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## Effect of Per Capita Health Spending on Child Mortality in Nigeria

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### Abstract:

The study investigated the effect of per capita health spending on child mortality in Nigeria using secondary data from 1980 to 2012. The study employed multiple regression methodology. Results show that per capita health spending has no significant effect on infant mortality rate and neonatal mortality rate in Nigeria. Results also show that per capita health spending and per capita education expenditure have significant effect on under-five mortality rate in Nigeria. Finally, the study concludes that health care expenditure is far from the optimum which at present cannot sustain the teeming population health challenges and recommends that government should increase and sustain health spending especially on programmes aimed at reducing child mortality as it is this study's believe that child mortality could significantly reduce with increased health spending in Nigeria.

**Keywords:** Healthcare, Expenditure, Infant mortality, Under-five mortality, Neonatal mortality.

### 1. Introduction

Infant and child mortality remain disturbingly high in developing countries despite the significant decline in most parts of the developed world<sup>1</sup>. The state of the world's children indicated that about 12.9 million children die every year in developing world<sup>2</sup>. Also, the Nigeria Demographic and Health Survey (NDHS) reported that 87 of 1000 infants born in Nigeria die before their first birthday while 115 of 1000 children die before reaching age five<sup>3</sup>. The 1999 NDHS reported an infant mortality rate of 75 deaths per 1000 live births and under five mortality rates of 140 deaths per 1,000 live births for the 1995 to 1999 period. For five years immediately preceding the 1999-2003 survey, the infant mortality rate was 100 deaths per 1,000 live births, while the overall under-five mortality rate was 201 deaths per 1,000 live births<sup>4</sup>. The level of improvement in infant and child mortality in Nigeria as a whole is significantly lower than the average of 34 percent for the sub-Saharan Africa.

Indicator	National		Zone					
	Urban	Rural	NC	NE	NW	SE	SS	SW
Neo-Natal Mortality Rate	37	60	53	61	55	34	53	39
Infant Mortality Rate	81	121	103	125	114	66	120	69
Under-Five Mortality Rate	153	243	165	260	269	103	176	113

Table 1: Childhood Mortality Rates Unit of measurement: Deaths per 1,000 live Births  
National Bureau of Statistics (NBS) 2008

From table 1, Neo-natal mortality rate, infant mortality rate and under-five mortality rate are higher in rural areas than in urban areas with 60, 121 and 243 respectively against the urban counterpart at 37, 81 and 153 in the same order. North East has the highest neo-natal and infant mortality rates with 61 and 125 respectively while North West has the highest under-five mortality rate with 269. South East has the least neo-natal, infant and under-five mortality rates at 34, 66 and 103 followed by South West and South South with 39, 69, 113 and 53, 120, 176 respectively.

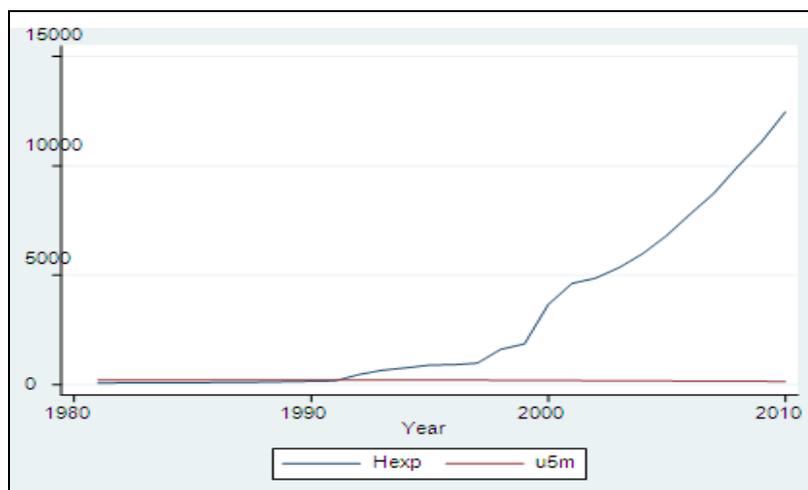


Figure 1: Relationship between health expenditure and under-five mortality rate  
*hexp=health expenditure, u5m=under-five mortality rate*  
 Data Source: Central Bank of Nigeria & NBS (2010)

From the graph above, health expenditure and under-five mortality remain relatively unchanged from 1981 to 1991. In sharp contrast, health expenditure increased rapidly from N452.85million in 1992 to N12,464.58 million in 2010 while change in under-five mortality rate remains insignificant.

Despite the fact that the major childhood diseases have been identified and modern technology to combat them developed, yet, children from African countries (Nigeria inclusive) die in large number from the attacks of these diseases. The adduced reason is deeply rooted in poor health service delivery as a result of mismanagement of fund allocated to the health sector<sup>5</sup>.

However, one of the most fundamental, yet unresolved, issues in health policy is whether public spending on health yields health benefits, especially in the form of improved health outcomes. If these considerations were to hold we would expect to see a strong connection between health spending and child mortality. It is this connection that this study seeks to test. Given the importance of this argument, this study will add to existing knowledge by employing covariance structure model to examine empirically the effects of public health spending on child mortality rates (CMRs) in Nigeria. This is a serious gap in the literature and there is an urgent need to fill it. This is because in spite of the observed increase in health expenditure, CMR is still high in Nigeria. Against this background, this study is poised to answer the following research question: what is the effect of per capita health spending on child mortality rate in Nigeria? However, child mortality rate is decomposed into – infant mortality rate, under-five mortality rate and neonatal mortality rate. Essentially, the study investigated the impact of per capita health expenditure on child mortality in Nigeria. The study assumed that Out-Of-Pocket (OOP) expenditure on health is zero. The study also assumed that institutional public accountability and incentives are constant.

## 2. Review of Relevant Literature

<sup>6</sup>provide a good survey of studies linking public spending with health outcomes. In their own work, they find that the two are very tenuously related. According to their results, doubling public spending from three to six percent of GDP would improve child mortality by only nine to 13%. <sup>7</sup>undertook a cross country analysis of 56 countries. In their study they concluded that increasing public expenditure on health has the ability to reduce the mortality rates of infants and children in a population.

In Nigeria, one stream focused on health expenditure and health outcomes using varying models, <sup>8, 9</sup> with conflicting results. Some results reveal that life expectancy rate is negatively correlated with health care expenditure both in the short and long-run and income elasticity of health care expenditure was below unity both in the short-run and long-run. Another stream focused on the interactions between health care expenditure and economic growth, <sup>10, 11</sup>. They used ordinary least square multiple regression analytical method to examine the relationship between health care expenditures and economic growth. Their results show that a significant and positive relationship exists between health care expenditures and economic growth. More importantly, the results and views of previous researchers are conflicting and would require a synthesis. This is because none of the studies reviewed decomposed child mortality into infant mortality, under-five mortality and neonatal mortality rates.

## 3. Methodology

### 3.1. Pre-Estimation Test

This is to test whether the mean value and variance of the stochastic term are constant overtime. The Augmented Dickey – Fuller (ADF) test was applied. The study therefore estimated the following equation:

$$\Delta Y_t = \beta_i + \delta Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-i} + \mu_t \dots \dots \dots (3.1)$$

Where Y is a vector of all the variables and  $\mu_t$  is a white noise error term.

However, the following abbreviations were used in the course of modeling: IMR = Infant Mortality Rate, UMR = Under-five Mortality Rate, NMR = Neonatal Mortality Rate, HEX = Per Capita Health Expenditure, PCI = Per Capita Income, HCF = Access to Healthcare Facilities, EDX = Per Capita Education Expenditure, DHP = Percentage of Delivery by a Health Professional,  $\alpha_i$ ,  $\beta_i$ ,  $\gamma_i$ ,  $\delta_i$  and  $\lambda_i$  = Parametric coefficients (i=1,2,3).

3.2. Model Specification

This study adopts and improves on<sup>9</sup> model. This work introduced new variables (per capita savings and ratio of healthcare professionals to patients) in the building of the model as suggested by literature.

The vectorized estimating equation is defined as:

$$Y = \alpha_{it} + \beta_i HEX_t + \gamma_i PCI_t + \delta_i HCF_t + \lambda_i EDX_t + \phi_i HPP_t + \mu_{it} \dots \dots \dots (3.2)$$

where Y denotes vector of health indicators (that is, IMR, UMR and IMR), PCI, HCF, EDX and HPP are set of control variables.  $\mu_{it}$  is a vector of random error term and 't' is the time variable and 'i' is the equation coefficient identifier.

4. Results and Discussion

The pre-estimation test shows that all the variables were stationary after taking their first difference.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-33.56006	15.28831	-2.195145	0.0373
LOG(D(HEX))	-1.061880	0.740813	-1.433399	0.1637
LOG(D(PCI))	-0.076241	0.146971	-0.518750	0.6083
LOG(D(HCF))	-4.817873	1.846312	-2.609457	0.0148
LOG(D(EDX))	-1.092938	0.752333	-1.452731	0.1583
LOG(D(DHP))	-1.760129	0.512882	-3.431837	0.0020

Table 2: Effect of per capita health spending on infant mortality rate in Nigeria

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-25.59598	11.67772	-2.191865	0.0375
LOG(D(HEX))	-1.500146	0.565857	-2.651104	0.0135
LOG(D(PCI))	-0.121093	0.112261	-1.078673	0.2906
LOG(D(HCF))	-3.919435	1.410274	-2.779200	0.0100
LOG(D(EDX))	-1.373484	0.574657	-2.390095	0.0244
LOG(D(DHP))	-1.572949	0.391757	-4.015118	0.0004

Table 3: Effect of per capita health expenditure on under-five mortality rate in Nigeria

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-19.40964	6.156530	-3.152692	0.0040
LOG(D(HEX))	-0.341427	0.298322	-1.144492	0.2628
LOG(D(PCI))	-0.025836	0.059184	-0.436541	0.6660
LOG(D(HCF))	-3.061987	0.743501	-4.118335	0.0003
LOG(D(EDX))	-0.402961	0.302961	-1.330077	0.1950
LOG(D(DHP))	-1.259925	0.206535	-6.100290	0.0000

Table 4: Effect of Health expenditure on neonatal mortality rate in Nigeria

The study found that per capita health spending has insignificant effect on infant mortality rate and neonatal mortality rate in Nigeria. This could be because of very low per capita health expenditure in Nigeria. This finding is in contrast with the findings by<sup>6</sup>. This implies that the relative increase of healthcare expenditure in recent years could not meaningfully reduce infant and neonatal mortality rates in Nigeria. It is without doubt that per capita spending on healthcare in Nigeria has not reached a threshold that could spur significant reductions in infant and neonatal mortality rates. Interestingly, table 4 shows that per capita health spending has significant effect on under-five mortality rate in Nigeria. This may not be unconnected with foreign assistance through under-five immunization, regularly initiated in an effort to reduce under-five mortality rate in Nigeria. More so, access to healthcare facility by Nigerians and percentage of delivery by health professionals has shown the potential to significantly reduce child mortality. This could be attributed to the recent increased provision of health care facilities to hospitals by the federal ministry of health and the continuous campaign

against self-medication. However, control variables like per capita income and per capita education expenditure are still very low to the extent that they cannot have significant effect on child mortality rates in Nigeria.

## 5. Conclusion

The primary aim of this paper was not to merely calculate child mortality rate for Nigeria but to see the effect of health spending on child mortality and the progress made since 1980, which will serve as a wake-up call assessment towards achieving the global minimum mortality targets and to examine those expenditure factors that contributes to lack of projected decline in mortality rates in Nigeria. It is important to mention that because of urbanization, quality health care services are concentrated in urban areas. In this sense, balanced rural and urban health care services can be seen as a good measure for short run and long run improved health status of the citizenry. Finally, the study concludes that child mortality could significantly reduce with increased health spending in Nigeria as far as health care allocation is judiciously expended.

As a caveat, this study is by no means an exhaustive treatment of the impact of health expenditure on child mortality in Nigeria, but will serve as a prelude for promoting further taught of the topic.

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