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School Health as a Mediator of Educational Quality in Public Primary Schools: A Desk Review of Research and Policy Evidence from Ethiopia's National School Health and Nutrition Strategy

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Abstract: *School health remains analytically underspecified as a mediating mechanism in Ethiopian education policy, despite its centrality to learning outcomes. This desk review examines how school health mediates the relationship between Ethiopia's National School Health and Nutrition Strategy (NSHNS) implementation and educational quality in public primary schools, drawing peer-reviewed articles, government documents, and organizational reports spanning global, African, and Ethiopian contexts (2015–2025). Guided by the Process Approach to Policy Analysis and four complementary theoretical frameworks, the study develops an original conceptual mediation model identifying four pathways — nutritional status, physical health, psychosocial well-being, and school attendance — through which NSHNS policy implementation produces educational quality outcomes. Findings confirm that while the NSHNS is architecturally robust, rural-urban infrastructure disparities, fragmented intersectoral governance, and inadequate intermediate outcome monitoring systematically constrain mediation pathway activation. The study advances a process-oriented policy evaluation framework transferable to analogous school health strategies across sub-Saharan Africa.*

Keywords: NSHNS; policy implementation; school health; educational quality; sub-Saharan Africa; primary education; Ethiopia

1. Introduction

Globally, the quality of education has emerged as one of the most pressing policy imperatives of the twenty-first century, constituting the cornerstone of Sustainable Development Goal 4 (SDG 4) and underpinning the realization of virtually all other development targets (Futures, 2021). While educational discourse has traditionally centered on pedagogical inputs — curriculum design, teacher quality, and physical infrastructure — a growing and convergent body of cross-disciplinary scholarship reveals that student health is an equally decisive, though systematically underappreciated, determinant of learning outcomes (UNESCO, UNICEF, 2023). Health shapes whether children attend school regularly, whether they can concentrate and engage in class, and whether they accumulate the cognitive foundations necessary for sustained academic progress. This recognition has catalyzed increasing policy attention toward school health programs as strategic levers for improving educational performance, particularly in low-income countries where health and education systems operate under persistent and compounding resource constraints. In Ethiopia — one of sub-Saharan Africa's most populous nations and among the world's most resource-constrained educational systems — the intersection of health and education is especially consequential. A substantial proportion of primary school-age children enter the classroom in nutritionally compromised, physically vulnerable, or psychosocially burdened states, conditions that fundamentally impair cognitive engagement, sustained attendance, and academic attainment (MoE, 2018; Eniyew, 2020). Responding to this reality, the Ethiopian government launched the National School Health and Nutrition Strategy (NSHNS) in 2012 — a comprehensive, multi-sectoral policy framework designed to embed health and nutrition interventions within the public primary education system through the joint stewardship of the Ministry of Education (MoE) and the Ministry of Health (MoH) (Strategy, 2012).

Despite more than a decade of implementation, a critical analytical gap persists in how the NSHNS and similar strategies are evaluated. Policy assessment in Ethiopia — as in many comparable settings — has predominantly adopted a linear, input-output framework that traces a direct path from policy implementation to educational outcomes, without adequately examining the intermediate mechanisms through which such outcomes are produced (FDRE, 2019). This analytical reductionism renders school health interventions invisible as process-level variables and obscures the causal pathways through which the NSHNS most plausibly influences educational quality. Specifically, school health has not been systematically conceptualized as a *mediating variable* — an intervening mechanism through which policy implementation translates into measurable learning improvements.

This desk review addresses that gap by synthesizing peer-reviewed journal articles, postgraduate dissertations and theses, government policy documents, and national and international organizational reports published over the

preceding decade. Drawing on the Process Approach to Policy Analysis (PAPA) framework as its analytical lens (Jareen, 2018), the study examines how school health functions as a mediator between NSHNS policy implementation and educational quality in Ethiopian public primary schools. By making the mediating role of school health analytically explicit, this study offers a theoretical contribution to education policy scholarship and a practical framework for evidence-informed policy reform in Ethiopia and comparable low-resource contexts.

1.1 Background and Policy Context

Educational quality in developing countries is shaped by a complex interplay of factors that extend well beyond classroom instruction. In Ethiopia, school-age children bear a disproportionate burden of nutrition-related vulnerabilities that constrain their capacity to benefit fully from primary education. Chronic undernutrition — including stunting, wasting, and micronutrient deficiencies — has been consistently associated with delayed cognitive development, reduced attention and concentration, and diminished academic performance among primary school learners (Eniyew, 2020; Mideksa et al., 2024) These nutritional effects are compounded by mental health burdens and psychosocial stressors arising from poverty, food insecurity, and social marginalization, all of which similarly impair learning readiness and undermine student resilience over time (Yorke et al., 2025).

The Ethiopian government has formally acknowledged the centrality of nutrition to sustainable national development. The Seqota Declaration of 2016, endorsed within the African Union Commission framework, represents a high-level political commitment to eliminating undernutrition among children under two years of age and among pregnant and lactating women by 2030 (FDRE, 2016). Implemented through the National Nutrition Program II (NNP II), the Declaration reflects a broader understanding that nutrition insecurity is not merely a health concern but a structural impediment to human capital formation, educational attainment, and long-term economic productivity. Despite these commitments, the prevalence of undernutrition remains persistently elevated across many regions of Ethiopia, with particularly severe manifestations in rural, pastoral, and food-insecure communities (Weldu, Abreham Habtemariam, et al.,2025).

Within this context, the school environment has been increasingly recognized as a critical access point for delivering integrated health and nutrition interventions to school-age children at scale. The NSHNS, formally launched in 2012 and jointly administered by the MoE and MoH, operationalizes this principle by institutionalizing school feeding programs, water, sanitation, and hygiene (WASH) services, health education, disease prevention, and psychosocial support within Ethiopia's public primary school system (Strategy, 2012). The school feeding component, in particular, functions simultaneously as a social safety net and a learning enabler — targeting chronically food-insecure households, reducing hunger-related absenteeism, and providing the nutritional conditions necessary for cognitive engagement (MoE, 2018). Recent UNICEF reporting on Ethiopia (UNICEF, 2025) notes incremental I improvements in child well-being indicators, attributing partial gains to multi-sectoral interventions of this nature.

Current evidence affirms that physical well-being, adequate nutrition, and psychosocial development are not peripheral to educational achievement but are foundational prerequisites for it. These health dimensions shape cognitive engagement, classroom participation, and sustained school attendance — the very processes through which educational quality is ultimately realized (Uno & Ogawa, 2025). In Ethiopian public primary schools, however, the contribution of the NSHNS to improving these intermediate health outcomes, and by extension to enhancing educational quality, has not been sufficiently examined or analytically specified (Solomon Shiferaw, et al., 2022) Systemic barriers — including fragmented intersectoral coordination between MoE and MoH, inadequate monitoring and evaluation systems, and pronounced resource disparities between urban and rural schools — continue to constrain the strategy's potential to convert health investments into measurable learning gains (Terefe & Asfaw, 2018; Weldu, Abreham Habtemariam, et al., 2025). This background establishes the rationale for examining school health as a mediator within the NSHNS policy framework.

1.2 Rationale for the Study

The rationale for this study emerges from three converging realities: the persistent health-education nexus in Ethiopian primary schooling, the limitations of prevailing policy evaluation approaches, and the absence of a mediation-oriented analytical framework for the NSHNS. Ethiopia's MoH has formally recognized that absent health and nutrition programs contribute directly to poor attendance, elevated dropout, and education wastage — particularly in rural communities (Republic, 2017) — and the school feeding program was introduced as a targeted response to mitigate food-related barriers among low-income households(Health, 2025). Yet despite more than a decade of implementation, the program's contribution to intermediate student health outcomes and, subsequently, to educational quality remains insufficiently documented and analytically underspecified within the Ethiopian policy literature.

Dominant policy evaluation approaches in Ethiopia treat educational quality as a direct product of implementation fidelity — measuring outputs such as enrollment figures and resource deployment — without interrogating the intermediate processes through which inputs generate learning outcomes (Declaration, 2021). This output-focused orientation systematically overlooks school health as a process-level variable, producing incomplete assessments of policy effectiveness and leaving the chain of health-related

intermediate variables through which outcomes are mediated largely unmeasured.

Third, the global evidence base increasingly confirms the value of school health interventions as investments in human capital with measurable educational returns. Research from comparable low-resource settings across sub-Saharan Africa demonstrates that well-implemented school health programs reduce absenteeism, improve cognitive readiness, and enhance the conditions for sustained academic engagement (Mideksa et al., 2024; Salisu et al., 2025; Garcia et al., 2025). Ethiopia's NSHNS was designed with precisely these outcomes in mind; yet the causal pathway through which the strategy's health components mediate educational quality has not been made analytically explicit in the existing literature. This study is therefore rationally necessary — both to close this conceptual gap and to provide a more nuanced, process-oriented evidence base for refining NSHNS policy in alignment with SDG 4.

1.3 Statement of the Research Gap

A substantial and growing body of global literature affirms that school feeding and health programs can produce transformative improvements in educational participation and learning performance, particularly among children in food-insecure and low-income settings (Watkins et al., 2024; Aurino et al., 2023). Since the formal launch of Ethiopia's NSHNS in 2012, a broad coalition of governmental and non-governmental actors has engaged in implementing its provisions — yielding a mixed record of achievements alongside persistent implementation challenges rooted in environmental, economic, social, and cultural factors (FDRE, 2019).

Despite this policy activity spanning more than a decade, a critical analytical gap persists. Policy frameworks in Ethiopia — as in many comparable LMIC contexts — continue to conceptualize the relationship between health and educational quality in direct, unmediated terms: policy implementation is assumed to produce educational outcomes without systematic attention to the intermediate variables through which this process operates. This analytical approach has several identifiable consequences: it renders school health interventions invisible as independent analytical constructs within policy evaluations; it directs monitoring and evaluation efforts toward output indicators rather than process outcomes; and it leaves unexplored the specific causal mechanisms — nutritional status, physical health, psychosocial well-being, and school attendance — through which the NSHNS may plausibly influence learning quality (Terefe & Asfaw, 2018; FDRE, 2019).

No existing study has explicitly conceptualized school health as a mediating variable within Ethiopia's primary education policy framework or developed a mediation-based analytical model mapping intermediate health-to-education pathways — a gap this study directly addresses by constructing an evidence-based conceptual mediation framework spanning global, African, and Ethiopian contexts.

2. Literature Review

The following section synthesizes evidence across three geographic tiers — global, sub-Saharan African, and Ethiopian — before examining specific evidence on each of the four proposed mediation pathways: nutritional status, physical health, psychosocial well-being, and school attendance.

2.1 Global Evidence: School Health and Educational Quality

At the global level, the relationship between student health and educational outcomes is among the most consistently supported findings in development research. The World Health Organization's (WHO) Health Promoting Schools framework established a foundational conceptual basis for this relationship, affirming that schools represent the most effective settings for delivering integrated health services to children and adolescents, with direct and measurable consequences for learning (UNESCO, 2021). This framework positions school health not as a welfare supplement to education but as a structural enabler of it — a framing that underpins the analytical demonstrated that school health interventions — encompassing feeding programs, deworming, WASH provision, and psychosocial support — generate significant improvements in school enrollment, attendance regularity, and cognitive performance (Watkins et al., 2024). A landmark global review by Aurino et al. (2023) documented that school feeding programs in LMICs produced average attendance increases of 4 to 8 percentage points and measurable gains in literacy and numeracy scores, effects that were most pronounced in food-insecure and nutritionally vulnerable populations. Similarly, UNESCO, (2022) in the World Bank's flagship report on school health and nutrition, argued compellingly that investment in school health programs yields returns across multiple SDG dimensions simultaneously — encompassing health equity, gender parity, poverty reduction, and learning quality.

The evidence further reveals that health-education integration is most effective when operationalized through structured, institutionalized policy frameworks rather than ad hoc programmatic interventions (Valois, 2011)

Intersectoral coordination between health and education ministries has been identified as a critical enabling condition for sustained impact, with fragmentation between sectors consistently cited as a key barrier to translating health investments into educational outcomes (Mokhtar et al., 2025). These global findings provide the overarching evidentiary context within which Ethiopia's NSHNS must be understood and evaluated.

Emerging scholarship has also begun to conceptualize school health through a human capital lens.

Donald A.P. Bundy, et al. (2022) demonstrated that health improvements during primary schooling yield measurable productivity gains in adulthood, reinforcing the long-term economic rationale for school health investment. Simultaneously, Social Determinants of Health (SDH) scholarship has underlined that educational quality is fundamentally embedded in the broader health environment, and that low-income children face structural health disadvantages that compound over time if left unaddressed through policy (Obwendo, 2025). Taken together, these global perspectives affirm that school health is a necessary, not optional, component of any serious strategy to improve educational quality in resource-constrained settings.

2.2 African Evidence: School Health in Sub-Saharan Africa

Sub-Saharan Africa (SSA) presents both the most acute manifestation of the health-education nexus and a rich, if heterogeneous, body of evidence on school health interventions and their educational consequences. Across the region, school-age children face overlapping burdens of undernutrition, infectious disease, inadequate WASH infrastructure, and psychosocial adversity — all of which converge to undermine educational participation and performance (Mideksa et al., 2024). In this context, school health programs have been increasingly deployed as multi-purpose policy instruments addressing health, nutrition, social protection, and educational equity simultaneously.

Evidence from Nigeria illustrates both the potential and the institutional challenges of school health implementation in the African context. School health programs in Nigerian public primary schools have been shown to meaningfully support student health maintenance and academic performance; however, inconsistent funding, inadequate teacher training, and weak monitoring systems have constrained their impact (Alafin et al., 2017; Capital, 2022). These structural barriers mirror those documented in Ethiopia's NSHNS, suggesting a region-wide pattern of policy ambition outpacing implementation capacity.

In the urban contexts of SSA — where rapid population growth has compounded the complexity of school health delivery — recent scholarship has underlined the need for context-sensitive approaches that account for the specific stressors faced by urban school-age populations (Donald A.P. Bundy, et al., 2022). School health programs in African LMICs are critical for enhancing the psychological, physical, and social well-being not only of students but also of teaching staff, reinforcing the school as a holistic health-promoting institution rather than merely a service delivery point.

WASH integration into school health programs has emerged as a particularly robust evidence area across SSA. Kar et al. (2025) demonstrated that behavior-centered WASH interventions embedded in early childhood and primary education programs significantly reduce the incidence of preventable diseases, thereby reducing health-related absenteeism and improving classroom engagement in low-resource settings. Similarly, Salisu et al. (2025) found that school health services supporting nutritional adequacy and hygiene practices are directly linked to the attainment of SDG targets on health, education, and gender equality — with girls showing particularly significant attendance and retention gains when WASH facilities are functional and safe.

A systematic review by (Mokhtar et al., 2025) while conducted in the Malaysian context, identified lessons with direct relevance to SSA settings: effective school health programs require strong teacher training, adequate resource allocation, clearly defined stakeholder roles, and robust collaboration between health and education authorities. The absence of these enabling conditions — all of which are documented challenges in Ethiopian and broader SSA school health implementation — substantially attenuates the health-to-education pathway. Karta et al. (2023) further observed that in economically disadvantaged school contexts across Africa, well-functioning school health programs catalyze a paradigm shift in student motivation and learning engagement, with effects extending beyond physical health to encompass a broadened sense of educational purpose and possibility.

2.3 Ethiopian Evidence: The NSHNS and Primary School Outcomes

Ethiopia's NSHNS represents one of the most ambitious school health policy frameworks in sub-Saharan Africa, designed to institutionalize a comprehensive set of health and nutrition interventions across the public primary school system through coordinated action by the MoE and MoH (Strategy, 2012). Launched formally in 2012, the strategy encompasses school feeding, micronutrient supplementation, deworming, WASH services, health education, psychosocial support, and community engagement — a multi-domain architecture that reflects an explicit recognition of the multi-dimensional relationship between health and educational quality.

The policy rationale for the NSHNS is grounded in the documented severity of nutrition insecurity among Ethiopian school-age children. Ethiopia faces malnutrition challenges deeply rooted in environmental, social, political, economic, and cultural factors, with key drivers including inadequate agricultural productivity, significant post-harvest losses, poor food safety practices, and deficient hygiene and sanitation infrastructure (FDRE, 2019). Despite sustained government effort — including the rollout of the National Nutrition Program (NNP) and the Seqota Declaration commitments — the persistence of stunting, thinness, and micronutrient deficiency among primary school children in rural and peri-urban areas represents a continuing structural impediment to educational attainment (Weldu, Abreham Habtemariam, 2025).

The school feeding program within the NSHNS has been progressively scaled up across Ethiopian public primary schools, functioning as a social safety net instrument targeting

children in chronically food-insecure areas and protecting them against the educational consequences of household food insecurity (MoE, 2018). Evidence indicates that students from low-income households who benefit from school meals demonstrate improved attendance patterns and greater cognitive engagement, suggesting that the feeding program operates as a meaningful bridge between nutritional deprivation and educational opportunity (FDRE, 2016). However, the contribution of the feeding program to advancing the nutritional status of primary school students specifically — and to educational quality more broadly — has not been sufficiently explored or rigorously evaluated in the Ethiopian policy literature (Solomon Shiferaw, 2022).

UNICEF's 2025 situational report on Ethiopian children notes some promising developments, particularly in multidimensional poverty reduction and improvements in select child health indicators. These gains are attributed partly to multi-sectoral health and nutrition programs operating at the school level. Nevertheless, critical systemic challenges persist. Fragmented intersectoral coordination between the MoE and MoH, pronounced urban-rural resource disparities in school health infrastructure, and inadequate monitoring and evaluation frameworks for health-education linkages collectively constrain the NSHNS's capacity to translate its multi-domain design into consistent improvements in student health and educational performance (Terefe & Asfaw, 2018; Cai et al., 2025)

Eniyew (2020) provided direct Ethiopian evidence that child undernutrition is a foundational driver of delayed cognitive development and academic underachievement in primary school settings — reinforcing the theoretical premise that nutritional health is a mediating variable rather than merely a contextual factor. Terefe & Asfaw (2018) further documented that school absenteeism in Ethiopian primary schools is significantly determined by health-related factors, with nutritional deficiency and illness identified as primary drivers of chronic absence and subsequent dropout. These Ethiopian findings constitute a critical evidence foundation for the mediation framework proposed in this study.

2.4 Evidence on the Four Mediation Pathways

The conceptual mediation model developed in this study posits four school health domains as intermediate variables through which NSHNS policy implementation produces educational quality outcomes. The following sub-sections synthesize the available evidence on each pathway, drawing on global, African, and Ethiopian literature to establish the empirical plausibility and policy relevance of each mediating mechanism.

2.4.1 Nutritional Status and Learning Outcomes

The relationship between nutritional status and academic performance is among the most extensively documented in development health research. Adequate nutrition — encompassing sufficient caloric intake, protein quality, and micronutrient availability — is a prerequisite for healthy brain development, cognitive function, memory consolidation, and sustained attention, all of which are foundational to effective learning (Eniyew, 2020 ;Aurino et al., 2023). Conversely, undernutrition during the primary school years produces measurable deficits in cognitive processing speed, working memory, and academic test performance, with effects that are particularly severe and lasting when nutritional deprivation occurs during early childhood and persists into the school years (Mideksa et al., 2024).

In Ethiopia, chronic undernutrition remains the predominant public health challenge in many regions, with stunting and thinness disproportionately concentrated in rural and pastoralist communities (Weldu, Abreham Habtemariam et al., 2025). School feeding programs within the NSHNS framework address this pathway directly by providing daily meals that improve the caloric and micronutrient status of food-insecure students, thereby creating the nutritional conditions necessary for cognitive engagement and sustained classroom participation (MoE, 2018). The NSHNS also incorporates micronutrient supplementation — particularly iron, vitamin A, and iodine — targeting deficiencies with well-documented consequences for cognitive development and school performance.

Global evidence further confirms that the nutritional mediation pathway is particularly powerful when school feeding is implemented with nutritional quality standards and sustained consistently across the school year (Watkins et al., 2024). Short-term or nutritionally inadequate feeding programs produce more modest effects, underscoring the importance of implementation fidelity to the realization of this mediation pathway. For the NSHNS, this finding highlights the criticality of sustained funding, supply chain reliability, and nutritional quality assurance as enabling conditions for the nutritional status mediator to function effectively.

2.4.2 Physical Health and School Performance

Physical health constitutes the second mediation pathway through which the NSHNS influences educational quality. Illness, parasitic infection, and inadequate sanitation are primary drivers of school absenteeism and reduced learning capacity in low-income primary school settings, as they both remove students from the learning environment and impair cognitive functioning even when children are physically present in class (Kar et al., 2025; Solomon Shiferaw et al., 2022). In Ethiopia, the burden of infectious and parasitic disease — including soil-transmitted helminthiasis, malaria in endemic regions, and waterborne illness linked to inadequate WASH — represents a significant and measurable impediment to educational participation and performance.

The NSHNS addresses the physical health pathway through a cluster of disease prevention and health promotion interventions, including deworming programs, immunization support, basic health screening, and the provision of

functional WASH infrastructure in schools (Strategy, 2012). Evidence from comparable sub-Saharan African settings demonstrates that these interventions, when implemented consistently and at scale, produce significant reductions in illness-related absenteeism and corresponding improvements in class participation and academic attainment (Kar et al., 2025; Garcia et al., 2025). Uno & Ogawa (2025) further documented that primary school attendance — itself shaped by physical health status — is significantly associated with literacy, numeracy, and broader approaches to learning, confirming the functional chain from physical health to attendance to academic performance.

In Ethiopia, however, the physical health pathway is constrained by pronounced inequities in school health infrastructure. Rural schools frequently lack functional latrines, handwashing stations, and safe water sources — conditions that undermine WASH interventions and create persistent disease transmission risks within the school environment (Weldu, Abreham Habtemariam et al., 2025). The NSHNS's physical health mediation pathway can therefore only be fully activated in contexts where adequate infrastructure is in place, making infrastructure investment a necessary enabling condition for policy effectiveness in this domain.

2.4.3 Psychosocial Well-Being and Academic Engagement

Psychosocial well-being constitutes the third — and perhaps most underappreciated — mediation pathway linking school health to educational quality. A growing body of evidence demonstrates that students' mental health, emotional security, social connectedness, and sense of belonging within the school environment are powerful determinants of academic motivation, classroom engagement, and learning persistence (Yorke et al., 2025). Psychological distress — arising from poverty, food insecurity, domestic violence, displacement, or social marginalization — impairs executive function, reduces working memory capacity, and undermines the self-regulatory skills necessary for effective learning.

In the Ethiopian primary school context, psychosocial stressors are prevalent and multi-dimensional. Children from food-insecure households frequently experience shame, social exclusion, and reduced self-efficacy related to hunger and material deprivation, creating emotional barriers to learning that persist independently of nutritional or physical health status (UNICEF, 2025). The NSHNS addresses this pathway through psychosocial support services — including school-based counselling, teacher training in child-centered and trauma-informed pedagogy, and community engagement programs designed to reduce stigma and build inclusive school environments (Strategy, 2012).

Global Health Promotion Theory explicitly frames psychosocial well-being as a core dimension of health and a prerequisite for educational participation and achievement (Valois, 2011). This framing positions psychosocial support not as a peripheral pastoral service but as a strategically necessary component of any comprehensive school health program. Garcia et al. (2025) confirmed that school health programs in African settings that incorporate psychosocial dimensions produce measurably superior educational outcomes compared to programs focused exclusively on nutritional or physical health components, suggesting a synergistic rather than additive relationship among the mediation pathways.

The psychosocial mediation pathway is particularly relevant in the Ethiopian context given the significant mental health consequences of chronic food insecurity, displacement, and exposure to adverse childhood experiences. Strengthening the psychosocial component of the NSHNS — through targeted counselling, teacher capacity development, and community partnership — therefore represents a high-leverage opportunity to enhance the strategy's educational impact beyond what nutrition and physical health interventions alone can achieve.

2.4.4 School Attendance as a Mediating Variable

School attendance occupies a distinctive analytical position in this mediation framework, functioning simultaneously as an outcome of the three preceding health mediators and as a proximate determinant of educational quality. Students who are nutritionally deprived, physically ill, or psychosocially burdened are at substantially elevated risk of chronic absenteeism and dropout — and it is through their absence from the learning environment that health deficits translate most directly into educational performance deficits (Terefe & Asfaw, 2018; Uno & Ogawa, 2025).

In Ethiopia, absenteeism and dropout rates in public primary schools are closely correlated with health and nutrition indicators. Terefe & Asfaw (2018) documented that hunger-related absenteeism is particularly prevalent in food-insecure rural communities, where children miss school to seek food, assist in household food production, or because they are too malnourished to walk to school or sustain attention through the school day. The NSHNS's school feeding program directly targets this attendance barrier by providing an educational incentive — the guaranteed daily meal — that increases the private return to school attendance for food-insecure households (MoE, 2018).

Uno & Ogawa (2025) confirmed that attendance is significantly associated with literacy, numeracy, and broader learning dispositions — mediated by health and nutritional status — reinforcing attendance as the penultimate causal variable through which improvements in the three preceding health mediators are converted into sustained educational quality gains. Current output-focused NSHNS evaluation systems measure enrollment and completion rates without capturing attendance regularity and engagement quality; introducing health-conditional attendance tracking linked to intervention delivery would provide a more sensitive, actionable process indicator for mediation pathway assessment (FDRE, 2019;UNESCO, 2022).

2.5 Theoretical Synthesis: Grounding the Mediation Framework

The evidence synthesized across Sections 2.1 through 2.4 converges on a theoretically coherent and empirically grounded mediation model, underpinned by four complementary frameworks — Health Promotion Theory, the Social Determinants of Health framework, Human Capital Theory, and Bronfenbrenner's Ecological Systems Theory — that collectively justify and illuminate the pathways through which school health mediates educational quality.

Health Promotion Theory Valois (2011) establishes the normative foundation: school health is both a right and a structural enabler of learning, requiring intersectoral policy coordination for its full realization. The Social Determinants of Health framework demonstrates that educational quality cannot be meaningfully separated from the broader health environment, particularly for children living in low-income settings characterized by multiple overlapping deprivations (Obwendo, 2025). Human Capital Theory provides the economic rationale: investment in student health and nutrition yields measurable returns in cognitive capacity, productivity, and long-term educational attainment, with effects that compound across the life course (Fix et al., 2021; Wuttaphan, 2017). Ecological Systems Theory contextualizes the mediation model within the multi-layered institutional environment in which school health operates — from the classroom microsystem to the national policy macrosystem — explaining how the NSHNS, when coherently aligned across these levels, can create synergistic effects on educational quality that no single-level intervention could achieve alone (Crawford, 2020).

Together, these theoretical frameworks affirm that school health is not an ancillary educational input but a structurally necessary mediating mechanism — one whose analytical visibility is a prerequisite for evidence-informed NSHNS policy reform. Figure 1 presents the complete conceptual mediation model mapping the functional relationships among policy implementation, the four school health mediators, educational quality outcomes, and the moderating contextual variables conditioning pathway effectiveness.

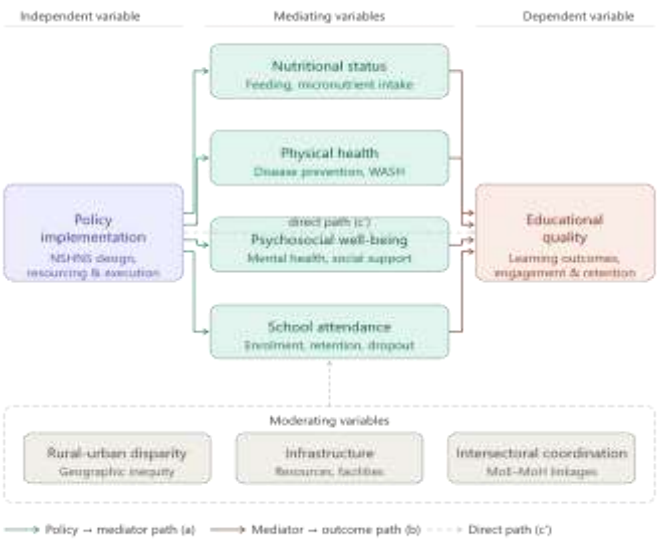

Figure 1. Conceptual mediation framework: functional linkages between NSHNS policy implementation, school health mediators, and educational quality in Ethiopian public primary schools. Source: Author (2026).

3. Objectives of the Study

The overarching objective of this study is to critically examine the mediating role of school health within Ethiopia's NSHNS framework and to assess how this mediation influences learning outcomes, student engagement, and retention in public primary schools. Four specific objectives guide the inquiry:

Four Specific Objectives

1. To examine the extent and implications of health and nutrition intervention integration within Ethiopia's NSHNS primary education policy framework.
2. To analyze how intersectoral coordination gaps among governmental ministries, communities, and development partners moderate school health mediation pathway effectiveness.
3. To synthesize global, African, and Ethiopian evidence on the contributions of four school health mediators — nutritional status, physical health, psychosocial well-being, and school attendance — to primary school educational quality.
4. To develop an original conceptual mediation framework rendering health-to-education causal pathways analytically explicit, thereby informing process-oriented NSHNS monitoring, evaluation, and reform.

4. Scope, Delimitation, and Limitations

4.1 Scope and Delimitation

This study is delimited to Ethiopia's NSHNS as implemented within the public primary school sector, focusing on four

analytically identified mediation pathways — nutritional status, physical health, psychosocial well-being, and school attendance. Secondary sources include peer-reviewed articles, dissertations, MA theses, government documents, and organizational reports published between 2015 and 2025, with selective inclusion of foundational pre-2015 works; sources were reviewed in English only, which may limit capture of Ethiopian research published in national languages. Primary data collection and quantitative methods are outside the scope of this review

4.2 Limitations

Five limitations are acknowledged: reliance on publicly available secondary sources — notably the absence of published NSHNS implementation evaluations at the woreda and school levels — limits disaggregated local precision; grey literature and unpublished institutional reports may not be fully captured; reliance on peer-reviewed literature introduces publication bias toward positive findings; the absence of standardized school health mediation indicators limits causal pathway precision; and the single national policy context constrains transferability of the framework to other low-income country settings pending future comparative empirical validation. These limitations notwithstanding, the conceptual mediation framework provides a rigorous foundation for future primary empirical investigation.

3. Methodology

3.1 Research Design

This study employs a qualitative desk review methodology — involving the systematic collection, critical appraisal, and analytical synthesis of secondary data from published and institutional sources (Valois, 2011) — to examine the mediating role of school health within Ethiopia's NSHNS framework through multi-source evidence synthesis rather than primary data generation. The study is guided by the Process Approach to Policy Analysis (PAPA) framework (Jareen, 2018) which examines policies not as static documents but as dynamic processes involving design, implementation, stakeholder interaction, and outcome generation — an analytical lens particularly suited to this study's objectives because it foregrounds the intermediate mediation pathways that existing output-focused NSHNS evaluations have systematically overlooked, and within which school health is positioned as a process-level mediating variable converting policy implementation into educational quality outcomes.

3.2 Data Sources and Inclusion Criteria

The desk review draws on four secondary source categories: peer-reviewed journal articles and book chapters (2015–2025, with selective inclusion of foundational pre-2015 works); postgraduate dissertations and MA theses on school health, nutrition policy, or educational quality in Ethiopian and comparable sub-Saharan African contexts; Ethiopian federal and regional government policy documents, strategic plans, and official reports (Republic, 2017); and reports and programmatic evaluations from international organizations including UNICEF, WHO, and WFP. Sources were selected against four criteria — relevance to school health or educational quality in primary settings, contextual applicability to Ethiopia or comparable low-income country contexts, public domain availability in English, and sufficient methodological transparency for critical appraisal — and organized following a deliberate global-to-Africa-to-Ethiopia funnel structure ensuring contextual specificity is built cumulatively.

3.3 Analytical Approach

The analysis followed three sequential stages: data extraction, in which relevant content was identified and coded around the four mediation pathways and three moderating variables; thematic synthesis, in which extracted evidence was analyzed for patterns of convergence, divergence, and complementarity across global, African, and Ethiopian literature (Thomas & Harden, 2008) and framework development, in which synthesized evidence was used to construct the conceptual mediation model presented in Figure 1. Throughout, the PAPA framework's process orientation guided analysis — examining not only what the NSHNS intends to achieve but how its health components function as intermediate mechanisms in the policy-to-education causal chain.

3.4 Methodological Rigor and Trustworthiness

Rigor and trustworthiness are ensured through three principles: transparency — maintained through an explicit, auditable account of data sources, inclusion and exclusion criteria, and synthesis procedures; conceptual clarity — ensured by grounding all analytical claims in the theoretical framework and consistently distinguishing mediating from moderating variables throughout; and triangulation — achieved by drawing on epistemologically diverse source types including peer-reviewed scholarship, government policy documents, and institutional reports to cross-verify findings and minimize interpretive bias (Lincoln, 2011).

3.5 Ethical Considerations

This study is entirely desk-based and involves no human subjects. All data were derived from publicly available sources — including government policy documents, institutional strategies, and organizational reports — and all sources are accurately and transparently cited in accordance with the ethical standards governing secondary data-based policy research. No confidential or personally identifiable information was accessed at any stage.

4. Results and Discussion

4.1 Overview of Findings

The evidence synthesis provides compelling support for conceptualizing school health as a critical mediating mechanism between NSHNS policy implementation and educational quality in Ethiopian public primary schools.

Across all four pathways examined, three overarching patterns emerge: the NSHNS is architecturally robust — its multi-domain design comprehensively addresses the primary health barriers to educational quality documented in the empirical literature; implementation quality is the decisive variable — mediation pathway activation depends heavily on implementation fidelity, intersectoral coordination, and resource adequacy, all of which vary significantly across Ethiopian school contexts; and contextual moderation is pervasive — rural-urban infrastructure disparities, MoE–MoH governance fragmentation, and inadequate monitoring and evaluation systems collectively constrain the strategy's ability to translate design ambitions into consistent educational gains (Geda et al., 2024; Cai et al., 2025) These findings are summarized in Table 1 and elaborated thematically in the sub-sections that follow.

Table 1. Summary of Research Foci, Key Findings, and Policy Implications

Research Focus	Key Strengths Identified	Key Limitations Identified	Critical Gaps
1. Policy, system & implementation context	Strong policy presence, global SDG alignment; multi-sectoral framework; MoH–MoE–MoY collaboration (Geda et al., 2024 ;Obwendo, 2025; Ministry of Education, 2018)	Persistent implementation gaps; weak capacity, poor coordination, fragmented governance, inadequate infrastructure; policies yield modest or short-lived impacts (Geda et al., 2024; Cai et al., 2025; Aldersey et al., 2025)	Limited system-level and longitudinal evidence linking NSHNS implementation to school health and educational quality outcomes (Goshu et al., 2023).
2. School health & nutrition interventions	Multi-component interventions (nutrition, feeding, mental health, WASH, participation) improve attendance, cognition, equity, and learning readiness; strongest effects when school–community linkages are strong (Ayele et al., 2025; Geda et al., 2024)	Inconsistent effectiveness; single-component interventions often weak; impacts vary by geography, seasonality, and socioeconomic status; 38% stunting rate persists (Madduri, 2018; Ayele et al., 2025)	Lack of scalable, context-sensitive models; insufficient longitudinal and causal evidence on system-wide nutritional and educational impact in Ethiopia
3. School health as mediating mechanism	Converging evidence that physical, nutritional, psychological, and attendance dimensions directly shape cognition, motivation, and engagement; emerging mediation pathway evidence (Eniyew, 2020; Yorke et al., 2025)	Mediation largely implicit rather than empirically tested; health dimensions treated in isolation; measurement inconsistency limits causal inference (Asadi et al., 2025; Griebler et al., 2014)	Absence of integrated mediation framework unifying all four health dimensions; no unified model linking indirect effects of school health to educational quality
4. Educational quality within socioeconomic context	Enhanced health and early interventions increase learning outcomes, attendance, and equity —	Persistent inequalities (gender norms, poverty, disability, food insecurity) constrain learning	Limited integration of socioeconomic moderators into health-education models; absence of

	especially for disadvantaged groups; outcomes shaped by income, parental education, and school environment (Geda et al., 2024).	gains; benefits often uneven; rural food and nutrition programs show varying effectiveness (Ayele et al., 2025; Yorke et al., 2025)	equity-sensitive monitoring linking school health interventions to quality of education outcomes

Source: Author synthesis (2026) based on desk review evidence.

4.2 Physical Health as a Mediating Pathway

Physical health is a foundational mediating pathway through which NSHNS implementation influences educational quality. Disease prevention, hygiene promotion, deworming, vaccination, and WASH provision — the strategy's core physical health components — directly reduce illness-related absenteeism and create physiological conditions necessary for sustained cognitive engagement, grounded theoretically in Health Promotion Theory (Strategy, 2012; Valois, 2011).

Where physical health interventions are effectively implemented, measurable reductions in absenteeism and improvements in classroom engagement are documented across sub-Saharan African contexts (Kar et al., 2025; Garcia et al., 2025). However, a critical Ethiopian constraint persists: rural public primary schools frequently lack clean water, functional latrines, and medical supplies — infrastructure deficits that directly negate WASH and disease prevention interventions (Weldu, Abreham Habtemariam et al., 2025). Physical health mediation is therefore not automatic but contingent on enabling infrastructure, making such investment a necessary precondition for pathway activation, not an optional measure.

Multi-country evidence confirms that school health programs integrating physical health with WASH infrastructure produce significantly greater attendance and learning gains than health education interventions alone (UNESCO, 2022) — underscoring that infrastructure is the decisive variable translating physical health policy into educational outcomes.

4.3 Nutritional Status as a Mediating Pathway

Nutritional status is the most empirically substantiated of the four mediation pathways. Students with improved nutritional status — achieved through school feeding and micronutrient supplementation — demonstrate higher energy levels, sustained concentration, and stronger academic performance, consistent with Human Capital Theory (Becker, 1964; ENN, 2021). Within the NSHNS framework, school feeding simultaneously functions as a nutritional intervention and social protection mechanism, reducing hunger-related barriers to attendance among food-insecure households (MoE, 2018; FDRE, 2016).

International evidence corroborates this pathway strongly. School feeding in Ghanaian primary schools produced measurable mathematics and literacy gains after two years, with above-average achievement gains for girls (Aurino et al., 2023) — findings directly relevant to Ethiopia's gender equity dimensions. Bundy et al. Bundy et al., (2024) similarly confirmed that school meal programs are among the most consistently documented drivers of girls' attendance and retention globally.

Despite this foundation, nutrition's practical mediation impact in Ethiopia is constrained by accountability gaps between MoE and MoH, supply chain inconsistencies, absent nutritional quality assurance protocols, and targeting mechanisms that frequently fail to reach the most vulnerable students (Solomon Shiferaw et al., 2022;Geda et al., 2024). Ethiopia's persistently high stunting rate — estimated at 38% of children — reflects the severity of the nutritional challenge the NSHNS must overcome to fully activate this pathway (Madduri, 2018).

4.4 Psychosocial Well-Being as a Mediating Pathway

Psychosocial well-being represents the most theoretically rich yet practically underinvested of the four mediation pathways. Student mental health, emotional security, and social connectedness function as highly influential mediators of academic motivation, classroom engagement, and learning persistence across Ethiopian, African, and global contexts (Yorke et al., 2025 ;Garcia et al., 2025).

Two theoretical frameworks ground this pathway. The Social Determinants of Health model establishes that psychological well-being is shaped by poverty, food insecurity, and social exclusion — conditions prevalent among Ethiopian primary school students (Marmot, 2005). Ecological Systems Theory further explains how supportive relationships within the school mesosystem are essential enabling conditions for psychosocial mediation to function effectively (Crawford, 2020).

Despite its theoretical salience, the NSHNS psychosocial component remains limited and inconsistent in practice — particularly in rural schools where trained counsellors are rare, trauma-informed pedagogy is minimal, and community engagement is underdeveloped (Asadi et al., 2025). Evidence confirms that student participation in school health program design and evaluation significantly amplifies psychosocial outcomes — a participatory principle the NSHNS's top-down structure currently fails to incorporate (Griebler et al., 2014). Strengthening this pathway represents a high-leverage opportunity to enhance educational impact beyond what nutrition and physical health interventions alone can achieve.

4.5 School Attendance as a Mediating Pathway

School attendance occupies a distinctive analytical position in this framework — functioning simultaneously as an outcome of the three preceding health mediators and as the most proximate variable through which cumulative health improvements translate into sustained educational quality gains.

In the Ethiopian context, health-related absenteeism is a primary driver of poor educational outcomes. Hunger-related absence — driven by inability to sustain cognitive function through the school day without food — is among the most prevalent forms of absenteeism in food-insecure Ethiopian communities (Terefe & Asfaw, 2018). The NSHNS school feeding program directly targets this barrier by providing a daily educational incentive that increases household-level returns to regular school attendance, particularly for children from the lowest income quintiles.

However, attendance as a mediation pathway is moderated by factors beyond school health interventions — including child labor, seasonal agricultural obligations, household poverty, and gender-based barriers, particularly for girls in rural Ethiopia (Geda et al. 2024; Aldersey et al., 2025) This finding underlines a critical policy implication: maximizing attendance as a mediation pathway requires the NSHNS to be embedded within a broader social protection framework addressing socioeconomic determinants of absenteeism alongside health determinants.

Globally, this pathway is well corroborated — school meal programs reach approximately 80 million children across 31 countries in Latin America and the Caribbean, with documented improvements in enrollment, retention, and gender parity mediated through the attendance channel (Solomon Shiferaw, 2022).

4.6 Policy Critique of the NSHNS Framework

A critical appraisal of the NSHNS strategy document reveals four structural design gaps that directly constrain mediation pathway activation — limitations requiring deliberate policy reform rather than incremental implementation adjustment.

First, the strategy lacks an explicit MEL framework with defined KPIs for intermediate health outcomes, making it structurally impossible to assess whether mediation pathways are functioning, identify where activation is failing, or attribute educational quality improvements to specific interventions. Without an accountability framework, neither policy success nor failure can be systematically recognized or corrected (FDRE, 2019).

Second, the document provides insufficient political economy analysis — neglecting the power dynamics, institutional incentives, and resource negotiation processes governing MoE–MoH coordination across federal, regional, woreda, and school levels. This gap directly contributes to the persistent coordination failures — inactive partner participation, unclear accountability lines, and inadequate school-level resourcing — that this study's moderating variables capture (Geda et al., 2024; Democratic & Of, 2019).

Third, the strategy's predominantly top-down formulation insufficiently incorporated the contextual knowledge of school communities, teachers, students, and local administrators. Consequently, school-level personnel remain inadequately aware of strategy objectives, targeting mechanisms fail to reach the most vulnerable students, and feeding program quality is inadequately protected at the local level (Asadi et al., 2025).

Fourth, while the strategy proposes committee structures and delegated responsibilities, it establishes no clear local-level accountability mechanisms. This underdeveloped communication chain creates persistent awareness gaps between national designers and woreda- and school-level implementers that systematically undermine implementation fidelity (Mokhtar et al., 2025).

5. Conclusion

This desk review examined the mediating role of school health within Ethiopia's NSHNS and its influence on educational quality in public primary schools, establishing three principal conclusions.

First, school health is an analytically necessary mediating variable — not a contextual complement — in the NSHNS policy-to-education causal chain. The four pathways examined — nutritional status, physical health, psychosocial well-being, and school attendance — are distinct yet functionally interconnected mechanisms through which policy implementation produces educational quality outcomes (Eniyew, 2020; Kar et al., 2025; Yorke et al., 2025; Uno & Ogawa, 2025).

Second, the NSHNS is architecturally robust but operationally constrained. Three moderating factors — rural-urban infrastructure disparities, fragmented MoE–MoH governance, and inadequate intermediate outcome monitoring — systematically prevent the mediation pathways from functioning at designed capacity across Ethiopia's diverse school contexts (Geda et al., 2024; Cai et al., 2025 ;Weldu, Abreham Habtemariam et al., 2025)).

Third, improving educational quality in low-resource settings requires a fundamental shift from linear input-output evaluation toward process-oriented frameworks that render intermediate health variables analytically visible and policy-actionable. The conceptual mediation model developed here is transferable beyond Ethiopia to analogous school health strategies across sub-Saharan Africa where the health-education nexus remains under analyzed (Obwendo, 2025; Salisu et al., 2025).

Ethiopia's NSHNS provides a valuable institutional foundation for leveraging school health as a driver of educational quality. Realizing this potential depends on addressing governance, resourcing, and monitoring gaps —

and embedding a mediation-aware analytical framework at the center of NSHNS policy evaluation and reform.

6. Recommendations

6.1 Policy Recommendations

Based on the findings of this desk review, five evidence-grounded recommendations are directed at Ethiopian federal and regional policymakers, MoE and MoH leadership, and development partners supporting the NSHNS.

First, the most urgent structural reform is the development of a Monitoring, Evaluation, and Learning (MEL) framework with standardized indicators tracking intermediate health outcomes — nutritional status, illness-related absenteeism, psychosocial well-being, and attendance regularity — alongside conventional output measures. Without such indicators, the causal contribution of school health to educational quality remains unmeasurable. Development partners including UNICEF, WHO, and WFP should provide aligned technical assistance.

Second, ring-fenced budgetary allocations dedicated to school health infrastructure — clean water, functional latrines, and medical supplies — are a necessary precondition for activating physical health and WASH mediation pathways equitably across rural and urban schools. School infrastructure investment must be classified as an educational, not merely a health, expenditure (UNESCO, 2022).

Third, persistent MoE–MoH governance fragmentation must be addressed through formal joint coordination mechanisms with defined responsibilities, shared accountability frameworks, and regular monitoring protocols, accompanied by decentralized NSHNS oversight to the woreda and school levels (Asadi et al., 2025; Republic, 2017).

Fourth, the psychosocial well-being pathway — the most systematically underinvested mediation mechanism — requires scaled-up school-based counselling, trauma-informed teacher training, and structured community engagement programs, prioritizing girls, food-insecure children, and students in conflict-affected areas (Yorke et al. 2025; Garcia et al., 2025)

Fifth, future NSHNS revisions should adopt participatory formulation processes engaging school communities, teachers, students, and local administrators as co-designers, with policy documents translated and contextualized at the woreda and school levels and structured upward feedback mechanisms institutionalized (Griebler et al., 2014; Mokhtar et al., 2025)

7. Future Research Agenda

This desk review establishes a conceptual mediation framework for understanding school health as a mediator of educational quality in Ethiopian public primary schools, while identifying five priority directions for future empirical investigation.

First, longitudinal studies employing structural equation modeling (SEM) with nationally representative Ethiopian primary school samples are needed to empirically test and quantify the hypothesized mediation pathways, transforming the conceptual framework developed here into an empirically validated policy evaluation instrument (Thomas & Harden, 2008).

Second, mixed-methods designs combining quantitative mediation testing with qualitative investigation of implementation processes across urban, rural, pastoral, and conflict-affected Ethiopian school contexts would capture both the magnitude and mechanisms of school health mediation with contextual precision that quantitative approaches alone cannot achieve.

Third, comparative cross-national research across sub-Saharan African countries at different stages of school health policy development would enable cross-validation and generalization of the Ethiopian mediation framework and identify context-specific moderating factors this single-country review necessarily leaves underexplored (Obwendo, 2025; Salisu et al., 2025).

Fourth, equity-focused research examining differential mediation pathway effects by gender, geographic location, disability status, and household income quintile is needed to ensure future NSHNS reform prioritizes the groups — particularly girls, rural students, and children from the lowest income quintiles — for whom mediation pathway activation is most structurally constrained (Geda et al., 2024; Ayele et al., 2025).

Fifth, policy implementation science research examining the political economy of NSHNS governance — including incentive structures, power dynamics, and coordination failures driving MoE–MoH fragmentation — would provide the implementation-level evidence needed to inform governance reform beyond strategic design (Cai et al., 2025; Asadi et al., 2025).

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Conflict of Interest

The author declares that there are no conflicts of interest regarding the publication of this paper.

Data Availability Statement

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Author Contributions

The author confirms sole responsibility for the following: study conception and design; data collection and source selection; analytical framework development; thematic synthesis; manuscript drafting; critical revision; and final approval of the version submitted for publication.

Declaration of Generative AI Use in Scientific Writing

During the preparation of this manuscript, the author utilized AI-assisted writing tools including Quillbot, Claude, and Gemini to support language editing and readability improvement. Following the use of these tools, the author reviewed, critically evaluated, and substantively revised all AI-assisted content. The author takes full and sole responsibility for the intellectual integrity, analytical accuracy, and originality of the final published work. AI tools were used solely for language support and did not contribute to study design, data collection, analysis, or the development of the conceptual framework.

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