Germaneness of human capital variables to health indicators in Nigeria.

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Abstract
Nigeria is a country rich in resources, though heavily relying on revenue from crude oil exports. To experience increased productivity, economic growth and improved welfare for its citizenry, it is imperative for such economy to reinvest revenue in infrastructural development and most importantly in human capital especially with the rising price of crude oil in the global market. Recent budgetary allocations to education, health and training according to literature, is supposed to have a direct bearing on the productivity of citizens. Health outcomes in the country have shown that recent spending in public and private spending does not impact health and wellbeing of citizens. Guided by three equations based on the objectives, using data set from 1996 to 2023, the study determined the long run effect of human capital development on life expectancy, maternal mortality and under-five mortality using the Auto-Regressive Distributed Lag Model and unit root testing, co-integration. The result showed that long-term investments in healthcare infrastructure have high prospects of reducing mortality rates, particularly under-five mortality rate. These further stresses the importance of sustained investments in the healthcare sector to record commendable progress in public health outcomes. The study recommended the promotion of policies that mitigate the financial burden on families by supporting affordable healthcare services, which inversely impacts maternal mortality rates and other health indicators in the country.

Keywords: Human Capital, Health Outcomes, Health Inequality, SDGs and Economic Development.

Introduction
Good health and longevity are fundamental to the human existence as healthy people are more vibrant, energetic, and have more positive outlook on life. These characteristics not only translate to a positive influence on the social infrastructure, but also affects economic development. Before the return to civilian rule in 1999, Nigeria has and still continues to face significant challenges in quality health care among rural and in some cases urban areas. The pressing health concerns faced in the country among others include high rates of malaria, tuberculosis, hypertension, diabetes etc., which are leading causes for decreased productivity of the workforce nationally (Oyewusi & Adebayo, 2018).

Between 1998 and 2019, life expectancy and Health Adjusted Life Expectancy (HALE) increased in Nigeria by 18% and 64·3 years, in 2023 life expectancy figure is 55.75 years, a 0.57% increase from 2022. Nonetheless, health indicators have remained poor; for instance, in regional ranking for age-standardized mortality, Nigeria is ranked sixth in West Africa, seventh for Health Adjusted Life Expectancy (HALE), tenth for Year of Life loss (YLLs), 12th for health system coverage, and 14th for Years of Health Life Loss due to Disabilities (YLDs) in 2019. Nigeria had the fourth-highest under-five mortality rate for male individuals (60 deaths per 100,000) and female individuals (50 deaths per 100,000) in 2023 (Statista 2023), but among the lowest mortality for men older than 55 years. There is still evidence of a growing non-communicable disease burden facing older Nigerians (Arthur & Oaikhenan, 2020).

Efforts have been made by both international and national agencies to improve healthcare outcomes in order to align with the Sustainable Development Goal (SDG 3) of the United Nations. The SDG 3 advocates for sustaining healthy lives and promoting the well-being of all ages, this ensures healthy lives for all and by extension their contribution to national productivity which is critical to sustainable development, as the recent COVID-19 global pandemic revealed how health crises can destabilize the economy and upend people's lives.

Before the outbreak of COVID-19, developing economies were burdened with health disturbing cases like Malaria and HIV/AIDS, with efforts concentrated on more effective support for the health systems to increase people's access to healthcare, improving sanitation/hygiene and reducing incidents such as child and maternal mortality (United Nations, 2020)

Health outcomes refer to the measurable impact or results of healthcare interventions or actions on the health status of individuals or populations (Ike & Onah, 2018). They are indicators of the effectiveness and quality of healthcare systems and practices. Health outcomes can include a wide range of measures, such as mortality rates (maternal and under-5), disease prevalence, morbidity rates, life expectancy, functional status, quality of life, and patient satisfaction. By understanding health outcomes, policymakers, healthcare providers, and researchers can evaluate the effectiveness of interventions and make informed decisions to improve healthcare delivery and by extension the health of the economy through the various impacts of health.

Nigeria's total per capita expenditure on health of US$50 is among the lowest globally, with 80% of health expenditure from household out-of-pocket expenses compounding the poverty level in the country (Federal Ministry of Health FMOH, 2009). Despite the country's large national resources, the country holds a GDP of only US$362, lower than the regional average of US$1740 and a global average of US$13840 (WHO, 2023). Thus, reflecting on a low percentage of the budget allocation of only 3.5% of the GDP to health. This can also be argued to be responsible for the poor distribution of health infrastructures across the country, thereby predicting health outcomes in the country.

Human capital development is a critical component of economic growth and development, as it enables individuals to contribute to the creation of wealth and prosperity. Studies have observed that the country experiences significant challenges in health outcomes, characterized by low life expectancy rate, infant and maternal mortality rates, prevalent infectious diseases which not unconnected with the inadequate expenditure on health and education by the government. These poor health outcomes hinder the development of the productive capacity of the economy by impeding individuals' ability to fully engage in economic, social, and educational activities. Government expenditure on health as a share of the GDP as at 2020 was 3.38%, and 4.97% in 2022 and 5.75%in 2023, these estimates though with trend of increase however fall short of the 15% of national budget to be spent on health as advocated during the Abuja declaration in 2001. Also government expenditure on education have not fare better which in turn affects health outcomes and restricts the development of human capital.

Life expectancy for Nigeria stood at 55.75 years for both male and female in 2023, an improvement from 55.44 years and 55.12 years for 2022 and 2021 respectively. This information shows that an average Nigerian would not live beyond their 56th birthday in 2023 as against 64.94 years for Ghana, 72.54 for Egypt and 64.88 for South Africa (WHO, 2023). 70,600 children died before their 5th birthday in Nigeria in 2023, this showed a decrease from 73,900 for the year 2021. In Ghana, 33,500 children died of various health related illnesses before their 5th birthday, Egypt's figure stood at 16,200 and South Africa had 26,400 under-five mortality in 2023 (WHO, 2023). The number of women who die during or immediately after child birth per 100,000 stood at 1047 for Nigeria in 2023, maternal mortality rate for Ghana for the same period stood at 263 deaths, 127 for South Africa and 17 for Egypt in 2023 (WHO, 2023). Though trend information shows improvement in the health outcomes mentioned for Nigeria and most African Countries, Nigeria still falls below the target for improved health outcome such as reducing maternal mortality to 70 deaths per 1000 live birth.

Poor health outcomes limit opportunities for individuals to reach their full potential, as they may be unable to attend school, learn new skills, or engage in economic activities.

Therefore, this study aims to examine the effects of human capital development in improving health outcomes. The following questions are raised to guide the study; what is the effect of human capital development on life expectancy in Nigeria? To what extent does human capital development affect maternal mortality in Nigeria? And what is the effect of human capital development on under-five mortality? Though the broad objective of this study is to investigate the impact of human capital development on health outcomes in Nigeria, the study specifically seeks to: determine the effect of human capital development on life expectancy in Nigeria; determine the impact of human capital development on maternal mortality in Nigeria; and to estimate the effect of human capital development on under-five mortality in Nigeria.

Issues in literature

Human Capital variables and Health Indictors

Human capital development, which encompasses education, healthcare, and workforce skills, plays a crucial role in shaping public health outcomes. In Nigeria, the impact of human capital development on key health indicators such as life expectancy, maternal mortality, and under-5 mortality has been extensively studied. This literature review synthesizes empirical findings from various studies to assess how investments in human capital development influence these health outcomes.

Human capital refers to the knowledge, skills, abilities, and attributes possessed by individuals that contribute to their productivity and economic potential. It represents the stock of human resources within a population or workforce. The concept of human capital recognizes that individuals are valuable assets and investments, and that their education, training, and development can enhance their economic output and overall well-being (Olajide & Oyelere, 2011). The concept of human capital is built upon the knowledge and skills acquired through education, training, and experience. This includes formal education from schools, colleges, and universities, as well as informal learning from practical experiences and on-the-job training. Knowledge and skills encompass a broad range of areas, such as technical expertise, problem-solving abilities, communication skills, critical thinking, and adaptability. Human capital is not innate but developed and improved over time. Individuals, organizations, and societies invest in human capital through various means, including education and training programs, professional development initiatives, mentor-ship, and access to information and resources. Olajide and Oyelere (2011) submit that this investment is aimed at enhancing individuals' abilities, productivity and economic value. Human capital is an economic asset because it contributes to economic growth and development through increased productivity. Individuals with higher levels of human capital tend to have higher productivity levels, higher wages, and increased employment opportunities. Human capital is a driver of innovation, technological advancements, and overall productivity in industries and economies (Thompson 2019).

Owopetu, Oyedele, and Tella (2024) conducted a comprehensive study examining the impact of human capital development on life expectancy in Sub-Saharan Africa. Utilizing panel data from 20 countries over a specified period, the researchers employed econometric techniques to analyze the relationship between key indicators of human capital development—such as education, healthcare investment, and workforce skills—and life expectancy outcomes. Their findings revealed a strong, positive, and statistically significant relationship between human capital development and increased life expectancy. This suggests that improvements in education, access to quality healthcare, and skill development contribute to better health outcomes and longer lifespans. The study emphasized the crucial role of sustained investments

in human capital as a policy priority for governments in the region. It concluded that fostering human capital development through strategic policies and targeted investments could lead to significant improvements in public health, economic productivity, and overall well-being in Sub-Saharan Africa.

Cervellati and Sunde, (2005), Acemoglu, and Johnson (2007) Soares (2007) are some of the studies that agree that an increase in life expectancy lead to higher population growth, which can dilute capital and potentially offset gains in per capita economic growth. However, they also note that improved health contributes to human capital development, which can have positive long-term effects on economic performance. Adepoju and Obasanjo (2020) conducted an in-depth study to assess the impact of education being a human capital variable, on life expectancy in Sub-Saharan Africa. Drawing on data from 15 countries over a specified period, the researchers utilized quantitative methods to evaluate the relationship between various educational indicators—such as literacy rates, average years of schooling, and government expenditure on education—and life expectancy. Their findings indicated a strong and statistically significant positive correlation between education and increased life expectancy. Specifically, the study demonstrated that higher levels of educational attainment contribute to improved health awareness, better access to healthcare services, and enhanced socioeconomic conditions, all of which lead to longer life spans.

Furthermore, Adepoju and Obasanjo (2020) highlighted that education plays a crucial role in shaping health-related behaviors, such as disease prevention, hygiene practices, and maternal and child healthcare. The study underscored the importance of investing in educational infrastructure, teacher training, and policy reforms to enhance the quality and accessibility of education in Sub-Saharan Africa. Based on their findings, the authors concluded that expanding access to education—particularly for marginalized and disadvantaged populations—should be a key policy priority for governments and development organizations seeking to improve life expectancy and overall well-being in the region.

Oyinlola, Adedeji, and Onitekun (2021) conducted a comprehensive study to examine the relationship between human capital development and health outcomes in Sub-Saharan Africa. Using panel data from 20 countries over a specified period, the researchers employed advanced econometric techniques to analyze the impact of human capital development on key health indicators, including life expectancy, infant mortality rates, and disease prevalence. Human capital development was measured through indicators such as educational attainment, healthcare investment, and workforce skill enhancement.

The study's findings revealed a strong and statistically significant positive relationship between human capital development and improved health outcomes. Specifically, countries with higher investments in education and healthcare experienced better overall public health conditions, longer life expectancy, and lower disease burdens. The results suggested that education contributes to better health awareness and preventive healthcare practices, while increased healthcare investment leads to improved medical infrastructure, access to quality healthcare services, and better-trained medical personnel.

Furthermore, the study emphasized the long-term benefits of prioritizing human capital development, noting that improved health outcomes lead to greater economic productivity, reduced healthcare costs, and enhanced social well-being. The authors underscored the importance of government policies and international development efforts aimed at expanding access to education and healthcare, particularly in low-income and rural communities. Based on their findings, Oyinlola, Adedeji, and Onitekun (2021) concluded that sustained investments in human capital development are crucial for achieving better health outcomes and overall

socioeconomic progress in Sub-Saharan Africa. Ubaka, Nnachi, and Ifeaka (2023) found contrasting results from the above submission.

On the nexus between human capital development and health indicators, Raheem, Isah, and Adedeji (2018) conducted a detailed study to explore the role of healthcare in human capital development and its impact on life expectancy in Sub-Saharan Africa. Using panel data from 15 countries over a specified period, the researchers employed advanced econometric techniques to assess how healthcare investment influences both human capital formation and overall population health. Their analysis focused on key healthcare indicators such as government healthcare expenditure, access to medical services, infant and maternal mortality rates, and disease control measures.

The study's findings revealed a strong and statistically significant positive relationship between healthcare investment, human capital development, and life expectancy. Specifically, countries that allocated more resources to healthcare services experienced better health outcomes, increased productivity, and longer life spans. The researchers highlighted that improved healthcare access leads to lower mortality rates, higher immunization coverage, and better management of communicable and non-communicable diseases, all of which contribute to enhanced human capital development. Additionally, they noted that healthier populations are more likely to benefit from education and employment opportunities, thereby fostering long-term economic growth.

Raheem, Isah, and Adedeji (2018) further emphasized that healthcare improvements should be accompanied by policy interventions aimed at increasing affordability and accessibility, particularly for disadvantaged communities. The study recommended that governments and policymakers prioritize healthcare infrastructure, medical personnel training, and public health awareness campaigns to maximize the benefits of healthcare investment. Based on their findings, the authors concluded that expanding healthcare access is not only essential for improving life expectancy but also serves as a fundamental pillar for human capital development and sustainable economic progress in Sub-Saharan Africa. Studies such as, Ribero, and Nuñez, (2000), Baldacci, Clements, Gupta, & Cui (2004), UNDP, (2010), World Bank. (2020), collaborate the linkage between the variables of this study.

The implications of a developed health system is evident through the relevant health indicators, while these indicators is expected to translate to improved capabilities of the citizenry (Amater Sen), effective delivery of health services and increased productivity. Increased productivity within an economy is translated to an improvement in the economic growth of a country which in turn funds human capital development. To discuss this bi-directional causality between human capital development and economic growth, Muriithi and Mwangi (2019) conducted an empirical study examining the relationship between human capital development and economic growth in Sub-Saharan Africa. Using panel data from 20 countries over a specified period, the authors employed econometric techniques to assess the impact of human capital indicators—such as education, healthcare, and workforce skills—on economic growth. Their findings confirmed a strong and statistically significant positive relationship between human capital development and economic performance. Ubaka, Nnachi, and Ifeaka (2023) assessed the impact of human capital development on Nigeria's economic growth from 1986 to 2019. The findings showed that life expectancy and government expenditure on health positively and significantly influenced the gross domestic product. Conversely, government expenditure on education and primary school enrollment had a negative and significant impact. The authors recommend formulating policies to improve citizens' living standards, thereby enhancing life expectancy and contributing to economic growth. Gebrehiwo (2023) also found a stable long-run relationship between real GDP per

capita and factors such as education and health human capital for Ethiopia. Notably, health human capital had a more substantial positive impact on GDP per capita growth compared to education human capital

The study contributed to the literature by demonstrating that sustained investments in human capital development lead to higher productivity, increased innovation, and overall economic prosperity. Furthermore, it emphasized the role of policy measures in enhancing access to quality education and healthcare, which are fundamental for long-term economic growth.

Human capital in this study is measured by a combination of variables which primarily indicate the level of investments in areas that affect human capital. This study employs government and private expenses which aims at improving the capacity, educational level and technical abilities of an individual. Literature points to a range variables like expenditure on education, health, and stock of investment that captures the effect of human capital development within the Nigerian economy. This study employs government expenditure on education and health, access to health, literacy level and personal expenditure on health consumables as variables to capture human capital development in Nigeria for the period under review.

The literature reviewed provides substantial evidence that human capital development significantly influences life expectancy, maternal mortality, and under-5 mortality in Nigeria. Investments in education, healthcare, and workforce development have been consistently linked to improved health outcomes, reduced mortality rates, and increased longevity. Based on these empirical findings, policymakers should prioritize initiatives that enhance human capital development to ensure sustainable improvements in public health across Nigeria.

Methodology

The study adopted both descriptive and econometric tools in its analysis and estimation. The descriptive analysis used include; simple tables, graphs, percentages, averages, to analyze the trend performance of the variables, while econometric techniques, on the other hand, the ARDL estimation techniques was used in estimating the relevant equations under the framework of multiple regression modelling and estimation. The broad dependent variable of health outcome is decomposed to include life expectancy, maternal mortality and under-five mortality, while the key independent variables are government expenditure on health, government expenditure on education, literacy rate, access to health care and out-of-pocket health expenditure. Government expenditure on health and education, adult literacy level and out-of-pocket health expenditure are employed in this study to represent investments in human capital as explained in the human capital theories by Becker and Schultz, mentioned in the preceding chapter of this study. Access to health as variable makes its way into the equations based on Sen's Capability Approach that explains that the compound investment and improved access to basic facilities will improve the capabilities and functionality of a unit of the population towards a better society. The inclusion of out-of-pocket health expenditure explains the determining factors Grossman discussed in his demand for health theory as the cost the individual is willing to pay for days in health.

Hinged on the Becker's human capital theory, Schultz's human capital formation theory, Amartar Sen's Capability approach and Grossman's demand for health theory, the equations for this study are specified thus;

- Life Expectancy Equation

$$LFEXP = f(GEH, GEE, LR, AHC, OOP, PCI, GINI) \quad - \quad - \quad - \quad 3.1$$

- Maternal Mortality Equation

MMR = *f* (GEH, GEE, LR, AHC, OOP, ACC, RMP) - - - 3.2

- Under-Five Mortality Equation

UNF = *f* (GEH, GEE, LR, AHC, OOP, VC, SBA) - - - 3.3

Where:

LFEXP = Life expectancy measured in average age within the population

MMR = Maternal Mortality Rate measured in percentages

UNFMR = Under-Five mortality rate, measured in percentages

GEH = Government Expenditure on Health, measured in Naira

GEE = Government Expenditure on Education, measured in Naira

LR = Literacy Rate measured in by Primary school enrollment rate

AH = Access to Health care measured by Ratio of physicians to 1000 of the population at a time (t)

OOP = Out of pocket expenditure on health measured as a percentage of total current health expenditure

PCI = Per Capita Income

HDI = Human Development Index

ACC = Antenatal Care Coverage

RMP = Ratio of Mid-wife to Population

VC = Vaccination coverage

SBA = Skilled Birth Attendants

The equations 3.1, 3.2 and 3.3 can be expressed in their econometric form as:

$LFEXP = \lambda_0 + \lambda_1 GEH + \lambda_2 GEE + \lambda_3 LR + \lambda_4 PP1000 + \lambda_5 OOP + \lambda_6 PCI + \lambda_7 HDI + U_1$ -3.4

$MMR = \alpha_0 + \alpha_1 GEH + \alpha_2 GEE + \alpha_3 LR + \alpha_4 PP1000 + \alpha_5 OOP + \alpha_6 ACC + \alpha_7 RMP + U_2$ - 3.5

$UNFMR = \beta_0 + \beta_1 GEH + \beta_2 GEE + \beta_3 LR + \beta_4 PP1000 + \beta_5 OOP + \beta_6 VC + \beta_7 SBA + U_3$ - 3.6

λ_0, α_0 and β_0 are the constant and intercept term for each of the specified equations above.

$\lambda_1, \lambda_2, \lambda_3, \lambda_4, \lambda_5, \lambda_6 \; and \; \lambda_7$ are respective parameters of the independent variables of the human capital and life expectancy equation.

$\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6 \; and \; \alpha_7$ are respective parameters of the independent variables of the human capital and maternal mortality equation.

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6 \; and \; \beta_7$ are respective parameters of the independent variables of the human capital and infant mortality equation.

U_1, U_2 and U_3 are the error terms for each of the specified equations above which captures all other factors that may affect the dependent variables, but not captured in the respective equations.

The expected signs of these parameters are;

$\lambda_1, \lambda_2, \lambda_3, \lambda_4, \alpha_1, \alpha_2, \alpha_3, \alpha_4, \beta_1, \beta_2, \beta_3$ *and* $\beta_4 > 0$, this explains a positive relationship between the government expenditure on health, government expenditure on education, literacy rate and access to health and independent variables, while λ_5, α_5 and $\beta_5 < 0$ explains a negative relationship between out-of-pocket expenditure on health and health outcomes.

Results

Long Run Estimate of the Life Expectancy Equation

Table 1: Long run estimate of the life expectancy equation

Dependent Variable: D(LEXP)

Selected Model: ARDL(2, 3, 1, 3, 3, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GEH)	-0.010510	0.001982	-5.301981	0.0187
LOG(GEE)	0.059790	0.002734	21.87255	0.0291
LR	3.96E-05	3.23E-05	1.225317	0.0135
PP1000	-0.360093	0.017093	-21.06625	0.0302
LOG(OOP)	0.395266	0.013856	28.52640	0.0223

Sources: Author's Computation, 2024.

Long run estimates of the maternal mortality rate equation

Table 2: Long run estimates of the maternal mortality rate equation

ARDL Long Run Form and Bounds Test

Dependent Variable: D(MMR)

Selected Model: ARDL(2, 3, 3, 3, 3, 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GEH)	-0.154820	0.338946	-0.456770	0.7272
LOG(GEE)	0.115829	0.409006	0.283195	0.0243
LR	-0.056066	0.019320	-2.901901	0.0211
PP1000	-11.83864	4.155765	-2.848727	0.0214
LOG(OOP)	-8.656833	3.612393	-2.396426	0.0251

Sources: Author's Computation, 2024.

Long run estimates of the under-five mortality rate equation

Table 3: Long run estimates of the under-five mortality rate equation

Dependent Variable: D(UNF)

Selected Model: ARDL(2, 3, 2, 3, 3, 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GEH	-1.602757	0.188356	-8.509194	0.0135
GEE	0.925482	0.120543	7.677627	0.0165
LR	3.637300	0.581175	6.258527	0.0246
PP1000	-0.889664	0.702397	-1.266612	0.3328
OOP	-0.488932	0.701102	-0.697377	0.5577

Source: Author's Computation, 2024.

Findings and discussion

The broad objective of this study was to explore the existing relationship between human capital variables and health indicators in Nigeria from 1996 to 2023. To achieve this broad objective, three specific objectives were specified from which three research hypotheses were formulated. The Auto-Regressive Distributed Model (ARDL) based on bounds testing approach was employed in the estimation of the three equations. From the results obtained the following summary of finding is made:

The results of the life expectancy equation showed that in the long run, government expenditure on health has an inverse but statistically significant relationship with life expectancy in Nigeria; government expenditure on education revealed a positive and statistically significant relationship with life expectancy; the literacy rate in the country showed a positive, but non-statistically significant relationship with life expectancy in Nigeria. The number of physicians per 1000 persons showed a negative but statistically significant relationship with life expectancy, meaning that if more qualified health workers are employed within the health system, it could naturally result in an increase in the life expectancy in the country. While out of pocket expenditure revealed a positive and statistically significant relationship with life expectancy in Nigeria. The long-run coefficient of government health expenditure is negative and significant, indicating that a 1% increase in government health expenditure will lead to a corresponding decrease in life expectancy in the long run. This result is the opposite of the expectation, is justifiable in the Nigeria context because of evident institutional complexities and the spate of corruption which the health sector in the country is not immune to. This said, and increase in government health expenditure in the context of this study showed that life expectancy will not necessarily increase. An increase in education expenditure is likely to lead to better education outcomes, increased literacy rates, and improved health outcomes, ultimately leading to an increase in life expectancy. The long-run coefficient of education expenditure is likely to be positive and significant, indicating that a 1% increase in education expenditure will lead to a corresponding increase in life expectancy in the long run.

For the maternal mortality equation, in the long run, government expenditure on health showed an inverse and non-statistically significant relationship with the maternal mortality rate in Nigeria; government expenditure on education showed a positive but non-statistically significant relationship with the maternal mortality rate in Nigeria; the literacy rate showed an inverse and statistically significant relationship with the maternal mortality rate; and physicians per 1000 persons revealed a positive and statistically significant relationship with the maternal mortality rate in Nigeria. Finally, out-of-pocket expenditure revealed an inverse but statistically significant relationship with the maternal mortality rate in Nigeria.

The results of the under-five mortality rate equation showed that government expenditure on health has an inverse and statistically significant relationship with under-five mortality rate in Nigeria, government expenditure on education have a positively significant relationship with under-five mortality rate in Nigeria, the literacy rate has a positively significant relationship with under-five mortality rate in Nigeria, number of physicians per head has an inverse and non-statistically significant relationship with under-five mortality rate in Nigeria, while out of pocket expenditure has an inverse statistically insignificant relationship with under-five mortality rate in Nigeria in the long run

Conclusion

This study examined the relationship between human capital variables and health indicators in Nigeria from 1996 to 2023. The study was guided by three equations coming from three specific objectives which were to determine the log run effect of human capital variables

on life expectancy in Nigeria, determine the long run impact of human capital variables on maternal mortality in Nigeria, and also to estimate the long run impact of human capital variables on under-five mortality in Nigeria. The results from the findings of this study however revealed that government expenditure on health has mixed impacts on life expectancy, maternal mortality rates, and under-five mortality rates in Nigeria. On the other hand, long-term investments in healthcare infrastructure showed high prospects of reducing mortality rates, particularly under-five mortality rate. These further stresses the importance of sustained investments in the healthcare sector to record commendable progress in public health outcomes.

Consequently, these results present the need for targeted and consistent interventions to address specific health challenges in Nigeria. For instance, the significant but varied effects of factors such as literacy rate and the number of physicians per 1000 persons on mortality rates stresses the need to address other socio-economic determinants of the healthcare like staff capacity and remuneration. Also, the inverse relationship between out-of-pocket expenditure and mortality rates points to the financial barriers to getting quality healthcare services in Nigeria. Increasing out-of-pocket expenses deters people, particularly those from low-income households, from seeking timely and quality healthcare, leading to adverse health outcomes and increased mortality rates. The synopsis of these findings is that consistent investment in healthcare, education, and healthcare staff remuneration is necessary for improving public health outcomes in Nigeria. Finally, targeted interventions with objectives of addressing the socio-economic determinants of health and reducing financial barriers to healthcare access will help to mitigate mortality rates and improve the overall health of the population, particularly those of vulnerable women and children.

Policy recommendations

Based on the findings above, the following recommendations are suggested.

(1) Reevaluate government health expenditure via investigating and addressing the factors causing the inverse relationship between long-term health expenditure and life expectancy to optimize the impact.

(2) Reexamine and optimize education expenditure strategies to ensure they contribute effectively to reducing maternal mortality, by promoting programs with objective of improving educational levels, particularly for women, to address broader socio-economic determinants of health.

(3) Invest on increasing literacy rates, given the positive relationship in the current and lag one period. Promote strategies for the long-term to curb the inverse impact seen in lags two and three.

(4) Promote policies that mitigate the financial burden on families by supporting affordable healthcare services, which inversely impacts maternal mortality rates and other health indicators in the country.

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