Impact of Public Health Spending on Health Outcomes in Nigeria

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Introduction

The outcome of healthcare or health outcomes entail changes (prevention of preventable diseases or complete cure of curable diseases or sustainable management of unpreventable and incurable diseases) in the health of an individual, or group of peoples or population (National Health Information Management Group [NHIMG, 1996]). The importance of good and quality health in economic growth and development agenda have made health economist activist and World Health Organization to consistently advised world leaders (developed and undeveloped) to set health as one of the major priorities in national budget. Nurse (000) notes that health is essential to economic growth and development in that unhealthy persons are less or unproductive ceteris paribus. (NHIMG, 1996) submits that good and quality health outcome can wholly or partially sustained through specific intervention or series of interventions by the government, non-governmental organization, cooperatives, individual and foreign assistance.

Oluwatoyin, Folasade and Fagbeminiyi (2015) pointed out that health interventions can be direct or indirect, they added however that in practice indirect interventions are more common and as well as provides or assist or support the mobilization of direct health interventions. It suffices to note that indirect interventions in the health sector are numerous, but the study in view focused on public health expenditure which is one of the most common in the world economy and Nigeria is not excluded.

World Health Organization (W.H.O, 2015) defines health expenditure as a measure of final consumption of health goods and services plus capital investment in healthcare infrastructure geared to promote health outcome. Edeme, Emecheta and Omeje, (2017) opined that health expenditures are classified 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. They added that health expenditure is one of the major factors that support the provision of health facilities and requirements and services which in turn accounts for good and quality health outcome.

Given the importance of health care in growth and development agenda as well as the role of health expenditure to its support system twenty first century economists around the world have made considerable effort to examine the role public spending on health care has played in growth of human capital development and health care services. Considering the several research arguments from economic literature, public health expenditures have been recognized as a key aspect of fiscal outlays in most developed countries of the world, especially responsible for the standard in health sectors across the globe (World Bank, report 2015). Interestingly, this argument has not been the same for countries in sub-Saharan Africa including Nigeria as these countries in the past two decades have consistently budgeted for the health sector yet have continue to record the least in health facilities and services despite the huge public spending in the sector (Oluwatoyin, Folasade & Fagbeminiyi, 2015).

In Nigeria's context, looking precisely at the 2017 approved health budget, the health sector receives N380.46bn (USD1.05bn), 13% of non-debt recurrent expenditure. The breakdown shows that Ministry of Health takes the larger chunk of 79.7% of all funding for health sector. National Health Insurance Scheme (NHIS), purchase of medical equipment, medical consulting, State House Medical Centre, NACA among others all share the remaining 20.3%. The total allocation of N380.46bn as derived from the approved health sector computation (health related expenditure, including the Federal Ministry of Health and its agencies) in 2017 represents a 7.54% increase over the 2016 level of N353.5bn in nominal terms. However, the share of the total budget in nominal terms slipped from 5.7% to 5.1%, as approved in the 2017 budget. The allocation to the Ministry of Health (headquarters) indicated an 81% allocation of the total allocation to health sector while the remaining 19% is shared amongst other agencies. Njoku, (2011) submits that regardless huge health budget allocation, the level of health care development assistance (HCDA) in the Nigeria's health sector is large enough to show that health care assistance and inflows should have penetrated Nigeria through the Official development assistance yet the physical evidence reflects the otherwise. In fact HCDA accounted for a total of $6 billion as official development Assistance, of the $6 billion received, grants constituted $3.2 billion (Njoku, 2011).

In spite of the huge HCDA and budgetary health allocation, evidence demonstrates massive traveling for healthcare services abroad by Nigerians which has amounted for huge exchange rates differential. This record depicts the country's inadequate and inefficient method of financing and as well as poor organizational health delivery structure despite the national health objective of providing health care through annual streaming expenditure plan for all categories of Nigeria. Amid of the said sum, Nigeria like some developing nation is still faced with massive preventable health challenges, little or no access to good health care, water and sanitation issues, maternal and child health, among others. Interestingly, the country spends 3.7% of its GDP on health care: a figure well below global average but on par with many of the countries around it (Igbuzor, 2011). Given some improvement in health expenditure in Nigeria it is expected that health outcomes will improve tremendously. But statistical evidence has shown that the targeted curable and preventive health outcomes are prevailing in mass in Nigeria. Such health outcomes include: Maternal and child mortality rate, neonatal mortality rate, diarrhea, malaria, measles, pneumonia, and HIV/ AIDS, under 5-years mortality rate, tetanus among newborns and tuberculosis etc.

Statement of the Problem

Health outcomes which are integral part of health promotion objectives, economic development and growth are not ends to themselves rather a prerequisite for increase in productive output and economic growth and development agenda. Considering the importance of quality health in economic growth and development agenda, nations (both developed and developing) have prioritized health promotion interventions through spending

on health as a means to improved quality health comes. World Health Organization (WHO) in its 2000 world health report on health systems concluded that responsibility for the performance of a country's health system lies with government, and thus advised that government in developing countries should increase her expenditure on health system.

In Nigerian context, health expenditure has been trending upwards on average. In 1981 Nigerian government spent ₦0.52 billion on health, the amount increased to ₦5.06 billion in 1993, and to ₦132.21 billion in 2007 and ₦364.25 billion in 2018 (CBN, 2018). Given the rise in health expenditure in Nigeria, it is expected that the health system and outcomes will improve tremendously. But what is rather obtainable in Nigeria's public health system is poor health infrastructure, obsolete medical equipments, strike actions, employment of medical personnel based on political influence etc. These problems have given rise to establishment of; private healthcares and hospitals in all the streets in Nigeria, increase in medical check-up and treatment abroad by well to do Nigerians and political office holders, and poor medical attention to majority of the middle and low income earners. The problems caused by poor public health system has contributed to; increase in deplorable condition of public health care facility, inadequate health personnel and poor attitude of health workers toward health care seekers or patient and out-of-pocket expenditure on health, and as well cast doubt over the state of health outcomes (e.g. child mortality, HIV/AIDS epidemic, diabetes, high blood pressure, malaria, tuberculosis, and other diseases) in Nigeria.

These problems no doubt have attracted efforts from government through several policies and bills to strengthen the health sector. Some of the efforts include intervention policies by stakeholders, civil society, development partners and donor agencies, the private sector, and intergovernmental agencies in health sector in Nigeria. Through the intervention policies huge budgetary allocation from both internal and external sources have been devoted to the Nigeria's health sector yet health outcomes are not as encouraging as expected. For instance, health outcomes such as number of infant and neonatal death are still relatively high as shown in figure 1.1

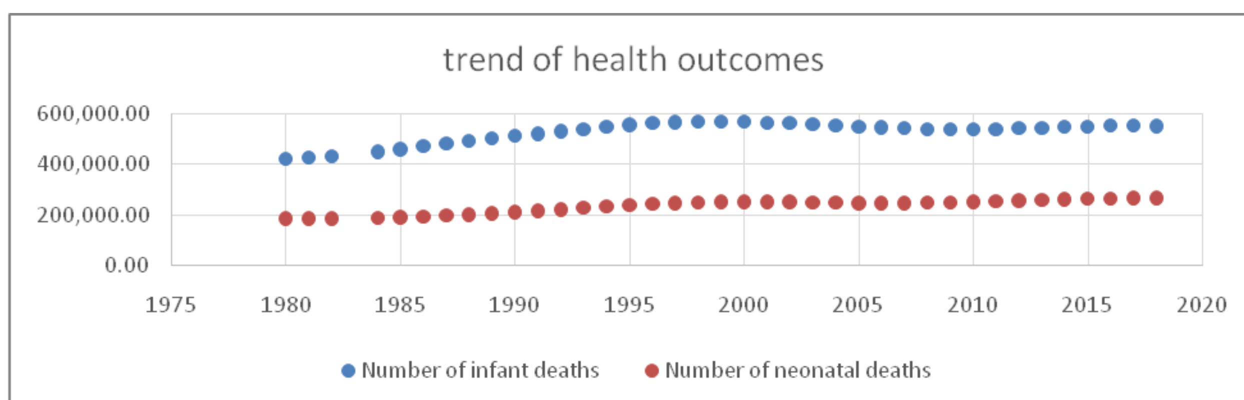

Figure 1.1: Trend of infant and neonatal death from 1980-2018.

Whereas Adewumi et al (2018) found that government health expenditure per capita has positive relationship with neonatal mortality rate, child mortality rate and infant mortality rate, and that private health expenditure has negative relationship with neonatal mortality, child and infant mortality rate in Nigeria, Yaqub et al (2012) found that public health expenditure has negative effect on infant mortality and under-5 mortalities when the governance indicators are included. While Edeme et al (2017) found that public health expenditure improves life expectancy and reduces infant mortality rates, Oluwatoyin, Folasade and Fagbeminiyi (2015) found that public spending on health has a significant relationship with health outcomes in Nigeria. The outcomes of these studies show clearly that

controversy exists among empirical research findings in respect of public health expenditure and health outcomes. As a result there is a need for further studies. But notwithstanding, these studies no doubt have made impact in literature and have contributed to existing knowledge, yet there are gaps that require further research investigations regardless of the controversy found in empirical research findings.

Reviewed literatures mainly from Nigerian authors chose health outcomes from the stipulated list by WHO which is quite standard. However, some of the health outcomes that featured in WHO standard health outcomes have been neglected by the literatures reviewed. The health outcomes include reduction in newborns protected against tetanus, reduction or zero prevention of measles through immunization, improvement in tuberculosis treatment success rate among others. The neglected health outcomes have attracted public, private and external financial assistance including educational (formal and informal) orientation yet there presence is felt among populace in Nigeria. Hence, there is a need to examine the impact of public spending on these health outcomes with recognition of other factors that have the capacity to potentially influence them in any possible direction. Having identified the above gaps and an attempt to bridge the gaps, this study intends to examine the impact of public spending on health outcomes with recognition of other factors that can potentially influence health outcomes, thereby raise the following research questions.

Research Questions

1) What impact has Public Health Spending on newborns protected against tetanus in Nigeria?
2) What impact has Public Health Spending on tuberculosis treatment success rate in Nigeria?
3) What impact has Public Health Spending on prevention of measles in Nigeria?

Research Objectives

The broad objective of this study is to examine the impact of public health spending on health outcomes in Nigeria, with specific objective to:

1) Examine the impact public health spending has on newborns protected against tetanus in Nigeria.
2) Determine the impact public health spending has on tuberculosis treatment success rate in Nigeria.
3) Ascertain the impact public health spending has on prevention of measles in Nigeria.

Research Hypotheses

For the purpose of evaluating and achieving the above objectives, the following hypotheses were formulated to guide the study:

1. **H_0:** public health spending has no significant impact on newborns protected against tetanus in Nigeria.
2. **H_0:** public health spending has no significant impact on tuberculosis treatment success rate in Nigeria.
3. **H_0:** public health spending has no significant impact on prevention of measles in Nigeria.

Scope of the study

This study examines the effect of public health spending on health outcomes in Nigeria. The scope of study covers from 1981-2018, and the study employed data on annual time series within the scope. The data set for this study include: public health spending and health outcomes. The health outcomes data include: newborns protected against tetanus, tuberculosis treatment success rate and prevention of measles via immunization. Other

required data are private health spending, health aid, health education. The data set are sourced from world development indicators (WDI), Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS).

Literature Review

Theoretical literature Review

Health Belief Theory: The Health Belief Theory (HBT) was developed by Irwin Rosenstock in 1966 and has been identified as one of the earliest and most influential theories in health promotion. It was inspired by a study of reasons people expressed for seeking or declining X-ray examinations for tuberculosis. Initially the theory included four constructs: (1) perceived susceptibility (a person's subjective assessment of their risk of getting the condition, as contrasted with the statistical risk), (2) perceived severity (the seriousness of the condition and its consequences), (3) perceived barrier’s (intervention that will promote and facilitate adoption of certain behavior), and (4) perceived costs of adhering to the proposed intervention. The first two constructs are referred to as psychological ill while the two are cure motives which centered on intervention. In 1970s and 1980s, Becker and colleagues modified the HBT to include people's responses to symptoms and illness, and compliance with medical directives and interventions. The directives and interventions included in theory extends to; preventative health, health education, health and screening. The units of analysis added to the theory includes a) demographic variables such as age, gender, ethnicity, occupation, b) socio-physiological variables such as socioeconomic status, personality, coping strategies, c) perceived self-efficacy such as ability to adopt the desired behavior, d) cues to action such as factors that instigate preventive health such as information sought/provided, persuasive communication, personal experience and health intervention programs, and e) health motivation such as perceived control, and perceived threat (Becker & Maiman, 1975). In recent years the theory has been used to predict general health behaviors (negative and positive health outcomes), although when it was originally proposed it was designed to predict actions by acutely or chronically ill clients. In the HBT a health-related action or intervention is seen as more likely when the action is viewed as being both cost effective and effective in terms of outcomes (Roden, 2004; Rosenstock, 1966).

Critique of the HBT has been based on the fact that not all health behavior is based on rational or conscious choice. The HBT also lacks concepts associated with detailed strategies for change (Roden, 2004). HBT failed to provide structural equation that expressed the relationship between health interventions and health outcomes. However HBT fractionally applies to this study in that it placed emphases on health interventions and health outcomes. In practice there are many ways through which health interventions can take place. That notwithstanding HBT linked health interventions to preventative health, health education, and health screening. Further, health interventions may be in form of government spending, foreign and private donation and health-aid etc. Through these measures, Health Infrastructure, drugs, and training of health personnel are provided for patient’s utilization which trickles down to reduction or elimination of disease and improvement in general health outcomes. The major intend of this study is to examine the impact of government spending on health outcomes in Nigerian context with recognition of other health interventions obtainable in Nigeria. Thus, critical review of some components of HBT indicates that HBT serves as a relevant theory to the study under review.

Intervention-Based Theory: In 1980, Andrew Tannahill forwarded a health promotion theory titled Intervention-Based Theory (IBT) which consists of three overlapping intervention spheres of activity: health education, disease prevention, and health protection. Health education is designed to change the knowledge, beliefs, attitudes, and behavior in a

way that facilitates health outcomes. Disease prevention aims to decrease risk factors and minimize the consequences of diseases; it includes primary, secondary, and tertiary prevention. Health protection focuses on fiscal or legal controls and policies and voluntary codes of practice aimed at preventing ill health and enhancing well-being. Tannahill (2009) asserts that health protection includes public policies, public spending that address fair access to Health Infrastructure, provision of drugs, employment, education, and health care. The Tannahill theory has been criticized for not providing detail explanation of fiscal or legal controls and policies. These concepts are broad hence requires concrete explanation. Second the theory did not model its state for better mathematical and statistical analysis. However, since it fractionally explains the relationship between health prevention (which may be in form of government spending, foreign and private donation, aid, health-education orientation etc..) and health outcomes, is proposition offers support to the work under review as the intent of this study is to examine the impact of government spending on health outcomes in Nigerian context with recognition to other health interventions obtainable in Nigeria.

Momentum Theory: Momentum theory (MT) is one of the most recent theories in health promotion propounded by Bonnie Raingruber (2013). The theory is an amalgam of ideas from Newton's Second Law of Motion, the Health Belief Theory, the Theory of Planned Behavior, the Trans-theoretical theory, Ecological Systems Theory, Salutogenic Theory, the Life Course Development Model, Diffusion of Innovations Theory, and Fender's Health Promotion Model.

Concepts within the theory include: (1) momentum, (2) roadblocks to change, (3) forces that get the ball rolling, (4) forces that provide ongoing impetus for change, (5) forces that help a person get past the plateaus where change seems to slow, and (6) habit patterns.

Momentum is defined as the amount and forces required to improve the existing health system and establish new once. As a result engaging in health behavior and system improvement on a regular basis has not only a self-sustaining aspect to it but public, private and foreign interventions as well. Momentum is also the case that, to initiate a health system change, a substantial amount of effort is required in order to ensure improvement in health outcomes.

Roadblocks to change are those things that interfere with, or get in the way of, nor detour, or inhibit healthy health system. Examples of roadblocks to change include; having to change rather than wanting to change; a lack of commitment to the public plans and policies; time constraints; competing priorities that deters health system improvement. Other factors include a staunch reliance on unhealthy implementation behaviors; policies, circumstances or laws that undermine health or interfere with change; environmental or psychological cues that tempt one to make unhealthy choices; and lack of money or resources

Forces that get the ball rolling are those factors that motivate one to initiate change. Examples include: a) a perceived threat to one's health or daily routine associated with support and maintenance of one's current health situation which in most cases are funded out-of-pocket, b) reinforcement, interest or coaching from significant others such as healthcare providers, non-government organization, government, private sectors (foreign or domestic), c) one's environment, d) clear benefits associated with the new health system and the image of positive future advantages associated with the changes in the improved health system.

Forces that provide on-going impetus for change are those factors that help a person maintain behaviors that support their health-related goals. These forces include any of the listed forces that get the ball rolling or a sense of purpose, focus or meaning experienced during the process of changing.

Forces that help a person get past the plateaus where change seems to slow include the forces that provide impetus to stay on course and persist despite a lack of progress in: a)

providing satisfactory health system, b) a strong investment in or commitment to the planned change, c) pleasure associated with the new health system.

Habits patterns are attitudes or behaviors created from repetitive experiences or inherited from one's family or their social/cultural/environmental/economic background that affect both individual and general your health system. Habit patterns can be conscious or unconscious which promotes or deters to health system and outcomes.

Momentum theory is diverse reaching to multiple areas of health promotion, however it fraction explains the link between government intervention, other forms of intervention and health outcomes. For instance in its concept of momentum, it recognized public, private and foreign interventions as means with which health systems can improve. An improvement in the health system in turn brings about improvement in health outcomes.

The roadblocks concept of the theory also recognized lack of commitment to the public plans and policies, unhealthy implementation behaviors, lack of money or resources as factors that interfere with improvement in the health system. These placed significant importance to spending and interventions from public, private and foreign agents as means to improved health systems and outcomes.

The concept of forces that get the ball rolling, forces that provide on-going impetus for change, forces that help a person get past the plateaus where change seems to slow and habits patterns in momentum theory recognized intervention of different forms (e.g. coaching from healthcare providers, non-government organization, government, private sectors (foreign or domestic) including out-of-pocket spending as strong factors that contributes to improvement and promotion of the health system.

Like the Health Belief Theory (HBT) and Intervention-Based Theory (IBT), Momentum theory (MT) fractionally applies to the study under review in that it placed emphases on different forms of health interventions and how the aforesaid interventions can promote the health system as well as the health outcomes. In practice there are many ways with which health interventions can take place. For example, health interventions may be in form of government spending, foreign and private donation, aid, health-education orientation etc.. Through these measures, Health Infrastructure, drugs, health seminars and conferences, and training of health personnel are provided for patient’s utilization which contributes significantly to reduction or elimination of diseases and improvement in general health outcomes. Given the proposition of the MT, it can serve as a theoretical backup to this study which majorly intends to examine the impact of government spending on health outcomes in Nigerian context with recognition of other health interventions obtainable in Nigeria.

Review of Empirical Literature

The empirical literatures herein reviewed are research works closely related to the study under review which tried to examine the impact of public health spending on health outcomes in Nigeria with diverse technique of analysis.

Adewumi, Acca and Afolayan (2018) examined the impact of government health expenditure on health outcomes in Nigeria. The research employed government health expenditure per capita to proxy government expenditure and neonatal mortality, child mortality and infant mortality rate to proxy health outcomes. Other control variables used in the study include private health expenditure per capita, per capita income, numbers of physician and life expectancy. The result shows that government health expenditure per capita have positive relationship with neonatal mortality rate, child mortality rate and infant mortality rate in Nigeria. Private health expenditure, numbers of physicians and life expectancy shows a negative relationship with neonatal mortality, child and infant mortality rate in Nigeria. The implication of this finding is that private sector has greater influence on health outcomes than the public sector which means that health services will be obtained at a

high cost in Nigeria.

Boachie, Ramu and Polajeva (2018) re-examined the link between government health expenditures and health outcomes to establish whether government intervention in the health sector improves outcomes. The study used annual data for the period 1980–2014 on Ghana. Employing the ordinary least squares (OLS) and the two-stage least squares (2SLS) estimators found that aside from income, public health expenditure contributed to the improvements in health outcomes in Ghana for the period. That, overall, increasing public health expenditure averts infant and under-five deaths in every 1000 live births while increasing life expectancy at birth despite that the health effect of income outweighs that of public health spending. Rahman, Khanam, and Rahman (2018) investigated the relationship between different types of healthcare expenditures (public, private and total) and three main health status outcomes in life expectancy at birth, crude death rate and infant mortality rate in the region. Using the World Bank data set for 15 countries over a 20-year period (1995–2014), a panel data analysis was conducted where relevant fixed and random effect models established that total health expenditure, public health expenditure and private health expenditure significantly reduced infant mortality rates, and, the extent of effect of private health expenditure was greater than that of public health expenditure. Private health expenditure also had a significant role in reducing the crude death rate, but per capita income growth and improved sanitation facilities also had significant positive roles in improving population health in the region.

Raeesi, Harati-Khalilabad, Rezapour, Azari, and Javan-Noughabi (2018) estimated the effect of health expenditure on health status. Employing a Panel of 25 countries using both random and fixed effects model based on the Hausman test found a significant relationship between health expenditures and health indicators. The result further showed that the effect of private health expenditures on health outcomes in countries with mixed health financing system and traditional sickness fund insurance was higher than public expenditures. Also, after comparing the results between different health care systems, found that the effect of health expenditure on the health outcome in countries with national health system (NHS) was more than other health care systems. Edeme et al (2017) investigated 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. More so, the results showed that an increase in public health expenditure improves life expectancy and reduces infant mortality rates. While urban population and HIV prevalence rate significantly affects health outcomes, per capita income exhibits no effect on health outcomes in Nigeria. Like the work done by Adewumi et al, Edeme et al neglected protection of Newborns against tetanus, treatment of Tuberculosis and Prevention of measles via immunization are part of health outcomes in their study whereas these variables are shortlist in the health outcome template of WHO, and have attracted huge public intervention through spending.

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. Having conducted a timely and desirable research in field of health economics, there are yet some missing variables such as life expectancy at birth, infant mortality rates, neonatal mortality rates, Newborns protected against tetanus, Tuberculosis and Prevention of measles via

immunization that need to be examined with respect to public spending. Sengupta (2015) examined the impact of per capita health expenditure on infant and child mortality separately for the urban and rural sector of India using lagged multiple regression models. The finding revealed that health expenditure taken alone does not have any impact on the health parameters. However, inclusion of mothers' education and the poverty level of the household represented by per capita income increases the effectiveness of health expenditure, which then becomes an effective tool for improving the health parameters of infant and child mortality. This implies that where the health beneficiaries are poor, level of education is low, awareness is less, and particularly in the rural sector public health expenditure is not incurred judiciously. Ultimately therefore it is not always the amount of finance, but more important becomes how the money is spent.

Result Presentation, Analysis and Discussion of Results

Result Presentation and Analyses

Unit root test

Table 4.4 Augmented Dickey-Fuller (ADF) unit root test.

Variables	ADF	Critical 1%	Critical 5%	Critical 10%	Order	Remarks
Dependent variables						
NBPT	-4.985316	-4.226815	-3.536601	-3.200320	I(I)	Reject H_0 @ 5%
TBTSR	-6.697569	-4.616209	-3.710482	-3.297799	I(1)	Reject H_0 @ 5%
PMI	-4.065537	-3.234972	-3.540328	-3.202445	I(1)	Reject H_0 @ 5%
Independent variables						
PUHE	-6.523732	-4.284580	-3.562882	-3.215267	I(0)	Reject H_0 @ 5%
PVHE	-7.878825	-4.226815	-3.536601	-3.200320	I(1)	Reject H_0 @ 5%
FAH	-3.869062	-3.219126	-3.533083	-3.198312	I(0)	Reject H_0 @ 5%
HEDU	-3.803928	-3.219126	-3.533083	-3.198312	I(0)	Reject H_0 @ 5%

Source: Authors Compilation 2019 with E-views 9.

From unit root test, is it obvious that all the variables in model one, two and three are fractionally stationary at order I(0) and I(I), we therefore reject H_0. Since all the variables were not stationary at the same order of integration but stationary at level I(0) and first difference I(1) in the three models, the condition for Engle-Granger co-integration was not met. Therefore it is preferable to proceed to ARDL co-integration for the periods under study.

Autoregressive Distributed Lag (ARDL) Bound Test Result

Table 4.5: Co-integration test.

Test Statistic	Value	k
F-statistic for model one	5.083570	4
F-statistic for model two	6.395039	4
F-statistic for model three	29.05584	4
Critical Value Bounds		
Significance	I(0) Bound	I(1) Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: E-views 9 computation

From table 4.5 the computed F-statistics exceeds the upper bound value I(1) across the three models. Thus we reject the null hypothesis and conclude that there is co-integration. Granger representation theorem cited in Gujarati, Porter and Gunasekar (2012) states that if two variables dependent and independent are co-integrated, that is, there is a long-run or equilibrium relationship between the variables. Of course, in short-run there may be disequilibrium. Therefore, error term in short-run equation is treated as equilibrium error and in order to correct such error is the major import of Error Correction Mechanism or Model (ECM). As a result, ECM test is carried out in this study to correct maybe equilibrium error (disequilibrium) in co-integration equation across the three models specified.

Table 4.6 Test for error correction model (Short-run)

Error correction test			
Model one			
Variable	Coefficient	t-statistic	Prob.*
ECM01(-1)	-0.827074	2.000234	0.0008
Model two			
Variable	Coefficient	t-statistic	Prob.*
ECM02(-1)	-0.842069	-2.379161	0.0387
Model three			
Variable	Coefficient	t-statistic	Prob.*
ECM03(-1)	-0.839010	2.924150	0.0025

Source: Authors Computation 2019 with E-views 9.

If the dependent and independent variable are co-integrated, in short-run there may be disequilibrium. In order to correct such error the ECM test is carried out. If the short-run disequilibrium is corrected (if coefficient of ecm_{t-1} is negative) the study analysis will rely on short run results because of the following advantages; (a) short run results give multiplier effect of the independent variables on the dependent variable (b) short-run is a convenient model that corrects disequilibrium in short-run into long-run (c) Short-run results resolves the problem of spurious regression by taking into account the lag of error correction model (ECM) which eliminates trends from the model (d) ECM fits into both general and specific approach to econometric model (e) the error term in Short-run result is a stationary variable etc (Gujarati, Porter & Gunasekar, 2012).

From table 4.6 the ECM for model one, two and three are stable since the coefficient of

the ECM's are negative and their t-test statistically significant. As a result, the analysis of this study relies on short run results.

Table 4.7: Short-Run analysis for model one

Dependent variable: NBPT				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.333925	2.203642	1.059122	0.0180
PUHE	0.307191	0.006146	2.170041	0.0012
PVHE	0.198307	0.081938	2.420206	0.0218
FAH	0.118712	2.544510	4.008314	0.0034
HEDU	2.007538	0.018272	3.412519	0.0029
ECM01(-1)	-0.827074	0.205470	2.000234	0.0008
R-squared	0.790119			

Source: E-views 9 computations

From the short run analysis in Table 4.7, we observed that the coefficient of public health expenditure (PUHE) had a positive impact of 0.307191on newborns protected against tetanus (NBPT) which shows that a unit increase in PUHE leads to approximately 0.31units increase in NBPT and this agrees with the a-priori expectation. Statistically, PUHE is also significant which means that its role cannot be ignored in promoting Newborns against tetanus. The coefficient of private health expenditure (PVHE) has positive impact of 0.198307 on NBPT within the period of this study. This simply means that an increase in PVHE leads to approximate 0.2 units increase in NBPT and this agrees with the a-priori expectation. Statistically, PVHE is also significant which means that its role cannot be disregarded in promoting Newborns against tetanus. The coefficient of foreign assistant on health (FAH) been positive recording approximately 0.12 indicates that a unit increase in FAH contributes less than proportionate increase in NBPT in Nigeria. The coefficient of health education (HEDU) shows that a unit increase in education orientations concerning health related issues improves newborns protected against tetanus (NBPT) by 2.00 units. This means that improvement in health education contributes greater than proportionate improvement in NBPT. Of particular interest is the ECM. The coefficient of error correction mechanism (ECM) is negative -0.827074 and statistically significant. This shows that about 83 per cent speed of adjustment is needed in the long run to correct the disequilibrium in the short run with respect to health interventions adopted in this study and newborns protected against tetanus in Nigeria.

The granger causality test in appendix IX (A) also confirms that PUHE, PVHE, FAH and HEDU can cause the direction of NBPT without feedback. From appendix IX (A), we observe that the null hypothesis that PUHE, PVHE, FAH and HEDU does not granger cause NBPT was rejected because the probability values are less than 0.05. Rejection of the null hypothesis implies that PUHE, PVHE, FAH and HEDU can predict the direction of NBPT without NBPT determining or predicting the direction of PUHE, PVHE, FAH and HEDU.

Table 4.8: Short-Run Analysis for Model two

Dependent variable: TBTSR				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-13.01050	36.92265	-0.352372	0.7319
PUHE	0.101649	0.008180	-3.201621	0.0043
PVHE	0.401040	0.302497	2.334020	0.0053
FAH	1.274510	2.964510	4.429093	0.0170
HEDU	3.049562	0.036988	4.339971	0.0099
ECM02(-1)	-0.842069	0.331911	-2.379161	0.0387
R-squared	0.754385			

Source: E-views 9 computations

From Table 4.8, it is observed that public health expenditure (PUHE) has a positive impact of 0.101649 on tuberculosis treatment success rate (TBTSR) which shows that a unit increase in PUHE leads to 0.10 units increase in TBTSR. Statistically, PUHE is also significant which means that its role cannot be ignored in promoting TBTSR and this agrees with the a-priori expectation. The coefficient of private health expenditure (PVHE) has positive impact of 0.401040 on TBTSR within the period of this study. This simply means that an increase in PVHE leads to approximate 0.4 units increase in TBTSR and this agrees with the a-priori expectation. Statistically, PVHE is also significant which means that its role cannot be disregarded in promoting TBTSR. The coefficient of foreign assistant on health (FAH) been positive recording approximately 1.3 indicates that a unit increase in FAH contributes more than proportionate increase in TBTSR in Nigeria. The slope of health education (HEDU) and TBTSR show that a unit increase in education orientations concerning health related issues improves TBTSR by 3 (three) units. This means that improvement in health education contributes greater than proportionate improvement in TBTSR. The coefficient of error correction mechanism (ECM) been and statistically significant implies that about 84.2 per cent speed of adjustment is needed in the long run to correct the disequilibrium in the short run with respect to health interventions adopted in this study and tuberculosis treatment success rate (TBTSR) in Nigeria. The result obtained in table 4.8 is in tandem with the result in appendix IX (B) which shows PUHE, FAH and HEDU causes the direction of TBTSR without feedback. In appendix IX (B) it was observed that the null hypothesis that PUHE, FAH and HEDU does not granger cause TBTSR was rejected because the probability values are less than 0.05. Rejection of the null hypothesis implies that PUHE, FAH and HEDU can predict the direction of TBTSR without TBTSR determining or predicting the direction of PUHE, FAH and HEDU. However, reverse holds for the causal link between PVHE and TBTSR were no causal link exists.

Table 4.9: Short-Run Analysis for Model three

Dependent variable: PMI				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.086305	333.7972	3.254385	0.0027
PUHE	0.490587	3.135607	4.834938	0.0000
PVHE	0.353409	7.012309	2.478144	0.0059
FAH	0.622104	0.519053	2.198537	0.0398
HEDU	4.345771	7.000226	3.419571	0.0018
ECM03(-1)	-0.839010	0.001733	2.924150	0.0025
R-squared	0.725838			

Source: E-views 9 computation

Table 4.9 shows that public health expenditure (PUHE) has a positive impact of 0.490587 on prevention of measles via immunization (PMI). This implies that a unit increase in PUHE leads to approximately 0.5 units increase in PMI and this confirms to a-priori expectation. Statistically, PUHE is also significant which means that its role cannot be ignored in promoting PMI. The coefficient of private health expenditure (PVHE) has positive impact of 0.353409 on PMI within the period of this study. This simply means that an increase in PVHE leads to approximate 0.4 units increase in PMI and this agrees with the a-priori expectation. Statistically, PVHE is also significant which means that its role cannot be disregarded in promoting PMI. The coefficient of foreign assistant on health (FAH) recording 4.345771indicates that a unit increase in FAH contributes more than proportionate increase in PMI in Nigeria. The slope of health education (HEDU) and PMI show that a unit increase in education orientations concerning health related issues improves PMI by 4.3 units. This means that improvement in health education contributes greater than proportionate improvement in PMI. The coefficient of error correction mechanism (ECM) been and statistically significant implies that about 83.9 per cent speed of adjustment is needed in the long run to correct the disequilibrium in the short run with respect to health interventions adopted in this study and prevention of measles via immunization (PMI) in Nigeria. Like in model one, it was also observed that PUHE, PVHE, FAH and HEDU cause PMI without feedback. This is evidenced in appendix IX (C) where it was observed that PUHE, PVHE, FAH and HEDU predict the direction of PMI without feedback hence we reject the null hypothesis that PUHE, PVHE, FAH and HEDU does not granger cause PMI and do not reject the alternative hypothesis. This implies that PUHE, PVHE, FAH and HEDU improves health outcome within the study period in Nigeria.

Evaluation of Estimate: Economic Criteria (a-priori expectation)

Table 4.10: A-priori expectation for model one, two and three

Independent variables	Exp. signs	Obtained results	Remarks
Model one**:** a-priori expectation			
PUHE	+	0.307191	Conform to a-priori
PVHE	+	0.198307	Conform to a-priori
FAH	+	0.118712	Conform to a-priori
HEDU	+	2.007538	Conform to a-priori
Model two**:** a-priori expectation			
PUHE	+	0.101649	Conform to a-priori
PVHE	+	0.401040	Conform to a-priori
FAH	+	1.274510	Conform to a-priori
HEDU	+	3.049562	Conform to a-priori
Model three**:** a-priori expectation			
PUHE	+	0.101649	Conform to a-priori
PVHE	+	0.401040	Conform to a-priori
FAH	+	1.274510	Conform to a-priori
HEDU	+	3.049562	Conform to a-priori

Source: Researchers' Compilation 2019 with E-views 9.

Summary of the economic criteria results

Comparatively, economic criteria results unveiled that the health orientations acquired through education contributes more to improved health outcomes in Nigeria with foreign assistant on health as next. On the other hand, the results indicate that PUHE and PVHE

contribute positively to improved health outcomes in Nigeria with relative economic insignificant effect.

Discussion of Findings.

The discussion of findings herein tries to highlight the outcomes of the results from economic and statistical criteria of the models specified and compare the results with the results of related empirical literatures reviewed and the theoretical postulations adopted. The results obtained from economic and statistical criteria of model one, two and three of this study revealed that the health orientations acquired through health education contributes more to improvement in health outcomes in Nigeria with foreign assistance on health as well. On the other hand, the results indicate that PUHE and PVHE contribute positively to improved health outcomes in Nigeria.

The obtained results are in tandem with the proposition of Health Belief Theory (HBT), Intervention-Based Theory (IBT) and Momentum theory (MT). These theories emphasized that different form of health intervention promotes the general health outcome. In practice there are many ways with which health interventions can take place. For example, health interventions may be in form of government spending, foreign and private donation, aid, health-education orientation etc. In this study, the health interventions adopted are public and private spending, foreign health assistance and health-education. From the results obtained it was found that the aforesaid health interventions had positive impact on health outcomes in Nigeria, though health education had greater positive impact on health outcomes with foreign assistance on health as next while PUHE and PVHE had positive impact of low magnitude on health outcomes in Nigeria

Policy Implication of Findings

This section tries to point out the negative and positive economic implication of the study outcome on Nigerian economy and among Nigerian citizens.

From the analysis of this study it was found that PUHE, PVHE and FAH had positive impact of inelastic magnitude on newborns protected against tetanus, tuberculosis treatment success rate and prevention of measles via immunization. This implies that the amount of money spent on these health issues is greater than the health benefits received by the patients in Nigeria. This may be as a result funding mismanagement, misallocation and poor financial accountability, transparency and lack of efficiency in the governance system and poor check in the private sector. On other hand, it was observed that HEDU had elastic positive impact on newborns protected against tetanus, tuberculosis treatment success rate and prevention of measles via immunization. This implies that the health orientations acquired through education contributes more in prevention grave diseases and promotion of quality health generally in Nigeria.

Summary

The results empirically obtained from economic and statistical criteria indicate that PUHE, PVHE, FAH and HEDU had positive impact on newborns protected against tetanus, tuberculosis treatment success rate and prevention of measles via immunization in Nigeria. However, whereas PUHE, PVHE and FAH had positive impact of inelastic magnitude on newborns protected against tetanus, tuberculosis treatment success rate and prevention of measles via immunization, HEDU had elastic positive impact on newborns protected against tetanus, tuberculosis treatment success rate and prevention of measles via immunization in Nigeria. Summarily, the observed result shows that HEDU have more potential to promote quality health in Nigeria. Secondly it was observed that spending (from public, private and foreign stakeholders) have not played huge significant role as expected however their impact

felt positively on the health outcomes of the study interest. Finally, the results obtained in this study revealed that PUHE, PVHE, FAH and HEDU have impacted positively on health outcomes in Nigeria and this is in line with theoretical views adopted in the study.

Conclusion and **Recommendations**

Enshrined in the body of the work include relevant health promotion theories and related empirical literatures were reviewed to further give a more strong stance to the research work from which research gaps were drawn. Methods of analysis relevant to capture the objectives of the study were adopted. Empirical findings revealed that PUHE, PVHE, FAH and HEDU had positive impact on newborns protected against tetanus, tuberculosis treatment success rate and prevention of measles via immunization in Nigeria. However, whereas PUHE, PVHE and FAH had positive impact of inelastic magnitude on newborns protected against tetanus, tuberculosis treatment success rate and prevention of measles via immunization, HEDU had elastic positive impact on newborns protected against tetanus, tuberculosis treatment success rate and prevention of measles via immunization in Nigeria.

Following the results obtained from short run ARDL statistical test estimation, the researcher then conclude that; a) on average PUHE, PVHE, FAH and HEDU have positive impact on newborns protected against tetanus, tuberculosis treatment success rate and prevention of measles via immunization in Nigeria, b) specifically PUHE, PVHE and FAH have positive impact of low magnitude on newborns protected against tetanus, tuberculosis treatment success rate and prevention of measles via immunization in Nigeria c) HEDU has positive impact of high magnitude on newborns protected against tetanus, tuberculosis treatment success rate and prevention of measles via immunization in Nigeria.

Based on the findings and conclusions of this study, the following recommendations were made; firstly, Nigerian Government should improve public health spending and as well as build financial efficiency, transparency and accountability in the health sector to ensure proper utilization of public health expenditure since it was found as a significant factor that improves health outcome . Secondly, Government should encourage private sectors to improve out-of-pocket health expenditure in order to improve health outcome. This is because out-of-pocket health expenditure (from the private sector) had significant impact on health outcomes within the period of this study. Third, more attention should be given to health orientation by educating the masses on benefits of health protection, prevention and promotion, as health education was found significant in improvement of health outcomes. Government should also attract more Foreign Assistance on Health since it had positive impact on health outcome.

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