

Research Article

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Maternal mortality and economic development in Sub-Saharan Africa

Christian Ikechukwu Nnadi¹, Janefrances Onu²,
Christopher Emmanuel Nwankwo^{*3} , Ifeoma
Uzoamaka Nwankwo⁴

^{1&3}Social Sciences Unit, School of General Studies, University of Nigeria, Nsukka, Nigeria. christian.nnadi@unn.edu.ng¹ christopher.nwankwo@unn.edu.ng³

²Department of Social Works, University of Nigeria, Nsukka, Nigeria. janefrances.onu@unn.edu.ng

⁴Department of Psychology, University of Nigeria, Nsukka, Nigeria. ifeomapenelope@gmail.com

*Corresponding author



Abstract: Globally, the highest number of maternal deaths is in Sub-Saharan African region with ratio of 546 maternal deaths per 100, 000 live births which is approximately 201,000 maternal deaths annually. This amounts to two-thirds of all maternal deaths per year worldwide. This fact calls for investigation to ascertain its effect(s) on economic development of the sub region. It is however hypothesized that maternal death generally is significant and has negative influence on economic growth (Gross Domestic product) both in under-developed, developing and developed nations. The

objective of this study is to estimate the effect of maternal mortality on economic development in Sub-Sahara African region. Cross-sectional data analysis of selected member countries in the region under focus was employed using double-log econometric model. The source of data is from United Nations Development Programme and World Bank. The explanatory variables in the model were statistically significant at 5% level while other coefficients like maternal mortality, exports and imports conform to the apriori expectations and impacted negatively on the overall GDP. A necessary but not sufficient condition is investing on viable programmes and projects that reduce maternal deaths as well as spur significant economic returns and sustainability in sub-Saharan African economies are however recommended.

Keywords – Development, Gross domestic product, Maternal mortality, Sub-Saharan Africa

1. INTRODUCTION

Maternal death is defined by the World Health Organization (2010) as “death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. This according to Skudder-Hill (2019) includes deaths of all pregnancy from first trimester to the last and other pregnancy-related causes, childbirth, or pregnancy-worsened condition, including deaths associated with the management of pregnancy.

This view helps in identifying maternal deaths as having direct and indirect causes. The statistics on maternal mortality ratio in Sub-Saharan Africa is not only mind-boggling but pathetic. More so, because evidence abound

that those countries in this region have put rhetoric before action in mitigating the effect of this scary public health issue. Importantly, we must recall that battling this menace of maternal deaths was indeed among the contending issues that took the frontal stage during the Beijing 1995 Conference convened by women activists drawn from all over the world. Also, inclusive issues discussed at the conference were the necessity of resolving skyrocketing household poverty levels, gender empowerment, healthcare status of women and girl-child education improvements cum upholding the rights to life of women. In this context, the socio-economic condition of women is paramount (Mobosi, Okonta & Ameh, 2022). The Millennium year summit that marked five years of Beijing conference prominently featured Maternal deaths discourse which indicated its escalating nature and magnitude and hence the mandatory injunction for every nation to abate it by 2015. The year 2015 marked for MDGs target has come and gone and even though some countries achieved MDGs that specifically related to maternal deaths, yet countries in our region of study still fall short of the target. Improvement was made in this region vis a vis maternal mortality but it's on an insignificant level.

Most countries both developed, and Low developed countries (LDCs) in pursuit of basic macroeconomic goals of sustainable growth of economy, full employment, price stability and favourable balance of payments rely so much on government for the provision of capital-labour intensive project(s). For instance, the work of Hall, Lilian and Makuta (2021) found the existence of highly non-linearity between public revenue per capita and mortality rates. By implication Nations whose per capita revenues are relatively less have mortality-reducing tendencies. The study indicated that a rise in per capita revenue causes possible gains that rapidly decline non-linearly. Government revenue increases will give rise therefore to mortality decrease and more lives saved. This can be exemplified in the case of Afghanistan whose 10% per capita revenue increase in 2002 resulted in under-5 mortality decrease by 12.35 and saving 13,094 lives. It also resulted to 9.3 decrease ratio to maternal deaths and saving 99 maternal deaths to 100,000 live births.

Policies and programmes designed to advance human development emanate from, and are implemented in the real sector (Arazu, Mobosi & Mba, 2022). In market-based economies, growth is generated by the private sector but facilitated by the government through productive and strategic public investment and creation of an enabling environment. It is on this particular function of public sector that the role of some selected Sub-Saharan African governments is analyzed vis-à-vis the role played in the health sector in reducing maternal mortality in particular. Women contribution to nation's economies cannot be overemphasized (Emojong & Korir, 2022). Empirical studies suggest that equitable involvement of women in Africa's labor markets brings about a substantial gain in the economy, given that women constitute a bigger chunk of the region's most economically productive population (Emojong & Korir, 2022).

2. LITERATURE SURVEY

2.1. Economic development and maternal mortality in sub-Saharan Africa

What is the relationship between maternal mortality and economic development? Can maternal mortality have any effect on economic development of any nation? Most studies carried out on maternal mortality often focus on its reduction without specifically analyzing the effect it may have on the economy. No wonder government health policies in most of sub-Saharan Africa aim at the reduction maternal mortality. It becomes imperative to study the effect of this health outcome on economies of some selected sub-Saharan African nations. A healthy nation is a wealthy nation. This is so because in the long-run, if pregnant mothers are not adequately taken care of during and after pregnancy, the products of that pregnant negligence are unhealthy children which not only affects the quality of labour force but also the quantity. What of maternal mortality's effect on a country's population size? Unarguably, it reduces the population size and by implication the size of the labour force which negatively affects its significant influence the country's economic growth indicator (Kur et al., 2021).

Maternal mortality also affects the quality of a country's labour force because deaths of mothers deny proper upbringing of children leading to denial of adequate care that will go a long way in determining the children's personality. Sigmund Freud in his theory of personality development likewise other human development psychologists affirms that nature and nurture play significant factors in personality development. It's based on this premise that we can assert categorically that deaths of mothers deny children both the natural factors of human development and the environmental factors since mothers' nurture their children to become whomever they will be and children equally receive traits from their mothers which aid their development.

On a clearer and economic note, there are several ways maternal mortality can influence GDP growth. Firstly, maternal deaths affect labour force thereby reducing output production. Secondly, deaths of a mothers affect the quality of labour force because mothers's role as care- givers and nurses are lost. Thirdly, deaths of mother's spell doom for the elderly in African society because elders play vital roles as family and community life counsellors, conflicts arbitrators and 'tacit' indigenous knowledge transmitters. Deaths of mothers translate to abandonment of the elderly especially where the culture of old peoples' home is non-existent. This implies that the contribution of the elderly to the growth of the economy is affected in areas of conflict resolution, value and indigenous knowledge transmissions. Fourth, the jamboree associated with lavish funeral in Africa entails that the affected families end up selling off their productive assets to bury their mothers. This attitudinal behaviour entails depletion of assets that contribute to GDP growth thereby eroding household production and not taking cognizance that African economies is characterized by low capital-labour ratio. Fifthly, maternal mortality adversely affects future human capital creation, labour force quality and quantity thus impacting negatively on GDP. This can be attributed to several factors, namely (a) mothers' role in provision of family nutritional needs and their demise affects the balanced growth of their children development physically and cognitively. (b) maternal deaths in Africa entails the death of a teacher who plays a role of nurturer, socializing agents in terms internalizing societal norms and mores and general education of children as the father is generally assigned the family bread winner. (c) the future economic prospects of the children of maternal deaths are dashed as most of them end up being trafficked, maids, prostitution and are school drop-outs as they now perform functions done by their dead mothers. (d) epidemiologically, maternal deaths lead to infant deaths and by implication lowers the future labour force. (e) it is a given that maternal deaths of those in active labour force reduce expenditure on total household expenditure, government revenues from tax, sole proprietorship and savings after tax, thus hampering investment projects. The factors enumerated above juxtapose to stifle GDP growth (Sule, 2021).

Maternal mortality's effect on a country's economic development cannot therefore be overemphasized because of its obvious effects aforementioned. The work of Anyamele, Ukawuilulu and Akanegbu (2017) attributed differences in sub-Saharan regions to the risk factors in infant and child mortalities. Infant mortality in urban areas is statistically negative relative to rural areas in Sun-Saharan Africa. The study of Yaya, Anjorin and Adedini (2020) summarized the causes in maternal mortality variations in Sub-Saharan Africa as being caused by inequities in gender and the ratio of skilled birth attendants to child deliveries. These two factors they believed are the major drivers that determine maternal mortality variations in Africa. Ayenew et al. (2020) added the COVID-19 effect. They argued that lockdown and quarantine measures to contain the pandemic affected pregnant mothers because of the associated disruptions on the health of pregnant mothers. The pandemic has also exacerbated economic inequality among both sexes thereby making women more and susceptible (Nyamkoh & Ngwa, 2021).

The effectiveness cum efficiency of a country's health system determines her health outcomes. Adjudging the region of the study as having the most number in terms of maternal deaths is an indication that the health sector in this region is in a shambles. The neglect of the region's health sector had led to her falling far below the established benchmark of WHO regarding Safe motherhood as result by poor women participation in national decision-

making (Agbofa et al., 2020). The abysmal state of sub-Saharan health sector and particularly her primary healthcare is responsible for the shamble nature of maternal health outcome in the sub region. The Nigeria Federal Ministry of Health document (2004), acknowledged the deplorable state facing Nigeria’s health system and health status of Nigerians and notes numerous problems including, low motivation for health professional workers, an annual budget preparation processes the report calls a ‘ritual, ’a culture of corruption and little consultation between the Federal and State health authorities and between the Federal ministry of Health and other ministries. Nigeria ranking second to India as country with highest maternal mortality ratio is a testament of a shamble nature of her health system and this is characteristic of health system in the sub-Saharan Africa since Nigeria is a country that cannot be ignored in sub-Saharan Africa. The table 1 by Lawn, Blencowe and Patterson (2011) summarizes the shambolic nature of health sector performance in Sub Saharan Africa as the countries from this region are ranked among the first 10th and 16th in the continent having more newborn and maternal deaths respectively.

Table 1: Ranks of Maternal deaths and other closely related health outcomes in selected African countries in 2011

Countries	Newborn deaths by rank	Annual death of newborn	Maternal deaths by rank
Nigeria	1	241,000	1
Democratic Republic of Congo	2	131,000	2
Ethiopia	3	120,000	3
Kenya	6	44,000	4
Angola	8	43,000	5
Uganda	5	45,000	6
Niger	10	32,000	7
Tanzania	4	45,000	8
Mali	9	37,000	9
C’ote d’Ivoire	7	43,000	16

Source: Lawn et al 2011.

The MDGs signed in September 2000 189 by member nations is aimed at reducing poverty and development that is sustainable be achieved by 2015. Goals of eight goals resolution directly addresses the issue of maternal mortality. There was reduction in maternal deaths by 2015 but the reduction differs significantly across all nations and continents. WHO (2015) acknowledged this fact and went further to assert that developing regions accounted for the most maternal deaths and sub-Saharan Africa has the most share of the deaths followed by southern Asia.

Oluwole (2004) attributed this high rate of maternal mortality to the high-risk factors in the region. These factors are low education status, penury, low nutrition, pregnancy weight loss, overweight in pregnancy, underage marriage and marriage above thirty-four years of age. Others include sexual infections affecting pregnancies, and sickness like anemia, cervical cancer.

Pregnancy related deaths can be reduced by addressing these triumvirate delays: (i) taking decisive and prompt action at household levels on pregnancy-related needs. (ii) prompt accessibility of healthcare facility and (iii) getting healthcare appropriate services without unnecessary protocols. The above is recommended by Khan and Shaw (2011), Anyamele (2015), Adedini et al. (2013), Tessema et al. (2017) and Sharma et al. (2017) that women lack of access and control of resources in the household, low education status; powerlessness in decision-making; and limited access to regular transport facilities especially in the rural areas where more than 80% of the women live are all attributed to the first two delays above. Safe motherhood initiative encompassing the enumerators factors namely; planning, ante-natal care; essential obstetrics care; post-natal care; post-abortion care; and sexually transmitted diseases/human immune virus prevention is recommended by WHO (2002) as the solution to these delays. Improving in the socio-economic status and education standard of women, provision and reliable primary health care; together with societal reorientation vis -a- vis relationship in the way we perceive women are the core effective-reducing factors of maternal mortality.

Women in Africa render their services to complement others via productive services in areas like cash crop production, subsistence agriculture and career jobs. They also play other significant but unrecognized and unrewarded roles through cooking for family, sanitary service provision, nursing services even when they are not fully healthy themselves as well as training their children and wards in schools. A death of mother either during or after pregnancy or any form of disability as opined by Walsh et al. (1993) denies a family a bread winner, trainer and above all family 'general overseer' with irreplaceable role. The essentiality of all actors both political and apolitical in knowing and providing this core effective -reducing factors of maternal mortality and morbidity cannot be overemphasized in achieving the goals embedded in safe motherhood programmes. No study in recent times has ventured carrying out comprehensive and elaborate study the implications of maternal mortality to the economic development in Africa.

The goal of this study is to bridge this gap in literature. Using econometric approach, its specific objective is to unravel the effect of maternal mortality on economic development in the sub-Saharan African. Our finding will be crucial in recommending policies geared towards significant reduction of maternal mortality that will translate into sustaining and improving economic development in Sub-Saharan Africa. The methodology adopted in this study could be relevant for researchers carrying out study on economic burden of maternal deaths. They can as well adopt another suitable approach that will add value to the study or introduce another methodology that will improve on the study. Positive maternal health achievement is a given for country on the path of achieving economic transformation. Sub Saharan Africa can achieve economic development but not in isolating improving maternal healthcare. The general performance of a country, region or otherwise is hinged on health sector performance and maternal health is particularly a necessity.

3. PROBLEM STATEMENT

Sub-Saharan African region has alarming maternal deaths despite significant health investment in primary healthcare sector meant to address the mortality menace. This high mortality has undermined the economic development the preventable deaths could have contributed to the development of the sub region. It is this problem that this study seeks to address because the contribution of mothers to economic development of the region is not factored in during economic policies of the selected Sub-African region.

4. RESEARCH METHODOLOGY OR METHODS

We used Generalized Method of Moment/ Dynamic Panel data of selected sub-Saharan African countries for instrumental variables estimation strategy in taking care of endogeneity issues. Data is from World Bank and WHO. There are many other covariates that could be correlated with both maternal mortality ratio (MMR) and Gross Domestic Product per capita (GDPPC) used for economic development. Thus, the model is specified as thus:

$$MMR_{it} = GDPPC_{it}\alpha_1 + X'_{it}\beta_1 + \mu_i + \delta_t + \sum_{r=1}^k \eta_{r,t} + \varepsilon_{it} \text{-----(1)}$$

where $i = 1, 2, \dots, n$ indexes selected countries in sub Saharan Africa, $t = 1, 2, \dots, T$ indexes years $N = n \times T$ observations, MMR_{it} stands for maternal mortality ratio, $GDPPC_{it}$ denotes Gross Domestic Product per capita, x'_{it} is a $((k-1) \times 1)$ control vector literacy rate in female (FLR), Skilled Birth Attendants (SBA), Sex Ratio (SR) control for factors like cultural norms, Health Expenditure per capita (HEPC) Governments Total Health Expenditure (GTHE), and GDP per capita at current price (GDPPCC), μ_i for fixed level effect, δ_t is fixed effect for the year, and $\sum_{r=1}^k \eta_{r,t}$ are trends in the regional time.

Table 2: Empirical result presentation

Dependent Variable: GDPPC				
Method: Panel GMM EGLS (Cross-section random effects)				
Date: 07/2/22 Time: 15:28				
Sample (adjusted): 1990 2018				
Periods included: 6				
Cross-sections included: 11				
Total panel (balanced) observations: 66				
2SLS instrument weighting matrix				
Swamy and Arora estimator of component variances				
Instrument specification: C GFR SBA SR HEPC GTHE GDPPCC GDPPC				
Table 2: Constant added to instrument list				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-442461.7	96115.62	-4.603432	0.0000
MMR	-61.29895	13.58222	-4.513177	0.0000
GTHE	202.8441	59.00340	3.437837	0.0011
SBA	-381.7892	83.86539	-4.552405	0.0000
FLR	9439.033	2016.812	4.680174	0.0000
SR	447669.3	97644.37	4.584691	0.0000
HEPC	-177.6531	49.00734	-3.625031	0.0006
GDPPCC	5.08E-10	1.20E-10	4.247021	0.0001
Effects Specification				
			S.D.	Rho
Cross-section random			0.000000	0.0000
Idiosyncratic random			915.9434	1.0000
Weighted Statistics				

R-squared	0.898181	Mean dependent var	1328.215
Adjusted R-squared	0.891682	S.D. dependent var	1032.401
S.E. of regression	12203.74	Sum squared resid	8.64E+09
Durbin-Watson stat	0.584475	J-statistic	1.59E-13
Instrument rank			
	Unweighted Statistics		
R-squared	123.68193	Mean dependent var	1328.215
Sum squared resid	8.64E+09	Durbin-Watson stat	0.584475

Authors' computation

3. DATA ANALYSIS AND DISCUSSIONS

Table 2 contains the empirical results for the analysis. GDP per capita (GDPPC) is the regressand, the independent variables are maternal mortality ratio (MMR), skilled birth attendants (SBA), sex ratio (SR), government total health expenditure for the selected countries (GTHE), female literacy rate (FLR) country and year fixed effects. The regressand's (maternal mortality) partial effect on the regressor (Economic development proxied as GDP) is the primary interest.

MMR in the result obtained having -61.29895 means that an increase in maternal mortality ratio by 1 percent would will on average reduce GDPPC in the selected Sub-Saharan Africa Nigeria by approximately 61. This is in conformity with existing theories and negative apriori expectation which states that maternal deaths negatively affect their labour force contribution to GDP.

Female literacy rate and Government total health expenditure and sex rate have positive signs of 9439, 202 and 447669 respectively. This means that a percent increase in each of the variables will increase GDP 9439, 202 and 447669 respectively. By implication, the level of education of women and health expenditure commitment by government will in the long run have significant and positive effect on sustainable development in the selected Sub-Saharan Africa. The outcome of the findings conforms to existing literature suggesting firstly that female literacy rate is vital variable that improves populations' health status as well as reduce maternal mortality. The coefficients of skilled birth attendant (SBA) and health expenditure per capita will negatively reduce GDP by 381 and 178 if increased by 1 percent. Selected countries in SSA to achieve a sustainable development must make sure that health workers like gynecologists and midwives are adequately catered for since they play pivotal role in reducing maternal mortality. The negative effect of health expenditure per capita is an indication that provision for health care services should be the primary responsibility of government like the provision of healthcare insurance scheme so that individual will be healthy and spend less thereby influencing GDP growth positively. Country that is healthy is nonetheless a wealthy country.

Female Literacy Rate is that percentage of female population who have attained 15 years with reading, writing abilities and can as well solve simple mathematics. Also, Ricci and Zachariadis (2006) noted that as the number skilled birth attendants-doctors, nurses and midwives per 100,000 populations improves, they are expected to lower not only maternal deaths but also other health outcomes and impact positively on GDP in the long run.

4. RESEARCH IMPLICATIONS

A percentage rise of MMR will reduce GDP by approximately 61. This suggests that Sub Saharan Africa to attain some level of development must invest massively in maternal mortality reducing interventions like investment in health care facilities, improved health insurance schemes for women, improvement in human capital development for skilled birth attendants and women education etc.

5. CONTRIBUTIONS TO SCIENTIFIC COMMUNITY AND FUTURE RESEARCH

The key contributions of the paper are that a significant increase in maternal mortality ratio and skilled birth attendants reduces economic development in SSA. Also the paper finds that literacy rate in female, governments total health expenditure, sex ratio, contributes positively and significantly to GDP per capita. Other regions of Africa should carry out a similar study to ascertain the similarities in the regions.

6. CONCLUSION

Maternal mortality Rate (MMR) and GDPPC (proxied for economic development) using panel data of eleven selected countries in Sub Saharan Africa from 1990 to 2018 was studied. In empirical analysis, MMR associated negatively with GDP. A one percentage rise of MMR will reduce GDP by approximately 61. This suggests that Sub Saharan Africa to attain some level of development must invest massively in maternal mortality reducing interventions like investment in health care facilities, improved health insurance schemes for women, improvement in human capital development for skilled birth attendants and women education etc. The scourge of maternal mortality should be reduced to barest minimum for Sub Saharan Africa to align herself first on the part of development before such development can be sustained.

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ORCID

Christopher Emmanuel Nwankwo  <https://orcid.org/0000-0002-9738-2759>

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