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Review Article

Public Health Expenditure and Health Outcomes in Nigeria

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Abstract: The study investigates the effect of public health expenditure on health outcomes in Nigeria, as captured by life expectancy at birth and infant mortality rates. The result shows that public health expenditure and health outcomes have long-run equilibrium relationship. Furthermore, the results showed that an increase in public health expenditure improves life expectancy and reduces infant mortality rates. In addition, urban population and HIV prevalence rate significantly affects health outcomes, while per capita income exhibits no effect on health outcomes in Nigeria. The findings suggest that public health expenditure remains a necessary component in improving health outcomes in Nigeria.

Keywords: Health Outcomes, Life Expectancy, Infant Mortality Rates

1. Introduction

Healthcare is an important input in the health production function. This is premised on the fact that it is one of the important means to reduce infant mortality towards welfare improvement. In most developing countries where child mortality, communicable diseases, income poverty and inequality remain high, private expenditures on healthcare dominate. Further, out-of-pocket expenditure remains a major component of private health expenditures in most of these countries, especially in countries with no social health insurance. This restricts access to medical care, particularly for the poor. Health is also a prominent part of human capital along with education. Lichtenberg [2004] contends that more public health services could enhance level of life expectancy. In achieving this, apart from individual to access services, public spending has a role to play. An increase in government spending not only leads to longer life and hence faster economic growth as reinforced by that long life, but implies a larger work force, which can also drive faster growth [AisaPueyo, 2004]. Empirical studies have revealed that a healthy person not only works efficiently but is also able to devote more time to economic activities that productivity. It is estimated that health improvements accounts for one-third increase in GDP growth and its impact on health status improves human capital development [Bloom and Sevilla, 2004].

The improvement in health status, especially in developing countries possesses huge challenge and the prevalence of large scale health problems, such as high infant mortality rate and low life expectancy, are as a result of the scarce health resources and infrastructure. Available statistics reveal that apart from healthcare budgets that are far below the developed countries, the few health infrastructures available are unbalanced between urban-rural areas. Availability of and access to improved healthcare services reduces mortality and financial risk among the population while addressing poverty issues. In this regard, adequate and efficient health spending remains crucial in improving health status. Between 1986 and 1990, health expenditure as a percentage of GDP averaged 0.32 percent and hardly changed between 1995 and 1999 when it averaged 0.33 percent. Comparing the performance of Nigeria with other African countries, Olaniyi and Adam [2003] observed that in 1990, public expenditure on health as a fraction of GDP was 2.7 percent against 3.5 percent in Ghana, 4.3 percent in Kenya and between 1995 and 1997, 4 percent in Seychelles. Poor expenditure on health sector in most developing countries is worsened by an inverted nature of health expenditure pyramid. About three quarters of all public health expenditure are for

expensive medical care that benefits a small minority of the population living in the urban areas. A high proportion of the budget for health, 80 to 90 percent in some countries, is spent on hospitals, almost all of which are located in the cities. Meanwhile, only about 60 percent of the people have access to primary healthcare. As noted by Graffian and Mckinley [1992)], a high proportion of the poor and of those living in rural areas is not reached by the healthcare system and is forced to rely on home remedies and traditional.

In recent years, impact of human capital formation, especially health status is realized to be an important predictor of economic growth not only in individual countries but across countries and over time [Bhargava, 2001; Webber, 2002; Alderman, et al, 2003 and Muysken, 2003]. Consequently, health and its likely impact on individual's well-being and on economic growth have received immense importance at various levels [Frank and Mustard, 1994]. The availability of healthcare services and the physical, biological, epidemiological and socio-economic environment in which a person lives, broadly determines the disease pattern, health status and generally the quality of life which reflects on the welfare of an individual. Implied is that if a country wants to develop successfully economically, a fair amount of money should be spent on healthcare. Government intervention in undertaking fundamental role of allocation, distribution, stabilization and regulation has been encouraged in this regard, especially where or when market proves inefficient. In the case of Nigeria, despite of economic improvement, social and demographic indicators present a dismal picture. Nigeria still has one of the highest infant mortality rates and low life expectancy when compared with other developing countries. In addition, there is significant inequality in the distribution of financial and human resources in the health sector. Still, Nigeria's spending in the health sector is lower than 16 percent of GDP [UNDP 2013].

Even though, growth in income per capita is significant over the past few years, this has had less impact on health spending and hence on the significantly low health status. Given this background, it becomes imperative to assess how public health expenditure has contributed to the improvements in health outcomes in Nigeria, using life expectancy at birth and infant mortality rates as outcomes. The proposition in this study is that if public spending is imperative in improving the healthcare of the citizens, then it is necessary to assess the contribution of the government spending towards the improvement in health status within the framework of the health production function. While previous studies focused on per capita income, urbanization, public health expenditure and two health outcomes: infant mortality and under-five mortality rate, this study contributes to existing studies by considering two health outcomes: life expectancy at birth and infant mortality rates with public health expenditure, per capita income and urban population as predictors.

2. Literature Review

In its simplest form, health expenditures are defined on the basis of their primary or predominant purpose of improving health, regardless of the primary function or activity of the entity providing or paying for the associated health services. But to World Bank [2014], health expenditure covers the provision of health services (preventive and curative), family planning activities, nutrition activities, and emergency aid designated for health but does not include provision of water andsanitation. In a different notion, WHO (2015) defines health expenditure as a measure of final consumption of health goods and services plus capital investment in healthcare infrastructure. In this context, health is a critical component in gauging the living standards of a nation or region. When linked with improvements with other variables like water, sanitation and nutrition, health is visualized as an input into and outcome of growth process, integrated socio-economic upliftment based on health status improvements which depicts a reflection and cause of ongoing development efforts towards human welfare. It is an established fact that improvements in health of population as a whole definitely have a positive impact by generating social returns to individuals and communities. This explains on one hand that improved human capital is better capable of participating in economic activities, improved productivity at individual level and consequently, better living standards. On the other hand, better health status will result in lesser absence from work and reduces disease burden which translates into low economic cost in terms of providing health services and hence better coverage and better management of the available resources [Basta, *et al*. 1979]. While healthcare consumption represents investment in health at the individual level, provision of healthcare infrastructure and improvement in healthcare infrastructure, including healthcare personnel, constitute health investment at the state level. Thus, the state makes available healthcare facilities and personnel whereas individuals utilize these facilities to improve their health status. Thus, individual's investment in health via medical care consumption is dependent on the availability of and access to healthcare services. Within the production function framework, healthcare is considered one of the several inputs in the health production function. Thus, healthcare is seen as input in the production of good health such as low mortality and higher life expectancy. Thus, healthcare is considered an input in producing, for example, zero or low mortality and higher life expectancy, hence the presence of health expenditure in the health production. Regardless of the approach used, healthcare is one of the means for individuals to improve their health status. However, the ability of individuals to undertake such investment or production activity is dependent on the availability of and access to health resources, whether provided by the public or private. Following the externality that health presents, income poverty, welfare, and inequity issues, government provision of healthcare (including public health services) is necessary.

It is for this reason that Ke et al. [2011] undertook a study with the aim of understanding the determinants of health expenditure in developing countries. The study data show great variation across countries in health expenditure as a

share of GDP, which ranges from less than 5% to 15%. Apart from income, many factors contribute to this variation, ranging from demographic factors to health system characteristics. Their results suggest that health expenditure in general does not grow faster than GDP after taking other factors into consideration. Income elasticity is between 0.75 and 0.95 in the fixed effect model while, it is much smaller in the dynamic model.

A number of scholars have also done extensive study on the effect of public health expenditure and their effect on health outcomes. A group of literature in recent years has tried to examine the link between public health expenditure and health outcomes especially as it affects under-five mortality, infant mortality and life expectancy at births. Available studies so far document a range of effects, from no impacts, to limited impacts, and to significant impacts on only specific interventions. For instance, Anyanwu and Erhijakpor [2007] carried out a study on health expenditures and health outcomes in Africa and provided econometric evidence linking African countries' per capita total as well as public health expenditures and per capita income to two health outcomes: infant mortality and under-five mortality using data from 47 African countries. Health expenditures were found to have significant effect on infant mortality and under-five mortality. The results imply that for African countries, total health expenditures (as well as the public component) are certainly important contributor to health outcomes. In addition, infant and under-five mortality were found to be positively related to health outcome for Sub-Saharan Africa. The reverse is true for North-Africa where ethno-linguistic fractionalization and HIV prevalence positively affect health outcome while higher numbers of physicians and female literacy reduce these health outcomes. Novignon, et al. [2012] carried out a study with an objective to determine the effects of public and private healthcare expenditure on health status in 44 Sub-Saharan Africa countries with panel data from 1995-2010. Fixed and random effects panel data regression models were fitted to determine the effects of healthcare expenditure on population health status and to examine the effect by public and private expenditure sources. The obtained result shows that healthcare expenditure significantly influences health status through improving life expectancy, reducing death and infant mortality rates. Both public and private healthcare spending showed strong positive association with health status even though public healthcare spending had relatively higher impact. Boachie and Ramu [2015] examined the relationship between public health expenditure and health status in Ghana. In their study, they examined the impact of public health spending on health status for the period 1990-2002 employing standard OLS and Newey-White estimation technique. After controlling for real per capita income, literacy level and female participation in the labour market, the study found evidence that the declining infant mortality rate in Ghana is explained by public health spending among other factors. Thus, they concluded that public healthcare expenditure is associated with improvement in health status through reduction in infant mortality.

Abbas [2010] described health as one of the basic capabilities that generates economic freedom. This was empirically tested by estimating the role of different macroeconomic and policy relevant factors affecting public health spending and health status in Pakistan over time and attempted to see the likely impact of health related variables like health status and per capita calorie availability on economic development using mainly health demand function and health production function. Contrary to the estimates obtained for most of the industrialized countries, income elasticity of public health expenditures was less than unity while the short run-elasticity was even negative. In a further analysis, the co-integration and Granger bivariate causality analysis was applied for health status of the population and the results shows that per capita health expenditure is negatively related with infant mortality rate and positively related with female life expectancy. Another modeling strategy efficiency wage hypothesis was tested using production function framework. The results of nutrition derived were compared with that of life expectancy, fertility, health expenditure and mortality and it was discovered that the magnitude of calorie availability is stronger on per capita income relative to life expectancy, infant mortality, public health expenditures and fertility showing a one-way causality running from per capita calorie availability to per capita income. This outcome confirms that health sector is interlinked with socio-economic development. It can inferred from the above that health policy must not treat the health services in isolation but in an integrated manner to achieve the broader goals of improving human wellbeing, which supports the reason of increasing public investments in health. In essence, policies which promote social inclusion by increasing employment will help in improving health status of the citizens. Leaning on the above, Ahmed and Hasan [2016] analyzed the impact of public health expenditure and governance on health outcomes in Malaysia using data from 1984-2009. Adopting an Autoregressive Distributed Lag (ARDL) cointegration framework, the results based on the bounds testing procedure show that a stable, long-run relationship exists between health outcomes and income level, public health expenditure, corruption and government stability. The results also reveal that public health expenditure and corruption affect long and short-run health outcomes. To improve the quality of life in the country, the study emphasize on the importance of health program while reducing or eliminating the corruption rate in the country.

Also, using panel data set of Indian states between 1983-84 and 2011-12, Barenberg, Basu andSoylu [2015] study the impact of public health expenditure on the infant mortality rate, after controlling for other relevant explanatory co-variables like per capita income, female literacy, and urbanization. The study found that public expenditure on healthcare dampens infant mortality rate. The baseline specification shows that an increase in public health expenditure by 1% of state-level GDP leads to a decrease in the infant mortality rate by about 8%. The study also finds that female literacy and urbanization also reduce the infant

mortality rate. Akinci, *et al* [2015] examined the impact of healthcare expenditures on selected health outcomes for 19 countries in the Middle East and North Africa region. Using panel data for 1990-2010, the study estimated the impact of both government and private healthcare expenditures on infant, under-five and maternal mortality rates. The results show that after controlling for co-explanatory variables, government and private spending on healthcare significantly improve infant under-five, and maternal mortality in the region, though it impact is not significant. In specific terms, a percentage increase in per capita government expenditure reduces the infant mortality rate by 8.6-9.5%, under-five mortality by 10.3-12 %, under-five deaths and maternal mortality by 26.0-26.3%. In the same vein, a percentage increase in the log per capita private expenditures reduces the infant mortality rate by 7.2-8.1%, under-five mortality rate by 9.5-9.8% and the maternal mortality rate by 25.8-25.9%.

3. Methodology

In accordance with the literature reviewed, health expenditure as an indicator of the volume of resources flowing into the health sector is expected to have a positive effect on life expectancy and a negative effect on infant mortality rates. Thus, an increase in health expenditure per capita implies a broader access to healthcare and other services which helps to increase life expectancy and decrease infant mortality rates. Given the re-distributive influence of public intervention, a positive correlation between public spending of health and health outcomes is expected. Roberts [2003], Baldacci et al., [2004] has emphasized that geographical/demographic factors such as rural or urban location or growth of population affect health outcomes. As shown by Schultz [1993], mortality rate is higher among rural, low-income, agricultural households than in their urban counterparts because, among other reasons, access to health is typically better in urban areas just as the private cost of health may be lower for urban households. Gupta, et al. [1999] had stated that the population's health status improves as per capita incomes rise, suggesting that increasing income is associated with lower infant mortality rates and increased life expectancy. In addition, higher incomes lead to improved public health infrastructure such as water and sanitation, better nutrition, better housing and the ability to pay for healthcare [Pritchett and Summers, 1996; Cutler et al., 2006].

According to basic economic theory, if everything else is held constant and if healthcare is a normal good, an increase in per capita income will lead to increases in the demand for healthcare. Income also increases the capacity of governments and other stakeholders to supply more and better healthcare and to improve access to healthcare through better infrastructure. An increase in public health spending is expected to increase the rate of life expectancy at birth, thus improving health outcomes while HIV prevalence rate is expected to have a negative impact on health outcomes by reducing the rate of life expectancy at birth and increasing infant mortality rate. This can be seen in the fact that HIV

disease is an epidemic that reduces the health status, life span of individuals, thereby affecting their level of productivity in the economy.

3.1. Model Specification

The specification of the model in this study is consistent with literature and allows for the identification of the channels through which government expenditure affect health outcomes over time. Assuming health outcome to be *Y* and government expenditure given as *X*, a simple model of health outcomes can be stated as follows:

$$Q_t = \beta_0 + \beta_1 \chi_t + \mu_t, \ t = 1\ldots n \qquad (1)$$

where Q_t is health outcomes, at time t and χ is a vector of independent variables influencing health outcomes, and β_0 represents the intercept term, while β_1 is a vector coefficient of the independent variables. μ_t is the error term which is assumed to be normally distributed with zero mean and constant variance. Given our specific variables, the linear relationship between health outcomes and health expenditure can be stated thus:

$$H\text{ʃ}_t = \eta_0 + \eta_1 PHE_t + \eta_2 PCI_t + \eta_3 URBANPOP_t + \eta_4 HIVPR_t + \mu_t \ (2)$$

Adopting life expectancy and infant mortality rates respectively as proxy for health status, equation (2) above is re-specified as:

$$LE_t = \varphi_0 + \varphi_1 PHE_t + \varphi_2 PCI_t + \varphi_3 URBANPOP_t + \varphi_4 HIVPR_t + \mu_t \ (3)$$

$$IMR_t = \text{ɟ}_0 + \text{ɟ}_1 PHE_t + \text{ɟ}_2 PCI_t + \text{ɟ}_3 URBANPOP_t + \text{ɟ}_4 HIVPR_t + \mu_t \ (4)$$

where Hʃ= health outcomes, LE= life expectancy at birth(measured by LE at birth per 1000 live births), IMR= infant mortality rates(measured by infant mortality rate per 1000 live births), PHE = public health expenditure(measured by percentage of total health expenditure), PCI= per capita income (measured as GDP per capita (constant USD), URBANPOP = urban population(measured by percentage of total urban population), HIVPR=HIV prevalence rate(measured by total prevalence of HIV).

3.2. Data Sources, Measurement and Theoretical Expectation

The variables under consideration are measured in growth rates to eliminate the effects of trend and irregular movements. This is because most macro-economic time series follow an upward trend as the years go by. Data for this study are annual time series data from 1981-2014 sourced from World Development Indicators and various publications of the World Bank regarding health and health expenditures. Guided by production theory and previous empirical literature, we control for real per capita income (per capita GDP), urban population and HIV prevalence rate in our quest to examine the effect of public health expenditure on health outcomes. Further, GDP per capita (constant 2005 USD) is used to measure per capita income, and public health expenditure is measured as percentage of total health expenditure, urban

population is measured as percentage of total urban population and HIV prevalence rate is measured by total prevalence of HIV.

Life expectancy at birth stands as an appropriate measure of indicator of health status for countries which might also capture the efficiency of necessary health services for elderly population. The previous studies show that there appears to be correlation between health expenditure and health outcomes in the OECD countries [Kyropoulos and Soulotis, 2008]. Infant mortality rate is often used as an indicator to measure the health and well-being of a nation, because factors affecting the health of entire populations can also impact the mortality rate of infants. This is a measure used to capture health outcome of a population. Public health expenditureIt is very important for decision makers to know the amount of government-funding on health care, the effectiveness ofhealthcareprograms and the level of efficiency of this public health expenditure on achieving improvements in health outcomes. Per capita incomeis a measure of the average income earned per person in a certain area in a specified year. This is used as a means of evaluating the living conditions and quality of life assessed by people in different areas. Amaghionyeodiwe [2009] found from the study on Nigeria that incomelevel of the people affects their health status and the poorare more strongly affected by public spending on health care relative to the non-poor. Gupta, et al. [2003] foundsame results supporting the fact that the poor are more strongly affected by public spending on health carein comparison with the non-poor. The poor heavily rely on public health facilities and services comparedto the rich. Urban population is used to capture the fraction of the population living in towns with more than 5,000 inhabitants. The inclusion of this variable in the model is to enable us measure the degree to which health outcomes could change with changes in the proportion of population living in urban areas. Themain justification for the inclusion of these variables in the study is that, most urban areas are associated withhigher risks of contagious diseases, they can also easily access healthcare facilities, they have lower travel timeand cost to healthcare facilities. This suggests that more people will tend to use healthcare facilities in the urbanareas than rural dwellers that may not even have access to a proper healthcare facility. In line with economic theory, the a-prior expectation is negative relationship between HIV and life expectancy at birth and a positive relationship on infant and under-five mortality rates. This variable is a measure that can influence on the quality and quantity of life of a population.

4. Results and Discussion

The models were subjected to statistical and econometrics tests using E-views 8.0 software and the results presented below.

Table 1. Descriptive Statistics.

Test Statistic	Variables					
	LE	IMR	PHE	PCI	URBANPOP	HIVPR
Mean	47.5883	110.8758	50.5362	682.3858	33.8398	2.1666
Median	46.3242	120.4000	33.9775	590.0519	33.2470	2.8000
Standard Deviation	2.1050	17.8807	30.9382	177.8669	6.7760	1.5699
Skewness	1.1833	-0.7850	1.1007	0.9288	0.1492	-0.5448

From Table 1 above, the average per capita income has the highest value, while HIV prevalence rate has the lowest average value. Since all variables exhibit positive range, it shows that the mean is normally distributed. The median value when the variables are arranged according to order of magnitude are the values of life expectancy and public health expenditure, being that they fall on the 3rd and 4th positions respectively. The value of per capita income has the highest value, while HIV prevalence rate has the smallest value. The values for life expectancy, public health expenditure, per capita income and urban population variables are positively skewed. However, the distribution of life expectancy has the longest tail, indicating that it has more extreme large values than others except infant mortality rate and HIV prevalence rate which are negatively skewed implying less extreme values.

Having establish or ascertain the summary statistics of the variables, further analysis was carried out using OLS, without the apprehension of estimating spurious regression results. In order words, we legitimately estimated our models using the levels of our data to obtain long-run equilibrating relationship among our variables. This is the main interest and focus of this study as we are interested in the long-term impact of government expenditure on health outcomes in Nigeria. Had it been we are interested in the short-term effect of government expenditure, we would have simply difference our data appropriately and then include an error term. The resulting specification is the so called error correction model. Based on the objective of the study, we estimate equations (3) and (4) and the results are presented in Tables 2 and 3.

Table 2. Regression Result of the Effect of Public Health Expenditure on Life Expectancy.

Variables	Coefficient	Standard Error	t-value	Probability
Constant	11.0022	0.7971	18.8895	0.0000
PHE	0.0275	0.0046	5.9432**	0.0000
PCI	0.0014	0.0007	1.9601	0.0600
URBANPOP	0.4534	0.0335	8.4954*	0.0000
HIVPR	0.5140	0.0807	-6.3663*	0.0000
R-squared		0.9933		
Adjusted R-squared		0.9924		
Durbin-Watson statistic		0.7749		
F-statistic		1050.927		

Source: Own estimation. Note: *represents 10% level of significance, while ** stands for 5% level of significance

Table 3. *Regression Result of the Effect of Public Health Expenditure on Infant Mortality Rates.*

Variables	Coefficient	Standard Error	t-value	Probability
Constant	21.1024	6.5828	6.6257	0.0000
PHE	-0.3468	0.0382	-9.0738*	0.0000
PCI	-0.0111	0.0059	-1.8706**	0.0719
URBANPOP	-2.9162	0.2774	-10.5110*	0.0000
HIVPR	-2.9550	6.5828	6.62578*	0.0001
R-squared			0.9937	
Adjusted R-squared			0.9928	
Durbin-Watson statistic			1.1211	
F-statistic			1112.431	

Source: Own estimation. Note: *represents 10% level of significance, while ** stands for 5% level of significance

In Table 2 above, the result indicates that a percentage increase in public health expenditure will lead to a 0.03% increase in life expectancy. The positive relationship between public health expenditure and life expectancy in Nigeria can be largely attributed to the persistent increase in demand for improvements in health care services by the population. The coefficient of per capita income implies that on the average, a unit increase in per capita income increases life expectancy by 0.001%. As per capita income keeps increasing, it would reflect in the disposable income of the individuals and improve their access to healthcare services. Increased access to healthcare will also increase health status and improve life expectancy. There is a positive relationship between urban population and life expectancy. Holding all the other explanatory variables constant, on the average, a percentage increase in urban population will lead to an increase in life expectancy by 0.45%. The positive relationship can be largely attributed to the fact that residents in the urban areas tend to adopt improved health practices, due to their increased knowledge of the benefits of better health conditions, as compared to their counterparts in the rural areas and this accounts for the difference between concentration of health care services which are more in the urban areas than in the rural areas. The difference in healthcare concentration reveals the effect of urban population on improving life expectancy in Nigeria. The coefficient of HIV prevalence rate of -0.51 is an indication that holding all other explanatory variables constant, on the average, a percentage increase in HIV prevalence rate reduces life expectancy by 0.51 percent. The reason for the negative relationship is because HIV is a virus that renders the human immune system weak and vulnerable due to the death and loss of anti-bodies in the cells, which leads to the entrance of various diseases and deterioration in health status. The deterioration in health status thereby reduces life expectancy in Nigeria.

As depicted in Table 3, all the explanatory variables are negatively correlated to infant mortality rates. A unit increase in public health expenditure decreases infant mortality rate, by 0.35% on the average. The negative relationship can be largely attributed to the persistent increase in demand for improvements in healthcare services by the population. Similarly, the coefficient of per capita income of -0.011

implies that on the average, a unit increase in per capita income decreases infant mortality rate by 0.011%. Also the negative relationship between urban population and infant mortality rate means that anincrease in urban population decreases infant mortality rate by 2.916%. The negative relationship between urban population and infant mortality rate in Nigeria can be largely attributed to the fact that residents in the urban areas tend to adopt more health improvement techniques, largely due to their increased knowledge of the benefits of better health status, as compared to their counterparts in the rural areas and this accounts for the difference between concentration of healthcare services which are more in the urban areas than in the rural areas. This difference in healthcare concentration reveals the effect of urban population on a decreasing infant mortality rate in Nigeria. The coefficient of HIV prevalence rate means that holding all other explanatory variables constant, on the average, a one percent increase in HIV prevalence rate will result to an increase in infant mortality rate by 2.95%.

5. Conclusion and Policy Recommendations

From the results, it can be deduced that while public health expenditure, per capita income and urban population are positively related to life expectancy, the relationship between infant mortality rates and public health expenditure, per capita income, urban population and HIV prevalence rate. A number of policy lessons could be deduced from the results. Although the relationship between per capita income is positive, it is not statistically significant. This tends to justify the notion that increase in per capita income does not necessarily imply improvement in health outcome, as considered in this study. This problem could be traced to the widening gap in income distributions among all levels of citizens in the country. This suggests that government should concentrate on its redistributive role of income in order to bridge this income inequality gap and enhance the significance of per capita income on improving health outcomes. With HIV prevalence rate having negative relationship with infant mortality rate, it implies that increase in HIV prevalence rate does not always develop finance to stabilize the financial system except the increase in money supply is consistent with policies that would stimulate productive and economic activities. Therefore, government should formulate and enact policies that would reduce HIV prevalence rate among the elderly population, as this would lead to reduction of its effect on infants' mortality. This will be necessary in improving health outcomes in the health sector. Nigerian government should adopt policies that will increase public expenditure in the health sector. This implies that increasing public health expenditure would be greatly helpful in moving Nigeria toward the SDGs target for health, although this is only a necessary condition in achieving those goals. This is suggesting that government should endeavor to improve income equality among citizens through its redistribution role

in order to afford an increasing portion of the population access to larger income that will finance health care, though its effect is not very significant. A continuous rise per capita income consistently over a long period like we saw before the mid 2000s, could improve life expectancy. The reduction in HIV prevalence rate should therefore be of great concern to the Nigerian government because it can determine the level of life expectancy in the country due to its significant effect on life expectancy. If healthcare expenditure is to boost and promote better health status, there is need to pay attention on massive and efficient expenditures in the health sector. This might require the mobilization of massive resources and a combination of enhanced and improved domestic resource mobilization and increased foreign aids and grants. With increased demand for healthcare services and declining mortality over the years, it has been discovered that public health expenditure alone cannot cater for expansions of healthcare needs. In this regard, the government may need to enter into partnership with other stakeholders order to mobilize the required resources, encourage efficiency and flexibility in healthcare provisions.

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