



EFFECT OF HEALTHCARE AND DELIVERY SERVICES ON LIFE EXPECTANCY AT BIRTH IN NASARAWA STATE, NIGERIA

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ABSTRACT *The objective of this study is to investigate the effect of healthcare and delivery Services on life expectancy at birth in Nasarawa State. Casual research design was adopted and a sample size of 399 was arrived at from a population of 445108; and these samples made up the number of questionnaires that were distributed; while structural equation modelling technique was used for analysing the data gathered through structured questionnaire. The empirical analysis showed that healthcare and delivery Services also have no significant effect on life expectancy at birth in Nasarawa State; and it was also revealed from the study that healthcare and delivery Services have no significant effect on maternal mortality rates in the State. These were attributed to lack of basic healthcare facilities in the Nasarawa State, lack of health personnel, equipment, medical supplies and pharmaceuticals needed for effective service delivery towards improving maternal mortality rates. Based on these findings, the study recommends that Efficient health care and service delivery health policies that increase Nigeria's life expectancy must be prioritized by both state governments and households; and lastly, The government should promote the formation of village/ward health development committees, whose duties include assisting the government in the construction of health posts, the maintenance of existing health facilities, the provision of logistics during health campaigns, and the monitoring of health workers' activities at health facilities..*

KEYWORDS : *life expectancy at birth, maternal mortality rates, health output.*

Introduction

The population of Nigeria, with an estimated growth rate of 2.60 per cent, is projected to be over 200million people (National Population Commission, 2018). It is therefore evident that the nation's demand for healthcare is large, young and increasing due to a large, growing and ageing population. The health indicators in North central Nigeria have remained below country targets and internationally set benchmarks including the Millennium Development Goals, which have recorded very slow progress over the years.

UNICEF (2017). Nigeria's females and males life expectancy are 53.1 and 52.42 years respectively in 2018; and are lower than those of Ghana, South Africa and Egypt in same year which were 67 and 65 years for female and male respectively. Life expectancy position of the country also lies below the sub-Saharan Africa regional values of 59.9 and 57.2 years for females and males respectively. In 2018, the infant mortality rate in Nigeria stood at 69.4 which is higher than those of Ghana (42.8), South Africa (33.6), Egypt (20.3) and even in the sub-Saharan Africa (56.3). Nigeria ranks among the countries with the highest child and maternal mortality rates globally: the under-five mortality rate is 201 per 1,000 live births, maternal mortality ratio is estimated at 800 per 100,000 live births (UNICEF, 2017).

These health outcomes have remained poor even though Nigeria has one of the largest stocks of human resources for health in Africa comparable only to Egypt and South Africa. There are about 39,210 doctors and 124,629 nurses registered in the country, which translates into about 30 doctors and 100 nurses per 100,000 population (UNICEF,

2017). This compares to a Sub-Saharan African average of 15 doctors and 72 nurses per 100,000 populations (WHO, 2018). While the number of healthcare professionals in the country represents a cause to be joyful, the current exodus of qualified doctors and healthcare workers coupled with the inadequacy and obsolescence of health infrastructure presents a worrying trend.

Health outcome indicators of infant mortality rate (IMR) for Nasarawa State Nigeria is estimated to be in the region of 140 per 1,000 live births. Under-five mortality rate (U-5M R) is over 200/1,000 live births. According to UNICEF (2017) Nasarawa State have a maternal mortality rate/ratio between 1,500 - 2,000 per 100,000 live births, and appears to be the highest when compared to South-South Zone of the country which has 4,500 - 7,000 per 100,000 live births despite the health policy framework such as National Strategic Health Development Plan of 2009, National Health Financing Policy, 2006, Revised National Health Policy, 2004 and other programmes that were aimed at achieving health for all Nigerians. Since healthcare services and delivery are limited, they are not likely to be efficiently accessible and affordable by the poor. These are the problems the study seeks to investigate and to find out why. Hence, in general, considering the relatively poor health outcomes in Nigeria, it is very necessary to critically investigate empirically the healthcare services and delivery on health outcomes in Nasarawa State in particular. To unearth this, the study posed the following research questions:

- i. What influence does healthcare and delivery services have on life expectancy at birth in Nasarawa State, Nigeria?
- ii. What effect does healthcare and delivery services have on maternal mortality rates in Nasarawa State, Nigeria?

Based on the research questions raised, the following hypothesis are posed to validate the data for the analysis of the findings of this study.

H₀₃: Healthcare and delivery Services has no significant effect on life expectancy at birth in Nasarawa State Nigeria

H₀₄: Healthcare and delivery Services has no significant effect on maternal mortality rates in Nasarawa State Nigeria

Conceptual Clarification

Healthcare System

The organized provision of health care services constitutes the health care system. According to the World Health Report (2018), a health care system is defined as comprising all organisations, institutions and resources that are devoted to producing health actions. The health system provides an organised manner for providing healthcare services or health actions. A health action is defined as any effort, whether in personal health care, public health services or through intersectoral initiatives focuses primarily at promoting, restoring or maintaining health.

According to Michael and Rifat (2018), a good health system delivers quality services to all people, when and where they need them. The exact configuration of services varies from country to country, but in all cases requires a robust financing mechanism; a well-trained and adequately paid workforce; reliable information on which to base decisions and policies; well-maintained facilities and logistics to deliver quality medicines and technologies. Therefore, the health care system can be described as production entities consisting of components or subdivisions oriented towards improvement of the health status of the populace. On this level, health facilities and services such as hospitals and primary care are considered as parts of the input domain in the health care system. There are, however, components with health enhancing benefits which are primarily not intended to influence overall level of health within the society. For example, prohibition of smoking in public places, regulations and actions aimed at the safety or health of individuals, among others, constitute such health promotion actions. The implication of the foregoing is the need to define the boundary of the health system as a production entity. Murray and Frank (2019) suggested that health systems boundary definitions are arbitrary, therefore, to undertake an assessment of health system performance, an operational definition of the care system must be proposed. Factors that are outside the defined boundary of the care system are regarded as non-health determinants.

Therefore, within the purview of production theory, resources that lie within the boundaries are health care resources and regulations, and policies guiding the acquisition, deployment and usage of these resources. That is, the systems inputs which are used to provide health care services in order to improve the health status

of the population. Health actions of the care system produces outputs which are expected to produce a change in the population health status. The initial and actual health status of the populace and the health care system are influenced by factors outside the boundaries, that is, the non-health determinants. These non-health determinants might be more important for the health status of the whole population.

The Nigeria Health System (NHS) is fashioned after the three tiers of government. It is in principle decentralized into a three-tier structure with responsibilities at the federal (national), state and local government levels. At the national level is the Federal Ministry of Health (FMOH) which provides oversight for the three tiers of the national health delivery system in general, though with specific control over departments and agencies under it. The Federal Ministry of Health is responsible for policy and technical support to the overall health system, international relations on health matters, national health management information system and the provision of health services through the tertiary and teaching hospitals and national laboratories (Federal Ministry of Health, 2013). At the State level is the State Ministries of Health (SMOH) which are responsible for secondary healthcare provisioning. They are responsible for the secondary hospitals and for the regulation and technical support for primary healthcare services. The third tier is the Local Government which provides primary healthcare services through local clinics and dispensaries.

Eneji, Juliana and Onabe (2013) contend that it is primary healthcare that suffers the most neglect as women and children, especially the poor, die from avoidable health problems such as infectious diseases, malnutrition, and complications at pregnancy and childbirth. However, while there seem good organization of the health sector, corruption and bad governance has marred performance over the years with attendant consequences on the weak and poor of the society.

Theoretical Framework

Grossman's Health Production Function

The Grossman model was propounded by Michael Grossman in 1972 and regards health as inherited good which deteriorates over time. That investment in health is a process in which medical care is combined with other relevant factors to produce new health, which in part, offsets the process of deterioration in health stock. Grossman's model stated that individuals maximize their utility subject to the household income and production technology (technology here refers to health inputs). Health is endogenous and that individuals choose the optimal amount of it that they need so as to produce 'healthy days'. That is, health status is governed by health investment and consumption activities of individuals (Mwabu, 2008).

The model specified investment in health as a function of medical care and time spent investing in health. Berger and Messer (2002) explained in their work that Grossman pointed out that other goods aside medical care could also be in the production function. Simply put, the model linked health inputs of an individual to his health status. The theory is criticised on the ground that it clearly showed that death occurs when the accumulated stock of health falls below a certain level. It also stated that individuals aimed at maximising number of healthy days,

or choose the optimal number of healthy days, rather than the length of life itself. There is a difference between length of life or longevity and healthy days such that the number of healthy days can be zero for an individual yet the individual is not death that is, an individual can live for a long time in sickness. Simply put, the weakness of this theory is found in the fact that individuals with good health status could die, while unhealthy individuals could live long.

Empirical Literature

Huo, Ho, Ko, Lam, Tactay, Maclachlan and Raanaas (2019) focused on obstacles to access healthcare delivery by people in the Circumpolar North region. The study adopted descriptive survey and exploratory design. Regression models were used in the analysis. Documented data were used as the main data collection. The gathered data was then analysed using descriptive statistics and inferential data analysis methods. From a selected 43 articles published between 2005 and 2016, the study identified the barriers to include: impact of physical geography, health care providers' related barriers, culture, education, systemic factors impact and language.

In a related study for America, Bhatt and Bathija (2018) studied access to quality healthcare in vulnerable communities note that hospitals are important and sometimes the only source of healthcare to these people. Thus, where there are transformations in the hospitals and healthcare fields, communities risk foregoing access to healthcare services and chances to improve healthcare. They highlighted some strategies hospitals should maintain which include: handling social factor that determine health; using current and innovative virtual care strategies; plan universal budgets; and use the inpatient/outpatient.

Fayissa and Gutema (2018) focused on estimating a health production function relevant to Sub Saharan Africa. Data was collected in the form of survey questionnaire. This research study adopted the seven-point Likert scale (as being interval-level measurement) as the measured scale in the survey questionnaire. The exploratory approach was used here to provide further input into the identification of items and latent variables. The study adopted Grossman (1972) theoretical model where social, economic and environmental factors are treated as inputs of the production system. To estimate their function, state of health was expressed as life expectancy at birth and this was determined by socio economic and environmental factors including per capita income, illiteracy rate, and ratio of health expenditure to GDP. The function's parameters estimated using a method of one-way and two-way random effect model suggested that increased per capita income, reduced rate of illiteracy and sufficient food supply are favorable to improved life expectancy at birth. The final results showed that health policy directed at health services provision, programs favoring family planning and emergency aids that exclude other socio-economic parts may work against efforts directed at improving the current health status of the region.

Ephraim-Emmanuel, Adigwe, oyegehe & ogaji (2018) study provided an insight into the quality of healthcare delivery in Nigeria with the aim of determining quality of healthcare in the country. The study extracted information

from articles and provided both analytical and descriptive discourse on the issue at hand. The study found that quality of systems of healthcare service delivery and health status of the population is poor. They reported an unsatisfactory pace of developing quality systems in healthcare delivery in the country.

In another study Welcome (2011) reviewed the state of healthcare system in the country using databases for literature search. It was also concluded that the Nigerian healthcare system is weakly developed without effective supervision systems. These pathetic situations are not without causes showed that substantial barriers exist against improved access to adequate healthcare and such barriers need to be eliminated.

The World Bank (2010) carried out a study on the performance of primary healthcare providers using quantitative surveys at the level of healthcare facilities, healthcare personnel, and households in Nigerian States. The study adopted a descriptive survey design and targeted senior management employees of the selected organizations as the study respondents. Study data was collected using interviewer-administered questionnaires and analyzed using both descriptive and inferential statistics. The study's results show that healthcare facilities have decaying infrastructure, don't offer basic services, lacks health personnel, equipment, medical supplies and pharmaceuticals needed for effective service delivery.

Further in the Southern African axis, Masiye, Kirigia, Emouzejad, Sanibo, Mounkaila, Chiiwfwembe & Okello (2016) used data envelopment analysis to estimate the degree of technical, allocative and cost efficiency in private and public health centres in Zambia. The authors' interest was to research the efficient management of human resources in the health centres in Zambia. And, of the few studies in Africa, this work appeared to be the only one that included private-owned facilities in the sample studied. The study found private facilities to be more efficient than the public facilities. Indeed, about 88 percent of these facilities were found to be both cost and allocatively efficient; 83 percent of the 40 health centres in the study were technically efficient.

Research evidence exists of healthservice delivery study in Botswana. Thekke, et al (2013) presented relative efficiency indices for the services rendered by health districts and specific hospitals in Botswana. The study which covered 22 health districts and gathered data on 13 hospitals combined stochastic frontiers analysis and data envelopment analysis in analysing the efficiencies of the facilities studied. Indeed, this study stands out as the only one to have used the two methodologies, even though data envelopment analysis was considered superior. Result of the analysis indicated that three districts have efficiency score of less than one, that is, inefficient. Trends in these reviewed studies are that most of the studies were conducted by researchers outside the academics and/or are based outside the shore of Africa with few members of the research team being African based.

Methodology

Nasarawa State - Home of Solid Minerals

Nasarawa State was created in 1996 with its capital as Lafia and has an estimated population of 1.5 million people based on 2006 Population Census. The state shares boundaries with Kaduna, Benue, Plateau, Taraba, the Federal Capital Territory and Kogi State. Nasarawa also has 13 Local Government Areas and the various ethnic groups within the state include: Alago, Aho, Ake, Agatu,

Bassa, Eggon, Gwandara, Hausa and Kanuri, amongst others. Some important cities and towns include Lafia, Akwanga, Keffi, Karu, Wamba, NassarawaEggon, Doma, Nasarawa, etc.

The main policy thrust of the Administration revolves around its agenda, with health care delivery as a major component. (www.nasarawastate.com, 2015).

Fig 1: Map of Nasarawa State



Research Design: The research design adopted for this paper is the *causal comparative* research design. The *causal comparative* research design was used to determine cause-effect relationship between the dependent and independent variables with a view to establishing a causal link between them; and also tests the hypotheses concerning cause-and-effect relationships. Questionnaire was administered to raise data meant for tabulation and while results are analyzed to establish the effect of healthcare services and delivery system on health output in Nasarawa state.

Population and sample Techniques: The population of the study covers purposively selected three (3) Senatorial Zones of the State, this include the Nasarawa South, Nasarawa North and Nasarawa West. The researcher used convenient sampling to pick the 3 Senatorial Zones. Smith (1984). The stratum is made up of three (3) Senatorial Zones in Nasarawa State and they are; Nasarawa South, Nasarawa North and Nasarawa West. The strata are formed based on members' staffs that shared different attributes or characteristics. A sample from each stratum is taken in a number that is proportional to the stratum's size when compared to the population. These subsets of the strata are then pooled to form the sample size. The above reasons formed the basis for the use of stratified sampling for this study.

Table 1: Population of Selected Zones in Nasarawa State

Source: National Population Commission, 2018

Smith (1984) sample technique was used to estimate a sample size out of the study population. The Smith (1984) formula is given by:

S/N	Selected Zones in Nasarawa State	Population
1	Nasarawa South(Lafia)	240656
2	Nasarawa North(Akwanga)	111902
3	Nasarawa West(Keffi)	92550
	Total	445108

$$n = \frac{N}{3 + Ne^2}$$

Where:

- N = Population size
- 3 = Constant
- e = Margin of error (5%)

$$n = \frac{N}{3 + Ne^2}$$

Substituting into the formula we have:

$$n = \frac{445108}{3 + 445108(0.05)^2}$$

$$n = \frac{445108}{3 + 445108(0.0025)}$$

$$n = \frac{445108}{1115.77}$$

$$n = 399$$

Method of Data Collection: Questionnaire was used as the instrument for data collection and most of the questions were defined in simple format to arouse respondent interest to read carefully and answer each question to ensure easy completion. They indicate, 5= Strongly agreed = 4 = agreed = 3 = undecided = 2 = disagreed = 1 = strongly disagreed in a 5-point Likert type scale

Theoretically, guided by health production function and health benefit theory, the study is modelled around the study of Ogunbekun, Ogunbekun and Owobaton (2018).

$$LEB_{1-5} = \phi_0 + \left(\sum_{i=1}^i \phi_1 HCS \right) + \left(\sum_{i=1}^i \phi_2 HCD \right) \text{-----} (2)$$

$$LEB_{1-5} = \phi_0 + \left(\sum_{i=1}^i \phi_1 AHF + \sum_{i=1}^i \phi_2 HFP + \sum_{i=1}^i \phi_3 QHS \right) + \left(\sum_{i=1}^i \phi_4 AA + \sum_{i=1}^i \phi_5 DHF + \sum_{i=1}^i \phi_6 SP \right) + v_t \text{-----} (3)$$

The *a priori* expectations of the parameters to be estimated are as expressed below:

$$\phi_1 < 0; \phi_2 < 0; \phi_3 < 0; \phi_4 < 0; \phi_5 < 0; \phi_6 < 0$$

That is, the access to health facility, health facility patronage and quality of health services co-efficients are expected to be positive. These imply that a decrease in health care services (access to health facility, health facility patronage, quality of health services) and health care delivery (Adequacy and availability, distance to health, service productivity) will all things being equal, lead to a corresponding decrease in infant mortality rates. An increase in the value of the variables above will lead to an increase in life expectancy at birth, all things being equal.

The study thus presents the health outcomes model in a structural equation model as:

$$LEB = f(HCS, HCD) \text{-----} (1)$$

Where: HCS is the Healthcare Services represented by Access to health facility, Health facility patronage, and Quality of Health Services

While, HCD is the health care delivery represented by Adequacy and availability, Distance to health facility and Service productivity.

The explicit model is given as:

Lastly, with respect to the relationship between healthcare delivery services and maternal mortality rates, the implicit model is given as:

$$MMR = f(HCS, HCD) \text{-----} (4)$$

Where: HCS is the Healthcare Services represented by Access to health facility, Health facility patronage, and Quality of Health Services

While, HCD is the health care delivery represented by Adequacy and availability, Distance to health facility and Service productivity.

The explicit model is given as:

$$MMR_{1-5} = \lambda_0 + \left(\sum_{i=1}^i \lambda_1 HCS \right) + \left(\sum_{i=1}^i \lambda_2 HCD \right) \text{-----} (5)$$

$$MMR_{1-5} = \lambda_0 + \left(\sum_{i=1}^i \lambda_1 AHF + \sum_{i=1}^i \lambda_2 HFP + \sum_{i=1}^i \lambda_3 QHS \right) + \left(\sum_{i=1}^i \lambda_4 AA + \sum_{i=1}^i \lambda_5 DHF + \sum_{i=1}^i \lambda_6 SP \right) + \xi_t \text{-----} (6)$$

The *a priori* expectations of the parameters to be estimated are as expressed below

Where:

QHS	=	Quality of Health Services
HFP	=	Health facility patronage
AHF	=	Access to health facility
SP	=	Service productivity
AA	=	Adequacy and availability
DHF	=	Distance to health facility
LEB	=	Life Expectancy at Birth
MMR	=	Maternal Mortality Rates

Results and Discussion

Table 2: Life Expectancy at Birth Structural Path Model Result

<i>SEM Regression Output</i>				
Dependent Variable: Life Expectancy at Birth				
Path	Path Coefficients			
Model	Beta	Std error	t-value	p-value
(Constant)	0.266	0.157	1.691	0.996
Healthcare Service -> LEB	0.255	0.135	1.885	0.220
Healthcare Delivery -> LEB	0.276	0.143	1.922	0.124
<i>Summary Outputs</i>				
R-Square	0.514	Wald:	F-value	3.288
Adjusted R-Square	0.501		p-value	0.098
Durbin-Watson (DW)	1.688			

Source: Authors Computation, 2021 (Smart-PLS-3)

The path coefficient value of 0.255 for healthcare services, showed that a unit increase in Healthcare Service, on the average, increases life expectancy at birth by 0.255. More so, the path coefficient value of health care delivery showed that a unit increase in health care delivery, on the average, leads to 0.276 increase in life expectancy at birth all things being equal.

The coefficient of determination (R-square), which was used to measure the goodness of fit of the estimated model, indicates that the model is reasonably fit in prediction. It showed that 81.39 percent changes in life expectancy at birth were collectively due to Healthcare and delivery Services while 18.61 percent unaccounted variations were captured by the error term.

The model also indicated that there was no autocorrelation among the variables as indicated by Durbin Watson (DW)

statistic of 1.688. This showed that the estimates were unbiased and can be relied upon also for policy decisions. **H₀₁:** Healthcare and delivery Services has no significant effect on life expectancy at birth in Nasarawa State. The Wald-test in Table 3, indicated that the calculated F-statistic value for the relationship between Healthcare /delivery Services and life expectancy at birth in Nasarawa State was found to be 3.288 and its probability value was 0.098. Since the probability value is greater than 0.05 or 5percent level of significance (and fell in the acceptance region), the third null hypothesis (**H₀₁**) was accepted. The study concludes that healthcare and delivery services also have no significant effect on life expectancy at birth in Nasarawa State.

Table 4: Maternal Mortality Rates Structural Path Model Result

<i>SEM Regression Output</i>				
Dependent Variable: Maternal Mortality Rate				
Path	Path Coefficients			
Model	Beta	Std error	t-value	p-value
(Constant)	0.586	0.276	2.122	0.036
Healthcare Service -> MMR	-0.093	0.052	-1.788	0.572
Healthcare Delivery-> MMR	0.072	0.042	1.729	0.660
<i>Summary Outputs</i>				
R-Square	0.663	Wald:	F-value	2.892
Adjusted R-Square	0.547		p-value	0.233
Durbin-Watson (DW)	1.723			

Source: Authors Computation, 2021 (Smart-PLS-3)

The path coefficient value of healthcare service was found to be -0.093, which shows that a unit increase in healthcare service, on the average, leads to 0.093 decrease in maternal mortality rate all things being equal. However,

the path coefficient value of healthcare delivery which was to be found 0.072, showed that a unit increase in healthcare delivery, on the average, leads to 0.072 increase in maternal mortality rate.

The coefficient of determination (R-square), which was used to measure the goodness of fit of the estimated

model, indicates that the model is also reasonably fit in prediction. The (R-square) value of 0.663 showed that Healthcare and delivery Services has a good fit on Maternal Mortality Rates. It indicated that about 66.3 per cent of the variation in Maternal Mortality Rates was explained by Healthcare and delivery Services, while the remaining unaccounted variation of 33.7 percent was captured by the error term.

The model also indicated that there was no autocorrelation among the variables as indicated by Durbin Watson (DW) statistic of 1.723. This showed that the estimates were unbiased and can be relied upon for policy decisions.

H₀₂: Healthcare and delivery Services has no significant effect on maternal mortality rates in Nasarawa State

The Wald-test in Table 4, the indicated that the F-value for the relationship between healthcare /delivery services and maternal mortality rates in Nasarawa State was found to be 2.892 with an associated probability value of 0.233. Since the probability value is greater than 0.05 or 5percent level of significance, the fourth null hypothesis (**H₀₂**) was accepted. The study thus concludes that healthcare and delivery services have no significant effect on maternal mortality rates in Nasarawa State

Policy Implication

Findings from the study showed that healthcare services and delivery also have no significant effect on life expectancy at birth in Nasarawa State. The implication of this findings is that most hospitals located in this region do not regularly provide drugs for age-related diseases so as to enhance the life span of the aged or elderly people. Medical advice is not usually given to older people on certain food to avoid due to their age to enhance their life expectancy; even as basic hygiene and routine habits amongst people has not been able to enable them live longer in advance age. This is in line with the findings of Ephraim-Emmanuel (2018) whose study showed that quality of systems of healthcare service delivery has not significantly impacted life expectancy at birth of rural population is poor. They reported an unsatisfactory pace of developing quality systems in healthcare delivery in the country.

Above all, findings from the study revealed that healthcare services and delivery have no significant effect on maternal mortality rates in Nasarawa State. These insignificant effects are essentially due to the fact that pregnant women are not regularly checked at the hospital using adequate machines to ensure that the position of the baby will not lead to bad delivery; drugs are usually not provided for pregnant women to ensure steady growth of the baby in the womb and health of the mother; and most women on ante-natal in these regions are not adequately well taken care of to ensure timely and safe delivery. This agrees with World Bank (2016) whose report showed that healthcare facilities in several part of Nigeria have decaying infrastructure, don't offer basic services, lacks health personnel, equipment, medical supplies and pharmaceuticals needed for effective service delivery towards improving maternal mortality rates.

Conclusion and Recommendations

The benefits inherent in an effective and efficient health care services and delivery system cannot be overemphasized as it is pertinent to having an improved health status and outcomes in a country.

In order to make the Nigerian health care system a world class that would contribute significantly to the improved health outcomes in general, the following suggestions are put forward:

- i. Efficient health care and service delivery health policies that increase Nigeria's life expectancy must be prioritized by both state governments and households. Health-care programmes and delivery should not be solely focused on health care, neglecting other aspects of health such as prevention. Preventive health measures such as physical activity and eating a healthy diet free of tobacco, alcohol, high fat, processed, and refined foods, among other things, can extend life expectancy.
- ii. The government should promote the formation of village and ward health /development committees, whose duties include assisting the government in the construction of health posts, the maintenance of existing health facilities, the provision of logistics during health campaigns, and the monitoring of health workers' activities at health facilities. This will help to alleviate the problem of high maternal mortality rates in the North Central regions. It would also help to minimize the cost of transportation as well as the time spent waiting or queuing, which discourages many pregnant women from evaluating or using health care and delivery facilities.

References

- Bhatt, J. & Bathija, P. 2018. Ensuring access to quality health in vulnerable communities. *Academic Medicine*, 93(9), 1271-1275, September
- Eisenberg, J 2016. *Doctors Decisions and the Cost of Medical Care*, Ann Arbour: Health Administrations Press
- Ephraim-Emmanuel, B. C., Adigwe, Oyeghe, R. & Ogaji, D. S. T. 2018. Quality of healthcare in Nigeria: A myth or reality. *International Journal of Research in Medical Sciences*, 6(9): 2575-2881
- Ersoy, K.; Kuvuncubasi, S; Ozcan, Y & Harris, J.M 2017. Technical Efficiencies of Turkish Hospitals: Data Envelopment Analysis approach. *Journal of Medical System*, 21, 61-75
- Fayissa, B. & Gutema, P. 2008. A health production function for Sub Saharan Africa (SSA). Department of Economics and Finance. *Working Paper Series*, August
- Federal Ministry of Health 2013 Health Sector Reform: Medium Term Plan of Action 2010-2012.
- Fetter, R.B. 2017. *Diagnosis Related Groups: Their Design and Development*, Michigan: Health Administration Press
- Grossman, M. 1972. On the concept of health capital and the demand for health. *Journal of Political Economy*, 80(3), 223 – 255.
- HNR 2017. National Human Resources for Health Strategic Plan (2008 - 2016)
- Huot, S., Ho, H., Ko, A., Lam, S., Tactay, P., Maclachlan, J. & Raanaas, R. K. (2019). Identifying barriers to healthcare delivery and access in the circumpolar North: Important insights for health

- professionals. *International Journal of Circumpolar Health*, 78(1), 157-385
- Jacob, R 2018. Alternative Methods to Examine Hospital Efficiency: DEA and Stochastic Frontier Analysis, *Health Care Management Science*, 4, 103-115
- Manhiem, L.M, Feinglass, J, Shortell, S.M & Hughes, E.F 2017. Regional Variations in Medicare Hospital Mortality, *Inquiry*, 29(1), 55-65
- Masiye,F.,Kirigia J.M.,Emouznejad A., Sanibo, G.L., Mounkaila A., Chiwfwembe, D.,&Okello, D. 2016 Efficient Management of Health Centres Human Resources In Zambia. *Journal of Medical System*, 3(6), 473-481
- Masiye, F. 2017. Investigating Health System Performance: An Application of DEA to Zambia Hospitals. *BMC Health Services Research*, 7(58).
- Michael, B. &Rifat, A., 2018. The unfinished journey from Semashko to Bismarck: health reform in Central Asia from 1991 to 2016. *Central Asian Survey*, 25(4), 419-440.
- Murray, C J. L. & Frank, J. 2019. A WHO Framework for Health System Performance Assessment. *Global Programme on Evidence for Health Policy Decisions*, 6, Geneva: WHO.
- Mwabu, G. 2008. *Handbook of development economics*. 4(7), 53.
- Ozcan Y.A and Luke, D 2013. A National Study of the Efficiency of Hospitals in Urban Markets. *Health Services Research* 27(6), 45-77.
- Rosko.M and Chilingerian, J 2019. Estimating Hospital Inefficiency: Does Casemix Matter? *Journal of Medical System*, 23:57-71
- Thakke, V.R; Chandra, K.S &Thupeng, W.M 2013 A Comparison of the Technical Efficiencies of Health Districts and Hospitals in Botswana. *Development Southern Africa* 20(2), 307-320
- UNICEF 2017. *Rising to the Challenge: The Millennium Development Goals for Health*. Washington, D.C.: World Bank
- Welcome, M. O. 2011. The Nigerian healthcare system: Need for integrating adequate medical intelligence and surveillance systems. *Journal of Pharmacy and Bioallied Sciences*, 3(4),470-478
- World Bank 2010. Improving healthcare delivery in Nigeria: Evidence from four States. *Working Paper*, 187. Washington DC: World Bank
- World Bank 2014. *Better Health in Africa: Experiences and Lessons Learned*, The World bank: Washington D.C
- World Bank Development Indicators 2018. Doctors and Nurses Per 100,000 Populations. Washington D.C.: World Bank
- World Health 2018. Why do Health System Matter? *World Health Organisation*