



Does Public Health Expenditure promote Health Outcomes in Nigeria?

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Abstract

This paper investigated the nexus between public health expenditure and health outcomes (using maternal mortality as a proxy for the latter) for the period covering 1981 to 2014 in Nigeria. The study employs Cointegration and error correction modeling procedure with its attendant advantage of minimization of spurious regression estimates, while providing long-run estimates simultaneously. The results of the analysis reveal that maternal mortality rate declines as both public health spending and private health expenditure rise, suggesting that public health spending does not crowd out private health financing within the Nigerian context. Poverty rate was, however, found to contribute significantly to the rising rate of maternal mortality. Finally, health-oriented official development assistance had a negative but insignificant impact on maternal mortality rate in Nigeria. Arising from the foregoing, it is recommended among others, the need for policy makers to adopt a multi-pronged approach which should include, but not limited to, the diversification of the productive base of the economy so as to raise the revenue trajectory of the nation, economic status of women as well as guarantee the provision of good quality facility-based delivery care system will ultimately reverse the sombre mortality rate in the country.

Key Words: Health Expenditure, Mortality Rate, Poverty, Nigeria

JEL Classification: I19, H51

Paper Classification: Research Paper

Introduction

One of the crucial indicators of the state of health care situation in any country is the state of its maternal health. In most developing countries, however, the maternal health status has remained worrisome, when measured by the maternal mortality ratio (MMR). According to the World Health Organization (WHO, 2015), maternal death is the proportion of women who die from pregnancy-related causes while pregnant. In this context, pregnancy related death is conceived as that type of death that occurs to a woman during pregnancy or within 3 ½ weeks of termination of such pregnancy, the cause of such death notwithstanding.



In Sub-Saharan African countries, this health indicator appears to have performed poorly when compared to other developing parts of the world. For instance, between 1990 and 2015, maternal deaths per 100,000 live births declined from 95 to 27 (about 72 per cent) for Eastern Asia, 538 to 176 (67 per cent) for Southern Asia, it merely declined from 987 to 546 (45 per cent) for Sub-Saharan African (WHO, 2015).

At the country level, Nigeria was reputed to have had one of the highest rates of maternal mortality in the world in 2015. In that year alone for instance, Nigeria was estimated to account for about 58,000 maternal deaths (about 19 percent) of global maternal mortality deaths of 303,000 (WHO, 2015), a trend that poses severe challenges to the nation's policy makers.

Several factors have been identified as responsible for the overall abysmal performance of the health system in Nigeria over the years. These include poor health facilities, inadequate human resources and management and inadequate health care funding, amongst others (Obansa & Orimisan, 2013). Among the myriad of factors militating against the performance of the health care system in Nigeria, poor health care financing has come to be identified as a major challenge. This consistently poor state of health care financing has been partly blamed for the high incidence of maternal mortality recorded over the years. In view of the foregoing, this paper attempts to empirically investigate the nexus between public health spending and health outcomes in Nigeria with focus on maternal mortality ratio (MMR) as a proxy for health outcome for the period of 1981 to 2014.

The Dynamics of Health Expenditure and Maternal Mortality Ratio

Health care financing essentially entails strategies for paying for health care expenditure. Broadly speaking, it encompasses the collection of funds from diverse sources, pooling of such funds with a view to sharing the associated risk across large population groups, and the utilization of such funds for the purchase of goods and services from private and public providers for meeting the major needs of the population. (Uzochukwu, 2013).

In Nigeria, funding of health care expenditure comes from several sources, such as private sector, government, international partners and NGOs. This study, however, considers government funding. This is partly because public components of total health spending are considered as major contributors in the drive towards improving health outcomes (Anyanwu & Erhijakpor, 2007; Ilori, 2015). It comprises those budgetary allocations from the three-tiers of government, namely, Local, State and Federal Government.

Table 1 reveals that in Nigeria total health expenditure as a percentage of the GDP stood at 2.8% in 1995, but rose to about 3.4% in 1999, 4.3% in 2004, 4.2% in 2009, before stagnating at 3.7% in 2013 and 2014. In all, these values fall short of the 15% recommended by the Abuja Declaration of 2010. This trend seems to suggest that, health care system is grossly under-funded, a development that partly underscores the low state of public health in general and the disturbing trend in maternal deaths.

Between 1990 and 2015, MMR was estimated to have declined by about 44 per cent globally though the size of the reduction differed significantly between regions. In Nigeria, although there has been a decline in the MMR for the past two decades (see table 1), yet the reduction has been slow. For instance, between 1995 and 1999, the MMR declined from 1,250 to 1220 in nominal term, representing about 2.4. Similarly, between 2000 and 2004, 2005 and 2009 and 2010 to 2015, the percentage reductions in MMR were 11.1, 12.4 and 5.4 per cent, respectively. These figures,

when compared to those obtained in East Asia countries within the same time period, reveals that Nigeria has performed poorly in terms of MMR reduction.

Literature Review

Theoretical Review

The theoretical framework for this study is predicated on two strands of theories, namely, the Grossman (1972) model of health capital and Wagner (1883) model of government expenditure. Grossman (1972) model of health capital is basically concerned with the way and manner an individual allocates his/her resources in order to produce health. This theoretical exposition follows the unconstrained utility maximization theory whereby the individual aims to maximize his utility with a given set of resources. Grossman posits that as the individual aims to maximize his health, he does so by investing in himself to produce the typical health status desired. Essentially, the theory largely explains the nexus between health care spending and health outcomes. Thus, the theory simply presents the individual as one whose demand for health inputs is a derived demand, not necessarily for consumption but to produce a typical health outcome. This the individual does by acquiring health inputs such as health care financing which is either public or private financed, dietary intake, exercise, environment, income, and time, to engage in some production process that yields a typical health outcome.

On the part of government, Wagner (1883), while arguing in favour of government expenditure, posited that there are natural tendencies for government spending on investment to grow both intensively and extensively. Specifically, he designed three focal bases for the increase in state expenditure. One of such focal bases is the need for government to provide welfare services like public health through budgetary spending. Such public spending, according to him, is an endogenous factor which in turn, is a function of the growth in national income.

Empirical Review

There are several empirical studies on the nexus between health care spending and health outcomes at both the regional and country levels. Irrespective of the level, research findings in that regard are mixed, suggesting that the debate remains inclusive.

On the positive front, Filmer and Pritchett (1999), Anyanwu and Erhijakpor (2007), Akinkugbe and Mohanoe (2009) and Akanni (2012), Kim and Lane (2013), Eneji, Dickson and Onabe (2013), reported that increase in government expenditure helps produce positive health outcomes. In a related study, Farahani, Subramanian and Canning (2010) investigated the impact of state level public health expenditure on mortality across all age groups in India. They found that a ten-percentage rise in public expenditure on health in India tend to reduce the mean probability of death by two percentage, although the effect was largely on the women, elderly and young.

Kim and Lane (2013) employed the mixed effect model to examine the effect of public health spending on infant mortality rate and life expectancy at birth. Their results revealed that higher government expenditure helps to produce better overall health results for individuals. In another study, Barenberg, Basu and Soyulu (2015) examined the impact of public health expenditure on infant mortality rate in India. Their finding reveals that a one per cent increase in public health spending causes infant mortality rate to fall by about 8 infant deaths per 1000 live births.

On the other hand, some other studies reported that expenditure on public health may adversely impact on health outcomes or, at best, have no significant effect. For instance, Rajkumar

and Swaroop (2008) examined the effect of government expenditure on health status by utilizing 1990, 1997 and 2003 data for 91 developing and developed nations. Their results revealed, among others, that in countries with weak governance, public health spending may have no impact on under-five mortality rate. On their part, Berger and Messer (2002) investigated the impact of public expenditures and other health inputs on mortality rates for 20 OECD nations for the period, 1960-1992. Their results revealed among others, that increase in the share of health expenditure publicly financed is largely associated with higher mortality rates. Burnside and Dollar (1998) however, reported a case of no meaningful relationship between health care spending and change in infant mortality rate for low income nations.

The empirical studies examined above have several shortcomings. To begin with, some studies (Burnside and Dollar; 1998, Berger and Messer, 2002; Anyanwu and Erhijakpor, 2007; Rajkumar and Swaroop, 2007; Akanni, 2012; Kim and Lane, 2013) have been conducted using cross-sectional data of many developed/developing countries without paying much attention to their differing levels of development and health structures. In addition, such cross-country studies tend to mark important variations that may exist in terms of health status as well as health services used in individual countries characterized by diverse socio-economic configurations.

Thus, applying the results from such cross-national studies to policy formulation for individual countries may be quite misleading. Second, at the country level, studies on the nexus between public health spending and health outcomes in Nigeria are sparse. Even those at the macro level, for example, Akinkugbe and Mohanoe, (2009) in the case of Lesotho, used either life expectancy at birth, infant/under-5 mortality rates as proxies for health status. In Nigeria, a handful of the empirical studies on the nexus between public health spending and health outcomes measured the latter using life expectancy, infant/under five/adult mortality rather than maternal mortality rate. And, for a nation notoriously reputed with one of the highest rates of maternal mortality (MMR) (WHO, 2015), utilizing MMR as a proxy for health outcomes would better gauge the health status of the Nigerian nation. The paper intends to bridge this gap, among others. Third, the study utilizes a relatively longer sample period than any of those previous studies in this area, thus taking into cognizance the far-reaching health reforms that have been carried out over the years. Lastly, the study employs cointegration and error-correction methodology aimed at providing estimates for both the long-term structure and short run dynamics.

Data and Methodology

The data for this study comprises annual time series spanning 1981-2014. The variables under consideration are total government health expenditure (TGHE), maternal mortality ratio (MMR), health-oriented official development assistance (ODA), per capita income (PCI) (a proxy for private health financing), and poverty rate (POVRATE). The data for all the variables were sourced from various sources, including Statistical Bulletin of the Central Bank of Nigeria (2015), National Bureau of Statistics (NBS), World Development Indicators (WDI) of the World Bank, and other sundry sources.

Drawing from the reviewed literature, the theoretical underpinnings, comprising Grossman (1972) model of capital health and Wager (1983) government expenditure on health as well as several contemporary studies such as Muldoon, Galway, Nakajima, Kauters, Hogg, Bendavid and Millis (2011), and Akinci, Hamidi, Suvankulov and Akhmedjonova (2014), which estimate the

impact of health expenditure on health outcomes, a simple model is hypothesized where maternal mortality ratio (MMR) is stated as dependent on a number of health inputs, including total government expenditure on health, health-oriented official development assistance, per capita income and poverty rate as follows:

$$MMR = \alpha_0 + \alpha_1 TGHE + \alpha_2 ODA + \alpha_3 PCI + \alpha_4 POVRATE + \varepsilon \text{-----}(1)$$

Where: $\alpha_1, \alpha(2,)$ $\alpha_3 < 0$, while $\alpha_4 > 0$

MMR = Maternal Mortality Ratio

TGHE = Total government expenditure on health

ODA = Health-oriented official development assistance

PCI = per capita Income (proxy for private health financing)

POVRATE = Poverty rate

l = Error Term

Essentially, the study utilized the method of cointegration and error-correction modeling for the investigation. This approach encompasses testing the variables for unit root (in this regard, we utilized the Augmented Dickey-Fuller and Phillip-Perron tests), the cointegration test (using Johansen cointegration test) and, if the variables exhibit long-run relationship then an error-correction model is applied to capture the short-run dynamic relationship, using the Engle and Granger (1987) two-step procedure. The error-correction term in the short-run model indicates the speed of return to equilibrium in the advent of the equation being disturbed.

Also, taking into cognizance the relatively lengthy sample size of the study (1980-2014) and in order to avoid producing spurious parameter estimates, which may be injurious to policy making, structural stability test was constructed using the Cumulative Sum of Recursive Residual (CUSUM) and the Cumulative Sum of Squared Recursive Residual (CUSUMsq)

Analysis Of Results And Discussion Of Findings

Table 1: Descriptive Statistics (Panel A)

	MMR	TGHE	ODA	PCI	POVRATE
Mean	575.73	1039087	7.37	232457	59.95
Median	519.59	382816.4	2.00	201126.9	60.02
Maximum	800	4233063	80.00	364328.5	70.76
Minimum	350	9636.5	0.00	171136.3	49.15
Std. Dev.	126.61	1352453	15.72	58448.6	6.70
Jarque-Bera	2.57	9.19	311.57	5.77	2.03
Prob	0.27	0.01	0.00	0.05	0.36
Observ	32	32	32	32	32

Source: Author's Computation

Correlation Matrix (Panel B)

MMR	TGHE	ODA	PCI	POVRATE	
MMR	1.0000				
TGHE	-0.0394	1.0000			
ODA	0.391	0.3624	1.0000		
PCI	-0.0822	0.9118	0.4461	1.0000	
POVRATE	0.315	0.8685	0.4266	0.6772	1.0000

Source: Author's Computation

Table 1 (Panel A) presents the description of the variables. From the table, the Jarque-Bera statistic rejects the null hypothesis of normal distribution for total government spending on health, official development assistance, and per capita income, while for maternal mortality and poverty rate, the null hypothesis of normal distribution is accepted.

From the correlation matrix (Panel B), maternal mortality ratio (MMR) shows a positive correlation with ODA (39 per cent) and poverty rate (31 per cent), and a negative correlation with total government expenditure on health (3 per cent) and per capita income (8 per cent). Similarly, PCI shows a high positive correlation with TGHE and to a less extent, with POVRATE.

Stationarity Test

It has been observed in the literature that time series variables always trend in are non-stationary forms (Nelson & Plosser, 1982) and as such are prone to spurious or nonsense regression. To avoid this pitfall, the stationarity status of the series is investigated using the Augmented Dickey-Fuller (ADF) and the Phillips-Perron unit root tests. The unit root tests are presented in Table 4. The ADF test is based on minimizing the Akaike information criterion (A/C) while for PP tests, the spatial estimation is based on the Bartlett Kernel method while the bandwidth is selected based on the Newey-West approach.

Table 2: ADF and PP Unit Root Tests

Variable	ADF			PP		
	Level	1st Differences	Remark	Level	1st Differences	Remark
MMR	0.9106	-4.2675*	I(1)	-0.4166	-4.3357**	I(1)
TGHE	0.3706	-6.5558**	I(1)	-0.0709	-6.5255**	I(1)
ODA	-3.9175	-3.9175*	I(0)	-3.1324	-11.8755**	I(0)
PCI	-1.2430	-5.2587**	I(1)	-1.2074	-5.3239**	I(1)
POVRATE	1.2257	-5.3018**	I(1)	-3.3386	-12.4875**	I(1)

Source: Author's computation

The unit root test results as contained in Table 2 show that, except for ODA variable that was stationary at level (using both test statistics), all other variables became stationary after first differencing. In addition, while TGHE, PCI and POVRATE are significant at 1 per cent level of significance, MMR and ODA were only significant at 5 per cent level of significance.

Co-Integration Test

Cointegration tests are normally carried out to check for the presence (or otherwise) of a long-run relationship among the variables in a regression relation. The study therefore utilizes the

methodology advanced by Johansen (1988), and Johansen and Juselius (1990). By adopting the procedure provided Johansen and Juselius, the Max-Eigen and the Trace tests were employed to evaluate the number of possible cointegrating equations. However, if the two tests produce different results, the max test is preferred as it has been observed to be more reliable especially in small samples (Dulta and Ahmed, 1997; Odhiambo, 2005).

Table 3 shows the results for the Johansen cointegrating test. The test statistics that suggest absence of cointegration among the variables can be rejected. The results show that there are six (6) and five (5) cointegrating equations (with respect to the trace and max-Eigen statistics respectively) existing among the variables of interest.

Table 3: Johansen Cointegration Test results

Null Hypothesis	Trace Statistic	Critical value at 5 percent	Null Hypothesis	Max-Eigen Statistic	Critical value at 5 percent
$\alpha = 0$	230.62	95.75	$\alpha = 0$	91.75	40.07
$\alpha \leq 1$	138.86	69.81	$\alpha \leq 1$	61.49	33.87
$\alpha \leq 2$	77.37	47.85	$\alpha \leq 2$	38.28	27.58
$\alpha \leq 3$	39.08	29.79	$\alpha \leq 3$	18.49	21.13
$\alpha \leq 4$	20.59	15.49	$\alpha \leq 4$	15.27	14.26

Note: represents number cointegrating vectors

Sources: Author's Computation

Long-Run Model

Next, the results for the long- run relationship are presented as follow:

$$\text{MMR} = 14595.54 - 0.6517\text{TGHE} - 0.5121\text{ODA} - 409.7906\text{PCI} + 0.2358\text{POVRATE} \quad \text{---- (2)}$$

$$(-6.1955)** \quad (0.4158) \quad (6.7053)** \quad (2.3465)*$$

Note: *(**) implies significant at 5 per cent and 1 per cent levels respectively

From the foregoing long run results, total government expenditure on health variable (TGHE) is a major determinant of maternal mortality ratio. The coefficient of TGHE is negatively signed and statistically significant at the one per cent level. Thus, a rise in government expenditure on health by one per cent brings about a long run decrease in the maternal mortality rate by about 0.65 percent. These results are in consonant with those earlier obtained by Akinkugbe and Mohanoe (2009), Farahani et.al (2010), Maruthappu, Ng, Williams, Atun, Agrawal and Zeltner (2015) and Pickbourn and Ndikumana (2016). The implication of this is that any government policy that encourages greater allocation of funds and purposeful utilization of such funds in the health sector will inevitably bring about a commensurate reduction in maternal mortality rate.

The coefficient of poverty rate is positive and has statistically significant impact on maternal mortality rate. Thus, a one per cent increase in poverty rate brings about a 0.24 percentage point rise in maternal mortality rate. This finding corroborates results from earlier studies by Rosenfield and Freedman (2007), and Lanre-Abass (2008). They affirmed the synergistic interrelationships that exist between poverty and maternal mortality, especially in developing countries. The implication of this is that government should adopt a comprehensive policy framework for reducing the rising and alarming level of poverty estimated at 33.1 per cent (World Bank, 2011) if the crusade to reduce the maternal mortality rate to an acceptable level in Africa's biggest economy is to be realized.

The result for per capita income (a proxy for private health financing) suggests a significant complementarity between private and public health financing within the Nigerian nation. More specifically, a rise in private health financing by one per cent brings about 409.75 percentage point decrease in maternal mortality rate. This lends credence to the rising private expenditure on health as a percentage of total health expenditure, estimated at 74.85 per cent in 2018 (WHO, 2018). Thus, within the Nigerian context, policies directed at improving the per capita income have the potential of producing a significant net decrease in the nation’s maternal mortality ratio. This result is corroborated by those of Demery and Walton (1998), Alvarez, Gil, Hernandez and Gil (2009), Umoru and Yaqub (2013) and Kim and Lane (2013).

The Error Correction Model

Having established that the variables are stationary and cointegrated, a parsimonious error correction model is specified to capture the short-run dynamics that might have ensued in estimating the long-run relations. The parsimonious error correction model accomplishes this by incorporating an error correction factor. In this regard, the error correction variable measures the speed of adjustment of maternal mortality ratio to its long-run convergence in the event of any shock. Equation 3 presents the error correction model.

$$\Delta MMR_t = \phi_0 + \phi_{1i} \sum_{i=0}^1 \Delta MMR_{t-1} + \phi_{2i} \sum_{i=0}^1 \Delta TGHE_{t-1} + \phi_{3i} \sum_{i=0}^1 \Delta ODP_{t-1} + \phi_{4i} \sum_{i=0}^1 \Delta POVRATE_{t-1} + \phi_{5i} ect_{t-1} \text{ ----- (3)}$$

where,

ect is the error correction term, and “Δ” represents the difference of a series. ϕ_0, \dots, ϕ_7 are parameters of the model to be estimated. The “i” represents the number of lags included for the first difference of both the dependent and independent variables while t represents the time period. Since all the variables, in the equation are stationary, estimating the equation by Ordinary Least Squares (OLS) gives consistent estimates (Enders, 1995). Accordingly, the OLS method is utilized, and the model is then tested for stability.

Table 4: Estimated Short-Run Regression Result for Maternal Mortality Rate (MMR)

Dependent Variable: MMR
 Sample (adjusted): 1983-2014
 Included Observations: 30 after adjustments

Variables	Coefficients	Std. Error	t-Statistics	Prob.
C	342.9559	314.6829	1.0901	0.2880
DTGHE	-8.7305	4.3706	-1.9988	0.0587
DTGHE(-1)	-0001**	5.3015	-3.0865	0.0056
DODA	0.5445	0.5187	1.0498	0.3057
DPCI	0.0013*	0.0006	2.1577	0.0427
DPOVRATE	-436.2454	430.8983	-1.0124	0.3229
ECM(-1)	-0.6502**	0.2166	-3.2881	0.0017
R-squared	0.6116	Akaike Info. Criterion	10.9314	
Adjusted R-squared	0.4637	Schwarz Criterion	10.9314	
F-Statistics	4.1344	Hannan-Quinn Criterion	10.6455	
Durbin Watson stat.	2.2745			

Note:*(**) Significant at 5% and 1% respectively
 Source: Author’s Computation using E-views 7.0

Table 4 contains the estimated short-run regression result for maternal mortality ratio (MMR). From the table, the parameter of per capita income (PCI) is significant at 5 per cent level, while the one-period lagged of total government expenditure on health (TGHE) is significant at 1 per cent level. Also, the coefficient of one-period lagged error correction term (ECM-1) is appropriately signed. It indicates that about 65 per cent of the previous year’s shock in maternal mortality is offset by periodic adjustment (annually), and this is significant at 1 per cent level as shown by the resultant t-ratio. This high rate of convergence is of much practical relevance in policy analysis and in decision making process (Pesaran, 1997).

Stability Test and Impulse Response Function

Following the procedure provided by Brown, Durbin and Evans (1975), the stability properties of the maternal mortality ratio model is examined using the plots of cumulative sum of recursive residual (CUSUM) and cumulative sum of Squares of Recursive Residual (CUSUMsq). The results are presented in Figures 1A and 1B. The rule demands that if CUSUM and CUSUMsq go outside the borders given by the two dotted lines, then the parameters are said to be unstable. On the other hand, when they stay within the borders, parameter stability is confirmed. They are both estimated at 5 per cent critical level. From the figures, only CUSUM stays within the 5 per cent critical lines, implying parameter stability all through the sample period. For CUSUMsq however, parameter instability was established between 2005 and 2007.

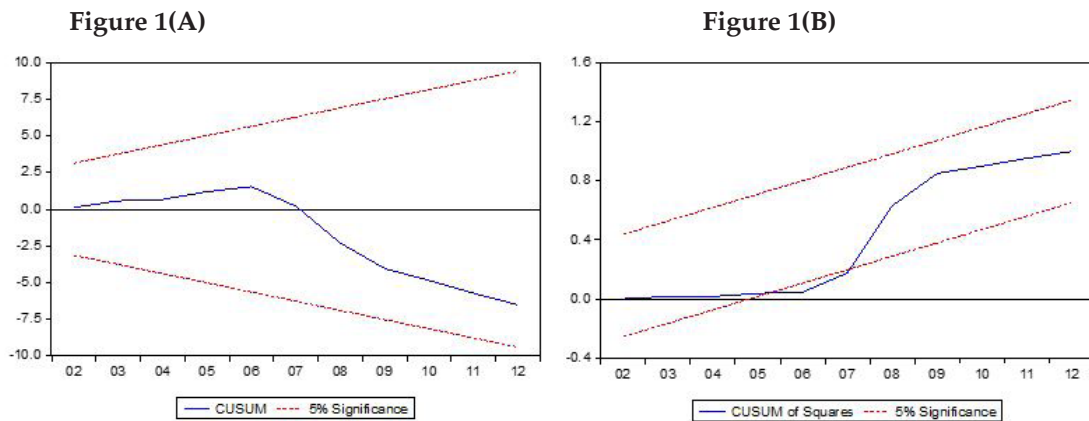


Figure 1: Stability test using CUSUM and CUSUMsq of residuals

In order to further examine the short-run dynamic properties of maternal mortality ratio, our earlier results are supplemented by computing the impulse response function which measures shocks arising from itself and those of total government expenditure on health, health-oriented official development assistance, per capita income and poverty rate over a ten-year period. The ten-year period will enable one to capture the short, medium and long run responses. The result as contained in Table 5 reveals that maternal mortality has a positive response with its past values in the first nine periods/years, while its relationship turned negative in the last year. Conversely, its own response to the shocks of per capita income and poverty rate was positive in the first year and then negative in the other years. However, in its response to the total shocks of government expenditures on health and health-oriented official development assistance, it alternated between negative in the first few years and positive in the other years, except for TGHE in the tenth year.

Table 5: Impulse Response of MMR

Period	Response of MMR				
	MMR	THE	ODA	PCI	POVRATE
1	28.46675	0.000000	0.000000	0.000000	0.000000
2	18.83307	-11.60167	12.37626	-4.161921	-0.70398
3	36.93589	-0.408896	-6.786001	-0.263914	-2.90175
4	35.41862	-3.085273	-16.61988	-6.666402	-0.90428
5	31.82226	1.059621	5.055780	-21.27618	-4.21202
6	21.73633	11.87231	18.58460	-21.81467	-10.1208
7	20.45328	15.46437	12.73500	-10.51896	-15.789
8	10.75711	13.35137	9.244281	-2.486839	-16.1237
9	2.186237	5.142897	12.38851	-0.941944	-15.2493
10	-6.728501	-2.790699	13.77557	-0.159767	-12.5406

Source: Author's Computation

Conclusion

This study has investigated the nexus between public health spending and health outcomes, using maternal mortality ratio (MMR) as a proxy for the latter in Nigeria for the period 1981 to 2014. The estimated results from the long run model suggest that government expenditure on health and per capita income has statistically significant negative impact on maternal mortality ratio. The critical role of poverty level in aggravating maternal mortality ratio was clearly confirmed in the study, as increase in poverty was positively associated with the rise in maternal mortality ratio. However, health-oriented official development assistance appears not to have any meaningful impact on maternal mortality rate.

Arising from the foregoing findings, the following policy recommendations are made. First, there is the need for the government at all levels to step up their resource allocations to the health sector. A sizeable proportion of such increment of funds should be channeled towards providing effective, skilled maternal health care in Nigeria. Such improved funding will help reduce high-risk and unintended pregnancies and ultimately make pregnancy and delivery safer. As a corollary to the foregoing, there is the urgent need to establish a credible system to register births and deaths at the three tiers of government, and a coordinated approach to ascertain the factors responsible for maternal deaths taking place in the nation.

Second, given the prevalence of obnoxious traditional cultural values in many of our rural communities, where women do not have the right to take decisions on the use of health services without the approval of their husbands, there is the urgent need to educate the men on the issue of high maternal mortality through community-based educational programmes. Such educational interventions would promote easy use of resources as they become available.

Third, because poverty makes it difficult for women (especially rural women) to afford medical bills, antenatal and post-natal services, transportation bills and good nutrition (especially for pregnant women), there is the urgent need to empower the women. This can be achieved by the government guaranteeing soft loans through micro finance institutions to those women in trade and in agricultural activities. Such efforts should be complemented by putting in place strategies aimed at ensuring equitable distribution of wealth which accrues from oil (that is, the sovereign wealth fund (SWF)).

Fourth, per capita income has been shown to complement rather than substitute public health financing in the country. In this regard, government should put in place appropriate policy measures aimed at promoting the real income growth of the nation and reducing the rising unemployment level. In the latter case, the current youth empowerment programme of the government should be strengthened and sustained. Also, given the complementary nature of the public-private expenditures on health, the government should put in place appropriate policy framework aimed at establishing effective public-private partnerships with a view to developing the health sector and improving the level of maternal health. In general, the task of improving women's health and reducing maternal mortality in Nigeria, as in many other developing economics, requires the adoption of a multi-faceted approach. Such multi-pronged approach should include not only improving the revenue base of the nation and, by extension, the economic status of women, but also provide good quality facility-based delivery care system manned by qualified medical workers.

In the interim however, and considering the dwindling revenue trajectory of the nation, there is the urgent need to address the issue of poverty-constrained access to the patchy services available in our health institutions with a view to curbing the rising tide of maternal mortality in the country.

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