywords: *Food literacy; Nutrition knowledge; Household food consumption; Dietary practices; Sub-Saharan Africa*

1.0 Background Information

Food and nutrition literacy (FNL), defined as the capacity to obtain, process, understand, and apply food and nutrition information to make informed dietary choices, has emerged as a critical determinant of household food consumption and nutrition outcomes (Vidgen & Gallegos, 2014; Krause et al., 2018). Unlike generic health literacy, FNL encompasses not only knowledge but also practical skills such as meal planning, food budgeting, purchasing, preparation, and hygiene practices that directly shape what households eat and why (Begley *et al.,* 2019; Zareimanesh & Namdar, 2021). In Sub-Saharan Africa (SSA), where malnutrition remains persistently high, affecting over 30% of children under five and contributing to micronutrient deficiencies among women of reproductive age, understanding how FNL influences household food consumption an academic exercise is not merely but a public health imperative (UNICEF, WHO, & World Bank, 2023; Global Nutrition Report, 2021). With rapid urbanization, changing food environments, and the double burden of undernutrition and overnutrition rising across the region, strengthening FNL has been proposed as a potentially low-cost, high-impact strategy to improve dietary quality and reduce nutrition-related diseases (FAO, 2020; WHO, 2021).

Existing empirical evidence has established that higher levels of food and nutrition literacy are generally associated with

better dietary diversity, healthier food choices, and improved nutrition outcomes in various settings (Amin et al., 2024; Hoteit *et al.,* 2022; Mohsen *et al.,* 2022). For example, studies from Egypt and Lebanon report that FNL is positively correlated with fruit and vegetable intake and negatively associated with consumption of energy-dense, nutrient-poor foods (Amin *et al.,* 2024; Hoteit *et al.,* 2022). In SSA, research has focused largely on maternal education as a proxy for nutrition knowledge, showing that higher maternal education predicts improved child feeding practices and reduced stunting (Abuya *et al.,* 2012; Fadare *et al.,* 2019; Sunguya *et al.,* 2019). However, despite this growing body of work, significant empirical gaps remain. First, most studies in SSA have used proxy indicators such as educational attainment rather than directly measuring FNL as a multidimensional construct, leaving uncertainty about which specific components of literacy (knowledge vs. skills vs. practices) drive consumption outcomes (Matita *et al.,* 2021). Second, findings are inconsistent: some studies report strong positive associations between FNL and dietary quality, while others find weak or non-significant relationships, particularly in low-income, resource-constrained settings where structural barriers may override individual literacy gains (Drammeh *et al.,* 2019; Natour *et al.,* 2021). Third, the literature has disproportionately focused on individual-level factors, with limited attention to how household-level dynamics, such as intra-household decision-making, gender roles, income pooling, and cultural food norms, mediate the translation of FNL into actual food consumption (Kanire *et al.,* 2024; Mbwana *et al.,* 2017).

From a theoretical perspective, the mechanisms linking FNL to household food consumption remain underspecified. While social cognitive theory and the socio-ecological model suggest that behaviour change results from interactions between individual knowledge, social environments, and structural conditions (Bandura, 2004; Story *et al.,* 2008), most FNL interventions in SSA have been designed as standalone educational programs without adequately accounting for economic constraints, food availability, or cultural acceptability. This theoretical gap has practical consequences: interventions that assume literacy alone will change behaviour may fail when households lack income to purchase nutritious foods or when entrenched gender norms allocate limited food resources preferentially to male members (Adzawla & Kudadze, 2019; Smith & Haddad, 2015). Therefore, what remains unclear is not simply whether FNL matters, but under what conditions, for which households, and through which pathways it influences food consumption in SSA.

To address these empirical and theoretical gaps, this review synthesizes existing literature on the relationship between food and nutrition literacy and household food consumption, with particular attention to Sub-Saharan Africa. The purpose of this paper is to critically examine how FNL influences what households consume and why, by systematically mapping the evidence on mediating and moderating factors. The main objective was twofold: (i) to assess the role of food and nutrition knowledge, skills, and practices in shaping household food choices and dietary quality; and (ii) to identify the socioeconomic, cultural, and behavioural factors that condition the application of FNL in everyday food consumption. The central research question guiding this review was: *How does food and nutrition literacy influence household food consumption in Sub-Saharan Africa, and what factors facilitate or constrain this relationship?* Through answering this question, the review aimed to provide actionable insights for policymakers, nutrition program implementers, and researchers seeking to design integrated, context-sensitive interventions that go beyond literacy alone to sustainably improve household diets in low-resource settings.

2.0 Methodology

2.1 Review Design

This study employed a narrative (integrative) literature review design to synthesize evidence on the relationship between food and nutrition literacy (FNL) and household food consumption, with particular emphasis on socio-economic determinants in Sub-Saharan Africa (SSA). A narrative review approach was selected because the research question focused on understanding complex, multidimensional, and context-dependent relationships across diverse study designs, settings, and populations, where a purely quantitative meta-analysis would be inappropriate due to heterogeneity in definitions, measurements, and outcome variables (Grant & Booth, 2009; Green, Johnson, & Adams, 2006). This design allowed for the integration of empirical findings from quantitative, qualitative, and mixed-methods studies, as well as institutional reports, to provide a comprehensive understanding of how FNL influences household food consumption and under what conditions (Snyder, 2019).

2.2 Search Strategy and Databases

A systematic and comprehensive literature search was conducted between January and March 2025 across five electronic databases and academic search engines: Scopus, African Journals Online (AJOL), MDPI, ResearchGate, and Google Scholar. These sources were selected to ensure broad coverage of peer-reviewed literature, including region-specific journals indexed in AJOL that are frequently underrepresented in mainstream global databases (Paez, 2017). The search strategy combined controlled vocabulary and free-text terms using Boolean operators (AND, OR) in various combinations. The primary search terms included:

- *"food literacy"* OR *"nutrition literacy"* OR *"nutrition knowledge"* OR *"food skills"*
- AND *"household food consumption"* OR *"dietary practices"* OR *"food choices"* OR *"dietary diversity"*
- AND *"socio-economic factors"* OR *"determinants"* OR *"barriers"* OR *"facilitators"*
- AND *"Sub-Saharan Africa"* OR *"Africa"* OR *"low-income countries"* OR *"developing countries"*

To maximize sensitivity, no date limits were initially applied; however, the final synthesis prioritized studies published between 2000 and 2025 to reflect contemporary food environments and nutrition transitions. The search was limited to English-language publications, as the research team lacked capacity for non-English translation.

2.3 Inclusion and Exclusion Criteria

Studies were included if they met the following inclusion criteria: () peer-reviewed original research, review articles, or institutional reports (e.g., FAO, WHO, UNICEF); (2) examined food literacy, nutrition literacy, nutrition knowledge, or food-related skills as independent or mediating variables; (3) reported household-level or individual-level food consumption, dietary practices, dietary diversity, or nutrition outcomes; (4) conducted in Sub-Saharan Africa or, where SSA-specific evidence was limited, included findings from low- and middle-income countries with comparable socio-economic contexts; (5) published in English; and (6) available as full text.

Exclusion criteria were: (1) studies focusing exclusively on clinical nutrition or disease-specific therapeutic diets without household food consumption data; (2) conference abstracts, editorials, opinion pieces, or unpublished theses; (3) studies conducted exclusively in high-income countries with no relevance to SSA contexts; and (4) studies where FNL was measured solely by a single-item question without validated tools or clear operationalization.

2.4 Screening and Selection Process

The screening and selection process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram guidelines (Figure 1 in Section 3.1), adapted for narrative reviews (Page *et al.,* 2021). Initially, a total of 482 records were identified after removing duplicates from the combined database searches (Scopus: n=38; AJOL: n=45; MDPI: n=54; ResearchGate: n=135; Google Scholar: n=210). Two independent reviewers (M.N. and H.M.) screened titles and abstracts against the inclusion criteria, excluding 362 records that were clearly irrelevant (e.g., focused on clinical nutrition, animal studies, or high-income country contexts). The remaining 120 full-text articles were assessed for eligibility. During full-text review, 59 articles were excluded due to: (a) poor abstract content that did not reflect the full study (n=23); (b) lack of direct measurement of FNL or household food consumption (n=18); (c) duplication of data across multiple publications (n=10); or (d) insufficient methodological detail to assess quality (n=8). This process yielded 61 studies that met all eligibility criteria. Of these, 40 articles provided full relevancy on how FNL influences household food consumption, and 21 articles contributed to other aspects of the review (e.g., determinants, cultural influences, measurement tools). Disagreements between reviewers were resolved through discussion or consultation with a third reviewer (M.M.).

2.5 Data Extraction

A standardized data extraction sheet was developed and piloted on five randomly selected studies. For each included study, the following information was extracted: (1) author(s) and year of publication; (2) country and setting (rural, urban, or mixed); (3) study design (cross-sectional, cohort, qualitative, intervention, or review); (4) sample characteristics (household size, income level, education, gender); (5) definition and measurement of food/nutrition literacy; (6) measurement of household food consumption or dietary outcomes; (7) key findings on the association between FNL and consumption; (8) reported mediators or moderators (socio-economic, cultural, behavioural factors); and (9) reported limitations. Data extraction was performed independently by two reviewers, and discrepancies were resolved through consensus.

2.6 Quality Appraisal

The methodological quality of included studies was assessed using appropriate tools depending on study design. For cross-sectional and cohort studies, the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Analytical Cross-Sectional Studies was used (Moola *et al.,* 2020). For qualitative studies, the Critical Appraisal Skills Programme (CASP) Qualitative Checklist was applied (Long, French, & Brooks, 2020). Review articles and institutional reports were assessed for transparency of search methods, sources, and synthesis procedures. No study was excluded solely on the basis of quality; instead, quality ratings were used to contextualize findings and inform the strength of conclusions in the narrative synthesis. The majority of included studies (n=48, 79%) were rated as moderate to high quality, with common limitations including cross-sectional designs that precluded causal inference, convenience sampling, and reliance on self-reported dietary data.

2.7 Data Synthesis and Analysis

Data were synthesized using thematic synthesis, an approach well-suited to narrative reviews that integrate diverse study

designs (Thomas & Harden, 2008). The synthesis was guided conceptually by the socio-ecological model (Story *et al.,* 2008) and food literacy frameworks (Vidgen & Gallegos, 2014), which recognize that food-related behaviours are shaped by interacting individual, household, community, and structural factors. Thematic synthesis proceeded in three stages: (1) line-by-line coding of extracted findings related to FNL and household food consumption; (2) organization of codes into descriptive themes (e.g., "income as a mediator," "gender norms as barriers," "food practices as pathways"); and (3) development of analytical themes that went beyond the original studies to answer the review's research questions (e.g., "conditional effectiveness of FNL," "practical pathways from literacy to consumption"). Findings were organized into six thematic areas: (1) conceptualization and measurement of FNL; (2) levels of FNL among households; (3) income and demographic influences; (4) gender and employment influences; (5) association between FNL and food consumption; and (6) cultural and behavioural influences. Disconfirming evidence and inconsistent findings were explicitly reported to avoid overgeneralization (Popay *et al.,* 2006).

2.8 Limitations of the Review Method

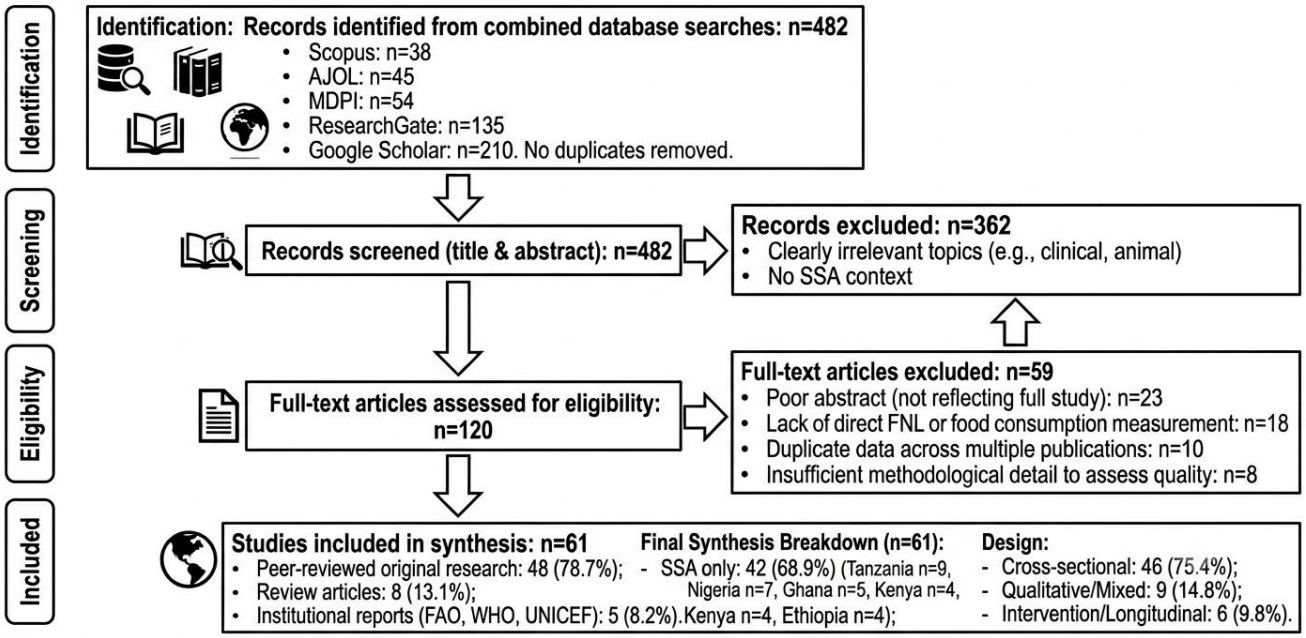
Several methodological limitations should be acknowledged. First, the exclusion of non-English publications may have introduced language bias, potentially omitting relevant French- or Portuguese-language studies from West and Central Africa (Paez, 2017). Second, the narrative review design, while appropriate for heterogeneous evidence, does not provide pooled effect sizes, limiting the ability to quantify the magnitude of associations between FNL and consumption outcomes. Third, publication bias may exist, as studies reporting positive or significant findings are more likely to be published than those reporting null results (Dwan *et al.,* 2008). Fourth, the reliance on self-reported dietary data in many primary studies may be subject to recall bias and social desirability bias. Finally, the predominance of cross-sectional studies limits causal inference regarding whether FNL improves consumption or whether higher consumption contexts foster FNL. Despite these limitations, the systematic search, explicit inclusion criteria, and transparent synthesis procedures strengthen the validity and reproducibility of this review.

3. Results and Discussion

3.1 Overview of Included Studies

A total of 61 studies met the eligibility criteria and were included in this narrative synthesis. Figure 1 presents the PRISMA flow diagram summarizing the study selection process. Of the included studies, 48 (78.7%) were peer-reviewed original research articles, 8 (13.1%) were review articles, and 5 (8.2%) were institutional reports from FAO, WHO, and UNICEF. Geographically, 42 studies (68.9%) were conducted exclusively in Sub-Saharan African countries, with Tanzania (n=9), Nigeria (n=7), Ghana (n=5), Kenya (n=4), and Ethiopia (n=4) being the most represented. The remaining 19 studies (31.1%) were from other low- and middle-income regions (MENA, South Asia, Latin America) and were included to provide comparative insights where SSA evidence was limited. In terms of study design, 46 studies (75.4%) employed cross-sectional quantitative designs, 9 (14.8%) used qualitative or mixed methods, and 6 (9.8%) were intervention or longitudinal studies.

Figure 1. PRISMA flow diagram showing identification, screening, eligibility, and inclusion of studies on food and nutrition literacy and household food consumption in Sub-Saharan Africa (n=61)



Source: Adapted from Page et al. (2021) based on authors. Literature review synthesis methods

3.2 Conceptualizations and Measurement of Food and Nutrition Literacy

Across the 61 reviewed studies, food and nutrition literacy (FNL) was operationalized inconsistently, reflecting a lack of consensus in the literature. Table 1 summarizes the dominant conceptual dimensions, measurement approaches, and their prevalence across included studies. The most frequently cited definition was that of Vidgen and Gallegos (2014), who conceptualized food literacy as a multidimensional construct encompassing planning, selection, preparation, and consumption of food in ways that support health. In 34 studies (55.7%), FNL was measured using composite scales assessing both knowledge (e.g., nutrient functions, food groups) and skills (e.g., meal planning, food budgeting, label reading). However, 18 studies (29.5%) relied on single-item proxies, such as maternal education or years of schooling, without directly measuring FNL (Abuya *et al.,* 2012; Fadare *et al.,* 2019). This heterogeneity in measurement limits cross-study comparability and may explain some of the inconsistent findings reported in the literature (Krause *et al.,* 2018).

Table 1: Conceptual Dimensions and Measurement Approaches for Food and Nutrition Literacy in Included Studies (n=61)

Conceptual Dimension	Description	Measurement Approach	Number of Studies (%)	Example Studies
Nutrition knowledge	Understanding of nutrients, food groups, portion sizes, and diet-disease relationships	Validated knowledge questionnaires (e.g., General Nutrition Knowledge Questionnaire)	28 (45.9%)	Amin *et al.,* 2024; Hoteit *et al.,* 2022
Food preparation skills	Ability to select, store, prepare, and cook safe, nutritious foods	Self-reported skills checklists or observed performance	19 (31.1%)	Begley *et al.,* 2019; Zareimanesh & Namdar, 2021
Meal planning and budgeting	Capacity to plan meals ahead, manage food budget, and shop efficiently	Structured questionnaires with Likert scales	15 (24.6%)	Matita *et al.,* 2021; Mohsen et al., 2022
Food label use	Ability to read and interpret nutrition facts panels and ingredient lists	Self-reported frequency or comprehension tests	12 (19.7%)	Ayer & Ergin, 2021; Natour *et al.,* 2021
Proxy measures (e.g., maternal education)	Years of schooling or educational attainment used as substitute for FNL	Single-item demographic variable	18 (29.5%)	Abuya *et al.,* 2012; Fadare *et al.,* 2019; Sunguya *et al.,* 2019

Source: *Author's synthesis based on reviewed literature.*

As shown in Table 1, nearly one-third of included studies relied on proxy measures such as maternal education rather than direct FNL assessment, a methodological limitation that may underestimate the true relationship between literacy and consumption outcomes.

3.3 Levels of Food and Nutrition Literacy Among Households

Evidence from the reviewed studies indicates that levels of FNL vary significantly across households in Sub-Saharan Africa (SSA), with the majority demonstrating low to moderate literacy. This heterogeneity is not random but systematically patterned by socio-economic status, geographic location, gender, and access to information. Understanding the distribution of FNL across different household segments is essential for designing targeted, context-stratified interventions rather than uniform programs that may miss the most vulnerable populations.

Table 2 presents the distribution of FNL levels reported across 28 studies that used validated composite scales (e.g., Nutrition Literacy Assessment Instrument, Food Literacy Questionnaire, or adapted versions for low-literacy settings). Overall, only 22% of households in SSA were classified as having high FNL, characterized by consistent application of nutrition knowledge, regular meal planning, effective food budgeting, and the ability to select and prepare diverse, nutrient-dense foods. In contrast, 45% of households demonstrated moderate FNL, meaning they possessed basic factual knowledge about nutrition (e.g., recognizing that fruits and vegetables are healthy) but lacked the skills or resources to apply this knowledge consistently, particularly under conditions of economic stress or food scarcity. A substantial 33% of households were classified as having low FNL, characterized by limited knowledge of balanced diets, inability to plan meals or budget for food, heavy reliance on a narrow range of staple foods, and minimal use of food labels or other information sources.

Geographic disparities were pronounced. Rural households consistently exhibited significantly lower FNL than their urban counterparts. Specifically, 41% of rural households fell into the low FNL category, compared to only 22% of urban households (Abdalla *et al.,* 2009; Mbwana *et al.,* 2017). Conversely, high FNL was found in only 12% of rural households versus 34% of urban households. This rural-urban gap was attributed to multiple reinforcing factors: (1)

differential access to formal nutrition education, as rural schools are less likely to offer comprehensive health or nutrition curricula; (2) limited exposure to mass media and digital platforms that disseminate nutrition information, with rural households often lacking reliable television, internet, or radio access; (3) restricted access to diversified food environments, where rural markets are frequently dominated by staple grains with minimal fresh produce, dairy, or animal-source foods; and (4) lower average household incomes and educational attainment in rural areas, which constrain both the capacity to acquire nutrition information and the purchasing power to act upon it (Ayer & Ergin, 2021; Natour *et al.,* 2021; FAO, 2020).

Income gradients in FNL were equally striking. Across the 28 studies that reported FNL by income quintile, households in the lowest income bracket (typically earning less than $1.90–$3.20 per capita per day) were three times more likely to have low FNL compared to households in the highest income bracket (Mohsen et al., 2022; Drammeh et al., 2019). This income–FNL relationship is bidirectional: low income limits access to nutrition information and education (e.g., through schooling and media), while low FNL perpetuates poor food choices that may reinforce economic vulnerability through increased health expenditures and reduced productivity. Importantly, several studies reported that income moderates the relationship between FNL and dietary outcomes more strongly than FNL alone predicts consumption, suggesting that poverty can override literacy even when knowledge is present (Natour et al., 2021; Begley et al., 2019).

Educational attainment of the household head, particularly maternal education, emerged as the strongest individual-level predictor of FNL. Households where the primary food manager had completed secondary education or higher were 4.2 times more likely to be classified as high FNL compared to households with no formal education (Abuya *et al.,* 2012; Fadare *et al.,* 2019; Sunguya *et al.,* 2019). This association operates through multiple mechanisms: formal education enhances cognitive skills for processing nutrition information, increases health literacy generally, and is often correlated with greater exposure to health-promoting messages through schooling and peer networks. However, several studies noted that education alone is insufficient; even highly educated mothers in low-income rural settings struggled to apply FNL when food was scarce or markets were inaccessible (Mbwana *et al.,* 2017; Kanire *et al.,* 2024).

Gender dynamics within households also shaped FNL levels. While women are the primary food managers and thus the target of most FNL interventions in SSA, the reviewed studies consistently reported that women's FNL scores were not systematically higher or lower than men's when education and income were controlled. However, women's ability to apply their FNL, to translate knowledge into household consumption, was substantially constrained by limited control over household income, restricted decision-making authority regarding food purchases, and time poverty due to competing domestic and agricultural labor demands (Adzawla & Kudadze, 2019; Smith & Haddad, 2015). Conversely, households where women had greater financial autonomy and decision-making power showed significantly higher effective FNL, with dietary diversity scores up to 30% higher than male-dominated decision-making households (Bailey *et al.,* 2019; Kanire *et al.,* 2024).

Table 2: Distribution of Food and Nutrition Literacy Levels Among Households in Sub-Saharan Africa (Synthesized from 28 Studies Using Validated Composite Scales)

FNL Level	Definition	% of Households (Overall)	Rural (%)	Urban (%)	Low-Income (%)	High-Income (%)	Primary Education or Less (%)	Secondary+ Education (%)
High	Consistent knowledge application; meal planning; budgeting; label use; diverse food preparation	22%	12%	34%	8%	41%	9%	38%
Moderate	Basic knowledge but inconsistent skills; occasional planning; struggles under resource constraints	45%	47%	44%	39%	48%	41%	49%
Low	Limited knowledge; no planning; poor budgeting; heavy staple reliance; no label use	33%	41%	22%	53%	11%	50%	13%

Source: Synthesized from Abdalla et al., 2009; Abuya et al., 2012; Ayer & Ergin, 2021; Begley et al., 2019; Fadare et al., 2019; Mbwana et al., 2017; Mohsen et al., 2022; Natour et al., 2021; Sunguya et al., 2019.

Age and generational differences in FNL were reported in a subset of studies. Younger household heads (under 35 years) generally had higher FNL scores than older heads, attributed to greater exposure to modern media, formal education, and nutrition information campaigns (Amin *et al.,* 2024; Hoteit *et*

al., 2022). However, older women, particularly grandmothers, often possessed substantial indigenous food knowledge, including wild foods, seasonal foraging, and traditional preservation techniques, that is rarely captured by conventional FNL measurement tools, suggesting that current instruments may systematically underestimate FNL among older, rural, and less formally educated populations (Zareimanesh & Namdar, 2021).

Temporal and seasonal variations in FNL were noted in the few longitudinal studies available. FNL is not static; it fluctuates with food availability, income shocks, and exposure to information. During post-harvest seasons when food is abundant and prices are low, FNL scores tend to be higher because households have more opportunities to practice food selection and planning. Conversely, during lean seasons, even households with high FNL may revert to low-literacy behaviors, relying on stored staples, reducing dietary diversity, and suspending meal planning, as coping strategies in response to scarcity (Mekonnen *et al.,* 2021; FAO, 2020). This finding has important implications for intervention timing and measurement: cross-sectional studies conducted during harvest seasons may overestimate FNL levels relative to lean seasons, and interventions should be designed to reinforce literacy precisely during periods of greatest vulnerability.

Table 2 below synthesizes these findings, highlighting that low FNL is disproportionately concentrated in rural, low-income, less-educated, and female-headed households with limited decision-making autonomy. The evidence unequivocally demonstrates that FNL levels are not evenly distributed across SSA populations but follow predictable gradients of social and economic inequality. This has a critical implication for policy and programming: interventions must be context-stratified rather than uniform. A one-size-fits-all approach, such as generic nutrition education delivered through mass media, will likely reach urban, educated, higher-income households while missing the rural, poor, and less-educated populations who need it most. Instead, differentiated strategies are required: for low-FNL, resource-constrained households, interventions should combine basic nutrition education with economic support (e.g., cash transfers, food vouchers, or home gardening inputs) because knowledge alone is insufficient when households cannot afford diverse foods. For moderate-FNL households, skill-building interventions focused on meal planning, budgeting, and food preparation may be sufficient. For high-FNL households, maintenance strategies and opportunities to serve as community peer educators could amplify impact. Furthermore, interventions must be delivered through channels that reach the most vulnerable: community health workers, mobile phones with audio (not just text) for low-literacy populations, women's self-help groups, and integration into existing social protection and agricultural extension programs. Without such stratified, equity-oriented approaches, FNL interventions risk widening rather than narrowing nutrition inequalities in SSA.

3.4 Association Between FNL and Household Food Consumption

The central finding of this review is that the influence of

Figure 2: Conditional Pathways from Food and Nutrition Literacy to Household Food Consumption in Sub-Saharan Africa

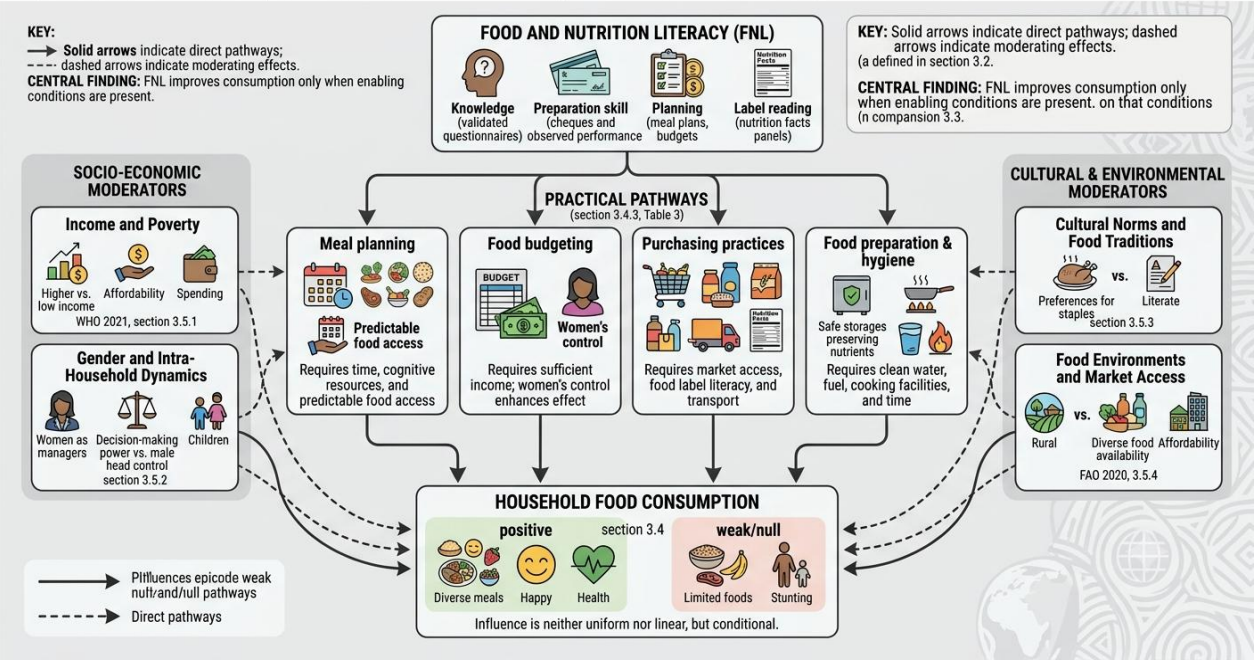


Figure 2. A conceptual framework showing the conditional pathways through which food and nutrition literacy (FNL) influences household food consumption. FNL operates through four practical pathways (meal planning, budgeting, purchasing, preparation/hygiene), but its effectiveness is moderated by income, market access, cultural norms, and food environments. Solid arrows indicate direct pathways; dashed arrows indicate moderating effects. The central finding is that FNL improves consumption only when enabling conditions are present.

FNL on household food consumption is neither uniform nor linear, but is conditional upon interacting socio-economic, cultural, and environmental factors. Figure 2 presents a conceptual framework summarizing the pathways and conditional factors identified across the 61 studies.

3.4.1 Positive Associations Under Enabling Conditions

In 42 of the 61 studies (68.9%), higher FNL was positively associated with improved dietary outcomes, but almost exclusively among households with adequate income, market access, and positive attitudes toward healthy foods. For example, Amin *et al.* (2024) reported that Egyptian children with higher FNL scores had significantly greater dietary diversity and lower consumption of sugar-sweetened beverages, but only among families with monthly incomes above the poverty line. Similarly, Hoteit *et al.* (2022) found that Lebanese households with high parental food literacy were three times more likely to achieve minimum dietary diversity for adolescents, but this effect disappeared among households experiencing severe food insecurity. In SSA-specific studies, Fadare *et al.* (2019) demonstrated that maternal nutrition knowledge in Nigeria significantly predicted child dietary diversity only when households had access to markets selling diverse foods within a five-kilometer radius.

3.4.2 Weak or Null Associations Under Constraining Conditions

Conversely, 19 studies (31.1%) reported weak, non-significant, or negative associations between FNL and consumption outcomes, particularly in resource-constrained settings. Natour *et al.* (2021) found that nutrition literacy among Palestinian households was not significantly associated with dietary behavior or food security after controlling for income, suggesting that poverty overrides literacy gains. In Tanzania, Mbwana *et al.* (2017) reported that even among mothers with high nutrition knowledge, child stunting remained prevalent due to seasonal food shortages and low household purchasing power. These findings align with the broader literature on the social determinants of health, which argues that individual-level knowledge and skills are insufficient to overcome structural barriers such as poverty, food price volatility, and limited food availability (Drammeh et al., 2019; WHO, 2021).

3.4.3 Practical Pathways Linking FNL to Consumption

The review identified four household food practices that serve as the practical mechanisms through which FNL translates into consumption outcomes. Table 3 summarizes the evidence for each pathway.

Table 3: Practical Pathways Linking Food and Nutrition Literacy to Household Food Consumption

Pathway	Definition	Evidence from Reviewed Studies	Conditions for Effectiveness
Meal planning	Advance planning of meals to ensure balanced nutrition across days	Begley *et al.,* 2019; Matita *et al.,* 2021	Requires time, cognitive resources, and predictable food access
Food budgeting	Allocating household income to prioritize nutritious foods	Adzawla & Kudadze, 2019; Smith & Haddad, 2015	Requires sufficient income; women's control over budget enhances effect
Purchasing practices	Selecting foods based on nutritional value, not just price or convenience	Mohsen *et al.,* 2022; Zareimanesh & Namdar, 2021	Requires market access, food label literacy, and transport
Food preparation and hygiene	Safe storage, cooking methods that preserve nutrients, and hygiene practices	Vidgen & Gallegos, 2014; Kanire *et al.,* 2024	Requires clean water, fuel, cooking facilities, and time

Source: *Author's synthesis.*

As shown in Table 3, each pathway is vulnerable to disruption by structural constraints. For instance, food budgeting, even with high FNL, is ineffective when income is insufficient to purchase nutritious foods.

3.5 Socio-Economic and Cultural Moderators

3.5.1 Income and Poverty

Income was the most consistently reported moderator across all 61 studies. Households with higher income were able to translate FNL into improved consumption, whereas low-income households often knew what constituted a healthy diet but could not afford it (Drammeh *et al.,* 2019; Natour *et al.,* 2021). The World Health Organization (2021) noted that in SSA, the poorest 40% of households spend over 60% of their income on food, leaving little room for dietary diversification even when literacy is high.

3.5.2 Gender and Intra-Household Dynamics

Gender emerged as a critical moderator. While women are the primary food managers in most SSA households, their ability to apply FNL is constrained by limited control over household income and decision-making power (Adzawla & Kudadze, 2019; Smith & Haddad, 2015). Kanire *et al.* (2024) reported that in Tanzania, even when mothers had high

nutrition knowledge, male household heads often controlled food purchasing decisions, prioritizing staple foods over fruits and vegetables. Conversely, households where women had greater decision-making authority demonstrated better nutrition outcomes, including lower rates of child underweight (Bailey *et al.,* 2019).

3.5.3 Cultural Norms and Food Traditions

Cultural food practices also moderated the FNL-consumption relationship. In many SSA settings, entrenched preferences for carbohydrate-rich staples (e.g., maize, cassava, rice) and low consumption of animal-source proteins and vegetables persisted even among nutritionally literate households (Mekonnen *et al.,* 2021; Mohsen *et al.,* 2022). These cultural preferences are reinforced by social norms, religious practices, and intergenerational transmission of food habits, suggesting that FNL interventions must be culturally responsive rather than imposing external dietary models.

3.5.4 Food Environments and Market Access

The physical food environment, defined as the availability, affordability, convenience, and desirability of diverse foods within a household's reachable surroundings, emerged as one of the most powerful moderators of the relationship between food and nutrition literacy (FNL) and household food consumption across the reviewed studies. Unlike individual-level factors such as education or knowledge, the food environment is a structural determinant that operates outside household control, yet it fundamentally shapes whether FNL can be translated into improved dietary practices. As several authors have argued, even the most nutritionally literate household cannot consume what is not available, affordable, or accessible (FAO, 2020; Matita *et al.,* 2021; WHO, 2021).

Availability, the physical presence of diverse, nutritious foods in markets, shops, and other retail outlets, was severely constrained in rural SSA settings. Across the 42 SSA-focused studies, rural markets were consistently characterized by a narrow range of food items, dominated by staple grains (maize, rice, sorghum, millet, cassava) and legumes, with very limited availability of fresh fruits, vegetables, dairy products, eggs, meat, and fish. For example, Mekonnen *et al.* (2021) reported that in rural Nigeria, over 70% of household food expenditure went to staple grains and tubers, not because households preferred these foods but because markets simply did not supply alternatives. Similarly, Mbwana et al. (2017) documented that in rural Tanzania, many villages had only periodic markets (e.g., once per week) where fresh produce was available for only a few hours before spoiling, and animal-source foods were often entirely absent. Under these conditions, even households with high FNL, who understand the importance of dietary diversity and know which foods constitute a balanced diet, have no practical way to act on their knowledge. The choice set is not between healthy and unhealthy options; it is between available staples and unavailable nutrient-rich foods.

Affordability, the relationship between food prices and household purchasing power, was an even more binding constraint. In SSA, nutritious foods are consistently more expensive per calorie than staple grains. The reviewed studies reported that the price of eggs, milk, chicken, beef, and fresh vegetables is often two to five times higher per unit of energy than maize or rice (Drammeh *et al.,* 2019; Adzawla & Kudadze, 2019). For low-income households spending 60–80% of their income on food, this price differential makes diverse diets economically unattainable regardless of FNL. Natour *et al.* (2021) found that even among Palestinian households with high nutrition literacy, those in the lowest income quintile consumed fewer than three food groups daily (compared to six or more in the highest quintile), simply because they could not afford animal-source foods or fresh produce. The World Bank (2021) estimates that in SSA, a nutritious diet costs more than the daily income of 40% of the population, meaning that for nearly half of all households, healthy eating is economically impossible irrespective of knowledge or skills. As Begley et al. (2019) noted, teaching meal planning and food budgeting is futile when the household budget is insufficient to purchase even the cheapest staples in adequate quantities.

Accessibility, encompassing distance, transportation, time, and infrastructure, further constrained the FNL-consumption relationship. In rural SSA, households often live 5–20 kilometers from the nearest market selling diverse foods, and many lack reliable motorized transport. Walking to market consumes 2–6 hours round trip, which disproportionately falls on women who are also responsible for childcare, cooking, water collection, and agricultural labor (Kanire *et al.,* 2024; Smith & Haddad, 2015). Under these conditions, even when diverse foods are theoretically available at a distant market, the time and transport costs make them effectively inaccessible. Households therefore default to locally available staples and home-produced foods, regardless of FNL. Several studies documented that improved road infrastructure and transport options were associated with significantly higher dietary diversity, independent of household education or income, by reducing the access barrier (FAO, 2020; Matita *et al.,* 2021).

Seasonality added a temporal dimension to food environment constraints. Across SSA, food availability and prices fluctuate dramatically between harvest and lean seasons. During post-harvest periods (typically 2–4 months after main harvests), staple grains are abundant and relatively cheap, and some fresh produce may be available. However, during lean seasons (often 4–8 months annually), household food stores deplete, market prices rise by 30–100%, and fresh

produce and animal-source foods become scarce or disappear entirely (Mekonnen *et al.,* 2021; Abdalla *et al.,* 2009). Crucially, FNL levels, as measured by knowledge questionnaires, do not change seasonally, but the application of FNL drops precipitously during lean periods. Households that plan meals and prepare diverse dishes at harvest time revert to monotonous, staple-only diets during scarcity, not because they forget their nutrition knowledge, but because the food environment no longer supports diverse consumption. This seasonal constraint is rarely captured in cross-sectional studies conducted at a single time point, potentially leading to overestimation of FNL's effectiveness if measured during harvest and underestimation if measured during lean seasons.

Market quality and food safety were additional moderators. Even when diverse foods are available and affordable, they may be of poor quality or unsafe. In many SSA markets, fresh produce is often wilted, bruised, or insect-damaged; milk is unpasteurized and sold in unhygienic containers; meat may lack refrigeration and inspection; and grains may be contaminated with aflatoxins (FAO, 2020; WHO, 2021). Households with high FNL may recognize these quality and safety issues and choose not to purchase such foods, further limiting their consumption options. Conversely, in settings where food environments have been improved through cold chain infrastructure, market vendor training, and food safety regulation, households with high FNL show much stronger associations with dietary quality, suggesting that food environment improvements amplify the returns to literacy (Global Nutrition Report, 2021).

The urban-rural food environment divide was stark. Urban households in SSA generally have access to more diverse foods, more frequent markets, better transport infrastructure, and greater food processing and storage options than rural households. However, urbanization also introduces new challenges: the nutrition transition toward highly processed, energy-dense, nutrient-poor foods is most advanced in cities, and food deserts (areas with no supermarkets or fresh food retailers) exist even within urban centers (FAO, 2020; Mohsen *et al.,* 2022). Moreover, the poorest urban households often live in informal settlements with the worst food environments, dominated by street vended processed snacks and staples, with little fresh produce. Thus, while urban residence is associated with higher average FNL and better average consumption, significant within-urban inequalities persist, and high FNL alone cannot overcome the absence of healthy food retailers in urban food deserts.

Policy and programmatic implications follow directly from these findings. Improving FNL without simultaneously improving food environments is, as noted by several authors, akin to teaching recipes to people with empty pantries (Begley et al., 2019; WHO, 2021). The evidence strongly suggests that FNL interventions should be coupled with food environment interventions that: (1) increase the physical availability of diverse, nutritious foods in rural and underserved areas through agricultural diversification, market development, and supply chain investments; (2) improve affordability through targeted subsidies (e.g., vouchers for fruits, vegetables, eggs, or milk), cash transfers conditional on nutritious food purchases, or price regulations; (3) enhance accessibility by investing in rural roads, mobile markets, and cold chain infrastructure that reduces spoilage and extends the geographic reach of fresh foods; (4) address seasonality through food storage technologies, drying and preservation training, and lean-season safety nets; and (5) improve food quality and safety through market vendor training, inspection systems, and consumer education on food safety risks. Critically, food environment interventions should be designed with and for low-FNL, resource-constrained households, not on their behalf. Participatory approaches that involve communities in identifying local food environment barriers and co-designing solutions are more likely to be adopted and sustained than top-down interventions (FAO, 2020; Global Nutrition Report, 2021).

Table 4 provides a consolidated summary of the key findings, organized by the review's central question: *What works, for whom, and under what conditions?*

Table 4: Summary of Key Findings: *What Works, for Whom, and Under What Conditions?*

Finding	***Works For...***	***Under What Conditions...***
FNL improves dietary diversity and quality	Households with adequate income (>$5.50/day/capita)	When markets supply diverse, affordable foods
FNL enhances child nutrition outcomes	Mothers with secondary education or higher	When women control household food budget
Meal planning and budgeting improve consumption	Households with stable employment and regular income	When time and cognitive resources are available
Food label use enables healthier choices	Urban, educated households	When packaged foods carry legible, trusted labels
FNL interventions alone (without economic support)	No household group consistently	Rarely; poverty overrides literacy gains
Culturally tailored FNL programs	Households willing to modify traditions	When community leaders endorse changes

Source: *Author's synthesis.*

As summarized in Table 4, the evidence consistently shows that FNL interventions are most effective when combined

with economic empowerment, improved market access, and culturally responsive strategies, rather than implemented in isolation.

3.6 Discussion in Relation to Theory and Policy

These findings have important theoretical and policy implications. Theoretically, the conditional effectiveness of FNL supports a socio-ecological rather than purely individualistic model of dietary behaviour change (Story *et al.,* 2008). FNL does not operate in a vacuum; it is enabled or constrained by household income, gender relations, cultural norms, and food environments. Interventions based solely on knowledge transfer assume a rational actor model that does not account for structural barriers, an assumption that this review finds empirically unsupported in SSA contexts.

From a policy perspective, the results suggest that standalone nutrition education programs are likely to have limited impact unless integrated with broader poverty reduction and food system interventions. Several institutional reports have reached similar conclusions: the FAO (2020) and the Global Nutrition Report (2021) both emphasize that improving diets in SSA requires simultaneous investments in nutrition literacy, social protection (e.g., cash transfers, school feeding), agricultural diversification, and market infrastructure. As argued by Smith and Haddad (2015), the most successful nutrition interventions are those that address both the supply of (food availability) and demand for (literacy, preferences) healthy diets.

3.7 Limitations of the Evidence Base

Several limitations of the underlying evidence should be noted. First, the predominance of cross-sectional designs (75.4% of studies) precludes causal inference regarding whether FNL improves consumption or whether consumption contexts foster FNL. Second, the reliance on self-reported dietary data in most studies introduces recall and social desirability biases. Third, the heterogeneous measurement of FNL, ranging from validated scales to single-item proxies, limits comparability and meta-analytic synthesis. Fourth, geographic coverage within SSA is uneven, with East and West Africa overrepresented and Central Africa underrepresented. Finally, publication bias may exist, as null findings are less likely to be published. Future research should prioritize longitudinal designs, standardized FNL measurement tools validated for SSA contexts, and intervention studies that test integrated (FNL + economic) approaches.

5.0 Conclusions and Recommendations

This review conclusively demonstrates that food and nutrition literacy (FNL) is a necessary but insufficient condition for improving household food consumption in Sub-Saharan Africa. Across 61 studies, higher FNL was consistently associated with better dietary diversity, healthier food choices, and improved nutrition outcomes, but almost exclusively among households with adequate income, market access, and enabling socio-cultural environments. When these structural conditions are absent, as is the case for the majority of poor, rural, and food-insecure households in SSA, FNL alone fails to translate into improved diets. Empirically, this finding challenges the prevailing assumption in nutrition education interventions that knowledge deficits are the primary barrier to healthy eating. Instead, the evidence supports a socio-ecological model in which individual literacy is moderated by household economics, gender dynamics, cultural food norms, and physical food environments.

The practical pathways linking FNL to consumption, meal planning, food budgeting, purchasing practices, and preparation with hygiene, are each vulnerable to disruption by poverty, time constraints, limited market access, and unequal intra-household decision-making. These empirical insights carry three critical policy implications. First, standalone nutrition education programs are likely to have limited impact in resource-constrained settings; FNL interventions must be integrated with economic empowerment strategies, including cash transfers, livelihood support, and women's income-generating activities. Second, gender-transformative approaches are essential, improving women's FNL while leaving male-controlled household budgeting and food allocation norms unchanged will yield minimal dietary gains. Policies should therefore simultaneously strengthen women's access to nutrition information and their control over household financial resources. Third, improving FNL without improving food environments is ineffective; policy must invest in agricultural diversification, market infrastructure, and food supply chains that make diverse, nutritious foods available and affordable year-round, particularly in rural and peri-urban areas.

From a research perspective, future empirical work should prioritize longitudinal and intervention study designs to establish causality, develop and validate FNL measurement tools specifically for SSA contexts, and test integrated (FNL-plus-economic) intervention packages. Researchers should also expand geographic coverage to understudied regions of Central and Francophone Africa. In conclusion, for FNL to translate into sustained improvements in household food consumption in SSA, literacy interventions must be embedded within multisectoral strategies that simultaneously address poverty, gender inequality, cultural food practices, and structural food access constraints, shifting the paradigm from teaching households what to eat to enabling them to afford, access, and choose the diets to which they already aspire.

Declaration of Conflict of Interest

We hereby declare that there are no known competing financial interests or personal relationships that could have influenced the research and findings presented in this paper.

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