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Public health financing and health outcomes in Nigeria

Bello Wasiu[1]

Abstract

A review of literature showed the role of governance has largely been neglected while investigating the health care financing impact on health outcomes in Nigeria. This study filled this gap by introducing governance to the nexus between financing of health care and health outcomes for the case of Nigeria. The study sought to assess the relationship among expenditure on public health, governance as well as health outcomes. For the empirical analysis, the study adopts data ranging from 1985 to the year 2018. The study made use of an error correction model (ECM) for the short run analysis while an autoregressive distributed lagged (ARDL) model was adopted for examining the long run relationships between the variables of the study. The result showed that public expenditure on health has a positive significant impact on life expectancy in Nigeria. The result also shows that increase in public expenditure on health leads to a reduction in the infant mortality rate. The study recommended an increase in the government expenditure on health. The study also recommended the provision of infrastructural facilities in the rural areas in order to checkmate the high rate of rural urban migration to avoid densely populated urban areas.

Keywords: Public Health Expenditure, Health Outcomes, Governance, Infant Mortality, ARDL

JEL Classification: B22, B26, C13, C22

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[1] bellowasiu09@gmail.com

1. Introduction

Health is regarded as one of the most important factors to the achievement of growth in an economy. In the light of this, there has been a consensus among researchers who have recognized health as a public good; the demand and supply of which is not considered safe to be left at the mercy of the invisible hands (Olarinde, 2010). This therefore points to the dire need for government to play a very important role in the provision of good and quality health care services that the people can both access and afford. The acknowledgment of the above led the World Health Organization (WHO) to propose at the 2010 World Health assembly, issues that would addresses financing of health as this facilitate the provision of quality and affordable healthcare service (Ataguba and akazili, 2010). Therefore, in facilitating the achievement of a long-term goal of enhancing the nation's economic development, it is very important that a quality, affordable and accessible healthcare services be provided (Riman, 2012).

In line with the above suggestion, and in an attempt to demonstrate its obligation to the restructuring of health care sector in its fiscal dispensation, the Nigerian government has assumed the responsibility of providing a good health care facility for its citizens by increasing the allocation to health. Available data has shown that on the average, about 2.1% to 5.8% of the total expenditure of government were expended on health between the year 2000 and the year 2007 (Mordi, 2010). Evidence from the literature revealed that persons with good health are more likely to make more investments in education, as they possess higher human capital by implication as well as the ability to innovate and adapt to new technology (Rahman et al., 2018 cited in Osakede, 2020). Hence, investment in public health or government spending on public health gives some social protection and improve accessibility to health care most especially for the less privileged (Noy & Sprague-Jones, 2016). It was believed that the improvement in the allocation of the government expenditure to health would in turn improve on the health of the general populace which can translate into energetic human capital base and which will have a multiplier effect on the economic growth and development.

As stated by WHO (2005), a qualitative health service has a consequence of a widespread growth of the economy, and a way of avoiding poor health traps in poverty. The progress the world has made in the reduction of child mortality is impressive in the past decades. The number of under-five deaths fell to 5.6 million in 2016 from 12.6 million in 1990 – 15, 0000 each day when compared to 35,000 in 1990. In addition, globally, the under-five mortality rate fell to 41 deaths per 1,000 live births in the year 2016, which was from 93 deaths per 1,000 live births, which is an impressive 56% decline. On the global level, 2.6 million newborns died in 2016 – or 7,000 every day. Neonatal deaths were responsible for 46 percent of all under-five deaths, which is an increase from 41 per cent in the year 2000. Shockingly, the biggest number of newborn deaths occurred in Southern Asia (39 per cent) which is trailed by sub-Saharan Africa (38 per cent). Five countries accounted for half of all newborn deaths: Democratic Republic of Congo India, Pakistan, Nigeria as well as Ethiopia. It is quite surprising that Nigeria is among the countries that account for half of the newborn deaths being the giant of Africa. However, the neonatal mortality rate dropped by 49 per cent from 37 deaths per 1,000 live births in 1990 to 19 in the year 2016 (World Development Indicators, 2017).

It is noteworthy that disparities in child survival occur across regions and countries: For the case of sub-Saharan Africa, approximately one child in 13 dies before his or her fifth birthday,

`while in the world's high-income countries the ratio was observed to be 1 in 189. Among newborns in sub-Saharan Africa, it was observed that 1 child in 36 dies in the first month, while in the world's high-income countries the ratio is 1 in 333 (UNICEF, 2017). It is quite alarming that if the current trends continue with more than 50 countries falling short of the sustainable Development Goal (SDG) target on child's survival, about 60 million children whose ages are below age 5 would die between 2017 and 2030. In addition, an additional 10 million lives of children age under 5 would be saved all through the period 2017-2030 – where about half of them would be newborns (UNICEF, 2017). To further improve on this situation, there is a need for a good governance for the benefit of all.

Governance as explained by the IMF (2016) can be referred to as an all-encompassing aspect of the way a country is governed, its economic policies as well as monitoring framework. It could be deduced from the definition that governance has to do with the totality of governmental actions and activities that are focused on making and achieving operational economic policies. The delineation lays emphasis on 'economic policies' which is regarded as the strength of the nation's stability and development. Suffice to say a well-thought-out economic policy is a prerequisite for the survival, stability and development of all the important sectors of the economy the health sectors inclusive. The basic structures of good governance include the conduct of an all-inclusive management wherein all the critical stakeholders are permitted to have a say in the decision-making route (Odo, 2015).

The ineptitude of the government and a low level of people's interest has led to a condition where the people have been deprived of a good social structures and amenities. In cases where the government claim to have provided these social amenities, they are either substandard or depleted. This poor governance can also be observed in the area of misplacement of priority misplaced on the part of the government; a situation where the leaders spend scarce public resources on uneconomic projects with less contribution to the well-being of the people. These leaders prefer to embark such projects that will earn them with immediate monetary gains- They put their personal interests before that of the common populace. For instance, the performance of the power sector is still not encouraging as this has in effect affected the performance of industries in Nigeria and it has led to exorbitant prices being charged on the provision of goods and services. The Situation is alarming as poor health services has been the case in the Nigerian health sector. It is quite obvious that most of the government hospitals in Nigeria are a mere consulting clinic. This is one of the main reasons why public office holders and the well to do people or the people that can afford it prefer to move abroad for medical attention. Although, a huge amount of money has often been quoted in the nation's annual budget to have been allocated or expended on the maintenance of the hospitals, but considerable part of the monies is always mismanaged or diverted for use not in the public interest.

Obayelu (2007) claimed that Nigeria, being an underdeveloped country is lacking in capital requirements for development. The limited resources which are meant to be well allocated in the local government areas totaling 774 being diverted for self-use by the public officials which results lack of access to a good health care service by the people. The situation health situation has also not been helped by the outbreak of the novel coronavirus (2019-nCoV) since the knowledge of the first case in December 2019 which was reported to have started in Wuhan, the Mainland of China. Ever since the first case, a total of 20,932,526 cases have been reported

with 749, 633 deaths, while 13, 797, 395 recovered as Nigeria recorded 47,743 cases with 956 deaths as at 13th of August, 2020 (Chinazzi et al., 2020). In an attempt to address the situation, the Nigeria government has expended lots of money while most hospitals are reluctant to treat patients with common ailments out of fear of contacting covid-19 as this in turn led to the deaths of lots of patients with common illness left unattended to.

There had been an increase in the level of government health expenditure over the years, for instance, from 0.13 billion of the public expenditure on health in Nigeria, the figure rose to 99.90 billion in 2010, and to 231.80billion in 2011. In the year 2015, the government expenditure on health rose to 257.72 billion and it fell a bit to 202.36 billion in the year 2016 (CBN, 2017). Despite the increasing trend in the public health expenditure, Nigeria is among the few countries identified by the UNICEF (2017) as the countries where the largest number of newborn deaths occurred. The other countries include Southern Asia (39 per cent), followed by sub-Saharan Africa (38 per cent), India and Pakistan. Also, infant mortality rate was more than 6 times higher in the WHO African region (fifty-one per one hundred thousand live births) than in the European region segment of WHO (eight per one hundred thousand live births (WHO, 2019a). Also in the year 2017, 75% of all the under 5 deaths were reported to have occurred within the first year of life (WHO, 2019a). The case of Nigeria is also not encouraging given that it was reported to be high for maternal and infant health. Statistics from the United Nations Children Development Fund (UNICEF) ranked Nigeria as the fourth largest contributing country to the world maternal death with about 10% of the total maternal mortality (UNICEF, 2019). For new born mortality, Nigeria was ranked the 11th on new born deaths (UNCEF, 2018).

The situation is alarming as this was also in line with the comments of the Chairman, Bill and Melinda foundation, Bill Gates., when he came to Nigeria recently. He questioned the Federal Government's Economic Recovery with Growth Plan, ERGP, which claimed that the government identified investing in the people as one of its three strategic goals, its implementation priorities failed to reflect people's needs. He went further to say that Nigeria is one of the most dangerous countries in the world to have a new born given it has the fourth worst maternity rate globally, where it was ahead of only Sierra Leone, Chad, Central Africa and Republic. In addition, that one in three children in Nigeria was observed to be chronically malnourished (Agbakwuru, 2018). This is amidst the fact that the commitment of government in terms of money to the sector has been increasing. The problem may be likened to lack of efficient of the resources allotted to the health sector, worse still it may be blamed on corruption.

Also, the Nigeria life expectancy has been fallen below that of the world average. For instance, in 2012, the life expectancy in Nigeria was 51.69 while that of the world average was 71.22 in the same year. While 52.11 was reported as the life expectancy in Nigeria and that of the world average was 71.46 in the year 2013. In the year 2014, the life expectancy in Nigeria was 52.54 and that of the world was 71.69. Also, in the year 2015, the Nigeria life expectancy was 52.98 while that of the world was 71.89. For the years 2017 and 2018, the life expectancy was 53.4 and 53.9 respectively while the life expectancy was 56 Years compared to that of the World given as 61 years in the WHO African region and 78 years in the European region in 2019 (WHO, 2019b). The figures show the performance of the Nigerian sector has not been impressive over the years.

Studies were actually carried out to analyze the nexus between health expenditure and health outcome in Nigeria, among which are; Anyanwu and Andrew (2007); Barro (1996); Aniekwu (2006); Aranda (2010); Chaabouni and Abednnadher (2010); Denton and Prus and Walters (2004); Ataguba, Dauda (2004), Bingjie and Ronald (2010); Saka et al. (2012) and Omoluabi (2014). While many studies focused on countries other than Nigeria, the few ones that focused on Nigeria ignored the role of governance in the relationship between the public health expenditure and health outcomes. As shown by Kaufman et al. (2004), such as voice, accountability, government effectiveness, political stability as well as violence, and graft etc. have a strong direct negative effect on infant mortality. Poor governance will prevent the efficiency of the health sector regardless of the increment in the budgetary distribution to the sector.

In the light of this, the previous studies which neglected the role of governance in the analysis of the nexus between the health outcomes and health public expenditure can be said to be inadequate. Studies carried out by Yaqub et al. (2010) incorporated governance in their study while measuring the impact of public health expenditure on health outcomes. The data adopted can be said to be old as the study was carried out in 2010 with the data for the analysis starting from 2009 below. The results of their study may not be accurate to portray the current situation of the health sectors in Nigeria given series of developments that had taken place in the sector from 2010 till date. They have been an increase in cases of disease outbreak after 2010 and this has affected the situation of the health sector in Nigeria. For instance, From the first of January through 25 February 2018, 1081 suspected cases alongside about 90 deaths have been reported from states totaling18 (Anambra, Benue, Delta, Bauchi, Ebonyi, Osun, Plateau, Rivers, Edo, Gombe, Imo, Ekite, Federal Capital Territory, Kogi, Lagos, Nasarawa, Ondo, Osun, Plateau, Rivers, and Taraba). During this period, 317 cases have been classified as confirmed and eight as probable, including 72 deaths (case fatality rate for confirmed and probable cases, 22%). A total of 2845 contacts have been identified in 18 states. Fourteen health care workers have been affected in six states (Benue, Ebonyi, Edo, Kogi, Nasarawa, and Ondo), with four deaths (with reported case fertility rate at 29%). As at 18 February, four from the 14 workers in health care were confirmed positive for Lassa fever (WHO, 2018, accessed from www.who.int/csr/don/04-march-2018-lassa-fever-nigeria).

2. Theory and Review of Literature

2.1 Grossman theory on health expenditure

Grossman came up with a model in 1972 for good health, and where health has been treated as a durable capital stock (Grossman, 1972 cited in Jager, 2017). As also reiterated by Grossman (1972), healthy days are said to have been born out of health stock where utility is said to have been gained directly given it allows for enjoying good health (via consumption commodity), and also indirectly given that it gives room for time to be expended on other market as well on non-market activities also known as individual commodity (Jagger, 2017). It is assumed that the individuals are assumed to maximize the utility they derive from consumption as Grossman enforces two constraints; First, such time constraints that establishes time in a specified period has to be allotted to investment, consumption or on wage generation. An increment in sick days leads to a drop in the available time for the actions. Second, income

constraints to represent the real cost of time expended on consumption or some levels of investment and not the generation of wages which is placed on the maximization issue. There is an undying assumption that the individuals are born out of some levels of health stock which reduces with age. The reduction could be offset with investment activities, but at the time the stock gets to the critical level death occurs. Grossman, considering that the marginal benefit enlarged with consumption and investment activates taken as additive, develops a pure model of consumption as well as a pure investment model via an assumption that the marginal cost is constant.

The marginal benefit of the consumption and that of the investment model is separated and then equated to the health shadow price taken as an additive function of the rate of interest and depreciation of the rate of health (given $\delta MC = 0$). This therefore allows for the empirical assessment of the 3 key predictions in which the investment model brings. First, a higher level of depreciation rate that has a positive correlation with wage, would lead to a reduction in the demand for health. This is because, as the cost of producing healthy days' increase; the marginal cost of investment tends to be higher than the marginal benefits of investments. Second, a higher in wages will have an indeterminate effect on the demand for the quantity of health. When wages increase, marginal productivity also increases given more health days are available to earn higher wages which brings more incentives for investment in health and a higher health stock demand.

2.2 Conceptual Review

WHO (2010) conceptualizes public health expenditures include recurrent and capital expenditures from public budgets, external borrowing as well as grants (which donations from international agencies alongside NGOs) and compulsory health insurance? History shows that significant progress in public health, disease control with improved nutrition has led to significant progress in economic development. It was also reported that rapid growth in Britain during the period of industrial revolution, Japan rapid growth in the 20th century, Europe as well as East Asia in the 1950s and 1960s resulted from a progress in health status (Sein and Dalpatadu, 2005).

Governance can be conceptualized as the rules which may be formal or informal, for collective action and decision-making in a system composed of various actors and organizations, whereas no formal control mechanism can determine the actors and the organizations relationship (Chhotray & Stoker, 2009). Some authors criticize the concept of governance for being too vague (Schneider, 2004) and there is confusion as to the best way to conceptualize it (Kohler-Koch & Rittberger, 2006). Governance has been addressed lots of disciplines among which is political science, economics, social sciences, development studies alongside international relations, according to different theories. Governance is key because it concerns the operations of the various actors of the world and the reasons which prompt their decisions. Governance in the new institutional economy focuses on the role of institutions which shapes interactions among actors within the constraints of the rules governing institutions (Chhotray and Stoker 2009). This concept of governance has received support from other disciplines among which is political science. New institutional economists describe governance as a series of actions that ensure voluntary cooperation between key actors. More recently, health system governance has been pronounced as "a set of normative values such as fairness and transparency in the political settings in which a health system operates" (Balabanova et al., 2013).

As efforts to strengthen health systems and delivery of health services have accelerated in recent decades, there has been increasing attention to governance. Prominent international development partners have described governance as the "most important factor" for poverty reduction and development (Graham et al., 2003). Good policy is needed to maximize public health spending.

2.3 Empirical Review

2.3.1 Empirical Studies on Public Expenditure and Outcomes

Empirical studies on public healthcare expenditure and health sector performance nexus are limited, especially studies that are Nigerian focus. It is important to note that studies which summarised the discussion on the impact of health expenditure on health outcomes often arrive at conflicting views on the extent to which public health expenditure impacts on heath outcomes. While some studies found a positive relationship, some found a negative relationship as the findings can be said to be inconclusive.

Yaqub et al. (2010), in their study, examined the impact of governance in Nigeria on the effectiveness of public health spending using the two-step least squares approach. The results showed that government expenditure on public health has a negative effect on infant mortality and under-5 mortality when governance indicators are included. Yaqub et al. (2010) conclude that the achievement of the Millennium Development Goal of reducing infant mortality by two-thirds in 2015; A reduction in the under-five mortality rate while increasing life expectancy in Nigeria may be unachievable if the level of corruption does not decrease significantly. The result of Yaqub et al. (2010) on the relationship between public health expenditure and infant mortality rate of a negative relationship is similar to the one of this study. The line of difference is that, this study has found the correlation between government health expenditure and infant mortality rate to be positive and significant even when governance is included as against the findings of Yaqub et al. (2010),

Andrew (1995) supports the view Yaqub et al. (2010) and argues that the reform process is not just about setting priorities and policies, but about reforming and restructuring the institutions through which health policies are implemented. Also, in agreement with the findings of Yaqub et al. (2010), is the study of Boachie & Ramu (2015) who investigated the public health expenditures and the state of health relationship in Ghana. Their study assessed the impact of public health expenditure on health status for the period between 1990 and 2002, using the ordinary least squares technique. The study controlled for real per capita income, literacy and women's participation in the labor market, the findings of the study revealed that the decline in the infant mortality rate for Ghana was due to public health expenditures. The study concluded that public health expenditures were associated with improved health status through reduced infant mortality. The findings here on infant mortality rate in relation to public health spending is similar to the result of this study.

Ahmed and Hasan (2016) evaluated the impact of public health expenditure alongside governance on health outcomes in Malaysia using 1984-2009 data. Adopting an automatic lagging cointegration framework (ARDL), the study found that there was a stable long-term relationship between health outcomes and income levels, public health expenditures, corruption and government stability. The results also reveal that public health expenditures and corruption have an impact on health outcomes in the short and long term. To improve

the quality of life in the country, the study highlights the importance of health programs while reducing or eliminating the rate of corruption in the country.

Akinci et al (2015) also agrees with Yaqub et al. (2010) and Ahmed and Hasan (2016) where the impact of health expenditures on a number of selected outcomes for 19 countries in the Middle East as well as in the North Africa region was examined. Using the least squares analysis (GLS) and panel data for the period between 1990 and 2010, the study found that after following the control for the explanatory variables, public and private spending on health care significantly improved infant under-five mortality and maternal mortality in the region. Its impact is not significant. In specific terms, a percentage increase in public spending per capita reduces the infant mortality rate from 8.6 to 9.5%, under-five mortality from 10.3 to 12%, deaths under five years and maternal mortality from 26.0 to 26.3%. Likewise, a percentage increase in private expenditure on per capita income brought about a reduction in the infant mortality rate from 7.2 to 8.1%, the under-five mortality rate from 9.5 to 9, 8% and the rate of maternal mortality from 25.8 to 25.9%. This result also agrees with the one of this study on the impact of public expenditure on infant mortality rate.

In a related study, Anyawu et al. (2007) evaluated the link between the per capita total of African countries (group in different geographical areas) as well as the health expenditure on infant mortality and under-five mortality from 1999 to 2004, with results mixed. The study adopted the least squares in two steps (R2SLS). Their results revealed that health expenditure has a significant effect on infant mortality and under-five mortality and that total health expenditure is certainly important for African countries depending on the particularities of each region. It was concluded from the findings that infant and under-five mortality are positively and significantly associated with sub-Saharan Africa, while the reverse is true for North Africa. The result of Anyawu et al. (2007) also conforms to the findings of this study.

2.3.2 Empirical Review of the Effect of Governance on the Health Sector in Nigeria

Evidence from an International Monetary Fund (IMF) reports reveal that corruption (a proxy for governance in this study) has an overwhelming negative effect on health indicators such as infant and child mortality, female education, health budget and spending. Corruption reduces the immunization rate of children as it was mentioned above, and it also prevents the delivery of important treatment, mainly for the poor; as it also reduces the use of facilities available for public health (Dike, 2005). The findings here agree with the result of this study as regard the negative role corruption plays in the performance of the health sector.

Certainly, the drugs used to treat some of the world's most prevalent diseases, such as malaria, bacterial infections, tuberculosis among many others are filled with counterfeit drugs. This sometimes causes more problems for the health of individuals, groups and the nation as a whole, and also questions the integrity of the country. It should be noted that corruption has a large impact on the health status of the majority of the poor in Nigeria by repudiating them access to quality health services, thus putting their health at risk. The proof on the link between institutions and health is largely based on an analysis of the relationship between countries between corruption and health outcome measures.

Evidenced from 89 countries for 1985 and 1997, Gupta, Davoodi and Tiongson (2000), revealed indicators of corruption (using Kaufman, Kraay and Zoido-Lobatón, 1999) are negatively associated with infant and child mortality, the probability of assisted delivery, vaccination coverage and low birth weight. The level of correlation of corruption in explaining the same

health outcomes falls as soon as factors such as maternal education, public health and education expenditures, and urbanization are put in control but remain significant. The result of the study conforms to what this study has revealed concerning the devastating effect of corruption on health sector performance.

By measuring the impact of corruption on efficiency of health expenditure, Rajkumar and Swaroop (2002) carried out an analysis of the 1990 and 1997 data taking into account per capita GDP, women's educational level, and ethnolinguistic fragmentation, urbanization and note that the effectiveness of public health spending on reducing child mortality depends on the integrity index (range 1 to 5 based on perceived level of corruption), higher integrity associated with reduced mortality. Poor governance can help explain the inconclusive findings of Filmer and Pritchett (1999) on the lack of link between public health spending and child and child mortality. A related 2001 USAID perceptions survey on bribery among public officials in Bosnia, Herzegovina, Bulgaria, Romania, Croatia, Montenegro and Macedonia, showed that 45% to 55% of respondents felt that corruption among doctors was widespread. Albania and Serbia revealed much higher levels which is between 61 and 71%. Albania's perception of doctors was relatively insignificant compared to other civil servants, but Serbia had higher levels and more than other countries for most categories of civil servants, suggesting an environment that is relatively more corrupt (Vitosha / USAID, 2002). Business Environment and Business Performance ECA's administrative corruption surveys capture the perceptions of business leaders about the quality of health services. In 20 countries, only Slovenia and the Czech Republic obtained positive assessments of 60% or more of respondents which indicates management and governance problems in the other 18 systems (Ryterman, Hellman, Jones et al., 2000).

3 Methodology

3.1 Theoretical Framework

The theoretical base of this study follows that of Grossman (1972) who developed a theoretical health production function, and it specified as follows:

$$H = F(X) \qquad 1$$

It should be noted that H is a measure of the individual health outcome as X is a vector of the individual injections into the production of heath, F. The elements of the vector therefore include: income, nutrient intake, public goods consumption, time spent on health-related problems, education, initial individual endowment such as genetic makeup, community endowments like the environment for instance. Grossman's theoretical health output function model was structured for health output analysis at the micro level. The focus here is to analyze the production system at the macro and not at micro level. In a bid to move from micro to macro ahalysis, without losing the theoretical foundation, the vector X elements were represented by per capital variables and then grouped into subsector vectors of economic, environmental and social factors. Namely;

$$h = F(Y, S, V) \qquad 2$$

where Y indicates a vector of per capita economic variables, S is a vector of per capita social variables and Vis a vector of per capita environmental factors. Equation (2) can be rewritten in a scalar form and as stated in equation 3 below:

$$h = f(y_{1,}y_{2\ldots,}y_{n,}s_{1,}s_{2,..}s_{m,}v_{1,}v_{2,..}v_{m,}) \quad 3$$

Where h is individual's health status proxied by life expectancy at birth,

$(y_{1,}y_{2\ldots,}y_{n}) = Y(s_{1,}s_{2,..}s_{m,})$ = s;$(v_{1,}v_{2,..}v_{p,}) = v$ and n, m, and I are expressed as numbers of variables and n, m, and l are numbers of variables in each subgroup, respectively. According to the literature, health expenditure used as an indicator of the volume of resources allocated to the health sector is estimated to have a positive correlation with the life expectancy and a negative correlation with infant mortality rates. For example, an increase in per capita health expenditure implies greater access to health care and other related services, which contributes to increasing life expectancy and reducing child mortality rates. Given the redistributive role of public intervention, a correlation between spending on public health and health outcomes is expected to be positive.

Roberts (2003), Baldacci et al. (2004) pointed out that geographic / demographic elements such as rural or urban location or population growth have an impact on health outcomes. As explained by Schultz (1993), the mortality rate is found to be higher among low-income rural farm households than among their urban counterparts because, access to health is generally better in urban areas given the lower private cost of health for urban households among other reasons.

Gupta et al. (1999) reported that the health status of the population improved with increasing per capita income, suggesting that the increase in income was connected with lower infant mortality rates and longer life expectancy. Also, higher incomes lead to improvements in public health infrastructural facilities such as water and sanitation, better nutrition, better housing and the ability to pay for health care (Pritchett and Summers 1996, Cutler et al. al., 2006). As contained in a basic economic theory, if everything else is kept constant and if health care is normal goods, a higher per capita income would lead to an increase in the health care demand. Income also tend to push up the ability of governments and other stakeholders to provide more and better health care and improve the accessibility to health care through better infrastructure. A higher public health spending is expected to bring about an increase in life expectancy at birth.

3.2 Model Specification

The models of the study were extracted from that of Richardson et al. (2017). They stated their models as follows;

$$LE_t = \eta_0 + \eta_1 PHE_t + \eta_2 PCI_t + \eta_3 URBANPOP_t + \eta_4 HIVPR_t + \mu_t \quad 4$$

$$IMR_t = \phi_0 + \phi_1 PHE_t + \phi_2 PCI_t + \phi_3 URBANPOP_t + \phi_4 HIVPR_t + \mu_t \quad 5$$

Using life expectancy and infant mortality rates as proxy for health performance coupled with the inclusion of governance (proxied with the corruption perception index and the fiscal policy rating) the equations 4 and 5 are modified to give;

$$LE_t = \eta_0 + \eta_1 PHE_t + \eta_2 FPI_t + \eta_3 CPI_t + \eta_4 UPOP_t + \eta_5 PVI_t + \mu_{t1} \quad 6$$

$$IMR_t = \phi_0 + \phi_1 PHE_t + \phi_2 FPI_t + \phi_3 CPI_t + \phi_4 UPOP_t + \phi_5 PVI_t + \mu_{t2} \quad 7$$

Where;

LE represents life expectancy at birth (measured by LE at birth per 1000 live births),

IMR represents infant mortality rates (measured by infant mortality rate per 1000 live births),

PHE connotes public health spending (measured by percentage of total health expenditure),

FPI = Fiscal policy rating, where the rating is done on a scale of 1-6 with 6 being the highest rating.

CPI = Corruption Perception Index

PVI = Poverty Index; it is a rating from 1-100 with 100 indicating a high level of poverty with data sourced from the World Bank online data base.

UPOP = urban population (this is measured by the percentage of total urban population),

η_0 and ϕ_0 are constants,

$\eta_1 - \eta_5$; ϕ_1-ϕ_5 represent the slopes of the independent variables,

μ_t = error term.

The study adopts cointegration procedure testing to estimate long-term and short-term relationships as well as the dynamic interactions between variables of interest. Pesaran et al. (2001) offered a method for testing autoregressive distributed shift (ARDL) boundaries to search for the presence of a cointegration connections among variables. This approach has three advantages: (i) It eliminates the problem of the order of integration associated with Johansen's likelihood method (Johansen and Juselius, 1990). (ii) Contrasting most conventional multivariate cointegration procedures, which are valid for a large sample, the limit test method is suitable for a sample study that is small (Pesaran et al, 2001). (iii) It offers unbiased estimates of the long-term model and valid statistics even in a situation where some of the regressors are regarded as endogenous (Harris and Sollis, 2003).

The following Autoregressive Distributed Lagged Model model is estimated to test the cointegration relationship between the variables. The Error Correction Model (ECM) is then adopted to correct or eliminate short-term deviations. It is used to test the speed of adjustment of short-term equilibrium to long-term equilibrium. The error correction coefficient variable gives the percentage of the difference between the variables that can be eliminated in the next period. The expectation is that the ECM coefficient must be negative and significant. The higher the ECM, the higher the speed of adjustment. The first step in the Autoregressive Distributed Lagged (bounds testing) approach is to estimate equation (6 and 7) using ordinary least squares (OLS) to verify the existence of a long-term relationship between the variables in question. Performing an F test of the joint influence of the independent variables on the dependent variables. Coefficients of the shifted levels of the variables, namely:

$$H_N; \phi_1 = \phi_2 = \phi_3 = \phi_4$$
$$H_A; \phi_1 \neq \phi_2 \neq \phi_3 \neq \phi_4$$

Two asymptotic critical value limits provide a cointegration test when the independent variables of the study are I (d) [where 0≤d≤1]: For the case of a lower value, it is assumed that the regressors are I (0) and for the case of a higher value, it is assumed that the regressors purely I (1) or I(2) in some cases. If F-statistic is greater than the upper critical value, the null hypothesis of long-term non-relation can be rejected regardless of the integration orders for the time series. On the contrary, if the test statistic was estimated to have fallen below the lower critical value, the null hypothesis cannot be rejected. And also, for a situation where the F-statistic is between the lower and upper critical values, the result is said to be inconclusive. The approximate critical values for the F statistic test were obtained from Pesaran, Shin and Smith (2001).

Once cointegration is established the conditional ARDL (p, q1, q2, q3, q4,) long run model can be estimated as:

The ARDL model of equation 6 is stated as follows;

$$\Delta LE = \varphi_0 + \sum_{i=0}^{p} \varphi_1 \Delta LE_{t-1} + \sum_{i=0}^{p} \varphi_2 \Delta PHE_{t-1} + \sum_{i=0}^{p} \varphi_3 \Delta FPI_{t-1} + \sum_{i=0}^{p} \varphi_4 \Delta CPI_{t-1} + \sum_{i=0}^{p} \varphi_5 \Delta UPOP_{t-1} + \sum_{i=0}^{p} \varphi_6 \Delta PVI_{t-1} + \sigma_1 LE + \sigma_2 PHE_{t-1} + \sigma_3 FPI_{t-1} + \varphi_4 \Delta CPI_{t-1} + \varphi_5 \Delta UPOP_{t-1} + \varphi_6 \Delta PVI_{t-1} + \mu_t \quad (8)$$

The Error Correction Models (ECM) for testing the cointegration is stated as follows;

$$\Delta LE = \beta_0 + \sum_{i=1}^{p} \varphi \Delta LE_{t-1} + \sum_{i=1}^{p} \omega \Delta PHE_{t-1} + \sum_{i=1}^{p} \vartheta \Delta FPI_{t-1} + \sum_{i=1}^{p} \Psi \Delta CPI_{t-1} + \sum_{i=1}^{p} \nu \Delta UPOP_{t-1} + \sum_{i=1}^{p} \eta \Delta PVI_{t-1} + \alpha ECM + \mu_t \quad (9)$$

The ARDL model for equation 7 is stated below;

$$\Delta IMR = \eta_0 + \sum_{i=1}^{p} \Delta \eta_1 IMR_{t-1} + \sum_{i=1}^{p} \Delta \eta_2 PHE_{t-1} + \sum_{i=1}^{p} \Delta \eta_3 FPI_{t-1} + \sum_{i=1}^{p} \Delta \eta_4 CPI_{t-1} + \sum_{i=1}^{p} \nu \Delta \eta_5 UPOP_{t-1} + \sum_{i=1}^{p} \eta \Delta \eta_6 PVI_{t-1} + \gamma_1 IMR + + \gamma_2 PHE_{t-1} + \gamma_3 FPI_{t-1} + \gamma_4 CPI_{t-1} + \gamma_5 UPOP_{t-1} + \gamma_6 PVI_{t-1} + \mu_t \quad (10)$$

Error Correction Model for testing the cointegration of equation 3.9 is stated as follows;

$$\Delta IMR = \beta_0 + \sum_{i=1}^{p} \omega \Delta IMR_{t-1} + \sum_{i=1}^{p} \omega \Delta PHE_{t-1} + \sum_{i=1}^{p} \iota \Delta FPI_{t-1} + \sum_{i=1}^{p} \tau \Delta CPI_{t-1} + \sum_{i=1}^{p} \Psi \Delta UPOP_{t-1} + \sum_{i=1}^{p} \eta \Delta PVI_{t-1} + \alpha ECM + \mu_t \quad (11)$$

The a priori expectations are:

$\eta_1 > 0,\ \eta_2 > 0, \eta_3 > 0\ ,\ \eta_4 < 0$ and $\eta_5 > 0$

$\phi_1 < 0,\ \phi_2 < 0,\ \phi_3 < 0\ ,\ \phi_4 > 0$, and $\phi_5 < 0$

3.3 Sources of Data and Measurement of Variable

This study adopts a time series data which covers a period of 1985 to 2018. The data for this research work are mainly secondary data sourced from the CBN statistical Bulletin, The World Development Index (WDI), National Bureau of Statistics (NBS) and other relevant publications. The variables used are explained below;

LE and IMR- Health Sector Performance Outcome is represented with under- five- mortality (U5MR) and life expectancy. Under-five mortality is used in the study to refer to number of deaths before the age of five years per 1,000 live- birth. It is generally agreed that IMR and U5MR to a very large extent reflect the level of mortality and the effectiveness of preventive care and the attention paid to maternal and child health. In order to capture the impact of

government health care expenditure on the performance outcome of the health sector, Health performance is decomposed into infant mortality as well as life expectancy at births and they both serve as the dependent variables forming two models in this study.

PHE: It connotes Government healthcare expenditure. It is the amount of resources that drifts into the health sector and it is expected to have a negative correlation with the rate of infant mortality. This is captured by amount of recurrent government expenditure on healthcare.

PVI: Poverty Index. This is a rating of poverty level which is also sourced from the World Bank Online Data Base. The rating is done on a scale of 1-100 with) represents no traces of poverty in the land and 100 indicating the highest level of abject poverty.

Corruption: It is part of the independent variables and it is adopted to capture governance. It has to do with the quality of governance. A high level of corruption will undermine the efficiency of the health sector.

Fiscal policy rating: Fiscal policy evaluates the short- and medium-term sustainability of fiscal policy (taking into account monetary and policy on exchange rate and the sustainability of the public debt) as well as its impact on growth. 1= low to 6=high.

4. Estimation and Empirical Results

Table 1 describes the data in terms of the mean, the minimum, the median and the maximum values of the data on each variable. The standard deviation, the skewness among many other characteristics are also contained in the table above. As shown in the table it is important that the mean and the median of each variable falls within the minimum and the maximum values of each variable. Meeting up with the criteria of the means and the medians falling within the maximum and the minimum variables values implies the data are consistent and good enough for the purpose of estimation of the study. It can also be said to be reliable enough for the purpose of estimation.

Table 1: Descriptive statistics of the data

	LE	IMR	PHE	FPR	CPI	UPOP	PVI
Mean	48.36685	102.2559	73.02073	1.664706	14.44412	37.20782	59.62088
Median	46.67150	107.1000	28.89513	0.000000	16.00000	36.08850	65.60000
Maximum	55.20000	125.7000	296.4428	4.500000	28.00000	50.34400	75.23000
Minimum	45.84100	64.60000	0.041315	0.000000	0.000000	25.63500	34.10000
Std. Dev.	2.956956	21.77843	92.79744	2.038847	10.54992	7.350437	12.46341
Skewness	0.828336	-0.361944	1.079804	0.412056	-0.266050	0.230252	-0.715098
Kurtosis	2.257457	1.582768	2.715517	1.232376	1.537605	1.849218	2.332711

Source: Computed by the Author

Table 2: The Phillips Perron (PP)

Variable	PPTest @Levels	PP critical values	PP Test @ 1st difference.	PP Critical values	Remark
LFE	2.700706	-2.960411	-3.868990	-2.963972*	I(1)
IMR	1.912151	-2.960411	-2.975970	-2.963972**	I(1)
PHE	0.012027	-2.960411	-7.009306	-2.963972**	I(1)
FPR	-1.049237	-2.960411	-5.189659	-2.963972***	I(1)
CPI	-0.653272	-2.960411	-6.725429	-2.963972***	I(1)
UPOP	15.65737	-2.960411	2.979622	-2.963972*	I(1)
PCI	0.214997	-2.960411	-4.179352	-2.963972***	I(1)

Source: Computed by the Author

Table 2 shows the stationarity test of the data employed for the analysis of the model. Note: *, **, *** indicate stationarity at 10%, 5% and 1% respectively. The decision rule is that the critical values should be less than the table value at the chosen level of significance taken as 5 % in most cases, otherwise the null hypothesis of the presence of unit root is accepted. But, when the tabulated value is greater than the critical value then the null hypothesis is rejected for the unit root which says 'there is a unit root'. The result above shows that all the variables are stationary at first difference using the Philips Perron test. The data being stationary implies that the data are stable and they are fit for estimation as this will help prevent the possibility of obtaining spurious results.

Table 3: The results of Augmented Dickey-Fuller (ADF)

Variable	ADF Test @Levels	ADF critical values	ADF Test @ 1st difference.	ADF Critical values	Remark
LE	-0.548953	-2.971853	-3.313465	-2.971853**	(1)I
IMR	-4.088771	-2.963972**	-2.983123	-2.976263	I(0)
PHE	-0.286041	-2.986225	3.649559	-2.986225**	(1)I
FPR	-1.027550	-2.960411	-5.189659	-3.670170***	(1)I
CPI	-0.855769	-2.960411	-6.279537	-3.670170***	(1)I
UPOP	1.413040	-2.960411	3.512312	-2.963972**	(1)I
PCI	0.446250	-2.960411	-4.179352	-2.971853**	(1)I

Source: Computed by the Author

The Table 3 above shows the stationarity test of the data employed for the analysis of the model. Note: *, **, *** indicate stationarity at 10%, 5% and 1% respectively. The decision rule is that the critical values should less than the table value at the chosen level of significance which is 5 % in most cases. The result above shows the first variable which is the life expectancy is stationary at level, other variables are all stationary at first difference using the Augmented Dickey Fuller test. The data being stationary implies that the data are stable and they are good for estimation.

The Table below shows the bounds test which is a test on the cointegration among the variables of the study. A cointegration is said to exist when the F-stat. is higher than the I (1) bounds at 5% level.

Table 4: Test for Cointegration/Bounds test for model 1

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	8.919507	10%	2.08	3
k	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Source: Author

Table 5: Test for Cointegration for model 2.

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	5.075610	10%	2.08	3
k	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Source: Author

The Tests in the Table 4 and Table 5 which is a test of cointegration or bounds test show that F-stat. is more than the value of I(1) at all levels of significance. This confirms that a cointegration exists among the variables of the study. It is therefore concluded that there is a long run relationship among the variables.

Table 6. Short run results for the model 1

Dependent Variable: D(LE)

Method: ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
D(PHE)	0.001354	0.001034	1.309320	0.2028
D(FPR)	-0.003479	0.039587	-0.087888	0.9307
D(CPI)	-0.009463	0.008846	-1.069729	0.2954
D(UPOP)	-0.120443	0.280496	-0.429391	0.6715
D(PVI)	-0.000598	0.004854	-0.123267	0.9029
C	0.101813	0.181970	0.559502	0.5810

ECM (-1)	-0.083082	0.009442	-8.798939	0.0000
R-squared	0.767315	Mean dependent var		0.284406
Adjusted R-squared	0.699449	S.D. dependent var		0.296879
F-statistic	11.30627	Durbin-Watson stat		1.028829
Prob(F-statistic)	0.000003			

Source: Computed by the Author

The result above contains the output of the result on the error correction model. The variable of interest in the shortrun analysis is the CointEq (-1) * or ECM (-1). It denotes the rate at which a disequilibrium in the short run adjust to equilibrium in the long run. It is important that it is significant and its value is less than 1. The result implies that any observed disequilibrium in the short run will be readjusted back to the long run at the rate of 8.3%. The result further confirms the existence of cointegration among the variables of the study.

Table 6: Error Correction Result for Model 2

Dependent Variable: D(IMR)

Method: ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
D(IMR (-1))	1.143695	0.385531	2.966544	0.0067
D(PHE)	0.025358	0.014819	1.711215	0.0999
D(FPR)	-0.168385	0.573828	-0.293442	0.7717
D(CPI)	-0.137000	0.128252	-1.068208	0.2961
D(UPOP)	0.806591	3.138332	0.257013	0.7994
D(PVI)	-0.007110	0.069545	-0.102236	0.9194
C	-0.316373	2.152828	-0.146957	0.8844
ECM(-1)	-0.057636	0.008716	-6.612740	0.0000
R-squared	0.664271	Mean dep. variable		-1.525000
Adj. R-squared	0.678850	S.D. dep. variable		2.605453
F-statistic	1.964563	Durbin-Watson stat		1.078008
Prob(F-statistic)	0.102908			

Source: Author's computation.

The result in the Table 6 above contains the error correction model result. The most important item in this Table is the result of ECM (-1) or Cointeq (-1) *. This shows the adjustment speed from the disequilibrium in the short run to the equilibrium in the long run. It is important that the value is significant and that it is less than 1 as the result implies that any disequilibrium in the short run will lead to equilibrium at the speed of 5.7%.

Table 7: Long Run Result for Model 1 & 2

Dep.Var.	Life Expectancy (LE)		Infant Mortality Rate (IMR)	
Variables	Coeff.	Prob.	Coeff.	Prob.
C	59.05	0.000***	-1.57	0.000***
LPHE	0.037	0.0053***	-0.616	0.0085***
FPR	0.41	0.0354**	1.62	0.8759
CPI	0.062	0.3995	-3.58	0.0034***
UPOP	-0.46	0.029**	0.08	0.9912
PVI	-0.014	0.001***	-0.37	0.8092
R^2	0.99		0.66	
F-stat.	541.06		1.964	
DW	2.27		2.12	
Serial. Corr.		0.2603		0.9502
Norm. Test		0.789		0.674

*Source: Author. Note: *, ** and *** shows statistical significance at 10, 5 and 1 percent level of significance. Where LPHE is the log of public expenditure on health; FPR is the fiscal policy rating; CPI is the corruption perception index; UPOP is the urban population; PCI represents the poverty index and DW is the Durbin Watson.*

The results as contained in the Table 3 above represents the long rum results of the variables of the study. The result shows that public expenditure on health has a positive relationship with the life expectancy in Nigeria. The result is also statistically significant at 1% level of significance. The result further shows that a 1% increase in the level of public expenditure on health will lead to 0.037% increase in the life expectancy. The result confirms the importance of government spending on health on the life expectancy. The rating ranges between 1 and 100 with 1 means a very corrupt economy and 100 on the other extreme implies a very clean economy or a corruption free economy. So, the higher the rating the better it is for the economy. The result has shown that there is no significant correlation between the rating of the corruption and the life expectancy in Nigeria. The higher the rating the higher the life expectancy. More precisely, the result has shown that a 1% increase in the rating of corruption leads to 0.1% increase in the life expectancy in Nigeria. The result also shows that fiscal policy rating has a positive significant impact on life expectancy in Nigeria. The relationship is also positive as it implies that a 1% increase in the rating of fiscal policy which scaled between one and six. A 1% increase in the rating will lead to 0.41% increase in the level of life expectancy.

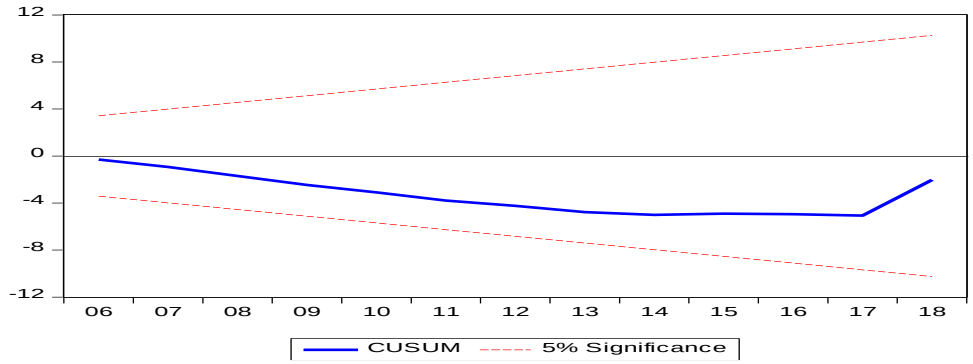
The findings have revealed that urban population has a negative significant relationship with life expectancy in Nigeria. It is statistically significant at 5% level. The findings imply that a 1% change in urban population will lead to 0.46% change in life expectancy in the negative direction. As more people move into the urban area, the more the stress on the limited resources for sustainability. The last variable on the long run result for model 1 which is the

poverty index has been shown to have a negative significant relationship with the life expectancy in Nigeria. The result shows that a 1% increase in the poverty index will lead to 0.014% reduction in the life expectancy of the people. The findings on the adjusted R squared shows the independent variables to have captured 99% of the behavior of the dependent variable as contained in the model of the study. It is also key that the value of the Durbin Watson (2.27) is greater than the value of the adjusted R-squared or the R squared itself. This further confirms that the model of the study is a long run model and the variables employed in the study are long run variables.

Table 7 above also shows the long run results on the model 2 with infant mortality being the dependent variable. The infant mortality rate is used as the dependent variable in this model. The results have shown that public expenditure on health has negative and statistically significant relationship on the infant mortality rate per 1000 births in Nigeria. The findings show that a 1% increase in the public expenditure on health will lead to 1.57% reduction in the mortality rate in Nigeria. The outcomes of the findings have also revealed that corruption perception index has a negative significant relationship with the infant mortality rate in Nigeria. The result shows that the higher the rating of the country in the area of corruption the lower the mortality rate becomes.

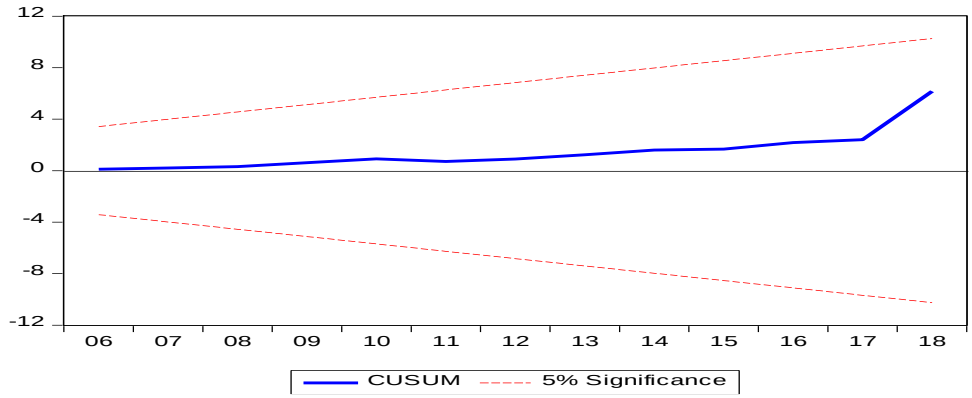
The result has also shown that the independent variables explained 66% of the dependent variable given the value of the adjusted R squared. The value of the Durbin Watson (2.12) is also shown to be more than the R squared or the adjusted r squares as this shows that the variables of this study are long run variables and the model is a long run model. The results also show that correlation test for the two models employed in this study. It is required that the results are not significant as this enables to accept the null hypothesis that there is no correlation among the data employed for the empirical analysis of the study. Also, in the Table 7, tests for the normality of the model employed in the study is shown. It is required that the results are non-significant as this allows us to accept the null hypothesis that the model of the study is normal. The result confirms this.

Figure 1: Kusum for model 1



Source: Computed by the Author

Figure 2: Cusum of square test for model 2



Source: Computed by the Author

Figure 1 and figure 2 above show the stability test on the models of the study. The decision rule is that the curve should not intersect the boundaries as this then implies that the model is consistent. The result as shown by the figures 1 and 2 above implies that the models of the study are consistent.

5. Discussion of Results and Implications

The study has found out that government expenditure on health has a positive relationship with the life expectancy as it has a negative significant. This shows an increase in public expenditure on health will improve the life expectancy and it will in turn lead to a drop in the mortality (infant) rate. Governance has also been found to have a significant effect on the performance of the sector as shown in the results of the study. The outcomes of the results are in line with the results found out by Asiedy et al. (2015) where the focus of the study is on the impact of income per capita on health outcomes using Sub-Saharan Africa and outside Sub-Saharan Africa as a case study. The findings of the study revealed that an increase in per capita GDP leads to a significant drop in mortality rates for children and on the other hand, it leads to an increase in life expectancy. The findings of the study are also in agreement with the results of Ahmed & Hasan (2016) where they analysed the impact public expenditure on health and governance have on health outcomes in Malaysia. The results found out that there is an existence of a long run relationship between health outcomes and the level of income, corruption, government stability and government health expenditure. Furthermore, their results also showed that expenditure on health as well as corruption affect long and short-run health outcomes. In order to improve on the quality of life I the country, the study laid emphasis on the significance of health programme while it reduces or eliminates the corruption rate. Corruption will go a long way in ensuring that allocation to health is effectively utilized.

The result of this study can also be said to be in line with that of the study by Boachine and Ramu (2015) who investigated the nexus between public health expenditure and the status of health in Ghana. Having controlled for real per capita income, the level of literacy and female participation in the labour market, the findings of the study revealed that the declining mortality rate (infant) in Ghana has public health spending among other factors responsible for it. Thus, the study concluded that government expenditure on health is associated with a progress in health status through a reduction in infant mortality rate.

6. Conclusion

A review of literature and to the best of my knowledge shows that the role of governance was not giving adequate attention in the course of examining the impact of public health spending on health outcomes in Nigeria. This study was therefore set out to assess the effect of public health care spending on health outcomes in Nigeria with consideration to the role of governance as proxied by fiscal policy rating. In line with the findings of the study, the following conclusions are made;

- Having established that a significant and a positive relationship exists between health care spending and life expectancy, it can be said that government has a key role to play in offering a good health care service to the people. Government spending are needed to ensure health personnel are paid as and when due in order to avoid incessant strikes on the part of the health workers. Government is also needed for the procurement of the health facilities in order to standardize the system as this will also encourage a number of people that seek health service abroad to patronize the health service provided locally.
- It can also be concluded that health care spending goes a long way in helping to reduce infant mortality rate. It was observed and as also supported by the results that the more government spend on the health care service the lower the rate of infant mortality in Nigeria.
- It can also be concluded from the findings of the study that governance plays a key role in health outcomes. A good governance will prioritize the key sectors of the economy such as the health sectors for funding.
- The study can be limited in scope having adopted just two indices for measuring health outcomes while there are quite a number of indicators such as cause of death by non-communicable disease, cause of death by injuries, life time risk of maternal death, mortality rate (neonatal) among many other indicators of health outcomes. The choice of two variables for health outcomes as adopted in this study, is due to the quest to keep this study simple.
- The government should increase his spending through a higher budgetary allocation to the ministry of health. The Ministry has numerous departments that specialise in different aspects of health care. The Family Health department is concerned with the creation of awareness on Maternal Neonatal, Child Health and Reproductive health in ensuring sound nutrition including infant and young child feeding, as well as care of the adolescents and the elderly ones.
- There should be good governance in the sectors among the leading personnel as transparency and accountability should be embraced in order to ensure the allocated funds to the sector are effectively utilized with a view to proving a sound health service to the people and one that will be good enough to compete with the ones the people going on health tourism seek.
- Corruption should be reduced to the barest minimum for effective allocation of funds to the health sector. The performance of the health sector would be better if the allocated funds are fully utilized for the purpose of which they are allocated.

- Urbanization has also been found in the study as factor affecting health outcomes. The government should increase spending on the infrastructural facilities in the rural areas in order to encourage people to stay put in the rural areas as this will reduce urbanization.
- The government should increase the level of employment opportunities and consider increment in the minimum wage as all these will improve on the per capita income of the people as this will in turn increase their capacity to afford health care service.

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APPENDIX

Appendix 1: Descriptive statistics

	LE	IMR	PHE	FPR	CPI	UPOP	PVI
Mean	48.36685	102.2559	73.02073	1.664706	14.44412	37.20782	59.62088
Median	46.67150	107.1000	28.89513	0.000000	16.00000	36.08850	65.60000
Maximum	55.20000	125.7000	296.4428	4.500000	28.00000	50.34400	75.23000
Minimum	45.84100	64.60000	0.041315	0.000000	0.000000	25.63500	34.10000
Std. Dev.	2.956956	21.77843	92.79744	2.038847	10.54992	7.350437	12.46341
Skewness	0.828336	-0.361944	1.079804	0.412056	-0.266050	0.230252	-0.715098
Kurtosis	2.257457	1.582768	2.715517	1.232376	1.537605	1.849218	2.332711
Jarque-Bera	4.669234	3.587794	6.721849	5.388511	3.430783	2.176514	3.528544
Probability	0.096848	0.166311	0.034703	0.067593	0.179893	0.336803	0.171311
Sum	1644.473	3476.700	2482.705	56.60000	491.1000	1265.066	2027.110
Sum Sq. Dev.	288.5384	15651.90	284175.0	137.1776	3672.924	1782.955	5126.109
Observations	34	34	34	34	34	34	34

Appendix 2: Life Expectancy

ARDL Long Run Form & Bounds Test
Dep. Variable: D(LE)
Selected Model: ARDL(1, 2, 2, 0, 0, 0)
Case 2: Restricted Constant and No Trend

Sample: 1985 2018
Included observations: 32

Cond. Error Correct. Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-9.329268	4.311816	-2.163652	0.0422
LE(-1)*	0.157994	0.097632	1.618259	0.1205
PHE(-1)	-0.005945	0.002529	-2.350857	0.0286
FPR(-1)	-0.065079	0.039919	-1.630296	0.1179
CPI**	-0.009856	0.008196	-1.202517	0.2425
UPOP**	0.072935	0.024509	2.975863	0.0072
PVI**	-0.002293	0.003744	-0.612395	0.5469
D(PHE)	-0.000826	0.001297	-0.636981	0.5310

D(PHE(-1))	0.003508	0.001293	2.713243	0.0130
D(FPR)	0.009400	0.037510	0.250591	0.8046
D(FPR(-1))	0.108809	0.037730	2.883910	0.0089

Levels. Equation
Case 2: Restricted Constant and No Trend

Variables	Coeff.	Std. Error	t-Statistic	Prob.
PHE	0.037628	0.012106	3.108243	0.0053
FPR	0.411912	0.183187	2.248586	0.0354
CPI	0.062384	0.072545	0.859932	0.3995
UPOP	-0.461630	0.362615	-1.273056	0.2169
PVI	0.014512	0.025234	0.575086	0.5713
C	59.04839	10.31809	5.722802	0.0000

Appendix 3: Serial correlation for model 1

Serial Correlation LM Test (Breusch-Godfrey)

F-stat.	1.321968	Probability. F(1,27)	0.2603
Obs*R-sq.	1.586998	Probability. Chi-Square(1)	0.2078

Appendix 4: Serial corr. for model 2

Serial Correlation (Breusch-Godfrey) LM Test:

F-statistic	0.051241	Probability. F(2,24)	0.9502
Obs*R-squared	0.140314	Probability. Chi-Square(2)	0.9322