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Master Thesis

Topic: « **INEQUALITY IN MATERNAL AND CHILD HEALTHCARE
SERVICE UTILIZATION IN NIGERIA** »

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Master Thesis Defense Grade

«_____»

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Specialty 073 «Management»
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ABSTRACT

Inequality in Maternal and Child Healthcare Service Utilization in Nigeria

The study is an attempt to ascertain the determinants as well as the extent of inequality in maternal and child healthcare utilization in Nigeria. The study set to firstly, identify the socio economic determinant of antenatal care utilization and child vaccination in Nigeria and secondly, to ascertain if there is inequality in the utilization of antenatal health care in Nigeria. The Binary logistic model and concentration index were utilized to achieve these set objectives of the research work. Data on antenatal care and child vaccination, household wealth index and other socio economic variables were sourced from the Nigeria demographic health survey 2018. Findings from the estimated models reveal the following. The study found that Socio economic variables like household wealth quintile, Mothers literacy, availability of health insurance, Employment status of mother, urban residency improves access to antenatal utilization and child vaccination while household size, female headed households and rural residence have significant negative impact on antenatal care utilization and child vaccination in Nigeria . The study also established there exists a significant inequality in antenatal care utilization amongst women across different wealth quintiles with significant positive bias towards the rich.

Key words: Inequality, Maternal, Child, Healthcare, Utilization

Kyiv 2022

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LIST OF ABBREVIATIONS

ANC= Antenatal care

BCG= Bacille calmete-Guerin

BHCPF=Basic Healthcare Provision Fund to finance

DTP= Diphtheria tetanus pertussis

FMCHP= Free Maternal and Child Health program.

HBM= Health belief model.

MCH= Maternal and child health.

MDG's=Millennium Development Goals

NDHS= Nigeria Demographic and health survey.

NHA=National Health Act.

NHIS= National Health Insurance Scheme

NHP= National Health Policy

NPC= National population Commissions

P= Probability of observing the coefficient value.

SDGs =Sustainable Development Goals

SMI= Safe Motherhood Initiative

UHC= Universal health care.

UNICEF=United nation children Fund

USAID= United states Agency for international development.

LMICs =low- and middle-income countries.

WHO=World health organization

INTRODUCTION

Inequality in Health care utilization amongst pregnant women and children has been identified as one of the major causes of poor health outcomes amongst women and children especially in developing countries (Zhang, Li, Li, Zhao, Guo, Qu (2018); Okoli, Hajizadeh, Rahman and Khanam (2020)). As a result, countries all over the world have sought to adopt policies that is aimed at increasing the accessibility and affordability of maternal and child health care by removing obstacles to health care utilization. The main goal is to increase the use of health services so as to improve mother and child health outcomes.

Carrasquillo (2013), defined Health Care Utilization as the quantification or description of the use of services by persons for the purpose of preventing and curing health problems, promoting maintenance of health and well-being, or obtaining information about one's health status and prognosis. Maternal and child health (MCH) care utilization entails the utilization of health service provided to mothers (women in their child bearing age) and children by formal health centers and geared towards the improvement of maternal and child health outcome. It involves the utilization of healthcare services given to a pregnant woman during pregnancy, at child birth and soon after delivery for the survival of both the mother and the child. Advocates of maternal and child healthcare utilization argues that health care utilization improves the health status of women and children which is an important index for socio-economic development hence, the emphasis on maternal and child healthcare services (Carrasquillo 2013)

Gabr (1985) identified the components of child healthcare services as follows: immunization services, growth monitoring, oral re-hydration therapy, promotion of breastfeeding, treatment of ailments and outreach services. Immunizations are given to protect the child against childhood killer diseases.

Also, world health organization (WHO) standard requires that pregnant women appear at least four times to the healthcare centre for antenatal care (ANC) services. In the first visit, the pregnant woman receives a series of services such as confirmation of the pregnancy, calculation of the expected delivery date, assessment of her psychological, medical and obstetric history, examination of her blood pressure retroviral screening and screening for sexually transmitted infections.

Evidence suggests that significant and long-lasting benefits accrue from investing in the health of women and children (WHO 2018). Healthy women and children are the linchpin for healthy and thriving societies investing in the health of women and children is indispensable to achieving the new Sustainable Development Goals (SDGs) agenda. In low- and middle-income countries (LMICs), providing healthcare for women and children can result in greater accumulation of human capital, increased productivity, and increased income and economic development (UNICEF 2015). According to William (1984), the objectives of maternal and child healthcare services are to reduce maternal and child morbidity and mortality, to enhance mental, physical and psychological well-being of the children to permit them to come to adulthood at their optimal stage of development as to perform at their effective level.

Considering the numerous benefits of investing in maternal and child health, there is an increasing concern and interest in maternal and child health care especially in less developed countries. This commitment towards MCH care gained further strength after the World Summit for Children, 1991, which gave serious consideration and outlined major areas to be addressed in the provision of Maternal and Child Health Care services (UNICEF 1992)

The federal government of Nigeria on its part embarked on several programmes to ensure adequate supply of reproductive healthcare services for effective services utilization. For instance, the federal government in 1976 adopted the Expanded Programme on Immunization after WHO initiated it in

1974. The aim was to achieve more than 85% immunization coverage of children within 0-2 years and pregnant women against vaccine preventable diseases (Tuberculosis, Poliomyelitis, Diphtheria, Tetanus, Measles and Whooping cough) identified as common causes of maternal and infant mortality and morbidity. Nigeria also adopted the Safe Motherhood Initiative (SMI) and the National Health Insurance Scheme (NHIS) in 1987 and 1999 respectively.

Between 2009 and 2015, A Free Maternal and Child Health program (FMCHP) was implemented in 12 states in Nigeria by the National Health Insurance Scheme (NHIS), using funds from the debt relief gains. The program ended with the termination of the MDG in 2015. In 2017, the federal Government kicked off a scheme to revitalize over 10,000 primary healthcare centers (PHCs) across the country with the aim of achieving universal health coverage (USAID 2019). The enabling legal and policy frameworks for PHC revitalization include the National Health Act (NHAct) 2014; National Health Policy (NHP) 2016 and Health Financing Policy and Strategy 2017. The government established the Basic Healthcare Provision Fund (BHCPF) to finance and manage the implementation of PHC revitalization as a means for achieving universal health care (UHC). The act calls for allocation of at least 1% of the Consolidated Revenue Fund (CRF) in the national budget to capitalize the BHCPF so as to finance and manage the PHC revitalization agenda. (WHO 2017)

However, despite this interventions indicator of health utilization shows only a marginal increase in the utilization of health services among women in Nigeria in the last 18 years. For instance data from the Nigerian Demographic health survey (NDHS) 2018 indicate that the percentage of women who had 4 or more antenatal visits increased from 51% to 57% from 1990 to 2018 implying only a 6% increase after 18 years. More worrisome is the fact that

only about 56% of women in the rural areas utilized antenatal services compared to 84% in the urban areas in 2018.

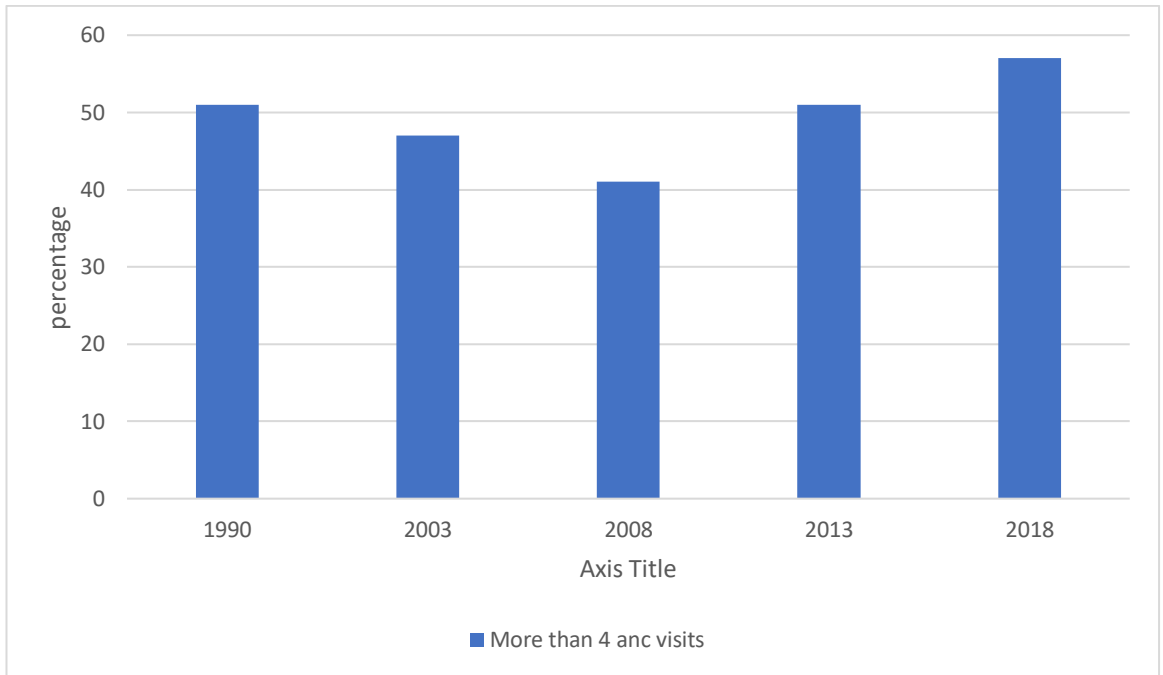


Fig.1. Percentage of Women with more than 4 Antenatal care visits. Source: 2018 NDHS report

On the other hand, disparities along socioeconomic characteristics exist in use of ANC services. Forty-five percent of women with no education received ANC services from a skilled provider, as compared with 97% of women with more than a secondary education. Similarly, women in the highest wealth quintile (93%) were more likely to receive ANC from a skilled provider than women in the lowest wealth quintile (41%)(NDHS 2018)

In terms of child health, the percentage of children age 12-23 months who received all basic vaccinations increased from 23% in 2008 to 31% in 2018 . The percentage of children who received none of the basic vaccinations declined from 29% to 19% during the same period. While these trends show improvement, they still fall short of Sustainable Development Goal 3, for which the target is achieving more than 90% coverage of all basic vaccinations among children age 12-23 months.

Particularly worrying for development experts is that despite this policies, maternal and child health problems have persisted and looks unresolved leading to loss of productivity and low human capital development. As a response, researchers are looking to analyze inequity in maternal and child health care utilization in Nigeria as well as the determinant of health care utilization in Nigeria (Anyamele, Akanegbu, & Ukawuilulu (2015); Ayoade, (2019)).

Transitioning from a position of poor or adverse maternal and child health care utilization to an improved state requires adequate understanding of the underlying causes of low health care utilization in Nigeria. Considering that women and children constitute a large percentage of the vulnerable population at any given time, understanding the level of inequality in health care utilization as well as causes and the determinant of inequality in the utilization of health care amongst women and children is important in designing policies that will improve health care delivery to women and children which will in turn improve health outcomes amongst women and children.

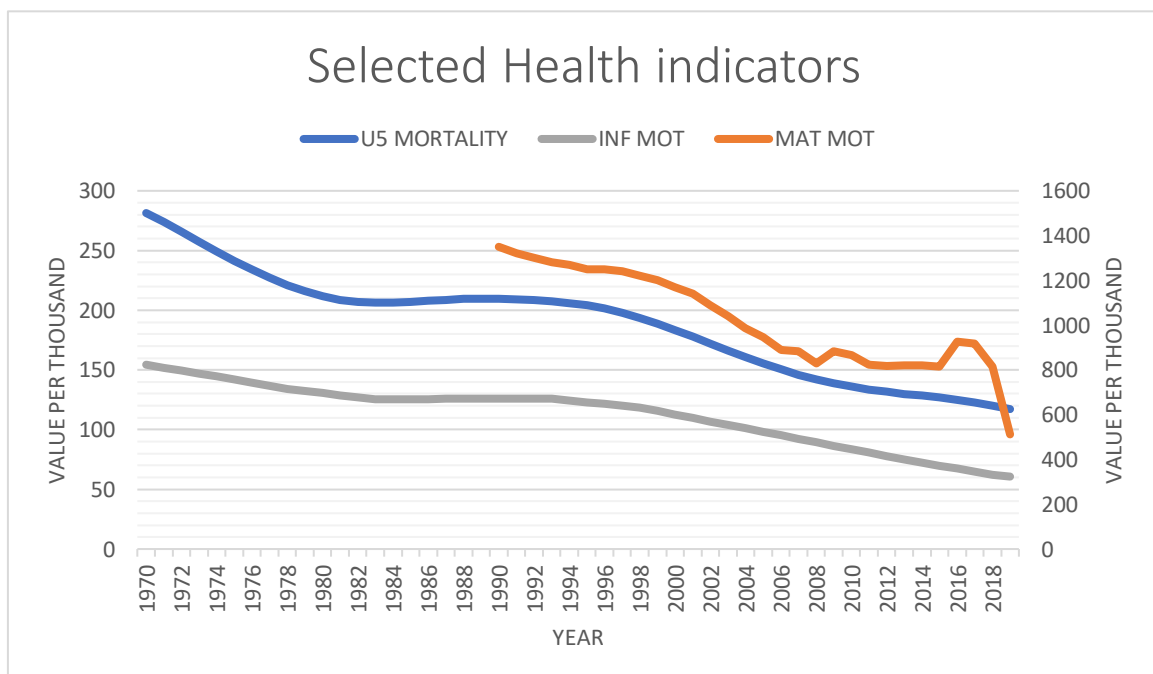
In the light of the above this study is an attempt to analyze the extent of inequality in health care utilization as well as the determinants of utilization of maternal and child health care in Nigeria.

STATEMENT OF PROBLEM

Nigeria has over the years committed to ensuring adequate supply of maternal and child health care services at an affordable rate. Since 1976 when the government of Olusegun Obasanjo introduced the first comprehensive health care services aimed at ensuring adequate immunization for children and pregnant women, successive government have over the years introduced several other policies and programmes aimed at improving access to health care facilities to children and pregnant women.

However, despite these interventions evidence from available data indicate that many women and children continue to die daily from preventable causes mostly related to pregnancy and child birth. According to WHO (2019), issues related to pregnancy and child birth accounts for about 99% of global and maternal child death. More disturbing is the fact that these issues are more pronounced in developing countries like Nigeria where inadequate and poorly equipped healthcare services prevail.

In Nigeria, 512 of every 100,000 live births results in the mother's death; this constitutes 14 per cent of the world maternal mortality burden (WDI 2019). Although the under-five mortality rate decreased from 201 deaths per 1,000 live births in 2003 to 117 in 2019, Nigeria is still far from the sustainable development goal (SDG) target of 25 in 2030. The high rate of maternal and child mortality constitutes a major economic problem due to its impact on productivity, poverty, human capital formation and economic growth.



Source: World development Indicator 2020

Economists characterize the poor maternal and child health to inequity in health care utilization (Carrasquillo (2013)). Poor uneducated rural women

and children are less likely to utilize health care services compared to women from upper income and wealth quantile. Similarly, Women and children from less privileged background are more likely to have adverse health outcomes compared to their counterparts from a higher socio economic status (NDHS, 2018). This evidence suggests a correlation between socio economic variables and health care utilization and outcomes in Nigeria.. However, the magnitude and direction continues to be debated. Furthermore, the magnitude of the inequality in health care utilization between social classes and income quantiles is of concern to this study. Understanding this problems have implications for resource allocations and policies aimed at improving maternal and child health. Considering that women and children constitute more than 67% of Nigeria's total population (NBS, 2019), policies that seek to increase the accessibility and affordability of maternal and child health care services are of great concern to policy makers and development experts.

The sustainable development goals aims to achieve maternal mortality rate of 70 per 100000 live birth and under 5 mortality rate of 25 per 1000 under 5 child before 2030. However, development experts have warned that without designing policies that will reduce the inequity in health care utilization this may not be achieved within the given time frame (WHO). Designing effective policies involve detailed knowledge of the factors influencing the utilization of maternal and child health care services as well as the level of inequality in utilization of health care services that exists between social and income classes. In this regards, this study will critically analyze household survey data to evaluate the determinant of health care utilization across various geographical zones and social classes with the aim of informing policy and contributing to the existing theory.

Studies conducted on the determinant of health care utilization show that low income, service cost, accessibility and availability and programmatic factors are critical in determining the level of healthcare service utilization. Others have linked socioeconomic and demographic factors(economic status,

education, birth order, and birth interval) as vital predictors of utilization of health care services. Others studies have also been conducted on the inequity in utilization of maternal and child healthcare services between social and income classess , these studies are yet to come to agreement on the major factors influencing maternal healthcare utilization and progress made so far. Given the desire to formulate healthcare policies that would accentuate the attainment of the SDG goals, it is instructive to conduct a study on the determinants of maternal healthcare utilization and comparatively explore the utilization level in maternal health care services.

In the light of the above submissions, the following questions will guide this study.

Research questions

- What is the impact of socio economic variables on women antenatal care utilization in Nigeria?
- To what extent does socio economic variables affect child vaccination in Nigeria?
- What is the extent inequality in antenatal care utilization among pregnant women in Nigeria?

Objectives of study

The general objectives is to evaluate the inequity in maternal and child health care utilization in Nigeria. The specific tasks are:

- To determine the impact of socio economic variables on antenatal health care utilization in Nigeria
- To evaluate the impact of socio economic variables on child vaccination in Nigeria
- To determine the level of inequality in antenatal health care utilization among women in different wealth quintiles in Nigeria

Significance of study

The study can provide information that can be used for surveillance and targeting programmes that would focus more on populations most affected. The study also makes important contribution to literature by analyzing socio economic inequalities as a non-monetary measure of poverty which is a recent innovation in the literature. This is based on the argument that socio economic inequalities like mothers education access to electricity, car ownership etc is a different dimension of welfare (capability deprivation) from income and expenditure. In addition, individual well-being in the form of nutritional status

can be directly observed as opposed to household well-being. The study will improve the literature on child nutrition by carrying out a holistic analysis on the nexus between socio economic inequalities in Nigeria.

CHAPTER 1.

LITERATURE REVIEW

1.1 Conceptualization of Literature

1.1.1 Health care utilization

Carrasquillo (2013) has termed Healthcare Utilization a use of services in the prevention of health problems; this could include curing or maintaining the current state of health to enquire about the state of one's health and future outcomes.

According to Awoyemi, Obayelu & Opaluwa (2011), Healthcare utilization is "the use of healthcare services by the people. Hence, people might choose different healthcare services due to different factors predisposing end users. Public and private healthcare providers dominate the healthcare delivery system of Nigeria. Akhtaw (1990) is of the opinion that the responsibility for healthcare provision falls on the three tiers of Government, with the private sector majorly following along. The tertiary healthcare system is being controlled by the Federal Government; while the state government is responsible for healthcare systems at the secondary level, primary healthcare services are under the management of the Local Government. According to Uchendu, Ilesanmi & Olumide (2013), private sector healthcare delivery is categorized into primary, secondary care, and practitioners that offer both services.

Traditional medicine was primarily used by the populace in Nigeria before the advent of modern medicine. According to Awoyemi, Obayelu & Opaluwa (2011), herbal healers, soothsayers, spiritualists, and bone setters provide healing services during this time. Chuke (1988) is of the opinion that medical services came into Nigeria in the middle of the nineteenth century due to the various European expeditions; the doctors would accompany explorers

and traders to cater to their health and well-being. In 1880, the first public healthcare facility in Nigeria was opened by the Church Missionary Society. This was followed by the opening of a healthcare dispensary in Onitsha and Lagos in 1886 and a General Hospital in Lagos in 1893. Between 1945 to 1955, the first colonial development plan for health care was put in place. This was followed by the second national development plan for health care which was in place between 1970-1975. The third national development plan for health care was launched by the Government between 1975-1980. In 1987 the Government launched the primary health care plan with the following major objectives: Improving collection and monitoring of health data, improving personnel development in the health care, ensuring the provision of essential drug availability, improving immunization programs, promoting the treatment of epidemic diseases, improving food supply and nutrition, improving material, child care, and family planning; and educating people on prevailing health problems and the methods of preventing and controlling them. (Nigerian Finder, 2022). Currently, the healthcare delivery system is a blend of both public and private healthcare providers.

1.1.2 Maternal and Child Healthcare Services

“Maternal healthcare services refer to healthcare services given to a pregnant woman during pregnancy, at child birth and soon after delivery for the survival of both the mother and the child”. Nuamah, Agyei-Baffour, Mensah (2019). In line with the definition, and as will be used in this work, maternal healthcare services are divided into antenatal care (ANC) services, delivery care services and postnatal care services. Antenatal care is meant for the detection and immediate treatment of possible causes of complication. In this, the pregnant woman receives basic cares such as iron tablet, intestinal parasite drugs, measurement of blood pressure, etc. Also given during ANC is tetanus toxoid injections to prevent infant death due to neonatal tetanus in case

the pregnant woman delivers in an unhygienic place or if sterile procedure is not followed in cutting the umbilical cord.

The antenatal care policy in Nigeria follows the WHO approach of promoting safe pregnancies, recommending at least four ANC visits for women without complications. The recommended schedule of visits is as follows: the first visit should occur between 8-12 weeks of pregnancy, the second visit should be between 24 and 26 weeks of pregnancy, the third visit should occur at 32 weeks, and the fourth visit should occur at 36 weeks (reference is needed). However, women with complications, special needs, or conditions beyond the scope of basic care may require additional visits. Early detection of problems during pregnancy leads to more timely treatment and referrals in the case of complications. This is particularly important in Nigeria, a large country where physical barriers are a challenge to accessing care within the healthcare system (WHO 2009).

Generally, ANC's can be accessed through the publicly funded health care systems and private ones. Governments at all levels in Nigeria subsidizes the cost of Antenatal care so as to make it affordable to all. They do this by providing subsidized treatment, drugs and other vaccines in primary health care centers and other publicly funded hospitals in Nigeria.

Evidence from the NDHS 2018 Report showed that the number of women who had four or more ANC visit rose from 51% in 1990 to 57% in 2018. Similarly the number of women who delivered at home dropped from 66% in 19. 90 to 59% in 2018. This figures indicate moderate increases in the utilization of healthcare among pregnant women in Nigeria.

Also important is the place of delivery. The national reproductive health policy requires that every child birth be in a facility and attended by a specialist (doctor or nurse/midwife) to avoid complications during child birth. The postpartum period is not the least important for women, because during this period they may develop serious, life-threatening complications,

especially in the interval immediately after delivery. “There is evidence that a large proportion of maternal and neonatal deaths occur during the first 48 hours after delivery. Postnatal care visits provide an ideal opportunity to educate a new mother on how to care for herself and her newborn baby’’. (NDHS-ICF Macro; 2018). A 2018 report of the Demographic and health care survey shows that from 2008 to 2018, post natal care by women rose from 30% to 42% respectively indicating progress in the utilization of postnatal care among child bearing women in Nigeria.

UNICEF (2002) refers to child health services as a channel through which medical and healthcare services can be organized to improve the health of the child, prevent diseases and promote growth and development. The essence of child health care services is to enable the child develop and realize his/her potential, satisfy his needs and develop capacities that allow him/her to interact successfully with his surroundings. Gabr (1985) identified the components of child healthcare services as follows: immunization services, growth monitoring, oral re-hydration therapy, promotion of breastfeeding, treatment of ailments and outreach services. These activities are aimed at protecting the child and preventing ill health. As will be used in this work, child health care services refer to all preventive treatments given to children under five against the childhood killer diseases. The policy in Nigeria is that a child is considered fully immunized if he/she receives a dose BCG, three doses of DPT, three doses of polio vaccine and a dose of measles vaccine before the first twelve months. In Nigeria, Government together with the support of International Agencies and Non Governmental Organization administers immunization vaccines free of charge to all eligible children . Households are therefore not required to pay for child’s vaccination. For the purpose of this study , those children who have received all the basic vaccination as required by Nigeria’s health policy that will be considered fully vaccinated

1.1.3 Inequality

Most common metric of measuring inequality is Income Inequality, which refers to the extent to which income is evenly distributed within a population (IMF, 2022). However there are other related concept of inequality such as Inequality of Opportunity (argues that inequality across groups of people defined by circumstances) (Romer ,1998) lifetime Inequality (inequality in incomes for an individual over his or her lifetime), Inequality of Wealth (distribution of wealth across households or individuals at a moment in time), (impact on income of circumstances over which individuals have no control, such as family socioeconomic status, gender, or ethnic background). All these inequality concepts are intertwined. They offer a different but yet a complementary insights of the consequences and causes of inequality, therefore providing a better guidance to the government when designing specific policies aimed at addressing inequality.(IMF, 2022)

1.2 Review of Relevant Theories

1.2.1 Health Capital Theory

This theory derives its framework from the human capital theory, the foundation of which was laid by the seminal works of Schultz (1961), Becker (1964) and Ben-Porath (1967). While their theory was very effective in explaining the decision with respect to education and on-the-job training, it falls short in regards to health. For instance, their theory argued that investment in human capital should fall with age as the period over which the returns from investment decreases. Yet, investment in health never decreases,

even after retirement when health has lost its importance in generating earnings. This distinction between health and other human capital led to the development of the health capital theory (Grossman; 1972).

In the health capital theory, health is treated as a stock that provides direct utility. In other words, the model posits that health services are sought because they improve health status. This implies that demand for healthcare is derived from the demand for health. Each individual is born with an initial stock of health which depreciates steadily with age, hence investment must be made to counter the natural and steady depreciation of the health stock. Thus, the purchase of healthcare is seen as investment in health capital and it generates utility in two ways.

First, it counters the natural depreciation of the health stock thereby reducing the disutility of being sick. Second, it reduces the time lost for market and non-market activities. In other words, investment in health capital prevents loss of time for productive activities which generate utility. Therefore, health is demanded as consumption commodity which directly enters the individual's utility function and as investment good which increases stream of healthy days that permit market and non-market activities that produce income and leisure both of which provide utility. Health capital theory recognizes healthcare, age, income, education, lifestyle and environmental factors as the factors that determine the demand for health. Age is measured in time, genetic factors determines the initial health status while other factors determine the health status as the individual ages. This theory is relevant in this work because its offers explanation on the reasons people seek health services.

1.2.2 The Political Economy of Health Theory

The political economy perspective was developed as a critical response to functionalism in the context of large changes in social thought occurring in the 1970s, hence, it is seen both as an approach as well as a realistic methodology with a holistic perspective to the analysis of social development (Aina, 1986; Alubo, 1995; Onimode, 1995). Under this approach, good health is defined in political terms not only as a state of physical or emotional wellbeing but as control over and access to the basic non-material and material resources that sustains and improves the satisfaction level of livelihood. With the existence of unequal distribution of resources; wealth and power. This theoretical framework, 'political economy of health theory' provides an insightful context used to consider the political and socio-economic determinants of health. Particularly it is useful when considering the health status of a historically marginalized group which includes Women, children, the ageing, non-whites, the physically disabled , the rural and the unemployed partially because of the lack of capacity to afford healthcare services or restricted access to healthcare services.

The political economy of healthcare is the analysis and perspectives on health policy for understanding the condition which shape population health and healthcare services development within the macroeconomic and political context. On this light, the political economy of healthcare makes two important emphases. First, health is a valuable resource and is therefore unequally distributed throughout societies. Second, a country's healthcare system is shaped by competition. While access to the highest attainable standard of healthcare is recognized as a right, it can be challenged by such factors as affordability, supply of medical practitioners and availability of medical facilities. How these factors interact determines if healthcare becomes a right or a privilege in a society. From the foregoing, the political economy of health theory is based on three cardinal points as follows:

Health as a valuable resources. Good health is associated with higher labour productivity and income generation. On the other hand, poor health

condition implies loss of income. To the poor, the consequence is grave, hence, the common aphorism “the poor have no right to be sick”.

Healthcare as an unequally distributed resources. Patterns of health and disease follow the line of social stratification. As poverty rate and income distribution vary across social classes and countries, so does access to healthcare vary. The rich are more likely to enjoy a quality healthcare than the poor. This pattern also obtains across countries. The poor health condition in less developed countries is mainly caused by indirect effect of poverty and overpopulation. This explains why there is low life expectancy and high infant and maternal mortality in the poor countries.

Health as object of power relation. Health is not only about identifying symptoms of a disease, but also about the intricacy of power relation within a society. The class difference produces unequal access to means of livelihood, including healthcare. This inequality produces exploitation of the poor by the rich. Thus, the rich do not only control the resources, but also the machinery of power to maximize their gain and put the poor in perpetual control.

There are two basic variants within the political economy school of thought- the liberal and the radical. While the liberal school of thought stresses the role of market forces in the distribution and allocation of resources including those of healthcare, the radical school upholds production and production relations (Owumi, 2002; Godswill, 2008). The Marxist political economy perspectives emphasizes the importance of material conditions in understanding and explaining social existence and in finding solutions to individual and group problems of man. The theory explains how people derive their livelihood (their mode of production) and maintain that in virtually all societies with the exception of the communal mode, classes have been developed.

The Marxist political economy asserts the strong link between capitalism and health such that health services and the organization of healthcare are the results of a capitalist economy and class relations.

Healthcare is distributed according to its ability to improve the productivity of labour and consequently, those considered to have low economic worth would have unequal access to healthcare services and programmes (Besley and Burgess, 2002). This theory is relevant in this work as it brings out clearly in political perspectives, how the organization of the society has put certain group, including women in disadvantage position of no access to healthcare services and hence, low utilization of such services. Health is seen as opulence and opulence is power.

1.2.3 Theory of Healthcare Seeking Behaviour

People differ in their willingness to seek help from healthcare service providers. Some go readily for treatment, others only when in great pain and in advanced state of ill-health. Healthcare seeking behaviour is a sequence of remedial actions that individuals undertake to rectify perceived ill-health. It is a tool for understanding why and how people engage with the healthcare system in their respective socio-cultural, economic and demographic circumstances. The focus of the theory of healthcare seeking behaviour is identifying the most appropriate factors (individual and environmental) that may influence the decision to seek healthcare services and the choice of healthcare provider. Scholars in different disciplines of the social sciences have explored the reasons behind the utilization of healthcare services by individuals and came up with different models such as the pathway model, the determinant model, the sectoral model of health and the Kroeger,s model. There are however, two major models that have been used to explain healthcare seeking behaviour of individuals under this theory. They are the healthcare utilization model and health belief model.

1.2.3.1 Healthcare Utilization Model

This theory developed by Andersen and Newman (1973) is one of the most widely acknowledged theory of health utilization behavior in the social sciences. The health utilization model classifies factors which affect healthcare services utilization into three groups. They are predisposing factors, enabling factors and need factors. Predisposing factors try to explain the inclination of an individual towards use of healthcare services before ill-health. It consists of demographic (age, sex, marital status, etc) variables, social structure (education, occupation, ethnicity, etc) and health belief. Health beliefs are values and knowledge about health and the healthcare system that influence healthcare services utilization. They include general attitude towards medical care, health practitioners and ill-health.

Enabling factors play supporting role in fulfilment of an individual's need for healthcare. They consist of factors representing family attributes and community resources. Enabling factors (personal and organizational) must be present for individuals to utilize healthcare services. Personal enabling factors include income, health insurance, regular source of healthcare and travelling and waiting time. Organizational enabling factors include availability of healthcare providers and their spatial distribution. Need is the ill-health level. It is the most immediate cause of healthcare service utilization. Assessment of the need can be made by the individual himself or by care giver or health professional based on the symptoms experienced during a period of time and perceive severity of the illness. The presence of the predisposing factor and the enabling factor combines with the need (ill-health) to determine the extent of utilization of healthcare services.

1.2.3.2 Health Belief Model

The Health Belief Model is a framework used to explain healthcare seeking behavior and why people fail to comply with medical recommendations. The disappointment of failure to comply with the Federal Government offer of free preventive medical care in the 1950s led to the development of the model from the research of three psychologists Irwin Rosentock, Godfrey Hochbaum and Stephen Kegels (Rosentock, 1984).

The basic components of the HBM framework are derived from already established body of behavioral and psychological theories whose models state that behaviors depend primarily upon two variables: the value placed by the individual on a particular goal and the individual's estimate of the goal. When these variables are interpreted in terms of compliance to recommended health action, four major components was obtained as follows: perceived susceptibility to a disease, perceived severity of the disease, perceived benefits of taking medical action and perceived barriers to the medical action. The four perceptions can be affected by some other factors as gender, education, age, facility location, experience, etc. Furthermore, the model suggest that behaviour can be influenced by exposure to mass media, advice from friends, advice of medical experts and health education programmes, generally referred to as "cues to action" .

According to Rosentock, Strecher & Becker, (1988) the health Belief Model was expanded in 1988 by adding the concept of "self-efficacy" to the original initial four perceptions of the model. The concept was used to describe people incentive to take new action in the face of a threat. The incentive is the ability to take the necessary action and when the ability is lacking, new actions are never taken, the treat notwithstanding. The couple's perception of the threat posed by pregnancy and child birth, their perception of the seriousness of the threat and the balance between benefits and cost of the medical compliance influence the decision to seek and utilize healthcare.

1.2.4 Culture-Bound Theory of Disease

This theory came into existence with advancements in Trans-cultural Psychiatry and Medical Anthropology. The activities of scientists in the two sub-disciplines increased awareness of the different interpretations, which are given to health behaviours in different cultures.

According to the theory, “health and diseases are to some extent shaped by culture” (Erinosho, 1998). This theory therefore shows that socio-cultural factors affect the health seeking behaviour of people from one society to another. That is why in some societies, it is a taboo for a male clinician to attend to a woman in labour. The tradition and belief system of a particular people also determine their interpretation of certain child and maternal sicknesses and the type of treatment to seek. Thus in some societies, some child and maternal sickness are seen as spiritual attack and would not require modern medical treatment and yet other child and maternal sicknesses are seen as normal stages of development for the child or normal pregnancy sickness for the pregnant women or normal process of recovery from pain of labour for the nursing mother.

1.2.5 Feminist Theories

Feminist theories seek to explain the nature, causes and solutions to power inequality across gender to enhance women’s status and autonomy. There exist many variants of the gender feminists’ theories such as the liberal feminism, Marxist/social feminism, development feminism, radical feminism, etc. According to the Liberal Feminist school of thought, they claims that the gender differences between a man and a woman are not biology based, therefore the genders are not all that different, as the common humanity of both genders supersedes their procreative differentiation. Since it is established that women and men are not different, then they shouldn’t be

treated differently under the law. Women should have the same rights as men and the same educational and work opportunities. Liberal feminism thus, argues that women and men are essentially similar, and therefore women should be equally represented in public arenas dominated by men - work, government, the professions, and the sciences.

Marxist and socialist feminisms severely criticize the family as a source of women's oppression and exploitation which makes them economically dependent on the "man of the house," like their children. If a woman works outside the home, she is still expected to fulfill her domestic duties, and so she ends up working twice as hard as a man, and usually for a lot less pay. Therefore, this group call for restructure of the family to make a woman's relationship with her husband as coordinates instead of subordinates. Marxist and socialist feminisms argue that the source of women's oppression is their economic dependence on a husband. Their solution is full-time jobs for women, with the state providing paid maternity leave and childcare.

Development feminism made an important theoretical contribution in equating women's status with control of economic resources. In some societies, women control significant economic resources and so have a high status. In contrast, in societies with patriarchal family structures where everything women produce, including children, belongs to the husband, women and girls have a low value. To the development feminists, the mode of production and the kinship rules that control the distribution of any surplus are the significant determinants of the relative status of women and men in any society. They support the rights of girls and women to an education that will allow them to be economically independent. For development feminism, the theoretical emphasis on universal human rights as reflected in pressure for the education of girls, maternity and child healthcare, and economic resources for women who contribute heavily to the support of their families.

Radical feminism however, is a gender resistant theory. Radical feminism argues that patriarchy is very hard to eradicate because its root-the

belief that women are different and inferior-is deeply embedded in most men's consciousness thus it can at best only be resisted. They lead and advocate the possibility of creating solely a woman's world; a safe residences for battered women, a woman-oriented healthcare facilities, legal services and counseling for survivors of rape, a woman's culture, and also a woman's ethics and religion forged the bonds of sisterhood and the reason for separation from men. The Radical feminism claims that most of the male gender have the potential to use physical violence against the female gender, and this includes murder and rape.

In conclusion, the primary point of feminists about gender inequality is that it is deeply ingrained in the structure of societies and it is not an individual matter, Gender inequality has its foundation in the organization of families and marriage, in religion, politics, works and the economy, arts and other cultural productions, and even the very language we speak. Women's empowerment, therefore, necessitates social and not individual solutions.

1.3 Empirical Literature Review

Riman and Akpan (2012). utilizes the multivariate analytical tool to describe the relationship that exists between health care financing, health facility utilization and health outcome in Nigeria. The research focused on women of child bearing age and women who had given birth to at least a child within the previous five years. The study was conducted using the technique of stratified sampling from cross River state Nigeria. It comprised of one Urban Local Government Area and two rural Local Government Areas. The study demonstrated that the high levels of infant mortality and morbidity rate was associated with the high incidence of out-of-pocket payment, and the wide disparity and inequality in income distribution. The study further observed a disproportionate disparity in the spatial distribution of health facilities, with

concentration of health facilities at the urban areas rather than the rural areas, which of course contributed to the poor service demand. The studies therefore recommend among other things the review of the current Federation revenue distribution formula, with emphasis given to the Local Government Areas (who are the principal institution responsible for primary health care in Nigeria) and the speedy implementation of the National Health Insurance Scheme (NHIS).

Oladipo, J. A. (2014). explored the existence of disparity in health care utilization and its implication for planning and managing healthcare delivery systems. The study sought to determine the relative importance of the various predisposing, enabling, need and health services factors on utilization of health services; similarity between rural and urban areas; and major explanatory variables for utilization. A four-stage model of service utilization was constructed with 31 variables under appropriate model components. Data was collected using cross-sectional sample survey of 1086 potential health services consumers in selected health facilities and resident milieu via questionnaire. Data analysis was done using factor analysis and cross tabulation. Findings from The 4-stage model is validated for the aggregate data and data for the rural areas with 3-stage model for urban areas. The ascending order of importance of the factors is health services, predisposing, enabling and need. 11 variables are found to be powerful predictors of utilization. The study concluded that Planning of different categories of health care facilities in different locations should be based on utilization rates while proper management of established facilities should aim to improve health seeking behavior of people

Adam and Awunor (2014) assessed community perceptions and the factors affecting utilization of health services in a rural community in the Southern part of Nigeria. A descriptive cross-sectional study carried out in Anegbette in 2011, a rural community in Etsako Central Local Government Area (LGA) of Edo State, Nigeria. Data was obtained through a structured,

interviewer-administered questionnaire administered to adult respondents in two selected settlements in Anebette using cluster sampling method. Over three-quarters of respondents, 219 (76.8%) utilized the health facilities. There was no statistical significant association in the utilization of health services with regard to gender ($p=0.889$, $OR=1.04$; 0.55-2.00), educational level ($p=0.707$, $OR=1.16$; 0.50-2.79) and age ($p=0.839$, $OR=0.94$; 0.51-1.72). Community perceptions of poor quality and inadequacy of available services, however, determined largely the level of use of the primary health care facility. The proper utilization of the primary health facilities was good, the communities perceptions of inadequacy in the availability of services and poor quality were identified as barriers to the satisfactory use of PHC services. This study recommended that the Identified barriers in rural communities to the effective use and access of qualitative health care services should be tackled by the relevant Local Government authorities.

Lawanson and Opeloyeru (2016). Analyzed the level of inequality in the utilization of healthcare services in Nigeria, and also the determinants of inequality in healthcare utilization. While applying the concept of horizontal inequity, the paper employed the Nigeria Living Standard Survey (NLSS) data of 2010 to investigate the unproportionality in healthcare utilization. The result showed that inequality in utilization of healthcare in Nigeria is generally directed against the poor, the analysis established evidence of the rich with similar medical needs as the poor having better access to higher healthcare service. The observed inequity in health care utilization is mainly driven by the differences in morbidity rate, residence location and health expenditure. The utilization rate of healthcare services is found to be positively related to household expenditure It is recommended that government should intensify greater equity measure to guarantee healthcare to all with minimal discrimination. While the private facilities may not be attracted to rural area, due to weak patronage arising from the poor economic fortune of the people, government will be in better position to argument and fill the deficiency gap in

the rural area. Utilization of healthcare services, especially by rural dwellers can be promoted by establishing more health facilities in the rural areas

Nghargbu, R & Olaniyan, O. (2017) examined the degree and patterns of horizontal inequity in maternal and child health care utilization in Nigeria. Horizontal inequity was estimated using concentration curves and a homogenous concentration index, which was decomposed into need and non-need variables to capture the foremost drivers of inequity in utilization. Maternal and child health care utilization was investigated by antenatal visits, immunization utilization and skilled delivery. Four(4) rounds of Nigerian Demographic and Health Survey (NDHS) data (2013,2008,2003,1999) were used. The results showed a positive horizontal inequality index from 1999 -2013; this indicates that there is pro-rich inequality in the utilization of skilled delivery, antenatal, and immunization, respectively. The study therefore concluded that there is a higher and an increasing inequality in maternal health care while inequality in utilization of child health care decreases over time with education and wealth status because the most important non-need drivers of inequity in utilization. Interventions to bolster women's wealth status and education could significantly improve equity in skilled delivery and antenatal care utilization. Therefore, women empowerment, creation of wealth, and education should be a made a priority for the improvement of the deteriorating equity in the utilization of maternal health care.

Do, Tran , Phonvisay and Oh (2018). Accessed the trends of socio economic inequality in using maternal health care services in Lao peoples democratic republic from year 2000 to 2012. Two levels of a Multiple Indicator Cluster Survey in the year 2012 and 2000 were compiled for the analysis. The study used logistic regression in estimating the likelihood of using delivery services with skilled birth attendants (SBA) and antenatal care (ANC) across different socioeconomic subgroups. A differences-in-differences method was applied to investigate the trends of inequality across the years by

carefully analyzing the interacting terms of the survey years and its socioeconomic factors (wealth, education, residential areas and ethnicity). The study found that Urban-rural disparity was improved over time while there were no educational disparity changes. Rural residential areas showed significant changes than urban areas over time [OR = 2.40; 95% CI: 1.52–3.77 for ANC and OR = 2.16; 95% CI: 1.36–3.42 for SBA]. However, there were intensification in the difference between minor and major ethnic group as well as worsening disparities between the poor and rich: i.e. Ethnic minority showed significant aggravation over time [OR = 0.62; 95% CI: 0.44–0.89 for ANC and OR = 0.65; 95% CI: 0.44–0.97 for SBA]. The study concluded that Efforts to increase maternal health service utilization in poor and minority ethnic groups should be emphasized to reduce social inequalities, thus encompassing multiple-sector interventions rather than focusing only on health sector related interventions.

Zhang, Li, Li, Zhao, Guo, Qu (2018) investigated the determinants and inequalities of maternal health services utilization in Shaanxi Province. A household survey was conducted from August to November in 2013. By using a multistage sampling method, local women aged 15–49 who gave birth in the preceding three years were recruited. Information that included maternal health services utilization and social-demographic characteristics was collected through face-to-face interview. The use of concentration index approach was employed to measure the inequalities in maternal health services utilization. A logistic regression model was investigated the determinants of maternal health utilization. There were 18,724 women from rural areas and 8,488 women from urban areas enrolled in this study. The index of consideration for all the indicators of maternal health services utilization showed significance in these two areas. In urban areas, the concentration index of having secondary or higher-level health facilities, delivering by C-section, receiving the first prenatal visit within 12 weeks and more prenatal visits, were 0.0177, 0.0591, 0.0166 and 0.0356 respectively. While in the rural areas,

the corresponding figures were 0.0183, 0.0334, 0.0566, 0.0183 and 0.0385 respectively. The determinants that were related to maternal health services utilization were employment status, women's age at delivery, parity educational level, household income and health problems during pregnancy. Inequalities in maternal health services utilization still exist in Shaanxi Province. Providing maternal health services for the less educated, unemployed, high parity, younger, and poorer women, especially in rural areas, is expected to cause a reduction in the inequalities in maternal health services utilization.

Zeng, Lannes & Mutasa (2018). examined the utilization of health services and level of financial risk protection of Zimbabwe's health system. Employing a multistage sampling approach, a total of 32,294 individuals in 7,135 households were surveyed in early 2016 on out-of-pocket health expenditure, utilization of health services, and household consumption (as a measure of living standards) in 2015. The study found that the out-patient visits were favorable to the poor but the poorest of people had less access to in-patient care. In 2015, the household OOP expenditure accounted for about one quarter of total health expenditure in Zimbabwe and 7.6% of households incurred catastrophic health expenditure (CHE). The incidence of CHE in comparison was 2.8% in the richest and 13.4% in the poorest quintile. Additionally, 1.29% of households fell into poverty due to health care-related expenditures. The study suggests that there are inequalities in utilization of health services among different population groups. The poor seeking inpatient care are the most vulnerable to CHE.

Ogundea, Pavlova and Groot (2020) analyzed the evidence on socioeconomic inequalities in reproductive health care utilization in Sub-Saharan Africa and identified the variance in the estimates of these inequalities. The study performed a systematic review and meta-analysis of

studies on socioeconomic inequalities in the use of reproductive health care services published between January 2008 and June 2019. Meta-regression was used to identify heterogeneity sources in reproductive care services use. Twenty-two studies were included and they reported 305 estimates of the concentration index for different reproductive health care services. Services were grouped into ten categories of reproductive health care services. Socioeconomic status was associated with inequality in reproductive health care use and was on average high, with a pro-wealthy inequality magnitude of the concentration index of 0.202. The meta-analysis indicated that inequality was highest for skilled childbirth services with an average concentration index of 0.343. The average concentration index for family planning and components of antenatal care was 0.268 and 0.142 respectively. Meta-regression random-effects showed that the heterogeneity in reproductive health care use was explained by contextual differences between countries. The study made a conclusion that the level of inequality in the use of reproductive health care varies with the type of service and its focus on skilled childbirth services through user fees removal appears to have fostered inequality. The one-shoefits-all approach used in reproductive health care initiatives has led to the ignored differences in reproductive health care needs and ability to overcome users barriers.

Okoli, Hajizadeh, Rahman and Khanam (2020). Examined the geographical and socioeconomic inequalities in maternal healthcare utilization in Nigeria over the period between 2003 and 2017. Methods: The study used four rounds of Nigeria Demographic Health Surveys (DHS, 2003, 2008, 2013, and 2018) for women aged 15–49 years old. The relative difference and ratio (RD and RR) were used to measure differences between rural areas and urban areas in terms of the utilization of three maternal healthcare services

including, facility-based delivery (FBD), antenatal care, and skilled-birth attendance (SBA). The Theil index (T), between group variance (BGV) were employed to measure the absolute and relative inequalities in the utilization of maternal healthcare across the six geopolitical zones in Nigeria. The relative and absolute concentration index (RC and AC) were used to measure education-and wealth-related inequalities in the utilization of maternal healthcare services. Results: The RD shows that the gap in the utilization of FBD between urban and rural areas significantly increased by 0.3% per year over the study period. The Theil index suggests a decline in relative inequalities in ANC and FBD across the six geopolitical zones by 7, and 1.8% per year, respectively. The BGV results do not suggest any changes in absolute inequalities in ANC, FBD, and SBA utilization across the geopolitical zones over time. The results of RC and AC when observed showed a persistently higher concentration of maternal healthcare use among the wealthier and well-educated mothers in Nigeria over the period of study. The study in its conclusion stated that the utilization of maternal healthcare was seen to be lower among less educated and poorer women, inclusively those living in rural areas, North West and North East geopolitical zones. Therefore, the focus should be on implementing strategies that increase the uptake of maternal healthcare services among these groups.

Atake (2021). Measured socio economic inequality in maternal health care (MHC) utilization during pregnancy. The concentration index for antenatal visits and facility based deliveries were 0.142 and 0.246 in 1998 and 0.129 and 0.159 in 2013, indicating inequality bias towards the rich in both. Household wealth status and women's education were the most significant contributors to inequality in antenatal visits and facility based deliveries. In 2013, household economic status contributed approximately 75.66% of the inequality in facility based deliveries, while mothers' education significantly contributed approximately 18.22% to the inequality in antenatal visits.

Socio-economic determinants of healthcare services utilization were investigated in Akpabuyo Local Government Area by Daniel and Adeyemi (2020) using structured questionnaires, administered to adults in the study area. The general objective of this study was to determine the reason behind underutilization of orthodox health services in the area with particular attention to the socio-economic factors; specific objectives were to ascertain the influence of income level and the relationship between proximity of health facilities and utilization. The research design adopted for this study was the cross-sectional survey design; a sample size of 400 was drawn from adults, selected from each household and the Multi-stage sampling technique was utilized for the process of data collection, which consisted of the systematic random and the purposive sampling techniques. The Pearson product moment correlation (PPMC) and One way analysis of variance (ANOVA) were used in the analysis of the generated data for the purpose of arriving at a conclusion as well as a policy recommendation. The findings from this research revealed the income level at all three categories; low, middle and high had a significant influence on the utilization of services of healthcare, and the proximity of healthcare facilities concerning their location and distance also had a significant relationship with its utilization. Conclusively, the recommendation of this study was that there should be an equitable distribution of functioning health facilities within the wards to reduce its distance and travel time, and an improvement on household income of rural dwellers in Akpabuyo should be made through numerous private and government interventions and as well as improved commercial activities.

Gopalan, Mohammed-Roberts, Matarazzo, Chrystine. (2021). Used machine learning analysis, to help Bangladesh identify priority investment areas that could accelerate reproductive, maternal, neonatal, child health, and

nutrition utilization, quality, and outcomes over the short run, by comparing the relative importance of demand- and supply-side determinants of key reproductive, maternal, neonatal, child health, and nutrition indicators over the past decade (across two time points). Two rounds of the Demographic and Health Survey and Bangladesh Health Facility Survey of (2017 and 2014) were analyzed. The findings indicate that the relative importance of the demand-side determinants (except education status and wealth) have recently declined. Conversely, investments in key supply-side determinants (for example; readiness for care, availability of skilled staff, and quality of care) could provide a thrust toward further increases in utilization. Immediate attention is needed to address the regressive role of wealth status on utilization through, for example, demand-side financing that goes beyond user fee exemptions. Further, developing strategies to improve the engagement of community health workers in maternal, nutrition utilization, reproductive, child health, neonatal, and tapping into the potential of mobile health technology to support community health workers' performance and women's awareness will help to boost utilization patterns.

CHAPTER TWO

METHODOLOGY

2.1 Theoretical Framework

Healthcare Utilization Model

This theory developed by Andersen and Newman (1973) is one of the most widely acknowledged theory of health utilization behavior in the social sciences. The health utilization model classifies factors which affect healthcare services utilization into three groups. They are predisposing factors, enabling factors and need factors. Predisposing factors try to explain the inclination of an individual towards use of healthcare services before ill-health. It consists of demographic (age, sex, marital

status, etc) variables, social structure (education, occupation, ethnicity, etc) and health belief. Health beliefs are values and knowledge about health and the healthcare system that influence healthcare services utilization. They include general attitude towards medical care, health practitioners and ill-health.

Enabling factors play supporting role in fulfilment of an individual's need for healthcare. They consist of factors representing family attributes and community resources. Enabling factors (personal and organizational) must be present for individuals to utilize healthcare services. Personal enabling factors include income, health insurance, regular source of healthcare and travelling and waiting time. Organizational enabling factors include availability of healthcare providers and their spatial distribution. Need is the ill-health level. It is the most immediate cause of healthcare service utilization. Assessment of the need can be made by the individual himself or by care giver or health professional based on the symptoms experienced during a period of time and perceive severity of the illness. The presence of the predisposing factor and the enabling factor combines with the need (ill-health) to determine the extent of utilization of healthcare services.

Functionally the model can be specified as:

Health care utilization =f(empl_stat, age, sex, marit_stat, income, health_ins, dist_health)

2.2 Models Specification

To capture the objective one, which is to evaluate the determinant of maternal health care utilization (proxied by antenatal care visit), the study will estimate a Binary logistic regression or Logit model. The logistic model is a maximum likelihood estimation technique that is used in the estimation of models that contain dichotomous or binary dependent variable. By using the cumulative distribution

function (CDF), the Binary Logistic model ensures that the probability of success lies between 0 and 1 Gujarati (2004).

The functional specification of the Logit model is presented as:

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = \beta_1 + \beta_2 \text{wealth_index}_i + \beta_3 \text{literacy}_i + \beta_4 \text{health_insurance}_i + \beta_5 \text{edu yrs}_i + \beta_6 \text{number_of kids}_i + \beta_7 \text{region}_i + \beta_8 \text{residence}_i + \beta_9 \text{empl_status}_i + \beta_{10} \text{religion}_i + \beta_{10} \text{Age_hhh}_i + \beta_{10} \text{Sex_hhh}_i + \mu_i$$

Where

P_i = probability that the woman utilized antenatal care 4 or more times during pregnancy

$1-P_i$ = probability that the woman did not utilize antenatal care 4 or more times during pregnancy

\ln = Natural Logarithm

Objective 2 involves estimating the impact of socioeconomic factors on child health care utilization (proxied by basic vaccination) in Nigeria. Just like in the case of objective one, the study will employ a logistic regression model to capture the impact of socio economic variables on child health care utilization.

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = \beta_1 + \beta_2 \text{wealth_index}_i + \beta_3 \text{literacy}_i + \beta_4 \text{health_insurance}_i + \beta_5 \text{edu yrs}_i + \beta_6 \text{number_of kids}_i + \beta_7 \text{region}_i + \beta_8 \text{residence}_i + \beta_9 \text{empl_status}_i + \beta_{10} \text{religion}_i + \beta_{10} \text{Age_hhh}_i + \beta_{10} \text{Sex_hhh}_i + \mu_i$$

Where

P_i = probability that the child (less than five years) had all the basic vaccination

$1-P_i$ = probability that the child did not get the basic vaccination

Objective three; To measure the inequality in maternal health care utilization across wealth quintiles.

To measure inequity in maternal health care utilization based on wealth status, we adopt the concentration index. The concentration curves and index are the most acceptable (Ganle et al., 2014; Wagstaff et al., 1999; O'Donnell et al., 2008; Alaba and Chola, 2014). The curves shows socio-economic inequality in health service utilization but it can not measure the magnitude of inequality. The concentration index which is directly related to the concentration curve does that.

$$C = 1 - 2 \int_0^1 L_h(p) dp$$

The index is bounded between -1 and 1 . The reason is that index takes up a negative value when the curve reclines above the line of equality, this indicates a disproportion in the concentration of health variable among the poor, and a positive value when it lies below the line of equality (O' Donnell et al 2012). For computation purpose, a more convenient formula for concentration index explains it in terms of the covariance between the the fractional rank in the living standards distribution and health variable (Kakwani 1980; Jenkins 1988; Lerman and Yitzhaki 1989),

$$C = \frac{2}{\mu} cov(h, r)$$

2.3 Description of variables

Li	Natural logarithm
Pi	Probability of attending four antenatal (in model one) (Dependent variable)
Pi	Probability of basic child vaccination (in model two) (Dependent variable)
health_insurance	A dummy variable that equals one if the respondent have any health insurance and zero otherwise. (Control variable)
rh_anc_4vs	A dummy variable that equals 1 if the woman utilized antenatal

	care four or more times before delivery and 0 if she did not (Dependent variable in model 1)
ch_allvac_card	A dummy variable that equals 1 if the child received all the basic vaccination and 0 if the child did not (dependent variable in model two)
eduyr	Years of education (Control variable)
wealth_index _i	Wealth of Respondent household ranked from poorest=1 to richest=5(Of primary interest)
region _i	Geographical region of respondent (six geographical region) (Control, variable)
Residence	A dummy variable that takes on the value 1 if urban and zero if rural.(Variable Of primary interest)
Mothers_edu	Mothers level of education (variable of Primary interest)
Age_hhh	Age of household head (Control variable)
Sex_hhh	Sex of household head 1=female and 0 =male (Control variable)
Numb_ofkids	Total number of kids in the ever delivered by the respondents (Control)
Religion	A nominal variable that takes 1= Christianity, 2=Islam and 3= others (Control variable)
Emply_status	An ordinal variable that takes on 3 values. 1= unemployed, 2 =once employed but not currently employed and 3= currently employed(Primary interest)
Literate	A dummy variable that equals one if the respondent have can read and write and zero otherwise (Of primary interest)

2.4 Model justification .

The logit model is a maximum likelihood estimation technique that is employed in estimating models that contains binary or dichotomous dependent variable. By using (CDF) a cumulative distribution function, the Logit model guarantees that the probability of having success lies between 0 and 1 Gujarati (2004).

Similarly , the concentration index is an appropriate measure of socioeconomic-related health (care) inequality. The Concentration Index is constant and unchanging to multiplication of the health sector variable of interest by a scalar (Kakwani 1980). Similarly, it does not matter whether health care is analyzed in terms of utilization per month or if monthly data are multiplied by 12 to give yearly figures. However, the concentration index is not constant to the linear transformation of a variable of interest. The addition of a constant to the variable will effect the change of value of the concentration index. In many applications this does not matter because there is no reason to make an additive transformation of the variable of interest.

2.5 Scope and source of data

The study will employ the Nigeria demographic and health survey (NDHS) data of 2018. The 2018 NDHS is a national sample survey that provides up-to-date information on demographic and health indicators. The sample was selected using a, two-stage, stratified cluster design, that had enumeration areas (EAs) as sampling units for the first stage. The second stage carried out through a complete listing of the

households that were carried out in each of the previously selected 1,400 EAs. The target groups were men age 15-59, women age 15-49 and children between the ages of 0-5 in randomly selected households across Nigeria. A representative sample selected for this survey were of approximately 42,000 households. The study utilized a sample of 33,924 child bearing women and children for this study.

To capture the specific objectives of the study, data on level of education, Number antenatal care visit by pregnant women, child vaccination information, employment status, total number of kids, availability of health insurance, place of residence, age of household head, Religion, Sex of household head, Region of residence, wealth index, and years of education. Data was accessed with permission from the World Bank Microdata website.

2.6 Research Design

The research design will employ in this research work is ex post facto method. This method will be chosen by the researcher because secondary data will be collected as no attempt is made to control or manipulate the relevant independent variables. In the case of this study, we employed secondary data from the Nigerian demographic health survey (NDHS) 2018 which was implemented by the National Population Commission (NPC) with the collaboration of the National Malaria Elimination Programme (NMEP) of Nigerian's Federal Ministry of Health. The 2018 NDHS is a national sample survey that provides up-to-date information on health indicators and demographic. This type of research is based on a scientific and analytical examination of dependent and independent variables. Independent variables are studied in retrospect for seeking possible plausible relations and the likely effects the changes in independent variables produce on a single or a set of dependent variables. In specifying the models, the closest socio economic variables which tend to influence maternal and child health in Nigeria were chosen. Variables used are Number antenatal care visit by pregnant women, child vaccination information, level

of education, employment status, age of household head, Sex of household head, total number of kids, availability of health insurance, place of residence, Religion, Region of residence, wealth index, and years of education. Models employed include the Binary logistic regression model and the Concentration index.

CHAPTER THREE

3.0 RESULTS

In this chapter, we present the results of the estimated binary logistic regression models and the estimates of the concentration index.

3.1 Socio Economic determinant of maternal health care utilization in Nigeria

Table 3.1. Socio economic variables and antenatal care utilization in Nigeria. N=33,924

VARIABLES	(1) Model 1 Logit	(2) Model 2 Odd ratio
rh_anc_4vs	Dependent var.	.
Ageyr	0.026** (0.011)	1.027** (0.001)
Health_insurance		

No	Base	
Yes		1.412***
	0.345***	
	(0.105)	(0.148)
Religion		
Christianity	Base	
Islam	-0.159***	0.853***
	(0.040)	(0.034)
Others	-0.730***	0.482***
	(0.135)	(0.065)
Literate		
No	Base	
Yes	0.208***	1.231***
	(0.042)	(0.052)
Years of education	0.074***	1.077***
	(0.004)	(0.005)
Emply_status		
Unemployed	Base	
Not Currently	0.465***	1.593***
Employed		
	(0.066)	(0.105)
Currently Employed	0.386***	1.471***
	(0.028)	(0.042)
Region		
North Central	Base	
North East	0.127***	1.136***
	(0.041)	(0.046)
North West	0.049	1.050

	(0.040)	(0.042)
South East	0.646***	1.907***
	(0.058)	(0.110)
South South	-0.402***	0.669***
	(0.052)	(0.035)
South West	0.682***	1.978***
	(0.056)	(0.112)
Residence		
Urban	Base	
Rural	-0.118***	0.889***
	(0.032)	(0.028)
Sex_hhh		
Male	Base	
Female	0.003	1.003
	(0.045)	(0.045)
Age_hhh	0.004***	1.004***
	(0.001)	(0.001)
Wealth_index		
Poorest	Base	
Poorer	0.434***	1.543***
	(0.035)	(0.054)
Middle	0.766***	2.152***
	(0.038)	(0.083)
Rich	0.940***	2.559***
	(0.046)	(0.118)
Richest	1.243***	3.468***
	(0.059)	(0.206)
Number_ofkids	-0.030***	0.971***
	(0.005)	(0.005)
Constant	-1.135***	0.321***

	(0.076)	(0.025)
Observations	33,924	33,924
Standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Table 3.1 shows the Socio economic determinant of inequality antenatal care utilization in Nigeria. The dependent variable `rh_anc_4vs` is a dummy variable that takes on the value 1 if the woman has atleast four or more antenatal care visits during last child birth and zero otherwise.

Evidence from the estimated Logit model shows having health insurance increases the probability of attending four or more antenatal visits during pregnancy. The impact is also statistically significant suggesting that health insurance is major determinant of antenatal care utilization by women during pregnancy. Estimates from the model suggests that the odd in favour of four or more antenatal care visits is higher by a factor of 1.027 for those who have health insurance compared to the base category which is women without any form of health insurance. One reason for this findings is that health insurance reduces the cost of health care utilization making it cheaper for women to utilize healthcare. Again most insured women are often educated, living in urban areas and more likely to appreciate the importance of health care utilization. (Nghargbu & Olaniyan, (2017))

Again, the study found that being a Christian increases the chances that a woman will have more than four antenatal visits during pregnancy compared to women of Islamic faith and other religions. The difference is also statistically significant indicating that religion may play a role in the utilization of antenatal care by women in Nigeria. For instance the Table shows that compared to women who are Christians the odd in favour of Muslim women utilizing antenatal care is lower by a factor 0.853 in the period under consideration.

On the other hand the study found that years of education and literacy levels increases the probability of antenatal care utilization in Nigeria. Education increases enlightenment. Women who are literate are more likely to access information about antenatal care and utilize same for improvement in their health status as well as that of their unborn child. For instance compared to women who are not literate, the odds in favour of attending four or more antenatal is higher by a factor of 1.27. the variable is also statistically significant.

Again the study found that being gainfully employed increases the odd in favour of antenatal care utilization in Nigeria. The study established that the log odds in favour of four or more antenatal care utilization is about 1.471 higher for women currently employed compared to the base category which is the unemployed category. One reason for this finding is that employed women are more likely to have more freedom and financial capacity to utilize antenatal care compared to women who are unemployed.

On the other hand the study found that residing in rural area as compared to an urban area reduces the odd that a pregnant woman will utilize antenatal care by a factor of 0.889. The impact is also statistically significant indicating that place of residence is an important determinant of health care utilization amongst pregnant women in Nigeria. One reason for this differentials is that most health facilities are concentrated in urban areas. Again, cultural belief prevalent in rural areas reduces maternal health care utilization in many rural areas.

The study also found that the higher the wealth index of a household, the more chances that a woman will utilize maternal health care. For instance, women from the richest household have an odd ratio higher by a factor 3.468 compared to women from the poorest household. The impact of household wealth on maternal health care utilization is also statistically significant in the period under consideration.

3.2. Socio Economic Determinant of child vaccination in Nigeria

Table 3.2. Socio economic variables and child immunization, N= 33,924

VARIABLES	(1) Logit Estimtion	(2) Odd ratio
ch_allvac_card		.
Health_insurance		
No	Base	
Yes	0.003 (0.109)	1.003 (0.109)
Religion		
Christianity	Base	

Islam	-0.246***	0.782***
	(0.057)	(0.045)
Others	-0.836***	0.434***
	(0.290)	(0.126)
Literate		
No	Base	
Yes	0.167**	1.182**
	(0.065)	(0.077)
Eduyr	0.044***	1.045***
	(0.007)	(0.007)
Emply_status		
Unemployed	Base	
Currently unemployed	0.284***	1.328***
	(0.105)	(0.139)
Currently Employed	0.176***	1.192***
	(0.049)	(0.058)
Region		
North Central	Base	
North East	0.009	1.009
	(0.068)	(0.069)
North West	-0.289***	0.749***
	(0.070)	(0.053)
South East	-0.043	0.958
	(0.069)	(0.066)
South South	-0.152**	0.859**
	(0.073)	(0.063)
South West	-0.269***	0.764***
	(0.069)	(0.053)

Residence		
Urban	Base	
Rural	-0.156***	0.855***
	(0.046)	(0.039)
Sex_hhh		
Male	Base	
Female	-0.171***	0.843***
	(0.064)	(0.054)
age_hhh	-0.001	0.999
	(0.002)	(0.002)
Wealth_index		
Poorest	Base	
Poorer	0.157**	1.171**
	(0.076)	(0.089)
Middle	0.397***	1.487***
	(0.076)	(0.113)
Rich	0.552***	1.737***
	(0.081)	(0.142)
Richest	0.728***	2.070***
	(0.089)	(0.185)
number_ofkids	-0.077***	0.926***
	(0.010)	(0.009)
Constant	-2.504***	0.082***
	(0.122)	(0.010)
Observations	33,924	33,924

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3.2 shows the impact of selected socio economic variables on child health care (proxied by child immunization). The dependent variable `ch_allvac_card` is a dummy variable that takes 1 if the child has completed all basic vaccination and zero otherwise.

With respect to the impact of household wealth on child vaccination, the estimated odds ratio indicate that compared to the poorest household, the odds in favour of full vaccination is 2.070 higher in the richest households. The impact is also statistically significant indicating that household wealth is an indicator of child vaccination. The reason is not far fetched, richer household have more resources to acquire vaccination for their kids without waiting to receive it for free from government and NGO's.

Again, mothers literacy increases the log odd in favour basic vaccination by 0.167 and. One reason for this positive relationship could be because more educated tend to appreciate better the importance of child vaccination and its impact on child's health. Moreover, education improves exposure about child health increasing the chances that children born to such women will receive basic vaccination .

Again mothers employment status have a positive impact on child health care utilization in Nigeria. For instance compared to children born to women who are unemployed, children born to currently employed women has a higher odds of receiving basic vaccination. Specifically, the odds of in favour of receiving basic vaccination is 1.328 higher for children who are born to women who are currently compared to those who are born to employed women.

Similarly, the study found a positive relationship between availability of health insurance and basic child vaccination in Nigeria.

On the other hand, the study found that residing in the rural areas, has a negative impact on child vaccination in Nigeria. For instance the study found that the odds in

favour of receiving basic vaccination is lower by a factor of 0.855 for children residing in the rural areas compared to those in the urban area. Inadequate provision of health care facilities in the rural areas coupled with cultural and traditional beliefs reduces the chances of receiving basic vaccination by children in the rural areas.

Furthermore, number of kids in a household was found to have a negative impact on the probability of receiving vaccination. One reason for this is that higher number of kids increases the dependency ratio and worsens household per capita income. The estimated model indicate having an additional child reduce the probability of child vaccination by a factor of 0.926. The variable is also statistically significant implying that it is a major determinant of basic child vaccination in Nigeria.

3.3 Inequality in maternal health care utilization .

To ascertain the level inequality in maternal health care utilization across wealth quintiles the study employed the concentration index popularized by Kakwani (1997). A positive value gives an indication that the health variable is more concentrated among individuals who are richer. As seen in cases of a variable for ill health, for example impairment in activities of daily living, a positive(+) value of the concentration index indicates that the rich are in a worse health situation than the poor. A negative value indicates the opposite, whereas a concentration index not very different from 0 reflects no relationship between income and health status Wagstaff et al (2011).

Using the necessary codes in stata (see O'Donnell et al (2008)), the estimated value of the concentration index for infant mortality in Nigeria was found to be 0.3014 (see appendix). The positive relationship implies that antenatal health care utilization in Nigeria is not evenly distributed but rather concentrated among the Rich. The impact is also statistically significant indicating that household wealth is a major determinant of inequality in maternal health care utilization. Similarly the results is in line with the findings of Okoli, Hajizadeh, Rahman and Khanam (2020) who found that there exists a significant inequality in antenatal care utilization with a positive bias towards the rich in the society.

CHAPTER FOUR

4.1 **Discussion**

The estimated models indicate that socio economic variables play significant roles in the utilization of healthcare among child bearing women and children in Nigeria. For instance the estimated Binary logistic models clearly show that mothers education, employment status, wealth status, urban residence and male household headship improves significantly the chances of maternal and child health care utilization in Nigeria. The impact of this variables are also statistically significant in most cases indicating that the variables plays a major role in determining health care utilization

in Nigeria. On the hand the study also found that rural residency, number of kids in the house and female household headship all impact negatively on the chances of maternal and child health care utilization in Nigeria.

The implications of this findings is not farfetched. Non-monetary dimensions of poverty and inequality plays a crucial role in the utilization of maternal and child health care in Nigeria. While government over the years have concentrated in building more primary health care facilities across the country, evidence from this study indicate that that alone may not be sufficient to tackle the inequality in the utilization of maternal and child health. A holistic approach must address gender economic imbalance in the society by introducing policies aimed at improving female labour force participation in Nigeria, female literacy and other poverty reduction policies that will improve woman agency, decision making power and overall health outcome

As evidenced from the estimated concentration index, there exist a statistically significant inequality in the utilization of healthcare in Nigeria in favour of the Rich. The implication is that child bearing women from richer households utilize this service more compared with their counterparts from poorer households. To reduce this gap and improve utilization, policies that are directed towards reduction in poverty will have a profound effect in bridging this gap.

4.2 **Conclusion**

The study is situated against a backdrop of inequality in maternal and child health care utilization amidst rising poverty and low standard of living in the country. After careful review of both empirical and theoretical literature, the study set to firstly, identify the socio economic determinant of antenatal care utilization and child vaccination in Nigeria and secondly, to ascertain if there is inequality in the utilization of antenatal care in Nigeria. The Binary logistic model and concentration index were utilized to achieve the set objectives of the research work. Data on antenatal care and child vaccination, household wealth index and other socio

economic variables was sourced from the Nigeria demographic health survey 2018. Findings from the estimated models reveal the following:

- i. Socio economic variables like household wealth quintile, Mothers literacy, availability of health insurance, Employment status of mother, urban residency improves access to antenatal utilization and child vaccination while household size, female headed households and rural residence have significant negative impact on antenatal care utilization and child vaccination in Nigeria
- ii. There exists a significant inequality in antenatal care utilization amongst women across different wealth quintiles with significant positive bias towards the rich.

4.3 Recommendations

The study revealed a number of interesting results which have policy implications; hence it is recommended that:

The study recommends that efforts to tackle maternal and child health care utilization should be holistically addressed and must include direct targeting of women in the rural areas by creating more health care facilities in the rural area and increasing literacy rate among women as this has a direct effect on health care utilization.

Creation of policies that supports women entrepreneurship development to empower and reduce poverty. This will improve women employment status and improve women decision making power with significant impact on healthcare utilization.

Significant relationship between availability of health insurance and maternal health care utilization implies that improving health care insurance coverage to cover the rural poor will go a long way in improving maternal and child health care utilization in Nigeria.

Economic factors such as employment status of women were found to good predictors of health outcomes in Nigeria The social change implications include the

reduction of child mortality attainment through effective gender bias policies on employment and education.

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```
. logit rh_anc_4vs ageyr i.health_insurance i.religion i.literate eduyr i.employ_
> status i.region i.rururban i.sex_hhh age_hhh i.wealth_index number_ofkids
```

```
Iteration 0: log likelihood = -23342.045
Iteration 1: log likelihood = -19519.664
Iteration 2: log likelihood = -19477.151
Iteration 3: log likelihood = -19477.019
Iteration 4: log likelihood = -19477.019
```

```
Logistic regression                Number of obs    =    33,924
                                   LR chi2(21)         =    7730.05
                                   Prob > chi2         =    0.0000
Log likelihood = -19477.019        Pseudo R2        =    0.1656
```

rh_anc_4vs	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
ageyr	.0264229	.010766	2.45	0.014	.0053219 .0475239
health_insurance					
No	0	(base)			
yes	.3448532	.1050323	3.28	0.001	.1389938 .5507126
religion					
christianity	0	(base)			
islam	-.1591477	.0395311	-4.03	0.000	-.2366272 -.0816681
others	-.7302991	.1352681	-5.40	0.000	-.9954196 -.4651786
literate					
No	0	(base)			
Yes	.2079896	.0424095	4.90	0.000	.1248685 .2911106
eduyr	.073844	.004477	16.49	0.000	.0650693 .0826187
employ_status					
Not employ..	0	(base)			
Not curcenn..	.4654203	.0661981	7.03	0.000	.3356744 .5951663
Curcennly ..	.385888	.0284835	13.55	0.000	.3300612 .4417147
region					
north cent..	0	(base)			
north east	.1274615	.0408984	3.12	0.002	.0473021 .2076209
north west	.0486595	.0402387	1.21	0.227	-.0302069 .1275259
south east	.6455034	.0578652	11.16	0.000	.5320896 .7589171
south south	-.4023833	.0524595	-7.67	0.000	-.5052021 -.2995646
south west	.6821725	.0564939	12.08	0.000	.5714465 .7928985
rururban					
urban	0	(base)			
rural	-.1180601	.0318054	-3.71	0.000	-.1803976 -.0557227
sex_hhh					
male	0	(base)			
female	.0026582	.0449853	0.06	0.953	-.0855115 .0908279
age_hhh	.0042696	.001123	3.80	0.000	.0020687 .0064706
wealth_index					
poorest	0	(base)			
poorer	.4335524	.0349277	12.41	0.000	.3650952 .5020095
middle	.766456	.0384725	19.92	0.000	.6910514 .8418606


```
. logit ch_allvac_card i.health_insurance i.religion i.literate eduyr i.emply_s
> tatus i.region i.rururban i.sex_hhh age_hhh i.wealth_index number_ofkids, or
```

```
Iteration 0: log likelihood = -10412.557
Iteration 1: log likelihood = -9774.2706
Iteration 2: log likelihood = -9691.5864
Iteration 3: log likelihood = -9691.4626
Iteration 4: log likelihood = -9691.4626
```

```
Logistic regression                               Number of obs   =   33,924
                                                    LR chi2(20)    =   1442.19
                                                    Prob > chi2    =   0.0000
Log likelihood = -9691.4626                       Pseudo R2      =   0.0693
```

ch_allvac_c~d	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]
health_insure					
No	1 (base)				
yes	1.00292	.1089536	0.03	0.979	.8105777 1.240902
religion					
christianity	1 (base)				
islam	.7821838	.044779	-4.29	0.000	.6991634 .8750623
others	.4336301	.125601	-2.88	0.004	.2457927 .765015
literate					
No	1 (base)				
Yes	1.181915	.0771837	2.56	0.010	1.039919 1.3433
eduyr	1.045412	.0070743	6.56	0.000	1.031638 1.05937
emply_status					
Not employ..	1 (base)				
Not curcenn..	1.327995	.1393889	2.70	0.007	1.081067 1.631324
Curcennly ..	1.192473	.0581304	3.61	0.000	1.083813 1.312027
region					
north cent..	1 (base)				
north east	1.009396	.0686597	0.14	0.891	.8834105 1.15335
north west	.7492528	.0526671	-4.11	0.000	.6528223 .8599273
south east	.9577235	.0659245	-0.63	0.530	.8368509 1.096055
south south	.8593241	.0627752	-2.08	0.038	.7446894 .9916052
south west	.7644236	.05298	-3.88	0.000	.6673286 .8756458
rururban					
urban	1 (base)				
rural	.8552783	.039279	-3.40	0.001	.781656 .9358348
sex_hhh					
male	1 (base)				
female	.8427312	.0537935	-2.68	0.007	.7436265 .9550438
age_hhh	.9991393	.0016572	-0.52	0.604	.9958965 1.002393
wealth_index					
poorest	1 (base)				
poorer	1.170511	.0887665	2.08	0.038	1.008844 1.358085
middle	1.486898	.1127342	5.23	0.000	1.281576 1.725114
richer	1.736654	.1415288	6.77	0.000	1.480283 2.037427
richest	2.070226	.1852142	8.13	0.000	1.737259 2.467011

```
. logit ch_allvac_card i.health_insurance i.religion i.literate eduyr i.empty_s
> tatus i.region i.rururban i.sex_hhh age_hhh i.wealth_index number_ofkids
```

```
Iteration 0: log likelihood = -10412.557
Iteration 1: log likelihood = -9774.2706
Iteration 2: log likelihood = -9691.5864
Iteration 3: log likelihood = -9691.4626
Iteration 4: log likelihood = -9691.4626
```

```
Logistic regression                Number of obs   =    33,924
                                   LR chi2(20)       =    1442.19
                                   Prob > chi2        =    0.0000
Log likelihood = -9691.4626        Pseudo R2      =    0.0693
```

ch_allvac_c~d	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
health_insurance					
No	0 (base)				
yes	.0029154	.1086364	0.03	0.979	-.2100081 .2158388
religion					
christianity	0 (base)				
islam	-.2456655	.0572487	-4.29	0.000	-.3578708 -.1334602
others	-.8355633	.28965	-2.88	0.004	-1.403267 -.2678598
literate					
No	0 (base)				
Yes	.167136	.0653039	2.56	0.010	.0391427 .2951293
eduyr	.044411	.006767	6.56	0.000	.0311479 .0576741
empty_status					
Not employ..	0 (base)				
Not curcenn..	.2836705	.1049619	2.70	0.007	.0779489 .489392
Curcennly ..	.1760292	.0487478	3.61	0.000	.0804852 .2715731
region					
north cent..	0 (base)				
north east	.0093526	.0680206	0.14	0.891	-.1239653 .1426705
north west	-.2886789	.0702928	-4.11	0.000	-.4264503 -.1509074
south east	-.0431961	.0688345	-0.63	0.530	-.1781094 .0917171
south south	-.1516091	.0730518	-2.08	0.038	-.2947881 -.0084302
south west	-.2686331	.0693071	-3.88	0.000	-.4044726 -.1327936
rururban					
urban	0 (base)				
rural	-.1563284	.0459254	-3.40	0.001	-.2463405 -.0663163
sex_hhh					
male	0 (base)				
female	-.1711073	.0638324	-2.68	0.007	-.2962164 -.0459981
age_hhh	-.0008611	.0016586	-0.52	0.604	-.0041119 .0023897
wealth_index					
poorest	0 (base)				
poorer	.1574406	.0758357	2.08	0.038	.0088053 .3060758
middle	.396692	.0758184	5.23	0.000	.2480906 .5452933
richer	.5519606	.0814951	6.77	0.000	.3922331 .711688
richest	.727658	.0894657	8.13	0.000	.5523085 .9030075

```

. egen raw_rank=rank(wealth_index), unique

. sort raw_rank

. quietly sum weight

. gen wi=weight/r(sum)

. gen cusum=sum(wi)

. gen wj=cusum[_n-1]
(1 missing value generated)

. replace wj=0 if wj==.
(1 real change made)

. gen rank=wj+0.5*wi

. qui sum ch_allvac_c~d [fw=v005]

. scalar mean=r(mean)

. cor ch_allvac_c~d rank [fw=v005], c
(obs=34,192,765,354)

```

	ch_all~d	rank
ch_allvac_~d	.084372	
rank	.01444	.081007

```

. sca c=(2/mean)*r(cov_12)

. sca list c
      c = .31045456

.
end of do-file

```

