The Analysis of Inequality in Utilization of Child Healthcare Services and Demographic Factors in Nigeria

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A b s t r a c t

High prevalence of inequality in utilizing child healthcare services has contributed in child mortality rate among under-five children globally. Though majority of these children are found in less developed economies such as Nigeria where poverty, income inequalities and diseases are widespread. This study examines the inequality in utilization of child health care services in Nigeria using the Nigeria Demographic Health Survey NDHS, 2013 data. The main objective of this study is to ascertain the demographic factors that determine child health care utilization in Nigeria. The methodology employed in this study include: Logit model, to estimate the marginal effects on the probability of utilization of child healthcare services. Also, the techniques of Field's (2003) approach to regression Base (RB) decomposition of inequality, were used to examine the difference in prevalence of child healthcare services between rural/urban dwellers and across male/female gender in Nigeria. "Utilization as dependent Variable" is proxy for modern healthcare facilities which takes the value 1or 0 otherwise. From our first objective, the empirical analysis reveals that there is a significant relationship between utilization of child healthcare service (Modern health facilities) and educational level of the mother of the child (0.0513702); similarly occupation of the parents of the child indicates a significant relationship with utilization (0.0000445), the reason is that as household move from labour-induced manual jobs to white-collar jobs they would be more likely to patronize improved child health healthcare services. This reflected the premise that children whose parents are menial workers may be more endangered than those whose parents are white-collar employed, thus the former having less health attention than the latter. In addition, it was found that the south west region (-0.0187363) of Nigeria has the least likelihood that households would not utilize modern child healthcare services while the North West (-0.1256421) is most likely not to utilize same. The recommendation that arouse is that more awareness should be made about child healthcare utilization. This would cover the gap between those who are more educated and those who are not since educational attainment is also a factor which reveals inequality in child healthcare consumption. Households should be encouraged on family planning so as to enable them have an optimal household size. Health insurance should be encouraged as a cooperative This would afford households whose forerunners are not formally employed enjoy improved healthcare services.

Keywords: *Healthcare utilization, Inequality and Child health*

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Background of the study

High prevalence of inequality in utilizing child healthcare services has contributed in child mortality rate among under-five children globally. Though majority of these children are found in less developed economies such as Nigeria where poverty, income inequalities and diseases are widespread. Previous studies have shown that utilization of child healthcare services among low- and middle-income countries are very poor, this can be as a result of unequal distribution of the health services across different subgroups of the population (Heaton, 1996). As shown by Janeiro (2007) many people in the developing world don't get effective health care which can be as a result of insufficient funds, distance or many other factors that can cause it. The poor level and distribution of healthcare services in the developing world demands that proper measures be taken to redress both facts.

Children from low income households have higher mortality rates and lower coverage of health services than children from more affluent households. These low income families suffer from high risk of poor health, stress, substance abuse, mental health problems and poor school performance as well as related early pregnancy, criminal activity and unemployment which then leads to a repeated cycle of poverty and poor health for the next generation (Zwi, 2010).However, coverage of health service in Nigeria and among other African countries remains the lowest as seen in skilled birth attendance where Nigeria has the lowest coverage of all the countries included in the African Health Observatory (World Health Organization, 2000). Report from Nigeria Demographic Health Survey (NDHS, 2003) shows that the utilization of essential child health services and child health outcomes among the population is very poor.

According to Smith and Ruel (2005) describes a huge regional difference in coverage of child healthcare services and that these services are more likely to be used by mothers that have formal education, those leaving in urban areas and the richer parts of the population. Fotso (2005) now added that child health is linked to socioeconomic conditions which include household income, maternal education, paternal education, household size, household structure employment and indicators of standard of living. The influence of these factors will also determine whether family members are able to maintain standard of cleanliness, access goods and services and have food security. Government has been doing its best to invest in the health sector both in the past and recent years but analysis suggest that public spending in health and education benefit the rich inappropriately (Adedini , Odimegwu, Bamiwuye, Fadeyibi and Nicole, 2014) . The aim of health system is to reduce inequality in access and utilization of healthcare services across socioeconomic groups and areas of residency. However, in low income countries studies are lacking that systematically monitor and evaluate health programs with regards to their effect on specific inequality.

This study goes beyond that and aimed at finding out whether children can potentially benefit from effective healthcare. The objective of the health system should be elevated by examining the rate of utilization of effective healthcare among the population of the children that needs the healthcare which can be seen as effective coverage. This paper is therefore set out to focus on the major factors that help in creating unequal distribution in child healthcare services in Nigeria.

Statement of the Research Problems

Study by Diaro (2014) shows that health indicators are very poor most especially among children living in the rural areas where poverty is very high. Though utilization of modern healthcare can be closely related to child survival, yet a number of barriers prevent many children from utilizing healthcare. Generally, lots of reasons/factors have been responsible for this limited utilization of child healthcare in Nigeria. Study done by Ayogu (1999) reveals that about 200,000 Nigerian children die every year from diarrhea related illness while about 65000 people are affected by guinea worm. This problem is as a result of inadequate medical personnel in Nigeria. A lot of efforts have been put in place to see that there is a high utilization of healthcare services as a motive towards eradicating childhood mortality. As a result, this study will differ from the previous studies as it aims at considering the possible effect of utilizing child healthcare services by using Demographic Health Survey data (2013) for the analysis which covers a wide range of demographic variables and utilization variables involving the six geopolitical zones of the country.

Research Objectives of the Study

This study has its broad objective as: To analyze the inequality in utilization of child health care services in Nigeria. Sequel to that, the author looked at the following specific objectives:

   (I) To ascertain the demographic factors that determines child health care utilization in Nigeria.
   (ii) To analyze inequality in child healthcare service in Nigeria on the basis of geopolitical zone, gender of household head and educational attainment.

Research Questions

This research paper seeks to address the following questions.

   (i) What are the demographic factors that determine child health care utilization in Nigeria?
   (ii) How can inequality in child health care services in Nigeria be analyzed on the basis of geopolitical zone, gender of household head and educational attainment?

Research Hypotheses

Following the research objectives and their underlying questions, the following assumptions shall be tested.

Hoi: The demographic factors do not impact on child healthcare utilization in Nigeria.

Hoii: Geopolitical zone, gender of household head and educational attainment do not contribute to inequality in utilizing child healthcare services in Nigeria.

Theoretical Literature

Theories of health Theory of Planned behavior: The theory started in 1980 as theory of reasoned action which predicts an individual's intention to engage in behavior at a specific time and place. The theory states that behavioral achievement depends on both motivation and ability. It consists of six contracts that collectively represent a person's actual control over the behavior. It comprises of attitudes which refers to the degree to which a person has a favorable or unfavorable evaluation of the behavior of interest the aim of the theory was to

explain all behaviors over which people have the ability to exercise self-control. The main component of this theory is behavioral intent. Behavioral intentions are influenced by the attitude about the likelihood that the behavior will have the expected outcomes and the subjective evaluation of the risks and benefits of that outcome. The theory has been very useful in predicting and explaining a wide range of health behaviors and intentions including smoking, drinking, health services utilization and substance use. Therefore, the theory of planned behavior has a relationship with the environment of child which determines how mothers make the decision on how to take care of their child especially on health issues. Furthermore, the behavior of the parents when they are making the decision about the child affects the child's nutrition e.g. decision to embark on exclusive breastfeeding, healthcare services and over all development of the child. Educational background of the parents is also very important in child's health which will help in their behaviour when they are taking decisions that concerns their children. Parent's behaviour determines the accessibility and utilization of healthcare services in one way or the other.

Theory of Fundamental causes of Health Inequality Link and Phelan (1995): This theory was developed to show the link between socioeconomic status and mortality has persisted despite radial changes in the disease and risk factors that are presumed to explain it. They proposed that the enduring association results because socioeconomic status embodies an array of resources, such as money, knowledge, prestige, power and beneficial social connections that protect health no matter what mechanisms are important at any given time. The fact is that poor and less privilege members live in worse health and die much younger than the rich and more privileged once. Socioeconomic inequalities in health and mortality are very large, very robust and very well documented.

Theory of Health Capital and the Demand for Health
The model views health as a durable capital stock that yields an output of healthy time. Individuals inherit an initial amount of this stock that depreciates with age and can be increased by investment. The household production function model of consumer behavior is employed to account for the gap between health as an output and medical care as one of many inputs into its production. In this framework, the shadow price of health depends on many variables besides the price of medical care. It is shown that the shadow price rises with age if the rate of depreciation on the stock of health rises over the life cycle and falls with education if more educated people are more efficient producers of health. Under certain condition, an increase in the shadow price may simultaneously reduce the quantity of health demanded and increase the quantities of health input demanded. Grossman said that individuals invest in themselves through education, training and health and the ultimate goal for this investment is to increase earnings.

Empirical Review
Many empirical studies have been carried out across the world on demographic factors determining the utilization of child healthcare services, among these studies are; Curie and stabile (2003) in their review found a vast literature documenting the relationship between socioeconomic station and health and emphasized that it has been difficult to determine

whether any relationship exists, primarily because health affects socioeconomic status, whether socioeconomic status has a direct impact on health, or whether both are affected by some third factor such as rate of time preferences. They substantiated their argument by citing works done by Deaton and Paxson (1999) they emphasized the difficulty of inferring a causal relationship from aggregate cross-country or cross- state data, which was done in many previous studies. Also, study done by Harvey (2014) examined the link between socio-economic and cultural determinants of healthcare service utilization in Ghana, using Ghana Demographic and Health Survey 2008 data collected by Ghana Statistical Service (GSS). The study adopted a two-stage sample design and a binary logistic regression model which was used with healthcare utilization on the dependent variable. The socio-economic and cultural factors that determine healthcare service utilization were identified based on (Andersen, 1968).

The result shows that age, sex, social status, marital status, education, ethnicity, religion, family size, employment and type of occupation were statistically significant in determining healthcare service utilization in Ghana. Based on the findings, the study thus recommends that there should be plans to address the unemployment problem in Ghana. This will help to improve people's social status and then improve their healthcare utilization. The importance of the reviewed study is that those socioeconomic factors mentioned can be used as socioeconomic determinants of healthcare services in the present study, even though the reviewed study was conducted in Ghana while the present study will be conducted in Nigeria. The study did not consider utilization of child's healthcare service but the present study will examine utilization of child's healthcare service.

Kuate-defo and Diallo (2002) carried out a study on healthcare and mortality in Nigeria. They discovered that healthcare explains most of the relationship between education and mortality by stressing that education facilitates access to healthcare. They suggested that access to trained health professionals will help in reducing socioeconomic differences in utilizing child healthcare. Following this, Human and Oren Stein (2011) said that "Vaccinations have greatly reduced child mortality and mobility worldwide which have led to the eradication of smallpox and a substantial reduction in polio and measles". They suggested that expanding vaccine delivery further many results in the prevention of 6.4 million child deaths between the year 2011 and 2020. The reviewed study focuses on the importance of vaccination in reducing child health disability and inequalities which is also very useful in the present study.

Limitation of Previous Studies and Value Added
Most studies in these work fails to examine other factors like, sectors, gender, nutrition, antenatal care, prenatal care, post-natal care, neonatal, education and child mortality as recommended by the (WHO, 2006). Most importantly, Majority of the reviewed studies were carried out outside Nigeria which is a knowledgeable gap.

Research Methodology
Theoretical Frameworks
According to Grossman health capital differs from other forms of human, and also concluded that a person's stock of knowledge affects his market and nonmarket productivity, and while

his total number of times he can spend producing money earnings and commodities is determined by his stock of health. The basic law in economics is the law of the down-ward-sloping demand curve, the quantity of health demanded should be negatively correlated with its shadow price. The Intertemporal utility function of a typical consumer be:

$$U = (\, Ho,....., \ nHn, Zo,......, Zn)..$$

Where Ho is the inherited stock of health, Hi is the stock of health in the ith time period, ϕi is the services flow per unit stock, $h = \dfrac{\phi i}{i}$ is total consumption of "health services," and Zi is the total consumption of another. This project will be guided by the work of Link and Phelan (1995), they explain the reason why the association between socioeconomic status (SES) and mortality has persisted despite radical changes in the diseases and risk factors that are presumed to explain it.

The model under this framework is adapted from the work of David Cox (1958), logit regression model can be used to estimate the probability of a binary response based on one or more independent variables. The dependent variable of the logit model is categorical (0, 1). The model measures the relationship between a categorical (0, 1) dependent variable and independent variable by estimating the probabilities using its cumulative distribution function. (Cameron and Trivedi 1992). The logit cumulative distribution function is expressed as:

$$F(x) = \Pr(Y = 1/X_1 = x_{i,}...X_i = x_i) = \frac{e(\ 0+\ iXi+,....\ iXi))}{1\ +\ e(0\ +\ iXi^-+,....\ iXi))} \quad..(2)$$

Equation (2) is nonlinear in parameters and to make it linear is by taking the odd ratio of F(x) - the probability of an event occurring

$$1 - F(x) = \Pr(Y = 0\ /\ x1 = x2,...., x1 = x1) = \frac{1}{1+ e(\ 0+\ 1xi +,..... \ ixi)} \quad....(3)$$

This implies that:
$$\frac{F(x)}{1 - F(x)} \qquad e(\ 0\ +\ _1x_1+,.....,+\ iXi)..(4)$$

Taking the log of both sides in equation (4) gives;
$$Log\ \frac{F(x)}{1 - F(x)} \ = (\ 0 +\ 1xi +,.... +\ ixi)..(5)$$

Where
$$Log\ \frac{F(x)}{1 - F(x)}$$ is the log-odd ratio which is a linear function of the explanatory variables.

In the second model, the regression- base inequality decomposition will be used to analyze inequality in child health care services in Nigeria on the basis of geopolitical zones, gender of the household head, this method allows quantifying the impact of the determinants of inequality.

Consider an income generating function such as:

$$Iny = \frac{k\ bjXj\ +}{j=1} \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(6)$$

Where y denotes income, Xj the j-th explanatory variable, bj its coefficient and ε the error term. The Fields method (Field, 2003) estimates the share of the log-variance of income that is attributable to the j-th explanatory factor.

Model Specification
Model 1
In order to address objective one which is to ascertain the demographic factors that determines child health care utilization in Nigeria the following model was used.

$Utilization = 0 + 1edulevel + 2occupation + 3inhh + 4dis \tan ce + 5age + 6age + 7 ghhh + 8hhsize + 9exclusive + 10immunization\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(7)$

The logit regression model will be specified as:

$UCHSi = 0 + 1x1+,\dots\dots, ixi + i,ui \quad logistic\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(8)$

Where:

UCHSi = { 1an individual utilizes modern health care services 0 otherwise }

Model 2
In order to address objective two, that is to analyze the inequality in child health care service in Nigeria on the basis of geopolitical zone, gender of household head and educational attainment this objective will follow the Field's (2003) approach to Regression Base (RB) decomposition of inequality. Given the household income as:

$$y = x + \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(9)$$

Where:

y is an n × 1 vector of income
X is an n×(k+1) matrix of individual and household characteristics (age, education, household size, occupation, residence, etc.)
β is a (K+1) ×1 vector of coefficients and ε is an n ×1 vector of residuals.

The linear equation (3.13) can be rewritten as:
$y = 0 + 1x1 + 2 x2\dots + kxk + \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(15)$

$$y = \beta_0 + \beta_1 + \beta_2 + ... + \beta_k + ...(16)$$

Where:
Each Zk is a composite variable equal to the product of a regression coefficient and its variable (Zk =βkXk), with k = 0, 1,…. K and x0 = 1. For inequality decomposition calculations, the value of β0 is irrelevant as it is constant for every observation.

Following Fields suggestion, the OLS estimate of (3.10) can be used for inequality decomposition:

$$[\qquad\qquad] = \beta_0 + \beta_1 + \beta_2 + \beta_3\ hh + \beta_4 + \beta_5 + \beta_6\ \ 2 + \beta_7\ hhh + \beta_8 hh\qquad + \beta_9 + \beta_{10} + \beta_{11}\ .$$

Data Source
This study will collect data from (NDHS) Nigeria Demographic and health survey 2013. A nationally representation sample of 40,320 households from 904 primary sampling units was selected. Woman age 15- 49 who were usual member of the selected households were eligible for individual interview. The objective of carrying out 2013 NDHS was to provide an extension, reliable information on fertility preference, knowledge on how to use family planning methods, maternal and child health, childhood and adulthood and adult mortality levels, to have knowledge toward HIV/AIDS and other (STI'S) Sexually Transmitted Infections. The survey was designed to produce reliable estimate for key indicators at the national level as well as for urban and rural areas, each of the 36 states and federal capital territory (FCT) as well.

Econometric Software
The models were estimated with Stata 13 econometric package. It was programmed in such a way that it is very efficient in implementing logit model and other cross- sectional models effectively.

Data Presentation, Analysis and Interpretation
Data Presentation
From the data obtained from the NDHS 2013, the summary of the variables used are presented in this section of the study. Though the number of sampled households gives a total household size of 176,963, due to data collection realities, the household size varies for each household based on applicable responses for specific questions. To this end, a total of 119,386 household members form the sample size upon which all variables were elicited except for the age of the child, the number of mothers who conduct exclusive breastfeeding for their children and the response on if the children had been immunized.

Data Analysis
Model 1
The study estimates two models in line with the specified objectives. The objective which is centered on ascertaining the demographic factors which determine healthcare utilization in Nigeria proposes a model. The result of the estimated model is presented in the table 4.2 below and discussed in the ensuing paragraphs.

Table 1: Model 1 Estimation (Marginal Effects)
Dependent Variable: (   )

Variable	Δ	Std. Err.	Z	p>z
	0.0513702*	0.00007	744.00	0.000
	0.0000445*	0.00000	259.78	0.000
hh	0.0533856*	0.00005	1074.61	0.000
	0.0255966*	0.00007	376.72	0.000
	0.004678*	0.00001	599.83	0.000
2	-0.0521242*	0.00005	-954.32	0.000
hhh	-0.0243357*	0.00017	-143.55	0.000
hh	-0.0082351*	0.00002	-435.09	0.000
	0.000068*	0.00000	34.79	0.000
	0.0054984*	0.00005	118.83	0.000

Source: Author's computation, 2018 with Stata (13)
*denotes significance at the 5% level of significance

The table 1 above reveals the estimates for the marginal effects from the Logit model estimation. All the results were found to be statistically significant at 5% level. Both the educational level, occupation, income of household, distance, age of the mother, exclusive breast feeding and immunization has a positive relationship utilization of child healthcare services. Then age of the child, sex of household head, household sizeare negatively related. This is in line with Ottawa (2014), findings that education increases opportunity for job and income security
and it improves people's ability to access and understand information to help keep them healthy. Also, this finding agrees with what Zwi (2001) found out that children from low income families are therefore at risk of poor health abuse, stress, mental health problems and poor school performance.

Model 2
The model estimates the utilization probability while varying inequalities in specific variables as geopolitical zones, gender of the household head and then the educational levels. The result for the model is summarized and presented in the table below;

Table 2: Model 2 Estimation (Marginal Effects)
Dependent Variable: (   )

Variable		Δ	Std. Err.		>
		0.0653196*	0.0001607	406.35	0.000
		0.1051242*	0.0001926	545.94	0.000
h	h	0.1543362*	0.0003414	452.11	0.000
		0.0000286*	0.000000187	152.49	0.000
hh		0.0524917*	0.0000539	973.90	0.000
		0.0246165*	0.0000733	335.84	0.000
		0.0046085*	0.00000846	544.56	0.000
2		-0.0561314*	0.0000568	-988.67	0.000
hhh		-0.0289339*	0.0001751	-165.20	0.000
hh		-0.0069643*	0.0000199	-350.06	0.000
		0.0000647*	0.00000207	31.22	0.000
		0.0072081*	0.0000493	146.33	0.000
h		-0.0658008*	0.0002146	-306.58	0.000
h		-0.1256421	0.0001914	-656.27	0.000
h		-0.0572777*	0.0002551	-224.50	0.000
h	h	-0.11892*	0.0001988	-598.05	0.000
h		-0.0187363*	0.0002282	-82.09	0.000

Source: Author's computation, 2018 with Stata (13)
* denotes significance at the 5% level of significance

The result is significant at the 5% level of significance, thus reliable. Regional variations show that the probability of households using modern healthcare facilities is reduced for each region compared to being in north central Nigeria. The North West has the highest likelihood of not utilizing modern healthcare facilities followed by the south-south. The north east measures next, followed by the south east and then the south west. Though the result shows that being in any region in Nigeria reduces the probability of utilizing modern healthcare facilities compared to the North Central the south west remains the region with the lowest of such unlikelihood.

Test of Research Hypotheses
Hypothesis 1
H01: The demographic factors do not significantly impact on child healthcare utilization in Nigeria.

The demographic factors tested in the model 1 include the educational level of the respondent, the occupation, the wealth index, age of the mother and child and the household size. Given the results in the Table 1, the p-value for these respective variables were all less than 0.05 and corroborated by a z score greater than 2 (i.e. $= 744, = 259.78, _{hh} = 1074.61, = 599.83, _{2} = -954.32, _{hh} = -435.09$) thus we conclude that the demographic factors significantly impact on the child healthcare utilization in Nigeria tested at the 5% level of significance.

Hypothesis 2

H02: Geopolitical zone, gender of household head and educational attainment do not significantly contribute to inequality in utilization of child healthcare services in Nigeria.

Results from the Table 2 reveals that there is disparity in the utilization of child healthcare services by educational level, gender of household head, and educational attainment. It was found that families with higher educational attainments had greater chances utilizing modern healthcare facilities than families with lower educational attainment. Households with males as heads had lower chances of utilizing child healthcare facilities and then all regions in Nigeria reduced the probability that child healthcare facilities would be utilized with the North West being the most unlikely and the south west is being the least unlikely. All results are tested at the 5% level of significance.

Summary of Findings

The findings of the study show that on the average, the households do not utilize modern child healthcare facilities, the average educational attainment of households is the primary school and that on the average, the distance to the healthcare facility was a big problem. 35 years is estimated as the average age for mothers from the survey, while 10 years is the average age of the child. Most households on the average are headed by males, the average household size is 7 persons and many households on the average have immunized their children.

The factors found to statistically influence the probability that child healthcare services are utilized in Nigeria include the education level, the occupation, the wealth index, distance to the health facility, age of the mother, age of the child, gender of the household head, the household size, the breastfeeding plan of the child and the immunization of the child. The factors account for the responsiveness to utilizing modern child healthcare or not. It was also found that inequality exists for child healthcare utilization and this holds across educational levels, gender of household heads and the geopolitical zones of Nigeria. It is on this premise, that the policy implications are discussed in the last section of the last chapter.

Conclusions

It was established that modern health facility contributed immensely to the present level of healthcare utilization in Nigeria. However, it was found that the south west region of Nigeria has the least likelihood that households would not utilize modern child healthcare services while the North West is most likely not to utilize same. Having said all these, we can go ahead and state categorically that if the variables mentioned above are properly maintained it will

improve the utilization of child healthcare services. So, policies that will help achieve this are to be enacted and pursued.

Recommendations

The recommendations of this study include the following;

1. More awareness should be made about child healthcare utilization.
2. Households should be encouraged on family planning so as to enable them have an optimal household size.

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