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Does Household Consumption Expenditure Improve Health Outcomes of Countries in Sub-Saharan Africa?

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Abstract

Despite gradual economic expansion and rising household expenditure across many countries in Sub-Saharan Africa (SSA), the region continues to experience poor health outcomes characterized by low life expectancy and high under-five mortality rates. This persistent disconnect raises concerns regarding whether increases in household consumption expenditure meaningfully translate into improved population health outcomes. Consequently, this study examined the effect of household consumption expenditure on health outcomes in SSA. Specifically, the study assessed the effect of household consumption expenditure on life expectancy and under-five mortality using panel data for 27 SSA countries covering the period 2000–2024. The study adopted a positivist research philosophy and a longitudinal non-experimental panel research design. Secondary data were obtained primarily from the World Bank World Development Indicators database. Panel econometric techniques including fixed and random effects models were employed, with the Hausman specification test guiding model selection. Relevant diagnostic tests were conducted to ensure robust and valid estimations. The findings revealed that household consumption expenditure had a statistically insignificant effect on life expectancy ($\beta = -0.00017,\ p > 0.10$), implying that variations in aggregate household expenditure did not meaningfully influence longevity across the sampled countries. However, household consumption expenditure exhibited a weak positive and statistically significant effect on under-five mortality at the 10 percent level ($\beta = 0.00228,\ p < 0.10$), suggesting that increases in aggregate consumption expenditure did not necessarily translate into improved child survival outcomes. The study concluded that household consumption expenditure alone is insufficient to guarantee improvements in population health outcomes in Sub-Saharan Africa. The findings imply that the health effects of household expenditure depend on the composition, efficiency, and allocation of expenditure toward health-enhancing goods and services, alongside the broader institutional and healthcare environment. The study recommends strengthening social protection systems, improving healthcare accessibility, expanding universal health coverage,

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and promoting nutrition-sensitive and child-focused interventions to ensure that household expenditure contributes to meaningful and sustained improvements in population health outcomes.

Keywords: Household consumption expenditure; Health outcomes; Life expectancy; Under-five mortality; Sub-Saharan Africa.

1. Introduction

Health outcomes remain among the most important indicators of human development because they reflect both the well-being of populations and the effectiveness of national health systems. Indicators such as life expectancy, child survival, and disease burden are widely used to evaluate the extent to which societies are able to provide conditions necessary for healthy living. The World Health Organization emphasizes that improvements in health outcomes are not solely dependent on healthcare services but are also shaped by broader socioeconomic and environmental conditions that determine people's ability to access and utilize health-enhancing resources (WHO, 2023). Similarly, Marmot and Allen (2020) argued that health inequalities are strongly linked to social and economic disparities that influence access to healthcare, nutrition, and healthy living conditions. In many low- and middle-income countries, persistent inequalities in income distribution, inadequate infrastructure, and weak health financing systems continue to undermine progress toward better population health outcomes (UNDP, 2022).

Within health economics literature, household consumption expenditure has increasingly emerged as an important dimension of purchasing power because it reflects the actual ability of households to translate income into welfare-enhancing goods and services. Unlike income, which measures potential economic capacity, consumption expenditure reflects realized living standards and spending behavior. Mishra and Narayan (2022) observed that purchasing power directly influences the extent to which households can access health-related services and commodities. Likewise, the Organisation for Economic Co-operation and Development emphasized that higher purchasing power enables households to access better nutrition, preventive healthcare, and quality treatment services (OECD, 2023). Conversely, weakened purchasing power often results in delayed treatment, poor dietary quality, and reduced preventive healthcare utilization, thereby worsening health outcomes (WHO, 2023).

The relationship between household consumption expenditure and health outcomes is strongly grounded in health economics theory, particularly Grossman's health capital model and the Permanent Income and Life Cycle hypotheses. Grossman (1972) conceptualized health as both a consumption and investment good, arguing that individuals allocate resources toward healthcare, nutrition, and other health-enhancing activities in order to maximize lifetime utility and productivity. Similarly, Hayakawa (2020) explained that the Permanent Income Hypothesis assumes households' smooth consumption based on expected long-term income rather than temporary fluctuations. Carroll and Summers (2022) further noted that the Life Cycle framework views consumption decisions as long-term welfare choices influenced by expected lifetime income and future needs. These theories collectively imply that stable and adequate

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household consumption enhances health outcomes through sustained investment in nutrition, healthcare, and healthy living conditions.

Globally, substantial improvements in health outcomes have been achieved over the last few decades, particularly in high-income economies where rising household welfare and stronger social protection systems have expanded access to healthcare services. According to the World Health Organization, global life expectancy rose to approximately 73 years prior to recent global economic and health shocks (WHO, 2023). The World Bank similarly reported that countries with stronger household welfare systems and higher consumption capacity tend to record lower mortality rates and better healthcare access (World Bank, 2024). In contrast, many developing economies continue to experience substantial health disparities linked to poverty, low purchasing power, and constrained healthcare financing systems (OECD, 2023).

Despite periods of economic growth and expanding aggregate consumption, many countries in Sub-Saharan Africa continue to record poor health outcomes relative to global averages. The World Health Organization reported that average life expectancy in the region remains significantly below the global average, while under-five mortality rates remain among the highest worldwide (WHO, 2023). Barasa et al. (2023) further observed that a large proportion of households across the region continue to experience catastrophic health expenditures despite rising aggregate consumption levels. Similarly, Tapsoba et al. (2023) argued that increases in consumption expenditure have not necessarily translated into improved healthcare access because many households remain constrained by poverty, inflation, and inadequate social protection systems.

The persistence of poor health outcomes despite rising consumption levels suggests that the composition and quality of household expenditure may matter more than aggregate expenditure itself. Osakede (2021) noted that in many developing countries, household consumption is largely concentrated on immediate survival needs, limiting spending on preventive healthcare and long-term health investments. Islamiah (2025) further argued that inflationary pressures and widening income inequality often erode the health-enhancing value of household consumption expenditure. In many Sub-Saharan African countries, increases in aggregate expenditure may therefore fail to improve healthcare utilization or nutritional outcomes because much of household spending is absorbed by rising food prices and other essential consumption needs.

Existing empirical literature presents mixed evidence regarding the relationship between household consumption expenditure and health outcomes. Choi et al. (2020) reported that higher household welfare and consumption levels were associated with improved healthcare utilization and better health outcomes in developed economies. Husain et al. (2021) similarly demonstrated that consumption expenditure significantly influences healthcare access and health-seeking behavior across several countries. However, Iheoma (2024) argued that evidence from low- and middle-income countries remains inconclusive because many studies fail to adequately capture institutional and macroeconomic conditions shaping consumption behavior. Wachira and Gachoki (2024) further noted that empirical studies focusing on Sub-Saharan Africa rarely

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utilize advanced panel econometric approaches capable of accounting for dynamic interactions and unobserved heterogeneity across countries.

Methodologically, panel data approaches capable of examining the long-run relationship between household consumption and health outcomes remain underutilized in the Sub-Saharan African context. Adesete et al. (2022) observed that many existing studies rely heavily on cross-sectional and descriptive approaches that limit causal interpretation and policy applicability. Saleem (2023) similarly noted that several macro-level studies fail to account for country-specific institutional conditions and dynamic macroeconomic interactions. Furthermore, advanced econometric approaches such as fixed effects, random effects, and longitudinal panel estimations remain relatively limited in regional health economics research despite their suitability for capturing temporal and cross-country variations (Iheoma, 2024). This creates an important empirical gap regarding whether household consumption expenditure significantly improves health outcomes within Sub-Saharan Africa.

This study contributes to the existing literature in three important ways. First, it extends the health economics literature by examining household consumption expenditure as a realized measure of welfare rather than relying solely on income or healthcare expenditure indicators. Second, the study employs longitudinal panel econometric techniques capable of capturing both cross-country and temporal dynamics within Sub-Saharan Africa, where empirical evidence remains limited. Third, the study provides new evidence showing that increases in aggregate household consumption expenditure do not necessarily translate into improved population health outcomes, thereby challenging conventional assumptions regarding the welfare-health nexus in developing economies.

2. Statement of the Problem

In principle, higher household consumption expenditure is expected to improve health outcomes by enabling households to access adequate nutrition, healthcare services, improved housing, sanitation, and other welfare-enhancing goods and services. Grossman's health capital theory posits that individuals allocate household resources toward health-enhancing activities in order to maximize lifetime utility and productivity (Grossman, 1972). Similarly, the United Nations through Sustainable Development Goal 3 emphasizes the importance of economic wellbeing in promoting health equity and improving population health outcomes (United Nations, 2022). Cashin et al. (2024) further argued that stronger household purchasing power combined with supportive healthcare financing systems should improve access to healthcare services and reduce vulnerability to health shocks. However, in many developing economies, including countries in Sub-Saharan Africa, these theoretical expectations continue to be constrained by poverty, inflationary pressures, institutional weaknesses, and inadequate healthcare systems (Oseni et al., 2023). Despite periods of economic growth and rising household expenditure across the region, health outcomes continue to lag behind global averages, with life expectancy remaining relatively low while under-five mortality rates remain among the highest worldwide (WHO, 2023). Barasa et al. (2023) similarly observed that many households continue to experience catastrophic health expenditures despite increases in aggregate consumption levels,

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suggesting that higher expenditure does not necessarily translate into improved healthcare access or better population health outcomes.

Empirical evidence on the relationship between household consumption expenditure and health outcomes remains inconclusive, particularly within the Sub-Saharan African context. Choi et al. (2020), Thompson et al. (2022), and Lopes et al. (2023) largely focused on developed economies where institutional and healthcare conditions differ substantially from those prevailing in Sub-Saharan Africa. At the regional level, several studies continue to rely on cross-sectional or simple regression approaches that fail to account for long-run dynamics, country heterogeneity, and macroeconomic interactions influencing health outcomes (Adesete et al., 2022; Saleem, 2023). Wachira and Gachoki (2024) further noted that advanced panel econometric approaches capable of examining the dynamic relationship between household consumption expenditure and health outcomes remain underutilized in African health economics research. Consequently, it remains unclear whether household consumption expenditure significantly improves health outcomes in Sub-Saharan Africa. Therefore, this study sought to answer the following research question: Does household consumption expenditure improve health outcomes in Sub-Saharan Africa?

3. Literature Review

Empirical literature on household consumption expenditure and health outcomes presents mixed findings across countries and contexts. Dieleman et al. (2020) found that healthcare expenditure and household consumption patterns significantly influence access to health services and long-term welfare outcomes within the United States. Husain et al. (2021) similarly reported that households with constrained consumption capacity were more likely to delay or forgo healthcare services due to affordability challenges. Baker et al. (2020) further demonstrated that economic shocks substantially alter household consumption patterns, particularly among financially vulnerable households, with potential implications for nutrition, healthcare utilization, and psychological wellbeing. These findings collectively suggest that household expenditure patterns shape access to healthcare and overall health conditions.

Other studies have emphasized that the composition of household expenditure is equally important in determining health outcomes. Pagliai et al. (2021) established that higher consumption of ultra-processed foods was associated with increased risks of obesity, cardiovascular disease, and mortality, demonstrating that consumption quality matters alongside expenditure levels. De Groot et al. (2020) similarly found that increases in household consumption improved child nutrition outcomes in Ghana, although food price shocks weakened these gains. Ohrnberger et al. (2020) further reported that predictable cash transfers that stabilize household consumption significantly improved mental health outcomes among poor households in South Africa. These studies suggest that household consumption expenditure influences health outcomes through multiple pathways including nutrition, stress reduction, healthcare utilization, and financial protection.

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The literature also demonstrates that financial protection mechanisms significantly influence the relationship between household expenditure and health outcomes. Wirtz et al. (2022) found that health insurance reduced out-of-pocket expenditure burdens among households managing chronic illnesses in Kenya, thereby protecting essential household consumption. Ipinnimo et al. (2022) similarly reported that catastrophic health expenditures significantly weakened household welfare among patients with non-communicable diseases in Nigeria. Mulaga et al. (2021) further established that out-of-pocket health spending increased poverty and crowded out non-health consumption among households in Malawi. Stewart et al. (2021) also observed that health insurance schemes reduced catastrophic expenditures among households in Ghana, although financial protection alone did not necessarily improve clinical outcomes. These findings indicate that health financing systems and financial protection mechanisms significantly shape how household expenditure translates into population health outcomes.

Beyond household expenditure itself, structural and contextual factors continue to shape health outcomes across countries. Polcyn et al. (2023) found that healthcare expenditure, environmental quality, and income levels significantly influence life expectancy across Asian countries. Anwar et al. (2023) similarly demonstrated that government health expenditure, physician density, and economic growth positively improve health outcomes while environmental pollution worsens population health conditions. Studies by Achim et al. (2020), Fikry and Ezzat (2025), and Yusufu (2025) further established that governance quality and corruption significantly influence the effectiveness of health expenditure and healthcare delivery systems. These findings suggest that household consumption expenditure alone may be insufficient to improve health outcomes in environments characterized by weak institutions, environmental stressors, and inadequate healthcare systems.

Despite extensive literature linking economic welfare and health outcomes, several important gaps remain. Much of the available evidence focuses on high-income countries and often examines income, healthcare expenditure, or insurance coverage separately rather than household consumption expenditure as a realized measure of welfare. Existing studies also rely heavily on cross-sectional or country-specific approaches that limit understanding of long-run dynamics across countries. Furthermore, limited empirical studies have examined the relationship between household consumption expenditure and health outcomes within a panel framework covering multiple countries in Sub-Saharan Africa. In addition, the interaction between household welfare, structural conditions, and population health remains insufficiently explored within regional health economics literature. Consequently, this study sought to examine whether household consumption expenditure improves health outcomes in Sub-Saharan Africa using longitudinal panel econometric techniques.

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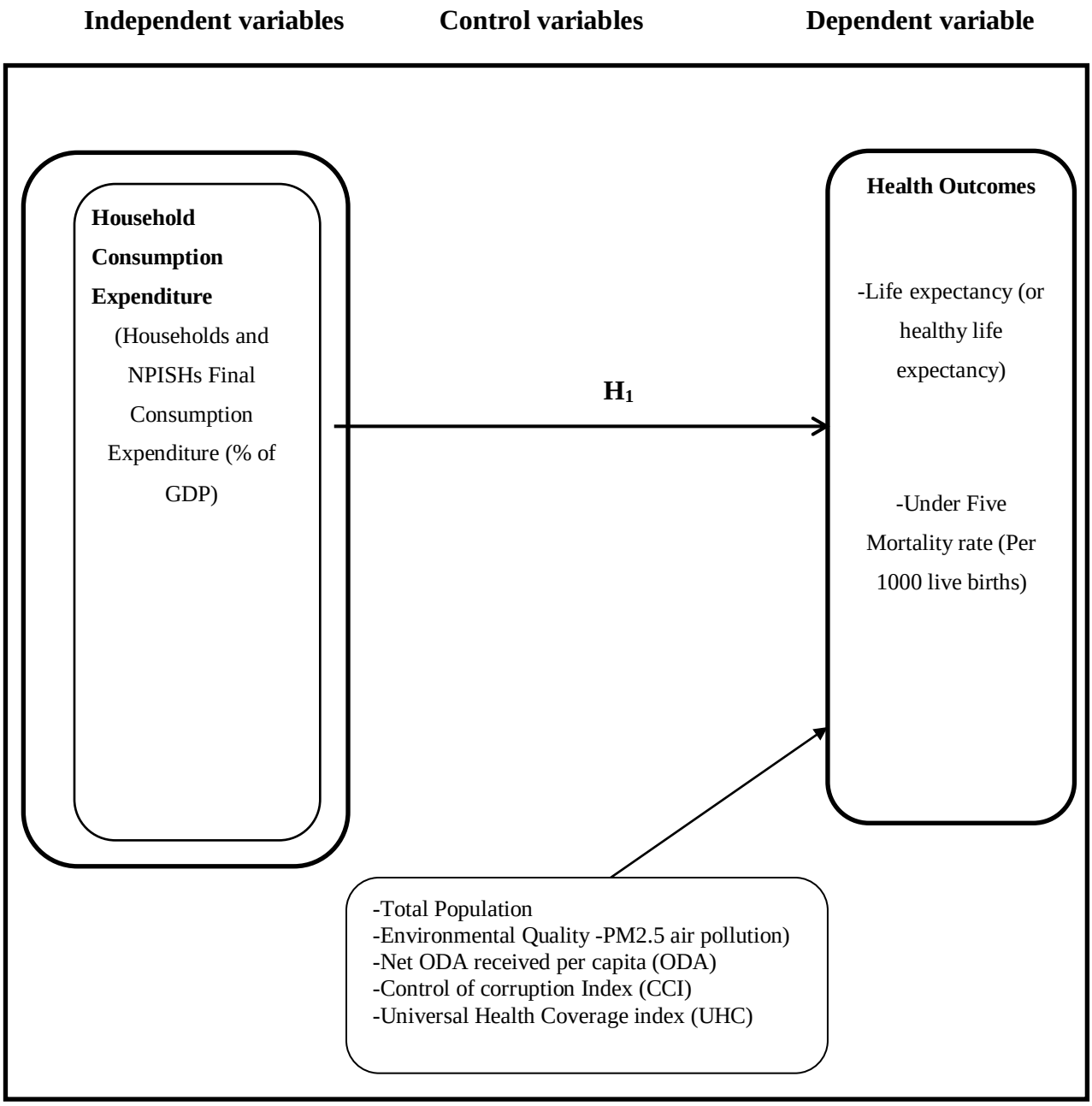

Figure 1: Conceptual Framework
Source: Researcher (2026)

The conceptual framework in Figure 1 illustrates the hypothesized relationship between household consumption expenditure and health outcomes in Sub-Saharan Africa. The framework assumes that household consumption expenditure significantly influences population health outcomes. In this study, household consumption expenditure is operationalized using Household and Non-Profit Institutions Serving Households (NPISHs) final consumption

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expenditure as a percentage of GDP, which reflects the extent to which households translate available economic resources into actual consumption of welfare-enhancing goods and services such as food, healthcare, housing, sanitation, and education. Higher household consumption expenditure is expected to improve access to essential needs and healthcare services, thereby enhancing population health outcomes.

Health outcomes are conceptualized as multidimensional indicators reflecting both long-term population health status and immediate survival conditions and are measured using life expectancy at birth and under-five mortality rate. Life expectancy at birth represents the average number of years a newborn is expected to live under prevailing mortality conditions and serves as a broad indicator of health system effectiveness, socio-economic development, and general wellbeing, while under-five mortality captures child survival conditions and short-term health system performance through the number of deaths of children under five years per 1,000 live births (Park & Won, 2025). The framework further recognizes that health outcomes are influenced by additional structural and contextual factors beyond household consumption expenditure. Consequently, the study incorporates selected control variables including population growth, environmental quality, official development assistance, universal health coverage, and control of corruption to account for demographic pressures, environmental risks, external financing support, healthcare accessibility, institutional quality, and governance effectiveness that may independently influence population health outcomes across countries in SSA.

4. Methods

This study was grounded in the positivist research philosophy, which emphasizes objective measurement, empirical observation, and statistical testing of relationships among variables. Positivism was considered appropriate because the study focused on quantifiable macroeconomic and health indicators that could be objectively measured and analyzed using panel econometric techniques. Consistent with this philosophical orientation, the study adopted a longitudinal non-experimental panel research design. The design enabled the examination of both temporal and cross-country variations in household consumption expenditure and health outcomes within Sub-Saharan Africa over time. Panel data designs are particularly appropriate in policy-oriented econometric studies because they capture heterogeneity across countries while controlling for unobserved country-specific effects (Baltagi, 2021).

The study focused on Sub-Saharan Africa (SSA), a region characterized by significant diversity in economic structure, healthcare systems, governance quality, and fiscal capacity. SSA continues to experience persistent health financing challenges, rising healthcare demands, inflationary pressures, and disparities in health outcomes despite periods of economic growth and expanding household expenditure (WHO, 2023). The target population comprised all 48 SSA countries as classified by the World Bank and the International Monetary Fund. However, the final analytical sample consisted of 27 countries classified as lower-middle-income, upper-middle-income, and high-income economies with sufficiently complete and consistent data covering the period 2000–2024. Low-income countries were excluded due to substantial data

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gaps and inconsistencies in macroeconomic and health indicators. The selected countries generated a balanced panel dataset comprising 675 country-year observations.

The study utilized secondary data obtained primarily from the World Development Indicators (WDI) database maintained by the World Bank. Data were collected on household consumption expenditure, life expectancy at birth, under-five mortality rate, and selected control variables including population growth, environmental quality, official development assistance, universal health coverage, and control of corruption. Household consumption expenditure was measured using Household and Non-Profit Institutions Serving Households (NPISHs) final consumption expenditure as a percentage of GDP. Life expectancy at birth represented the average number of years a newborn is expected to live under prevailing mortality conditions, while under-five mortality rate referred to the number of deaths of children under five years per 1,000 live births. A structured secondary data collection schedule was used to guide the extraction, verification, coding, and organization of annual country-level observations into a panel dataset suitable for econometric analysis.

Data analysis was conducted using Stata version 16.0 following cleaning, coding, validation, and transformation of variables where necessary. Both descriptive and inferential statistical techniques were employed. The study employed panel data econometric techniques including fixed effects (FE) and random effects (RE) models. The choice between FE and RE estimators was guided by the Hausman specification test. The fixed effects model was preferred where unobserved country-specific effects were correlated with explanatory variables, while the random effects model was appropriate where such correlations were absent. In addition, the models control for selected structural and contextual determinants of health outcomes, namely population growth (POP_{it}), environmental quality (ENQ_{it}), official development assistance (ODA_{it}), universal health coverage (UHC_{it}) and control of corruption index (CCI_{it}). In line with the study objective, the general specified regression model adopted in the study was presented as:

$$HO_{it} = \alpha_0 + \beta_1 CE_{it} + \beta_2 POP_{it} + \beta_3 ENQ_{it} + \beta_4 ODA_{it} + \beta_5 UHC_{it} + \beta_6 CCI_{it} + \mu_i + \lambda_t + \epsilon_{it}$$

Where: HO_{it}: Health outcomes (proxied by Life expectancy at birth and under five mortality); CE_{it} denotes the household consumption expenditure; μ_i: Country-specific effect; λ_t: Time specific effect; ϵ_{it}: Error term; α_0 is the intercept or constant; β_{1-6} is regression coefficients; and ε_{it} is a random error term that accounts for unexplained variations.

To evaluate the statistical validity of estimated relationships, the study applied a range of tests of significance. The t-test was used to assess the significance of individual regression coefficients, while the F-test determined the joint significance of multiple predictors in fixed effects models. For random effects estimation, the Wald chi-square test was used to evaluate the collective importance of the explanatory variables. The study rejected H_0 if the household consumption expenditure coefficient is significant ($p<0.05; 0.1$), showing its relevance to health outcomes. If not, fail to reject H_0.

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The study variables were operationalized using internationally recognized indicators. Health outcomes were measured using life expectancy at birth and under-five mortality rate. Household consumption expenditure was measured as Household and NPISHs final consumption expenditure expressed as a percentage of GDP. Environmental quality was proxied using PM2.5 annual air pollution exposure, while governance quality was measured using the control of corruption index. Logarithmic transformation was applied to selected variables including population and official development assistance to stabilize variance and facilitate elasticity-based interpretation of coefficients.

To ensure the validity and robustness of the panel estimations, several diagnostic tests were conducted prior to model estimation. Stationarity of variables was examined using the Fisher-type Augmented Dickey-Fuller (ADF) panel unit root test. Variables found to be non-stationary at level were differenced until stationarity was achieved. The Kao residual-based panel cointegration test was then employed to assess the existence of long-run relationships among variables. Multicollinearity among explanatory variables was examined using the Variance Inflation Factor (VIF), with all variables recording acceptable VIF values below the threshold of 10.

The Wooldridge test for autocorrelation in panel data was used to detect serial correlation within the error structure, while the Modified Wald test for groupwise heteroskedasticity examined whether the variance of the error term remained constant across panels. Where autocorrelation and heteroskedasticity were detected, robust standard errors were applied to ensure reliable statistical inference. The Pesaran cross-sectional dependence test was further conducted to determine whether residuals were correlated across countries due to shared regional shocks or macroeconomic linkages. Finally, the Hausman specification test guided the selection between fixed effects and random effects models, with the fixed-effects estimator ultimately adopted for the final estimations based on the test results.

5. Results and Discussions

Table 1 presents descriptive statistics for the key study variables used in examining the relationship between household consumption expenditure and health outcomes in Sub-Saharan Africa between 2000 and 2024. The health outcome indicators showed notable variation across countries and over time.

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Table 1: Panel Descriptive Statistics of Study Variables (2000–2024)

Variable	Observations	Mean	Std. Dev.	Min	Max
Life expectancy at birth (log)	648	4.09	0.12	3.77	4.35
Under-five mortality rate (log)	648	4.12	0.63	2.45	5.31
Household consumption expenditure (% of GDP)	544	63.38	18.84	13.98	119.41
Tax revenue (% of GDP)	380	17.30	7.86	3.40	40.22
Government expenditure (% of GDP)	544	16.39	7.67	2.05	46.26
Total population (log)	675	15.54	1.86	11.30	19.27
Environmental quality (Air pollution (PM2.5 exposure))	567	32.28	16.72	8.50	85.10
Official development assistance per capita (log)	640	3.86	1.03	-0.99	6.54
UHC service coverage index	648	45.67	14.70	13.00	81.00
Control of corruption index	621	-0.45	0.69	-1.65	1.70

Source: Researcher's computation based on secondary panel data (2000-2024)

Life expectancy, expressed in logarithmic form, recorded a mean of 4.09 with relatively low dispersion, suggesting moderate stability in longevity across the sampled countries. In contrast, under-five mortality exhibited a higher level of variability, indicating substantial disparities in child survival conditions across the region. Household consumption expenditure, measured as Household and NPISHs final consumption expenditure as a percentage of GDP, recorded a mean of 63.38 percent with considerable variation across countries, implying differences in household welfare patterns, spending behavior, and the extent to which economic resources translated into actual consumption.

The control variables also demonstrated meaningful cross-country and temporal variation. Population size, measured in logarithmic form, reflected moderate demographic heterogeneity across countries, while environmental quality proxied using PM2.5 air pollution exposure showed substantial disparities in environmental conditions. Official development assistance per capita similarly varied considerably, suggesting differences in external financing support among countries within the sample. The Universal Health Coverage (UHC) service coverage index recorded wide differences in access to essential healthcare services, reinforcing the uneven nature of healthcare system performance across Sub-Saharan Africa. In addition, the control of corruption index exhibited substantial institutional variation, with the negative mean value

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indicating that many countries remained below the global midpoint in governance quality. Collectively, these patterns justified the inclusion of demographic, environmental, institutional, and healthcare-related controls in the empirical analysis because they represent broader structural conditions capable of influencing population health outcomes independently of household consumption expenditure.

Table 2: Summary of Panel Diagnostic Test Results for the Study Variables and Models

Diagnostic Test	Test Applied	Key Findings	Decision/Implication
Panel Unit Root Test	Fisher-type ADF panel unit root test	Mixed orders of integration were observed. Life expectancy, income per capita, government expenditure, UHC service coverage, and control of corruption became stationary after first differencing, while under-five mortality, inflation, household consumption expenditure, tax revenue, population, pollution, and ODA were stationary at level.	Variables satisfied stationarity requirements after appropriate transformations, reducing the risk of spurious regression results.
Panel Cointegration Test	Kao residual-based panel cointegration test	Majority of Kao statistics for both life expectancy and under-five mortality models were statistically significant at $p < 0.05$, confirming long-run equilibrium relationships among variables.	Level panel regressions were retained because the variables were cointegrated in the long run.
Multicollinearity Test	Variance Inflation Factor (VIF)	All explanatory variables recorded VIF values below 10, with a mean VIF of 2.84. Inflation had the lowest VIF (1.19), while tax revenue had the highest acceptable VIF (4.26).	No serious multicollinearity problem was detected and all variables were retained in the models.
Autocorrelation Test	Wooldridge test for autocorrelation in panel data	The life expectancy model recorded $F = 111.812$ ($p = 0.0000$), while the under-five mortality model	First-order autocorrelation was present in both models; robust

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Diagnostic Test	Test Applied	Key Findings	Decision/Implication
		recorded F = 31.380 (p = 0.0000).	standard errors were therefore applied.
Heteroskedasticity Test	Modified Wald test for groupwise heteroskedasticity	The life expectancy model recorded χ^2 = 7248.67 (p = 0.0000), while the under-five mortality model recorded χ^2 = 13587.76 (p = 0.0000).	Heteroskedasticity was detected across panels and corrected using robust standard errors.
Cross-Sectional Dependence Test	Pesaran cross-sectional dependence (CD) test	The life expectancy model recorded CD = 0.317 (p = 0.7515), while the under-five mortality model recorded CD = -0.221 (p = 0.8251).	No statistically significant cross-sectional dependence was detected across countries.

The diagnostic test results confirmed the suitability of the panel dataset for econometric estimation. Although some variables were non-stationary at level, stationarity was achieved through first differencing where necessary, while the Kao cointegration test confirmed the existence of long-run relationships among the variables. The results further indicated the absence of serious multicollinearity and cross-sectional dependence, although autocorrelation and heteroskedasticity were detected and appropriately corrected using robust standard errors to ensure valid statistical inference.

Table 3 presents the fixed-effects regression results examining the effect of household consumption expenditure on health outcomes measured using life expectancy and under-five mortality. The table reports the estimated coefficients, robust t-statistics, model diagnostics, and goodness-of-fit statistics for the two panel models. The analysis controlled for population growth, environmental quality, official development assistance, universal health coverage, and control of corruption. In addition, the table reports key diagnostic statistics including the Hausman specification test, Wooldridge autocorrelation test, and Modified Wald heteroskedasticity test, which guided the adoption of fixed-effects estimation with robust standard errors. The results therefore provide empirical evidence on whether variations in household consumption expenditure significantly influence health outcomes across countries in Sub-Saharan Africa.

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Table 3: Regression Results on the Effect of Household Consumption Expenditure on Health Outcomes

	(1) Life Expectancy	(2) Under-Five Mortality
Households and NPISHs final consumption expenditure (% of GDP)	-.0001727 (-.3517341)	.0022784* (1.696994)
Log of total population	.1751412** (2.716767)	-1.053145*** (-6.107567)
Environmental quality (PM2.5 air pollution exposure (micrograms per cubic meter))	-.0003756 (-1.596345)	-.0018617 (-.8748875)
Log of net ODA per capita	.0017602 (.3147353)	-.0138507 (-.9048482)
UHC service coverage index	.0031022* (1.988881)	-.0086238** (-2.358364)
Control of corruption Index	-.0405524* (-1.938613)	.1715166** (2.103755)
Constant	1.24674 (1.322907)	20.87129*** (8.369628)
F-statistic	10.02646	41.95401
Prob > F	0.0000143	0.0000
Hausman chi2	61.49935	167.7022
Hausman p-value	0.0000	0.0000
Wooldridge F	134.3766	78.8987
Wooldridge p-value	0.0000	0.0000
Modified Wald chi2	47073.25	8233.00
Modified Wald p-value	0.0000	0.0000
Observations	424	424
Within R-squared	.6499472	.8336017
Overall R-squared	.1047606	.2565772

Source: Researcher's computation based on secondary panel data (2000-2024)

The regression results show that household consumption expenditure had no statistically significant effect on life expectancy in Sub-Saharan Africa ($\beta = -0.00017$, $t = -0.35$). This means that changes in aggregate household consumption expenditure did not meaningfully explain variations in life expectancy across the sampled countries. However, household consumption expenditure had a weak positive effect on under-five mortality ($\beta = 0.00228$, $t = 1.70$), significant at the 10 percent level, suggesting that higher aggregate consumption did not necessarily translate into improved child survival outcomes.

Among the control variables, universal health coverage was important in both models. It had a positive effect on life expectancy ($\beta = 0.00310$, $t = 1.99$) and a negative effect on under-five

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mortality (β = −0.00862, t = −2.36), implying that broader access to essential health services improved longevity and reduced child mortality. Population size was also significant, increasing life expectancy (β = 0.175, t = 2.72) while reducing under-five mortality (β = −1.053, t = −6.11). Control of corruption showed a negative association with life expectancy (β = −0.0406, t = −1.94) and a positive association with under-five mortality (β = 0.1715, t = 2.10), suggesting that governance-related effects may be complex in the sampled countries.

The models were statistically significant, with F-statistics of 10.03 for life expectancy and 41.95 for under-five mortality, both significant at $p < 0.01$. The within R-squared values were 0.650 for life expectancy and 0.834 for under-five mortality, indicating that the model explained a substantial proportion of within-country variation, especially for under-five mortality. These findings suggest that household consumption expenditure alone was not a strong direct driver of health outcomes; rather, health outcomes appeared to depend more on health service coverage, demographic dynamics, and institutional conditions.

The findings challenge the conventional expectation that higher consumption leads to better health outcomes and instead highlights the importance of how consumption is allocated. While increased consumption should theoretically improve access to nutrition and healthcare, the observed positive association with under-five mortality suggests that consumption patterns may not be optimally directed toward health-enhancing goods and services. In particular, households may allocate additional resources toward non-essential or low-quality consumption items, or may face structural constraints that limit the translation of expenditure into effective healthcare utilization.

From a theoretical perspective, this outcome can be interpreted within the framework of the Permanent Income Hypothesis (PIH) and the Life Cycle Hypothesis (LCH), which posit that consumption decisions are based on expected lifetime income and are intended to smooth utility over time. However, in many Sub-Saharan African contexts characterized by income volatility and liquidity constraints, households may be unable to smooth consumption effectively, leading to suboptimal allocation of resources. As a result, increases in consumption expenditure may not correspond to sustained investments in health capital, thereby weakening the expected positive relationship between consumption and health outcomes.

The finding that household consumption expenditure has no statistically significant effect on life expectancy contrasts with a broad expectation in health economics that higher consumption capacity should improve welfare and, by extension, population health. One possible explanation is that life expectancy is a cumulative and slow-moving outcome that reflects the long-term interaction of multiple structural determinants, including healthcare infrastructure, epidemiological transition, sanitation, education, and institutional quality, rather than short-run variation in aggregate consumption expenditure alone. In this sense, the insignificance of consumption expenditure for life expectancy in the present study may reflect the fact that aggregate household consumption as a share of GDP does not adequately capture whether expenditure is directed toward health-enhancing goods and services. This interpretation

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resonates with evidence from developed contexts such as Dieleman et al. (2020), who showed that even in the United States, rising healthcare expenditure and shifting payer patterns do not automatically establish a direct causal link to better clinical outcomes, partly because spending is highly concentrated across diseases and financing arrangements rather than uniformly translating into improved health. Similarly, Polcyn et al. (2023) found in Asia that healthcare expenditure, rather than general consumption behavior, was the more decisive driver of life expectancy, implying that the effectiveness, sectoral targeting, and composition of spending matter more than aggregate expenditure levels alone.

The positive and weakly significant association between household consumption expenditure and under-five mortality is more striking because it runs counter to the common assumption that greater spending capacity should improve child survival. A critical interpretation is that in many developing contexts, including Sub-Saharan Africa, higher aggregate consumption does not necessarily imply better child-focused expenditure. Household resources may be directed toward non-essential consumption, debt servicing, social obligations, transport, or treatment for existing illness, rather than toward preventive child health investments such as improved diets, immunization completion, sanitation, and timely care-seeking. This helps explain why the result diverges from studies such as De Groot et al. (2020), who found in northern Ghana that higher household consumption was associated with better child growth outcomes, and from Bahru et al. (2020), who showed that cash transfer support improved child meal frequency in Ethiopia, even though effects on anthropometric outcomes remained limited. The contrast suggests that the relationship between consumption and child health is highly contingent on whether additional expenditure improves diet quality, caregiving practices, and service utilization. In other words, it is not consumption volume per se that matters most for child survival, but whether expenditure is directed toward productive health inputs.

The results also point to an important difference between consumption capacity and effective access to healthcare, a distinction strongly emphasized in both developed and developing settings. Husain et al. (2021) found that constrained household consumption increases the likelihood of delaying or forgoing needed healthcare through affordability-related barriers such as transport costs, medicines, and user fees. By implication, one might expect higher consumption expenditure to reduce such barriers and improve health outcomes. However, the present findings suggest that this pathway may be weaker in Sub-Saharan Africa than theory predicts, perhaps because health systems themselves remain supply constrained. Even when households have greater expenditure capacity, poor-quality services, stockouts, long travel distances, weak referral systems, and informal payments may prevent that expenditure from yielding better outcomes. This interpretation is reinforced by Stewart et al. (2021), who found in Ghana that insurance reduced out-of-pocket burdens and catastrophic expenditure for injured children but did not improve surgical timeliness or mortality. Likewise, Wirtz et al. (2022) showed in Kenya that insurance improved affordability of medicines, yet the study did not establish corresponding clinical gains. These studies suggest that reducing consumption pressure or raising expenditure capacity is often necessary but not sufficient; without quality and

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responsiveness on the supply side, better consumption capacity may fail to translate into improved health outcomes.

A further critical issue is that aggregate household consumption expenditure may conceal the burden of illness itself, especially where chronic disease and out-of-pocket financing reshape household budgets. In such settings, higher measured consumption may partly reflect distress spending rather than welfare-enhancing expenditure. This is particularly relevant for interpreting the positive association with under-five mortality, because households facing recurrent illness may spend more overall while still experiencing worse outcomes. Evidence from Nigeria and Malawi is instructive here. Ipinnimo et al. (2022) showed that households managing non-communicable diseases were exposed to substantial catastrophic health expenditure and impoverishment, while Mulaga et al. (2021) found that out-of-pocket payments in Malawi crowded out non-health consumption and deepened poverty. From this perspective, rising consumption expenditure may not always indicate improved living standards; in some cases, it may reflect a reallocation of already limited budgets toward illness-related spending, leaving inadequate resources for nutrition, hygiene, and child care. This helps explain why higher consumption at the macro level may coexist with poorer child health outcomes, especially in systems where health financing remains fragmented and heavily dependent on households. The implication is that expenditure indicators should be interpreted cautiously, because they may capture both productive investment and defensive spending under economic stress.

Therefore, the two models suggest that household consumption expenditure is not a straightforward proxy for improved health in Sub-Saharan Africa. In developed settings, such as those reflected in Baker et al. (2020), Dieleman et al. (2020), and Jetty et al. (2022) the discussion often centers on how expenditure patterns, financing channels, and behavioral responses shape utilization and efficiency within relatively stronger health systems. In developing contexts, however, the literature indicates that consumption is filtered through deeper vulnerabilities (poverty, price shocks, informal payments, weak service delivery, and uneven financial protection) so that increases in expenditure do not necessarily produce proportional health gains. This helps reconcile the present results with the broader literature: while stronger consumption capacity can be beneficial, its health effects depend on composition, distribution, and institutional context. For policy, this means that improving health outcomes requires more than stimulating household consumption. It requires ensuring that consumption is supported by effective public health financing, social protection, affordable essential services, and nutrition-sensitive interventions. Without these complementary conditions, higher household expenditure may fail to improve longevity and may even coexist with worse child survival outcomes.

6. Conclusion and Recommendations

The study concluded that household consumption expenditure had a weak but statistically significant positive effect on under-five mortality at the 10 percent significance level, while its effect on life expectancy remained statistically insignificant. These findings suggest that increases in aggregate household consumption expenditure did not necessarily translate into

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improved health outcomes in Sub-Saharan Africa and, in some cases, were associated with worsening child survival outcomes. The results imply that the health impact of household expenditure depends not only on the level of spending but also on the composition, efficiency, and allocation of expenditure toward health-enhancing goods and services such as nutrition, healthcare, sanitation, and child welfare. The findings further indicate that broader structural factors including healthcare accessibility, institutional quality, and social protection systems play an important role in determining whether household expenditure contributes to improved population health outcomes.

The study recommends that governments in Sub-Saharan Africa strengthen policies aimed at improving the quality and effectiveness of household welfare expenditure rather than focusing solely on increasing aggregate consumption levels. Particular attention should be directed toward enhancing access to affordable healthcare services, nutrition-sensitive interventions, maternal and child healthcare programs, and preventive healthcare services to ensure that household expenditure contributes to improved child survival and broader population health outcomes. The study further recommends increased investment in universal health coverage, public healthcare infrastructure, and social protection systems to reduce the burden of out-of-pocket healthcare expenditure among households. Governments should also strengthen public awareness programs on nutrition, child healthcare, and health-seeking behavior while implementing policies that reduce poverty and inflationary pressures, which often limit the ability of households to allocate expenditure toward productive health-enhancing activities.
The study also acknowledges the possibility of endogeneity arising from reverse causality and omitted structural factors between household welfare conditions and health outcomes. Although fixed-effects estimation and inclusion of relevant control variables minimized this risk, future studies may apply advanced dynamic panel estimators such as instrumental variable or generalized method of moments approaches to further address potential endogeneity concerns.

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