2016

Use of Maternal Health Services and Pregnancy Outcomes in Nigeria

Abubakar Sadiq Umar
Walden University

Walden University

College of Health Sciences

This is to certify that the doctoral dissertation by

Abubakar S. Umar

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Chinaro Kennedy, Committee Chairperson, Health Services Faculty
Dr. Hebatullah Tawfik, Committee Member, Health Services Faculty
Dr. Daniel Okenu, University Reviewer, Health Services Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2016

Use of Maternal Health Services and Pregnancy Outcomes in Nigeria

by

Abubakar S. Umar

MHPM, University of Maiduguri, 2011

MPH, Usmanu Dan Fodiyo University, 2000

MBBS, University of Maiduguri, 1992

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

January 2016

Abstract

Maternal health services (MHS) provide primary, secondary, and tertiary levels of prevention to achieve better pregnancy outcomes. However, use of prenatal and natal services among Nigerian women has been ranked among the lowest in the world and, consequently, the country is among the 10 countries with the highest maternal mortality ratio. Moreover, nationwide community-based studies on the use of maternal health services in Nigeria are limited. To address this gap, this quantitative, cross-sectional study analyzed the 2008 Nigerian Demographic and Health Survey (NDHS) data to identify whether Nigerian women's biological, cultural, and socioeconomic characteristics are associated with their use of MHS and pregnancy outcome as measured by number of antenatal visits, place of delivery, and fetal outcome. The Anderson's health behavior model was used as the theoretical framework for this study. Respondents were women aged 15 – 49 years (N= 31,985), who had given birth between January 2003 and December 2008. Bivariate and multiple logistic regressions were conducted. The results indicated that religion, education, income, and availability of skilled health workers showed consistent significant statistical association with both the number of ante natal care (ANC) visits and place of delivery even after controlling for covariates. Overall, these findings have potential for social change on the choice of public health interventions with collaboration with social services such as education, community, and labor sectors. Further, a systematic involvement of local communities is needed to drive specific culturally-sensitive interventions.

Use of Maternal Health Services and Pregnancy Outcomes in Nigeria

by

Abubakar S. Umar

MHPM, University of Maiduguri, 2011

MPH, Usmanu Dan Fodiyo University, 2000

MBBS, University of Maiduguri, 1992

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

January 2016

Dedication

To the Nigerian Women who are victims of poor cultural practices, policies, and governance.

Acknowledgements

I am greatly indebted to my dissertation chair, Dr. Chinaro Kennedy, for her leadership, encouragement, and patience. I am also grateful to other committee members, Dr. Hebatullah Tawfik and Dr.Daniel Okenu, for their guidance and support. I would like to acknowledge ORC Macro and ICF International Calverton Maryland, USA, for granting me the permission to use the 2008 Nigerian Demographic and health Survey dataset. Finally, I am grateful to my family, Dr. Bello Arkilla, and all my course mates who have made the journey pleasant and educative.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

ANC: antenatal care

CDC: Centers for Disease Control and Prevention

DHS: Demographic and Health Survey

HF: Health Facility

IMR: Infant Mortality Rate

MDG: Millennium Development Goals

MHS: Maternal Health Services

MMR: Maternal Mortality Ratio

NDHS: Nigerian Demographic and Health Survey

NPC: National Population Commission

PNC: Postnatal Care

PoD: Place of Delivery

SBA: Skilled Birth Attendant

TRA: Theory of Reasoned Action

UNDP: United Nation Development Program

UNFPA: United Nations Fund for Population Activities

UNICEF: United Nations Children Endowment Fund

USAID: United States Agency for International Development

WCBA: Women of Child Bearing Age

WHO: World Health Organization

Chapter1: Introduction to the Study

Introduction to the Problem

Childbirth, even though a normal physiological process, has been associated with risks, which sometimes lead to loss of life. This fact is recognized and acknowledged in all cultures. Since the introduction of modern medicine, significant concern has been raised regarding the issue of improving maternal health services (MHS) to reduce morbidity, disability, and mortality due to pregnancy and the process of delivery. The World Health Organization (WHO), estimated 289,000 cases of maternal deaths were recorded in 2013 (WHO, 2014), indicating 2,000 more deaths compared with 2011 (WHO, 2013a). Majority (99%) of these deaths were in the developing countries. However, 65% of these deaths are recorded in five Asian countries (Afghanistan, Bangladesh, India, Indonesia, and Pakistan) and six sub-Saharan African countries (Democratic Republic of the Congo, Ethiopia, Kenya, Nigeria, Sudan, and Tanzania) (WHO, United Nations International Children Endowment Fund [UNICEF], United Nations Fund for Population Activities [UNFPA], & World Bank, 2010). Among sub-Saharan Africa countries, the worst performing countries are in the West African region, which has the highest lifetime risk (1 in 26) of a woman dying as a result of direct and indirect pregnancy related complications (WHO et al., 2010). Further, many pregnancies result instill births or are followed by neonatal deaths. In 2010, a total of 135 million babies were born, of which an estimated 3.1 million died in the first 28 days of life (UNICEF, 2012). The picture becomes more appalling given that more than 1 million other pregnancies ended with still births. However, a wide disparity exists between the developing and

the industrialized nations, with 99% of the estimated neonatal deaths in 2010 from developing countries (WHO et al., 2010).One of the major reasons for developing countries accounting for almost all of the global neonatal deaths was the lack of a systematic confidential inquiry into each case, as was done in the developed countries (Lawn, Causens, & Zupan, 2005). Regrettably, findings from these confidential inquiries have set the tune for public health programs in the developing countries despite their small sample sizes and wide variations in economic, political, social, and cultural norms. Further, mother-child relationships vary between the industrialized and developing countries. The inappropriateness of using information from developed countries to develop intervention programs for the developing countries made Lawn et al. (2005) dubbed the "inverse information and care law" (p.,891). The continued high neonatal deaths recorded in Africa and Asia for decades simply raises concerns, such as the following: To what extent are intervention programs in these regions developed from studies conducted in communities with the high number of maternal and neonatal deaths?

Studies have demonstrated that the magnitude and pattern of maternal and neonatal deaths are associated with the use of MHS. In general, the reduction in poor pregnancy outcomes was attributed to the increasing access and use of antenatal and skilled delivery services (WHO et al., 2010). The high number of maternal and perinatal deaths is a reflection of the availability, comprehensiveness, affordability, and the quality of MHS. These developing countries have significant proportions of high-risk pregnancies coupled with the low use of modern antenatal and skilled delivery services; the likelihood of maternal and perinatal fetal deaths is higher (WHO et al., 2010). High-risk pregnancies, such as pregnant teenagers, pregnancies among

women older than 35 years, short intervals between births, and grand multipara, were found to be commonly associated with high incidence of direct obstetric causes of maternal (Adeoye, Onayade, & Fatusi, 2013; WHO et al., 2010; UNICEF, 2012) and neonatal deaths (Lawn et al., 2005; Owais et al., 2013). The effect of poor access and use of MHS is evidenced by the fact that 14 of the 18 countries with the highest neonatal deaths (> 45/1,000 live births) (Lawn et al., 2005) and 6 of the 11 countries with the highest maternal mortality ratio (MMR) (WHO et al., 2010) were sub-Saharan African countries, including Nigeria. These countries with poor pregnancy outcomes all have unequal access to MHS, resulting from geographical, economic, cultural, and/or technical barriers (Coast et al., 2012; Mselle, Moland, Mvungi, Evjen-Olsen, & Kohi, 2013).Women in the lowest income quartile were more marginalized due to their inability to pay for services rendered (Coast et al., 2012; Obiechina & Ekenedo, 2013; United Health Foundation, 2011).

The primary objective of the MHS is to provide qualitative health promotion (health education, counseling), specific protective measures (immunization, family planning, antimalarial drugs, nutrition, iron, and folic acid supplement), early diagnosis of high-risk pregnancies, and rehabilitative care for pregnancy related complication such as vesico-vaginal fistula and puerperal psychosis. To improve the quality, accessibility, and use of MHS along the levels of prevention mentioned above, a robust surveillance system is needed to provide comprehensive and timely data; however, such a system was reported to be largely lacking or incomprehensive in more than two-thirds of the developing countries (WHO, 2013b). Moreover, most of the strategies for improving maternal and child health were based on reports and studies from the developed countries, which contribute only 1% of the annual

neonatal deaths. This approach of using data from the develop countries to address issues in the developing countries did not address differences in prevailing socioeconomic, political, and cultural contexts between the developed and the developing countries and, thus, was inappropriate and less effective (Coast et al., 2012; Lawn et al., 2005). Thus, research in such countries will reduce the knowledge gaps due to the reported weak surveillance system. Further, research may shed light on the use of MHS and its effect on pregnancy outcomes and data driven area specific intervention to reduce maternal and child mortality.

Background for the Study

Nigeria had a maternal mortality ratio (MMR) of 630 per 100,000 live births in 2010. These rates are better than only sub-Saharan African countries that have experienced war or political instability, such as Sierra Leone, with an MMR of 890 per 100,000 live births; Liberia, with MMR of 777 per 100,000 live births; and Chad, with an MMR of 1,100 per 100,000 live births during same period (WHO, 2013a). Nigeria's high MMR (630 per 100,000 live births) may be partly due to women's low use of MHS (WHO, 2013a). For instance, 47% of the estimated 8.3 million pregnant women received no antenatal care in 2010, whereas among those who did, 45% made less than the recommended number (i.e., four) of ante-natal care visits (WHO, 2013a). Only 38% of all deliveries in Nigeria are attended by skilled health workers (WHO, 2013a). Moreover, significant maternal health disparities exist in different parts of Nigeria. Women living in the Northern regions of Nigeria have the highest risk of dying from pregnancy and delivery complications compared with women residing in other regions of the country (National Population Commission & ICF Macro, 2009).

The Demographic and Health Survey (DHS) estimated a maternal mortality ratio of 545 per 100,000 live births, with the true values likely ranging from 475 deaths in the southwestern zones to 615 deaths in the northeastern zone per 100,000 live births (National Population Commission & ICF Macro, 2009). This is an underestimation compared with the reported 630 per 100,000 live births (WHO, 2013a) and might be due to low sensitivity of maternal death surveillance (WHO, 2013b) and poor record keeping of vital events such as births and deaths (Health Reform Foundation of Nigeria, 2007).

Similarly, in 2010, Nigeria was among the top 12 countries with the highest neonatal mortality rates of ≥ 40/1,000 live births (UNICEF, 2012). However, sub-Saharan African countries have laid claim to 8of the 12 countries, with the west (Nigeria, Cote Devoir, Mali, Sierra Leone) and central regions (Angola, Central African Republic, Guinea Bissau, Chad) having the worst neonatal mortality (NMR) experience ranging from 40 − 48/1,000 live births. Similar to the MMR statistics, Nigeria performed no better than war-torn countries such as Mali, Sierra Leone, Central African Republic, and Chad despite being the eighth-largest oil exporter in the world.

The national average of 40/1,000 live births is far below what was reported in other studies. For instance, a study in Jigawa State, North Western Nigeria, has found an NMR of 46/1,000 live births, suggesting 6 percentage points higher than the WHO (2013a) and UNICEF (2012) estimates for Nigeria. This suggests a possibility of under reporting and high proportion of home deliveries, because vital events in Nigeria were reported to be incomplete (WHO, 2013b; Guerrier et al., 2013; Mselle et al., 2013; Owais et al., 2013). However, the study was a hospital-based study that

reviewed data for a period of 8 months; therefore, the study is not a fair representation of the target population by time and place, because it is a referral hospital and is more likely to receive delayed and moribund cases that ultimately push the rates reported by the authors. Moreover, based on WHO and UNICEF estimates, nearly two-thirds of all deliveries in Nigeria are conducted outside modern health facilities. These figures suggestion that institutional studies use unrepresentative samples; they should not be generalized or appropriately comparable to community-based studies.

The reasons for high maternal and neonatal mortality rates in Nigeria include the lack of optimal use of antenatal and delivery services (Mselle et al., 2013; Owais et al., 2013), cultural barriers to accessing modern health services (Coast et al., 2012; Titaley, Hunter, Dibley, & Heywood, 2010), costly transportation fares and fees for services rendered, (Coast et al., 2012; Obiechina & Ekenedo, 2013; United Health Foundation, 2011), lack of knowledge on the benefits of using modern health services (Ezugwu et al., 2014; Fatso et al., 2009; Magoma et al., 2010; Onah et al., 2006), poorly equipped health facilities (Guerrier et al., 2013; Olusanya, 2011), and the low status of women in highly patriarchal communities of sub-Saharan Africa (Adamu & Salihu, 2002; Idris et al., 2006; Magoma et al., 2010).

The use of MHS and pregnancy outcome is not uniform within the six geopolitical zones of Nigeria. The Northeastern and western parts of the country have the lowest rates due to differences in the availability and distribution of health resources (Health Reform Foundation of Nigeria, 2007). Thus, the distribution of health facilities and availability of skilled health workers have implications on the use of MHS and pregnancy outcomes. For instance, although the Northwestern region was ranked second in terms of the average number of government owned health

facilities (Health Reform Foundation of Nigeria, 2007), however, the region has higher MMR compared to the Southern and Central parts of Nigeria (Health Reform Foundation of Nigeria, 2007; National Population Commission & ICF Macro, 2009).

Further, despite the fair distribution of health facilities, some states in the Northern region of Nigeria have lower use of MHS than other parts of the country. For instance, in Sokoto State, less than 50% of pregnant women had attended four antenatal clinic sessions and more than 60% of all deliveries occurred at home and were attended by unskilled persons (National Population Commission &ICF Macro, 2009). One of the plausible factors that impede the use of MHS is religion. Studies have reported that Muslim women in Northern Nigeria are less likely to deliver in health facilities or attended by skilled delivery compared to their Christian counterparts in the Southern region of the country (Babalola & Fatusi, 2009).

However, a study conducted in Southwest Nigeria, who are predominantly of Yoruba ethnicity and Christians, reported that at least two thirds of the respondents delivered in homes and at least 80% of those that delivered in homes used unskilled birth attendants (Adelaja, 2011). Moreover, 67% and 33% of the total home deliveries were reported to be planned and unplanned respectively. For those who reported to have planned home deliveries, the reason cited was convenience and comfort, while those reporting unplanned home deliveries cited obstacles such as sudden labor pains, lack of transportation, no person to accompany the mother to the hospital, and cost (Adelaja, 2011). This demonstrate that, religion might not be the only underlying reason for the practice of home delivery in Nigeria and calls for studies with participants drawn from various sub-strata of the Nigeria, which this research aims to achieve.

Thus, the reasons for the negative correlation between the number of health facilities and use of MHS during pregnancy and delivery are difficult to generalize and require population specific investigations. Reasons could be due to socio-cultural factors that determine the status of women, and their inability to take decisions independently on issues regarding their health, which may prevent them from going out of their homes to access health care.

Although, proximity to MHS is known to be associated with increased use of MHS (Ahmed et al., 2010; Babalola & Fatusi, 2009; Vinikoor-Imler, Messer, Evenson, & Laraia, 2011), the roles of cultural practices and their interactions with the economic, educational and empowerment status of women is unknown in developing countries including Nigeria. A plausible reason for this may be the differences in the ethnic and religious composition of the population. Ethnic and religious affiliations are known to shape attitudes and behaviors regarding women's autonomy, use of MHS, and pregnancy outcomes among segments of the population in a given geographical area. This calls for a population specific research to guide interventions that are culturally tolerable. Hence, research may shed light on the determinants of the use of MHS in a homogenous population, with a view to develop data driven intervention programs that will enhance the community demand and use of MHS.

Unfortunately, there seems to be a dearth of local research studies in Nigeria. For instance, of the 2,500 articles reviewed by Gil-González and colleagues (2006), only 3 articles (1.2%) were from Nigeria. A similar review by Say and Raine (2007), reported only 5 (0.1%) articles from Nigeria out of the 5,575 articles reviewed, thereby reinforcing the dearth of data on the use of MHS in Nigeria (WHO, 2013a).

One of the plausible reasons is that, most published studies in Nigeria, were hospital-based and focused more on direct (obstetric) and indirect (non-obstetric, medical) causes of death such as hemorrhage, eclampsia, obstructed labor, ruptured uterus, sepsis, malaria and anemia in pregnancy (Khan, Wojdyla, Say, Gulmezoglu, & Van Look, 2006; Say & Raine, 2007).Generally, hospital based studies does not shed light on antecedents before reaching a health facility arriving like delays in taking the decision to seek medical care, and the commencement of appropriate treatment(Say & Raine, 2007).

Problem Statement

Although, studies have provided data driven approaches to improve access and use of MHS in many parts of the world; in Nigeria, national reviews of maternal morbidity, mortality and disability are not carried out regularly or systematically. Periodic reviews shed light on the interaction of variables operating at the level of the family and community that determines the status of women in terms of their socioeconomic standing and pregnancy outcomes. This underscores the need for population based studies to understand the factors that lead to the underutilization of modern maternity services that invariably leads to high numbers of maternal and fetal deaths.

The use of DHS data provides an opportunity to explore factors that are associated with the use of MHS and how it impacts on pregnancy outcomes. This study has the potential to provide relevant information at the population level that might improve the perception and use of MHS by families and communities, which will ultimately reduce maternal and neonatal mortality in Nigeria. Moreover, although

it is apparent that Nigeria will not achieve the objective of the Millennium Development Goals (MDG) to reduce the maternal and child deaths by two thirds by 2015, it is important to understand the factors responsible for the failure to achieve the MDGs.

Nature of the Study

A secondary data analysis, using a quantitative cross-sectional study design was used to examine the association between biologic, socioeconomic and cultural factors and the use of MHS. Additionally, this study has examined the association between pregnancy outcome and the use of MHS. Permission to access the DHS data for Nigeria was sought from ORC Macro and ICF International based in Calverton Maryland, USA. Periodic DHS were currently conducted in over 70 countries from 1984 to date (United State Agency for International Development [USAID] & ICF Macro, 2006). Currently the database is housed in the domain called MEASURES DHS+ and generally supported by the USAID. Further, permission to carry out the study using DHS data was granted by the Institutional Review Board (IRB) of Walden University with approval number 01-23-15-0338613.

Strengths, Limitations and Delimitations

A pretested standardized data collection tools were used to collect the DHS data from 33,385 women form all states using proportionate to size two stage cluster sampling technique (National Population Commission & ICF Macro, 2009). One advantage of secondary data is it requires fewer resources (money and time) compared to primary data collection (Kozial & Arthur, 2011). Moreover, the large

sample size and appropriate representation of sub-groups of the target population enhances the external validity (Yiannakoulias, 2011) and statistical precision (Kozial & Arthur, 2011). These are necessary concerns for valid generalization of findings beyond the study sites particularly when policy reviews are being considered in areas other than the study areas.

However, there are some limitations (a) The DHS data is basically a cross sectional study design and therefore does not provide causality, but rather just associations between the independent and outcome variables; (b) in this study not all pregnancy outcomes were assessed. For instance, pregnancy outcomes such as puerperal psychosis, pregnancy related suicide, and vesico-vaginal fistula were not assessed even though they may be influenced by the bio-socio demographic variables, level of women's autonomy and the use of MHS. This is because, not all pregnancy outcomes are available in the DHS data set. This limitation might undermine the calculated statistical associations, because the exclusion of some pregnancy outcomes (puerperal psychosis, pregnancy related suicide, and vesico-vaginal fistula) will under estimate the actual total number of women that have used MHS; (c) The DHS data was primarily based on individual level information might not be a true reflection of the community; (d) Mapping of available health resources (health facilities, skilled health workers, services provided, funding received during period under review), was not undertaken. Thus spatial discrepancy on the pattern of utilization of MHS and pregnancy outcomes using the Geographical Information System (GIS) was not explored, as it is beyond the scope of this study and is an area for future research; (e) The use of secondary data does not allow the Researcher to reduce the effect of confounders that were noted in other similar studies, because the primary stage to

institute control on possible effect of confounders is during primary data collection and hence the data may not be in tune with some research questions (Smith et al., 2011). Similarly, the data tool is usually designed to answer specific study construct which might not have adequate information required during secondary data analysis (Kozial & Arthur, 2011). However, since the DHS website provides the actual raw data (National Population Commission & ICF Macro, 2009), such limitations mentioned above can be overcome by manipulating variables in the raw data set using the Statistical Package for Social Sciences (SPSS) (Sorensen, 1996). .

General assumptions

This work was based on the following assumptions based on some information in chapter two (literature review):

1. The use of antenatal, natal and post-natal care services depends on some predisposing factors which in the context of the theoretical framework of this study includes the biological characteristics of women (age and parity), their cultural affiliations (religious beliefs, tribal group/ethnicity) and their socioeconomic characteristics such as level of education, family income levels and where they live. These predisposing factors may have significant influence on the cultural health capital which will ultimately influence when, where, how frequent and from whom to seek for MHS. In particular, the predisposing factors has potential to affect how early a woman may seek for health care services from appropriate sources as it borders on knowing where to go and capacity to afford services rendered in a given health facility or service provider. This may manifest as delay in making decision to seek for

medical care and delay between taking decision and reaching the health facility.

2. The use of MHS depends on several enabling factors such as a) availability of health services, b) accessibility of health services in terms of distance from a woman's place of domicile; cost of services to be rendered, cost of transport, terrain, referral system including free ambulance services and the availability of communication gadgets such as telephones, hand held two way radios and email services. These enabling factors fall within the second and third levels of delay in relation to the 3D model of Thaddeus and Maine (1994).
3. The use of antenatal, natal and post-natal care services is related to several need factors such as severity of condition, previous obstetric history/experience and perceived quality of services rendered in a given health facility. These perceived needs may manifest as delay in taking decision in terms of why, where and from whom to seek for skilled medical care.
4. The use of MHS might be influenced by a combination of several predisposing, enabling and need factors.

Finally, the 2008 DHS data sampling is assumed to have minimized or totally eliminated sampling (systematic or random) and instrumental errors through the use of appropriate sampling strategies, having a large sample size of 33,385 respondents, weighing of the data and instrumental reliability test

Purpose of the Study

The purpose of this study is to address the gaps identified in the literature by testing the Anderson health behavior model (Anderson, 1995). The model provides

constructs to describe the relationship between biological, cultural or socioeconomic characteristics to (1) the use of MHS and (2) pregnancy outcomes among Nigerian women using 2008 DHS data.

Theoretical Framework

The Anderson health behavior model provides a framework to analyze the determinants of use of health services (Anderson, 1995). The model was first developed in 1968 and presently made up of three sets of individual and community level factors that provide constructs to assess individuals' capacity to access and use health services. The three main set of factors or characteristic of the model are a) predisposing characteristics; b) enabling characteristics and c) need characteristics (Figure 1).

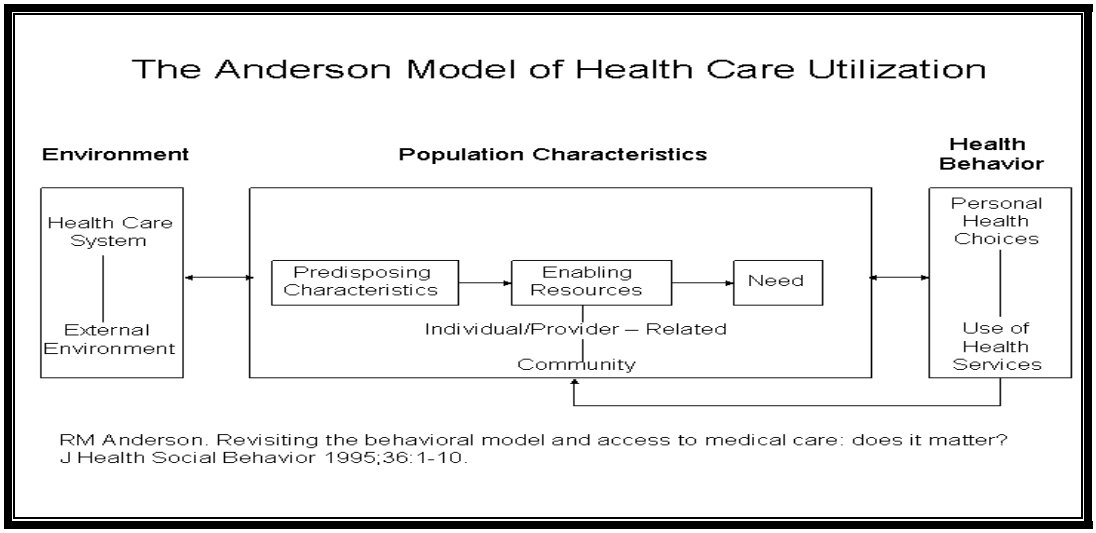


Figure 1. The Anderson model of the use of health care.

The predisposing factors are the bio-socio-demographic variables and are assumed to explain the observed differences in the use of health services. In the

context of this study, it means certain biological (age and parity), cultural (religious beliefs, ethnicity, female autonomy) and socioeconomic characteristics (education, income levels, place of domicile, marital status) will predispose some women to use or not to use MHS which could positively or negatively influence the outcome of pregnancy. Although, this work has focused on predisposing factors at individual level, the model caters for predisposing factors at community level that are known to influence the use of MHS (Anderson & Newman, 2005).These community level factors include the demographic profile of the community, collective and organizational values, cultural beliefs and political viewpoints. The cultural characteristics of a woman included the expected stereotype behavior of a pregnant women in a given community, tribe or religion which shape a woman's attitude to pregnancy and her use of MHS. Those with appropriate knowledge, positive attitude and behavior on the efficacy and effectiveness of MHS are likely to use these services (Anderson & Newman, 2005).

The enabling factors includes health care financing mechanism and the availability of health resources at individual and community levels that are required in order to access and afford the cost implication of services rendered in health facilities. At the individual level, factors that may influence health care use are personal income and whether an individual has a comprehensive health insurance policy or not (Anderson & Newman, 2005).The community level enabling factors include geographical accessibility of health services. For example, the number of health facilities and skilled health worker within a specific geographical location and per population density (Anderson & Newman, 2005).This ultimately has implications on

travel time and the time between reaching the health facility and the commencement of treatment.

The need characteristics include two factors which are perceived need and evaluated needs (Anderson & Newman, 2005).Perceived need is based on personal self-assessment of individual's state of health and previous experiences with symptoms and signs. Evaluated need is based on clinical and laboratory assessment by a skilled health worker that guide informed decision on what type of health services the individual may require. It is important to stress that the focus of this study does not include evaluated needs because the DHS data does not have information on evaluated needs (National Population Commission, Nigeria & ICF Macro, 2009).

The model examined conditions, processes and relationships at various levels of the society that defines the autonomy of individuals, how it affects the use of health services and outcomes. This study used secondary analysis of the 2008 DHS data to assess the use of MHS and pregnancy outcomes in Nigeria, in relation to the predisposing, enabling and need based characteristics of Nigerian women in the reproductive age group (15 − 49 years). The DHS data included questions that elicited culturally related reasons for the use of MHS, which shed light on the degree of cultural empowerment of sampled women across the socioeconomic gradient among the different tribal and religious affiliations of Nigerians.

The socioeconomic aspect of the theoretical framework was based on how socioeconomic variables enhance or delimit the access and use of MHS by pregnant women in Nigeria. This approach was appropriate for my dissertation which aims to assess the factors that influence the empowerment status of women, the use of MHS and pregnancy outcomes (still birth/live birth) in both homogenous and heterogeneous

communities in a country with diverse religions and 374 ethnic/tribal groups (National Population Commission & ICF Macro, 2009). Findings of the study may bridge the gap reported by Ahmed et al., (2010) on the lack of clear information on the role of cultural practices and how they interact with economic, educational and empowerment status of women in developing countries.

Definition of Terms

Below is the definition of terms and variables used in the study.

Use of Antenatal Care: The proportion of pregnant women who had attended ante natal clinic at least one and or four times those that attended four times and service was provided by skilled health worker (doctors, nurse, midwives) (WHO et al., 2010).

Autonomy: The extent to which a woman is capable to make independent decisions and take appropriate action on matters bordering on their reproductive health choices and behaviors (Burchardt, Evans, & Holder, 2010).

Contraceptive Prevalence: The number of women in married or in union who are on modern contraception methods (UNICEF, 2012).

Fertility Rate: The number of children who will be born per woman if she live to the end of her child bearing years and bore children at each age in accordance with the prevailing age specific fertility rate (WHO, 2005).

Home Deliveries: The proportion of women that gave birth in homes or places that are not health care facility (UNICEF, 2012).

Institutional Deliveries: The proportion of women that gave birth in modern health facilities whether public or private (UNICEF, 2012).

Life Time Risk: A woman's risk of dying as a result of pregnancy and puerperium over the course of her life (WHO et al., 2010).

Maternal Death: The death of any woman while pregnant or within 42 days of termination of pregnancy, from any cause related to or aggravated by pregnancy or its management, irrespective of the duration and site of the pregnancy, but not from accidental or incidental causes (WHO et al., 2010).

Maternal Mortality Rate: The number of maternal deaths among women in the reproductive age-group (15 − 49 years) in a particular year (WHO et al., 2010).

Maternal Mortality Ratio: The number of maternal deaths per 100,000 live births in given year (WHO et al., 2010).

Neonatal Mortality Rate: The proportion of new born that died within the first 28 days of life per 1000 live births (WHO, 2005).

Parity: Number of life births a woman had as at the time of survey (UNICEF, 2012).

Traditional Birth Attendants: Refers to non-formally trained community based individuals that provide prenatal, natal and post-natal care.

Skilled Health Worker**:** A doctor, nurse or midwife (UNICEF, 2012).

Skilled Birth Attendant**:** Deliveries conducted by a health worker (UNICEF, 2012).

Research Questions and Hypothesis

Research Question (RQ) 1: Are Nigerian women's biological characteristics as measured by age and parity (number of children a woman has) associated with

women's use of MHS as measured by number of antenatal visits and place of delivery?

Research Hypothesis (RH) 1:

H_{01A}: There is no significant statistical association between a woman's age and her use of MHS as measured by the number of antenatal visits and place of delivery.

Ha_{1A}: There is a significant statistical association between women's age and their use of MHS as measured by the number of antenatal visits and place of delivery.

H_{01B}: There is no significant statistical association between the number of children a woman has and her use of MHS as measured by the number of antenatal visits and place of delivery.

Ha_{1B}: There is a significant statistical association between the number of children a woman has and her use of MHS as measured by the number of antenatal visits and place of delivery.

RQ2: Are Nigerian women's cultural characteristics as measured by religious beliefs, ethnicity, marital status and female autonomy, associated with women's use of MHS as measured by number of visits and place of delivery?

RH 2:

H_{02A}: There is no significant statistical association between the religious beliefs of women and their use of MHS as measured by the number of antenatal visits and place of delivery.

Ha_{2A}: There is a significant statistical association between the religious beliefs of women and their use of MHS as measured by the number of antenatal visits and place of delivery.

H_{02B}: There is no significant statistical association between the ethic affiliation of women and their use of MHS as measured by the number of antenatal visits and place of delivery.

Ha_{2B}: There is a significant statistical association between the ethnic affiliation women and their use of MHS as measured by the number of antenatal visits and place of delivery.

H_{02C}: There is no significant statistical association between the level of female autonomy and a woman's use of MHS as measured by the number of antenatal visits and place of delivery.

Ha_{2C}: There is a significant statistical association between the level of female autonomy and a woman' use of MHS as measured by the number of antenatal visits and place of delivery.

H_{02D}: There is no significant statistical association between marital status and her use of MHS as measured by the number of antenatal visits and place of delivery.

Ha_{2D}: There is a significant statistical association between marital status and her use of MHS as measured by the number of antenatal visits and place of delivery.

RQ 3: Are Nigerian women's socioeconomic characteristics as measured by geopolitical zone of residence, level of education, income levels, and place of domicile associated with use of MHS as measured by the number of ante-natal visits and place of delivery?

RH 3:

H_{03A}: There is no significant statistical association between a woman's geopolitical zone of residence and the use of MHS as measured by the number of antenatal visits and place of delivery.

Ha$_{3A}$: There is a significant statistical association between a woman's geopolitical zone of residence and the use of MHS as measured by the number of antenatal visits and place of delivery.

H_{03B}: There is no significant statistical association between a woman's level of education and the use of MHS as measured by the number of antenatal visits and place of delivery.

Ha$_{3B}$: There is a significant statistical association between a woman's level of education and the use of MHS as measured by the number of antenatal visits and place of delivery.

H_{03C}: There is no significant statistical association between the income level of a woman and the use of MHS as measured by the number of antenatal visits and place of delivery.

Ha$_{3C}$: There is a significant statistical association between the income level of a woman and the use of MHS as measured by the number of antenatal visits and place of delivery.

H_{03D}: There is no significant statistical association between a woman's place of domicile and the use of MHS as measured by the number of antenatal visits and place of delivery.

Ha$_{3D}$: There is a significant statistical association between a woman's place of domicile and the use of MHS as measured by the number of antenatal visits and place of delivery.

RQ 4: Are Nigerian women's community health structure as measured by distance to nearest health care facility and the availability of skilled health care

worker at the facility associated with women's use of MHS as measured by number of visits and place of delivery?

RH 4:

H_{04A}: There is no significant statistical association between the distance to nearest health care facility from where a woman lives and the use of MHS as measured by the number of antenatal visits and place of delivery.

Ha_{4A}: There is a significant statistical association between the distance to nearest health care facility from where a woman lives and the use of MHS as measured by the number of antenatal visits and place of delivery.

H_{04B}: There is no significant statistical association between the availability of skilled health care worker and the use of MHS as measured by the number of antenatal visits and place of delivery.

Ha_{4B}: There is a significant statistical association between the availability of skilled health care worker and the use of MHS as measured by the number of antenatal visits and place of delivery.

RQ 5: Is there an association between pregnancy outcomes as measured by fetal outcome (dead/alive) and the use of MHS as measured by number of antenatal visits and place of delivery?

RH 5:

H_{05A}: There is no association between fetal outcome (dead/alive) and the use of MHS as measured by the number of antenatal visits.

Ha_{5A}: There is an association between fetal outcome (dead/alive) and the use of MHS as measured by the number of antenatal visits.

H_{05B}: There is no association between fetal outcome (live birth/still birth) and the use of MHS as measured by place of delivery.

Ha_{5B}: There is an association between fetal outcome (live birth/still birth) and the use of MHS as measured by place of delivery.

Significance of the Study

The study attempted to identify factors that influence the use of MHS in Nigeria by conducting secondary data analysis of the 2008 National Demographic and Health Survey (NDHS). Specifically, the study was aimed at identifying the biological (age, parity), socioeconomic (geopolitical zone of residence, education, income levels, place of domicile, distance to health facility, availability of skilled health workers), and cultural factors (marital status, female autonomy, religious beliefs, ethnicity) that influence the use of MHS.A second aim of this study was to determine whether these factors are associated with pregnancy outcomes.

The study has potential to bring about social change through identifying appropriate interventions that may improve the access and use of MHS that ultimately bring about the desired use of MHS and positive pregnancy outcomes. Health policy makers and implementers are likely to benefit from the study by gaining better understanding of the basic barriers that influence women's use of MHS and how it affects pregnancy outcomes. Identifying the relationship between women's autonomy, biological, cultural or socioeconomic characteristics and the pattern of the use of MHS and how it affects pregnancy outcomes across the multi-ethnic and multi-religious communities of Nigeria, may provide insights that will be used in fine tuning population specific intervention to improve access and use of MHS and better

pregnancy outcomes. Such information from heterogeneous setting has potential to guide public health stakeholders on how to improve the access and utilization of services that will have positive social change to reduce the high maternal and neonatal mortality rates.

Organization of the dissertation

For systematic approach and clarity, this study is divided into 5 chapters. Chapter 1 provided an overview on the magnitude of maternal and neonatal deaths and the pattern on the use of MHS at global, regional, and national levels that gave rise to research questions and hypothesis. Chapter 2 was a systematic review of existing literature on the topic highlighting strengths and weaknesses that underscored the need for further research to address some of the identified literature gaps. Chapter 3 is the methodology that was used to address the research questions and hypothesis. Chapter 4 was on the findings of the study in line with research questions and hypothesis followed by Chapter 5 which covered discussions, conclusion and recommendations of the findings.

Chapter 2: Literature Review

Introduction

Proximity to health services will result in higher use of health services and better pregnancy outcomes (Ahmed et al., 2010; Babalola & Fatusi, 2009; Vinikoor-Imler, Messer, Evenson, & Laraia, 2011). However, the role of cultural practices and its interactions with socioeconomic factors to influence female autonomy and the use of MHS across the developing remain inconsistent (Ahmed et al., 2010). I performed a literature search to assess the current state of information on the role of female autonomy and demographic factors on the use of MHS and pregnancy outcomes in the developing countries, particularly in Nigeria.

How Literature Search was Conducted

The current state of knowledge on female autonomy and use of MHS and pregnancy outcomes is dynamic and evolving. The literature search was performed using several databases in the Walden Library (MEDLINE, CINAHL Plus, ISI web of science, Nursing and Allied Health Source, Social Science Direct, SAGE), and the web sites of multilateral organizations of the United Nations Systems (WHO, UNICEF, UNFPA) using Google scholar, PUBMED and EBSCOhost search engines. MeSH words and phrases used included *female autonomy*, *female empowerment*, *maternal health services*, *maternal mortality*, *maternal deaths*, *family decision making*, *disparities in antenatal care*, *disparities in post-natal care*, *disparity in pregnancy outcomes*, *availability of maternity service*, *delays in obstetric service utilization*, and *obstetric challenges*. Priority was given to articles and reports published from 2006–2013. However, to understand the historical context of

autonomy, use pattern of MHS, and pregnancy outcomes, I also searched and used articles published more than 10 years ago, because there is paucity of community-based studies on autonomy, MHS use behavior, and pregnancy outcomes (Gil-González et al., 2006; Say & Raine, 2007).

Articles used in this study were selected in line with the key words of my dissertation topic and the Walden University literature review matrix table (Walden University, 2012). Interventional studies on empowerment (funding for skills acquisition scheme or small scale entrepreneurship) were not used in developing this chapter because they focused on improving economic empowerment of women with no regard to use of MHS and pregnancy outcomes. This approach yielded more than100 articles with approximately 50% were all published in the past 5 years (2009 – 2013), all of which improved my understanding of my dissertation topic and the current gaps in knowledge particularly at MHS delivery levels.

Background of the Country

Geography

Nigeria is located in the West African region sharing common boundaries with Niger republic to the north, Cameron and Chad republics to the east, Benin republic to the west, and Atlantic Ocean to the south (Figure 2). It has a total land mass of approximately 923,768 square kilometers. The country lies between 4^{o} 16’ and 13^{o} 53’north and longitude 2^{o} 40’ and 14^{o} 41’ east. Nigeria has a diverse climate with the north central and north east having uplands of 600 and 1,300 meters respectively, where as the lowlands of 20 meters are along the coastal areas of the south-south and

south-west zones of the country. The country has a tropical climate with rainy (April to August) and dry seasons (September to March).

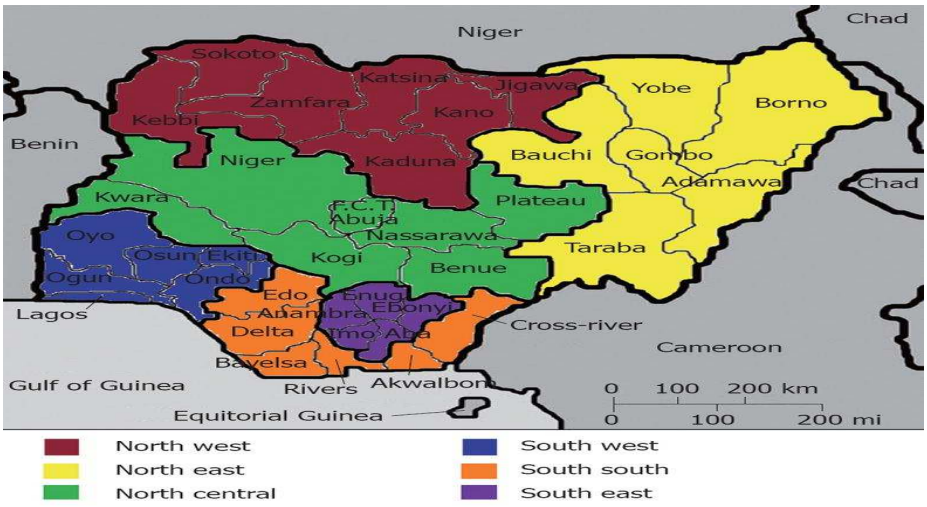


Figure 2. Map of Nigeria showing states and geopolitical zones.

Population Size and Distribution/Composition

Nigeria is the most populous country in Africa accounting for one-fifth of the continent population. It has total population of 143 million based on the estimates from the 2006 national census with a population density of 153 people per square kilometer. The states with the highest population density in each zone are as follows: North West zone (Kano state), South east (Anambra, Imo, and Abia states) and South-south zone (Akwa Ibom state). Two-thirds of Nigeria's population lives in rural areas. Women of child bearing age (WCBA) was estimated to be 31.4 million with an estimated annual number of pregnancies and surviving infants of 8.3 million and 7.3 million respectively. The current population growth rate and female fertility stands at 2.8% and 5.6% respectively (National Population Commission & ICF Macro, 2009).

Political Environment

The country operates as a federation with federal, state and local governments headed by democratically elected executive and legislative assemblies at all levels. There are 774 local government areas (LGAs), spread across 36 states and a federal capital territory (figure 1 above). The country has 374 ethnic groups (National Population Commission & ICF Macro, 2009).

The 36 states were clustered into six geopolitical zones: South-south zone with predominate tribes being Kalbiri Ijaw, Ikoi, Itsekiri, and Ibibio; South west zone with Yoruba as the dominant tribe; North Central zone with major tribal groups being Nupe, Ebira, Idoma, Tivs, Igala, Gwari, and Angas; North East is largely made up of Kanuri, Fulani, Marghi, Babur,Mumuye, and Jukun; South East with Igbo as the dominant tribe; and North west zone that are largely Hausa and Fulani tribal groups. Islam and Christianity are the dominant religions having followership of about 99% of Nigerians with Islam predominantly in the Northern and Christianity in the Southern geopolitical zones respectively.

Economic Development

Oil and gas is the major contributor of the Nigerian economy, accounting for 99% of the total export revenues, and about 80% of the Government revenues. Further, from 2008 to date, the Oil and gas sector accounted for 80% of the GDP, with an estimated economic growth rate of 6% (National Population Commission & ICF Macro, 2009).

The Health Care System

The provision of health services in Nigerian is the responsibility of all tiers of government. Health facilities are categorized as primary, secondary and tertiary (referral) level. The federal government is responsible for policy and overall technical guidance. The federal government also provide tertiary care through the teaching hospitals, and national laboratories, however, they also construct and equip comprehensive primary health care facilities which ought to be the responsibility of the local governments (Health Reform Foundation of Nigeria, 2007). The State governments of the other hand are supposed to provide secondary health care level, guide, supervise and monitor the health care activities provided by the Local Government Areas (LGAs). The LGAs are responsible for the provision of primary health care (PHC) services including maternal and child health care. These services cut across promotive, preventive, and curative services.

In 2011, the total expenditure on health as a percentage of Gross National Product (GDP) was 5.7 (WHO, 2014). Similarly, the general government and private expenditure on health as percentage of the total expenditure on health was 34% and 66% respectively. Out of pocket payment is the principal method of payment for health care services and accounting for 60.35% in 2001 and rose to 95.6% in 2011 (WHO, 2014). The National health Insurance Scheme was fully established in 2005 with people working in the formal sector as beneficiaries covering less than 10% of the total population of Nigeria (Health Reform Foundation of Nigeria, 2007). This is further underscored in terms of health expenditure ratio, with private prepaid plans as a percentage of private expenditure on health accounting for only 3.1% (WHO, 2014). Moreover, in terms of human resources, the country was reported to be performing

poor. For instance, in 2012 Nigeria, had 4.1 Physicians and 16.1 nurses and midwives per /10, 000 pop respectively (WHO, 2014). The proportion of health facilities with obstetric radiological/sonographical technology was less than 0.1% (WHO, 2014).These low level of financial, funding, human and capital resources has great implication on the access to health and the state of health of pregnant women in the Nigerians.

Maternal Health Surveillance in the sub-Sahara Africa

It has been estimated that 289,000 died in 2013 as a result of pregnancy related complications, with only 1% of these deaths from the developed countries (WHO, 2014). This means for every two minutes; a woman somewhere in the developing countries had died in her effort to sustain the human reproductive cycle.For instance, Nigeria, has a MMR of 630 while Italy and Sweden recorded four maternal deaths per 100,000 live births in 2010 indicating a more than 15,000 fold disparity. Hence, maternal mortality is one of the widest population health disparities between the developed and the developing countries. However, it must be pointed out that the figures from United Nations agencies and other global health agencies like the Center for Disease Control and Prevention (CDC) were reported to be an under estimation of the actual total number of maternal deaths by at least one third at global level and more than two thirds in some developing countries (Court, 1996; Royston & Armstrong, 1989).

Historically, the establishment of comprehensive registers for vital records in both developed and developing countries commenced at different times due to differences in the level of sociopolitical and economic development. For instance, the

establishment of comprehensive vital statistics registries in Sweden and Finland was 120 years earlier than the United States and Australia (Hanson, 2010). However, while registration of vital events is not only complete in the developed countries, but also lies in the domain of electronic data bases, same cannot be said of under developed countries.

Moreover, in 2012, 48.9% and 15% of the 180 countries were found to have incomplete or no data on registration of vital events like marriage, birth, and deaths respectively (Nieburg, 2012).This cannot be far-fetched because in the WHO African region, only 86% of districts have included maternal deaths among the national notifiable diseases/events on their Integrated Disease Surveillance and Response (IDSR) program (WHO, 2010). Further, in many African countries, post mortem remains only on the request of a judicial action. Cases of maternal deaths that occurred within an hour of arrival to a health facility or before the commencement of treatment were not examined by pathologist and may not be reported as maternal death (Onakewhor & Gharoro, 2008).

It is important also to note that when comparing data on maternal mortality over a long period of time, one must take cognizance on the differential socioeconomic, cultural and political context and the ever changing case definition of maternal death. The changing or non-uniformity on the case definition of maternal death could exaggerate or under report the numbers recorded in a given place and time. The definition of maternal death by the World Health Organization clearly excludes ‘accidental’ and ‘incidental’ factors in order to standardize operational case definition for research and facilitate comparability between countries (WHO, 2013b).

This definition is further underscored by the definition of maternal death by the International Federation of Gynaecology and Obstetrics (FIGO) that clearly declared that the site, mode of delivery or termination of a pregnancy is irrelevant (Weindling, 2004). However, field application of the definition of maternal death show variation among researchers and between countries. In the United Kingdom, the upper time period for reviewing of whether the death of a woman during pregnancy constitute maternal death may be up to a year, particularly if the woman had an abortion or delivery within the past 12 months(Drife, 1993; Weindling, 2004). Hence, there is large inconsistency in the definitions of maternal deaths making comparison difficult (Gabrysch, Zanger, & Cambell, 2012; Khan, et al., 2006).

Moreover, both the WHO and FIGO definitions of maternal deaths have excluded 'accidental' and 'incidental' causes such as suicide during pregnancy. This was criticized as inappropriate because, suicide could be due to physical, emotional and psychological stress experienced during unwanted pregnancy, particularly among women with limited autonomy on decision making process, unemployed and illiterate which jointly delimits her choices (Frautschi, Cerulli, & Maine, 1994; Hagman, 2013). It is also possible that women who got pregnant following an incident of rape and could not abort the pregnancy due to religious, cultural or legal reasons might have emotional breakdown and possibly contemplate suicide. Although, these definitions include deaths from abortion and ectopic pregnancy, it is not uncommon to find studies that have excluded abortion and ectopic pregnancy in their working definition of maternal deaths (Waboso, 1993). This has implication for comparison of the trend of maternal deaths between countries when the objective is to understand the determinants over several decades. The short comings on case definitions contributed

to the constituting of a WHO working group that revised guidelines that standardized the case definition of maternal death, what constitutes root causes and contributory conditions that could lead to maternal death. This led to the inclusion of suicide during pregnancy, puerperal psychosis and depression following delivery among the direct obstetric causes of maternal mortality, in addition to haemorrhage, sepsis, hypertensive disorders of pregnancy, obstructed labour and complications of abortion (Say, Souza, & Pattinson, 2009).

Pregnancy Outcome in sub-Sahara Africa

Pregnant women in the developing countries are at higher risk of losing their lives as a result of pregnancy related complications compared to their counterparts in the industrialised countries partly due to adherence to cultural practices that are neither health promotive nor disease preventive. This is made worse by the weak health system that disenfranchise the rural and urban slum population even though they account for the large proportion of high risk pregnancies that results in loss of life. It is important to note that more than 80% of all these deaths could be averted by simple, cheap, and effective high impact components of MHS (WHO, UNICEF, UNFPA, & World Bank, 2010).

In sub-Saharan African, the risk of maternal mortality over a woman's 35 fertility years is 139 times greater than the risk faced by the average woman in a developed country (WHO et al., 2010). For example, the life time risk of a woman dying from pregnancy and its related complications at the global level is 1 in 140. However, for the woman in the developed countries, it is 1 in 4300, while for her counterpart in the developing countries of sub-Saharan African region, the figure is 1

in 31, Oceania is 1 in 110, Middle east and North Africa is 1 in 120 and South Asia a1 in 120 (WHO et al., 2010).This is basically as a result of differences in socio-economic, cultural and political development, which invariably reflects the status of women, the health seeking behavior of the pregnant women, the quality and distribution of obstetric services.

Within the developing countries, the risk of dying each time a woman becomes pregnant varies from region to region. For instance, the life time risk of maternal death in sub-Saharan African region lies between 1 in 14 (Somali) to in 1600 (Mauritius), with 85% of the countries in region having a life time risk of dying during pregnancy and puerperium of less than 1 in 200.

In Nigeria, the risk is 1 in 23 and fare better only to Chad (1 in 14); Somali (1 in 14); Niger republic (1 in 16); Guinea Bissau (1 in 18), Liberia (1 in 20); Sierra Leone (1 in 21), and Mali (1 in 22). Women in Afghanistan, has the highest risk ratio of 1 in 11, while Greece have the lowest risk of 1 in 31,800, followed by Australia and Ireland with a risk of 1 in 17, 800 (WHO et al., 2010). Hence, maternal mortality is the only known population health indicator that has wide disparity between the developed and the developing countries (Abouzahr, Wardlaw, Stanton, & Kenneth, 1996; Mahler, 1987; Rosenfield, 1989). However, it has been argued that estimation of maternal deaths is inappropriate in measuring the effectiveness of MHS, because it is affected by socioeconomic, cultural and political factors that generally are beyond the individual biological characteristics (sovana-ventura & Greech, 1987).This line of thinking is plausible in the context of the "3D Model," because the effectiveness of MHS falls under the third form of delay. The effectiveness or efficiency of MHS might have been undermined by the first and second types of delay particularly when

obstetric cases reach the hospitals in moribund conditions and deaths occurred within an hour of admission, thereby, swelling up the statistic on maternal deaths.

Role of Maternal Health Service in sub-Sahara Africa

The objective for MHS is to provide primary, secondary and tertiary levels of prevention. It entails the provision of health promotive services (health education), provision of specific preventive measures (nutrition, iron and folic acid supplementation, anti-malarial, immunization), early detection and diagnosis of diseases/conditions through antenatal, natal and post-natal care (anemia, congenital disease, preeclampsia, eclampsia, obstructed labor) and rehabilitation such as post-natal psychosis, vesico-vaginal fistula and family planning counseling. The goal is not only to detect abnormalities during pregnancy and delivery, but also to facilitate the adoption of attitudes and behaviors that are health promotive and reduces instances of complicated pregnancies and poor pregnancy outcome.

Studies have demonstrated high correlation between maternal morbidity and mortality with women's use of antenatal, natal and post-natal services including family planning (Ahmed et al., 2011; Nieburg, 2012; Wang, Alva, Wang, & Fort, 2011). The incidence of congenital malformation, severe birth asphyxia, pre-term deliveries, still births, maternal and neonatal mortality were more commonly seen among women who did not start ante natal visits early, had not been regular for ANC visits, and or had received poor quality of MHS (WHO, n.d.). The consequences of maternal death have effect at affect both family and community levels, especially if she is the major contributor to family income (WHO et al., 2010). Hence the continued high rate of maternal deaths in the low income countries has been

considered an ignored and avoidable disparity (Rosenfield, 1989) for which Rosenfield and Maine (1985) rhetorically asked all stakeholders “where is the M in the MCH"? (P.83).

In order to sustain the achievements made towards the Millennium Development Goal (MDG) number 5, aimed to reduce maternal mortality by two thirds compared to figures of 1990 by the end of 2015, it is necessary for countries to have accurate information on the magnitude, pattern and factors influencing maternal deaths in order to guide the choice of intervention. Existing literature has demonstrated several risk factors associated with the use of MHS and pregnancy outcomes. The risk elements associated with the poor use of MHS and pregnancy outcomes includes the availability, distribution and quality of MHS, income, formal education, user fees for services rendered and availability of health insurance. Parity, age of pregnant woman, gestation age at first ANC visit, number of antenatal care (ANC) visits, use of tobacco, place and type of delivery have been reported to influence the outcome of pregnancy (Wang et al., 2011; WHO, n.d.). These factors are the product of interaction between the social, cultural and economic status of the woman and what a given community defines as an ideal behavior and practices for women.

Antenatal and Post-natal Care Service Use in sub-Sahara Africa

Not all pregnant women attend antenatal care (ANC), of those that attend, many fail to make the recommended 4 visits. Many women give birth in homes attended by unskilled health workers. This is buttressed by the proportion of pregnant women that had made at least a single ANC visit between 2005 – 2012 worldwide stood at 81%; however, only 55% had actually made the recommended 4 ANC visits,

indicating sub-optimal use of ANC services that will facilitate the detection and management of complications that do arise during pregnancy (WHO, 2013a). Among the 6 WHO regions, only the Americas and European regions that have achieved 86% and 80% respectively, regarding the proportion of women that have attended four ANC visits. While in African and Eastern Mediterranean regions less than half of all pregnant women had attended four ANC visits between 2005 – 2012 (WHO, 2013a). One of the reasons for the low number of ANC visits was because less than 50% of all pregnant women commence ANC visit in the first trimester. In some countries of Africa, the figure is as low as 10%. For instance, women who reported to have had at least one ANC visit in Malawi, half did so in the first trimester, while in Senegal, more than 90% of pregnant women were reported to have had their first ANC visit in the third trimester. Without doubt, such practices will not enhance the attainment of the primary objective of ANC aimed to identify and commence early management of high risk pregnancies (Ezugwu, Agu, Nwoke, & Ezugwu, 2014; Wang et al., 2011).

In Nigeria, 25%, 64% and 11% of pregnant women had their first ANC in the first, second and third trimester respectively suggesting that the majority of women have commenced ANC after five months (Wang et al., 2011). This could have led to the late identification of complicated pregnancies and partly responsible for Nigeria being among the top 11 countries with the highest MMR in the world (WHO et al., 2010). The North east and north west of Nigeria had the lowest use of ANC services. A pregnant woman in the South west zone is 6 and 9 times more likely to have 4 ANC visits compared to her counterparts in the North West and North East zones of Nigeria respectively (Health Reform Foundation of Nigeria, 2007).

Thus, the time at which a pregnant woman commence ANC visit and the number of times a woman had antenatal visit, does have strong influence on the maternal health and pregnancy outcome after controlling for place of delivery and availability of skilled man power (Ezugwu et al., 2014; Wang et al., 2011). The fact that not all women that have attended ANC have their deliveries supervised by trained health worker further increases the risk of poor pregnancy outcomes. The proportion of deliveries that were conducted by trained health worker between 2005 – 2012 worldwide stood at 70%; however, there exist wide disparity between the high income and low income countries with 99% and 37% respectively (WHO, 2013a). The low performing nations are from the WHO African and South East Asia geopolitical regions, with only 49% and 59% respectively of all births that were attended by skilled health worker.

In Nigeria, only 34% of deliveries are supervised by trained personnel (WHO, 2013a) and many women come in life threatening conditions (Fawole et al., 2012; Garba & Umar, 2013).This means, nearly two thirds of all births were conducted in homes or in health facilities that does not have institutional or technical competence. The reasons for the high proportion of home deliveries could be linked to negative cultural beliefs regarding hospital deliveries, inadequate number of skilled health worker, and the lack of information on the benefits of giving birth in health facility (Fawole et al., 2012; Magoma et al., 2010). Ityavyar (1984), in a study in Bodinga, Sokoto State Nigeria, found that the communities perceive lithotomy position preferred in health facilities as psychologically uncomfortable and humiliating because deliveries are conducted by persons whom they consider strangers. Hence, the author advanced that majority of pregnant women are more disposed to the

squatting or knee-chest position during delivery and thus underscores the need for systematic engagement of communities in research, program design and implementation of MHS to enhance the use of modern health services for better outcome of pregnancy. This view is contrary to findings in Assuit district of Egypt, where it was reported there is no significant statistical difference among women that have used MHS to those that never used MHS and the risk of poor pregnancy outcome is even higher among those that deliver in hospitals (Abdullah, Abolayoun, Abdel-Aleem, Moftah, & Ismail, 1992). This could be as a result of fallacy in numerical data reasoning, since the author interpreted the data without due consideration on conditions the women presented with, and time of arrival to the hospital, both of which have grave consequences on pregnancy outcomes (Belton, et al., 2014; Essendi, Mills, & Fotso, 2011; Ghebrehiwet & Morrow, 2007; Jammeh et al., 2011; Thorsen mail et al., 2012).

The WHO 2005 report noted that, the increasing access to appropriate MHS provided by skilled health workers contributed significantly to the observed decrease in the number of maternal and perinatal neonatal deaths in the developing countries (WHO, 2005). The increase in access and use of antenatal, natal and post-natal services could be attributable to the increase percentage of skilled health workers, that contributed to the reduction of maternal deaths from 543,000 in 1998 to 287,000 by 2010 (WHO, 2013a). Another major contributory factor to the observed decline is the concerted effort by various Governments and partner agencies in the developing countries, geared towards improving the status of women in terms of equality to access of education and employment following the 1994 Beijing conference and the MDGs declaration in 2000 (UNICEF, 2012).

Women's autonomy measured in terms of her economic independence, capacity to participate in health-related decision making processes at family level, and freedom to go out of home has potential to influence the use of MHS, whether the hospital is located in her place of domicile or not. However, it is important to note that, a study in urban slum of Nairobi Kenya, reported the use of prenatal and natal services does not have any significant statistical relationship with the levels of woman's autonomy in terms of decision making, freedom of movement and income independence (Fatso, Ezeh, & Essendi, 2009; Mumtaz & Salway, 2009). Moreover, the access and use of MHS was reported to be low for women living in communities without appropriate health facility, because of the interactions between transport fare, and cost of fees for services to be rendered (Fatso et al., 2008, 2009).Studies in Ghana (Hagman, 2013); Kenya (Desai et al., 2013; Essendi et al., 2011), and Nigeria (Babalola & Fatusi, 2009; Ebuehi & Akintujoye, 2012; Onah, Ikeako, & Iloabachie, 2006) have indicated that, the institutional and technical competence of a health facility that provides MHS services is a major consideration among women irrespective of their social status. The under use of MHS commonly seen among rural women in the developing countries in general and African countries in particular, because rural women are largely dependent on their spouse and other family members on financial support and most of them do adhere to the norms and traditions that stressed the authority of husband over their wives (Adamu & Salihu, 2002; Idris et al, 2006; Magoma et al., 2010).

A community based study in Nigeria, reported that nearly half of all participants cited the lack of use of modern health services, distance, and the need to have other members of the family to accompany the sick or pregnant women increase

the overall cost in terms of transportation fare, feeding and hospital charges (Ayeni, 1987). Nnadi and Kabat (1984), in an extensive work on health care use - a national survey on choice of health services amongst the Igbo's, Hausa's and Yoruba's that are the 3 major tribal groups of Nigeria, constituting about 50% of the Nigeria's population, reported that individuals who lived near modern health facilities have higher use rates for both urban and rural clients. Other factors reported in Nigeria, that are responsible for low ANC attendance and hospital deliveries include, the perceived quality of service and who among the family members is supposed to take decision on health matters, particularly in North west (Harrison, 1983; Oche et al., 2010; Umar et al., 2011), South west (Egunjobi, 1983) and South-south (Abasiekang, 1981) geopolitical zones of Nigeria. This means that the use of antenatal and natal services depends on the social, cultural and economic disposition of women.

Use of Family Planning Services: Its role in Unintended Pregnancies in sub-Sahara Africa

Many women have no access to family planning services which increases their risk of having an unplanned or unwanted pregnancy. In developing countries, between 2005 − 2012 a quarter of women aged 15 − 49 years who are married or in consensus sexual relationship and not desiring to have children,, lack access to family planning services (an unmet need) that will guarantee for spacing or limiting births, reduce the prevalence of unwanted pregnancies and poor pregnancy outcomes (WHO, 2013a). The majority of women with unmet need were from the same regions that accounted for the highest maternal and neonatal deaths. Sub-Saharan African countries having the highest proportion of women in relationship with unmet need includes: Uganda

38%; Ghana is 36%; Liberia 36%; Senegal 32%; Togo 31%, Zambia 27% and Nigeria 19%.

Thus, in Ghana, Uganda, Liberia, Senegal, and Togo, one in every three married women have an unmet need. In some of these countries of these countries, the proportion of married women with unmet need has risen in the last 2 decades. For instance, Ghana has an unmet need of 33% and 36% in 1994 (population reports, 1996) and 2010 respectively (WHO, 2013a). In Nigeria, despite efforts by Government and Non-Governmental Organisations (NGOs), there has little reduction in the proportion of married women with unmet need between 1990 (population reports, 1996) and 2010 (WHO, 2013a) evidenced by prevalence rates of 22% and 19% respectively. Reasons attributed to such ironical reproductive behavior of desiring no more children but not using any contraception, falls into two main categories namely the level of women's autonomy on reproductive health issues and quality and comprehensiveness of services rendered.

Couples that have agreed to use family planning services were found to have better spacing of pregnancies and high use rate of antenatal, natal and post-natal services compared to women who took unilateral decision to use family planning services (Furuta & Salway, 2006; Mullany, Becker, & Hidin, 2007; Wado, 2013; World Bank, 2010). This means that, low contraceptive use could be partly accounted by the low status of women's autonomy in the developing countries. Faced with unplanned pregnancies, some pregnant women, particularly unmarried teenagers, go for abortion rather than carry the pregnancy to term which put their lives in danger because abortion is performed as clandestine activity in the developing countries (UNICEF, 2012; WHO, 2005). Women that had unwanted pregnancies tend to use

health facilities that have no comprehensive MHS or the services are of poor quality compared to their counterparts who had wanted pregnancies (Fatso et al., 2009).

The other universal reason is the lack factual information, proper and appropriate guidance that is passed by the health workers, governmental departments and NGOs on the benefits and where to obtain MHS including family planning, in order to bring about positive attitudes and behaviors (Ezugwu et al., 2014; Fatso et al., 2009; Magoma et al., 2010; Onah et al., 2006; Rahman, Mosley, Ahmed, & Akhter, 2008). While the role of family planning in reducing the proportion of unwanted pregnancy and ultimately of mortality was not in doubt, however, the effect of family planning is more during prenatal period and therefore does not influence the outcomes of pregnancies.

The influence of women's autonomy on the use of family planning and MHS in general, is not consistently observed in different parts of the world. For instance, studies in Kenya, reported the use of prenatal and family planning services is not influenced by a woman's engagement in paid labor and freedom of movement (Fatso et al., 2009; Wado, 2013). Hence, there is the need for further research that uses data from representative units of population sub-groups of developing countries that are multi religious and multi ethnic such as Nigeria. This is because ethnicity and religion are among the variables that shape the pattern of use of health services.

Women's Autonomy in the Context of Maternal Health

Women's Autonomy: Terms and Definitions used by Various Researchers

Autonomy is a matrix of several specialties and disciplines in the fields of political economy, philosophy and psychology. In many instances, words like

empowerment (Ahmed et al., 2010; Ibrahim & Alkire, 2007; Mason & Smith, 2003), agency (Ibrahim & Alkire, 2007; Mason, 1986), independent decision making (Amowitz et al., 2002) and volitional control (Burchardt, Evans & Holder, 2010) were some time used interchangeability to infer autonomy.

Autonomy in the context of maternal health is basically the extent to which a woman is capable to make independent decisions and take appropriate action on matters bordering on their reproductive health choices and behaviors (Burchardt et al., 2010). It is the ability of a woman to decide when to be pregnant, number of children to have, where to seek for ANC, natal and post-natal services including family planning. It means been able to independently decide and implement actions as an autonomous being even if it is not in agreement with the views and opinion of people whom she has a very close relationship (Mason & Smith, 2003). Such different working definitions make comparison between different parts of the world difficult and incorrect. However, irrespective of the word used to mean autonomy, freedom to choose and take action is more likely to be an interaction of several socioeconomic, political and cultural factors that bring positive changes to various other aspects of life and not just reproductive behavior. This also means that, measuring autonomy must also be specific to a given aspect of our life, be it at individual, family, working place, community or national levels.

Variables used in Measuring Women's Autonomy

Social and demographic scientist have measured women autonomy indirectly, by assessing educational attainment, employment status, her age at first cohabitation, difference between her age and her partner (Mason, 1986), owning landed property or

gold ornaments, household characteristics such as living in same house with her mother in-law, her ability to decide what to eat, involvement in deciding the school her children will be enrolled and freedom to go out of her matrimonial home without asking for permission from anybody (Amowitz et al.,2002; Bloom et al., 2001; Cook & Dickens, 2002). In essence, these socio-demographic variables used in measuring women's autonomy is the social environment in which women were born, live and work and are the enabling background that defines her ability to make independent decision and actions in all spheres of life.

Social Environment and Women's Autonomy

The social environment is known to influence our attitudes and behaviors in all spheres of life including health and shapes our attitudes and behaviors based on information from family members, peer group, schools, and local political system. Such information has no scientific basis and mere speculations passed from generation to generation. Thus, when women lack factual information, equal opportunity to access resources and social services, they are likely to adopt attitudes and behaviors that could affect not only them but also her family.

However, attitudes are known to be specific, often less enduring and likely to change over time with improving enabling social factors that were used as a proxy to measure autonomy (Glanz, Rimer, & Viswanath, 2008). It is also known that, the behavior we adopt will definitely have a profound effect on the health and quality of life of an individual. Behavioral risks are now recognized as important causes of preventable morbidity and avoidable deaths (Parvanta, Nelson, Parvanta, & Harner, 2011). However, behavioral risks are modifiable and sometimes they do change

rapidly as a result of timely and appropriate intervention to enhance the equality in access to social services such as education and employment opportunities as was observed among native Communities in Canada (Macaulay et al., 1997).

Thus, the attainment of autonomy requires both individual (biological, social standing, locus of control) and community characteristics (equality, access, social inclusion, deliberate community sensitization) that will increase a woman's capacity to decide and take remedial action that will positively bring a positive social change at individual and community levels (Ibrahim & Alkire, 2007). However, how these bio-socio-demographic variables act to define female autonomy and effect on the use of MHS and pregnancy outcomes is still a subject of debate. My literature review indicated that, the variables used in measuring autonomy show wide differences within and between the place where a study was conducted and the aspect of the life of study participants that the researchers tries to explore.

However, Ibrahim and Alkire (2007) provided a useful guide to assess the appropriateness of variables used to measure autonomy in individual or household surveys as the case with demographic and health surveys that I have used for this dissertation. They posit that a measure of autonomy:

a. Must be important in the life of the under privilege and be applicable across geographical and cultural boundaries to allow for international comparison;
b. Must be able to measure a person's locus of control in terms of objective or subjective attitudes and behaviors to autonomy;
c. Must be sensitive to pick out changes in autonomy over time at individual, family, community or national levels;
d. Must have proven validity and reliability.

This approach demonstrated that many studies could be viewed to have assessed autonomy using few of the criteria above. Reviewing studies on reproductive health, use of MHS and pregnancy outcomes from similar sociocultural context (developing countries), studies in Asia, seem to have focused on assessing the ability of a woman to decide when to be pregnant, number of children to have, where to seek for ANC, deliver and receive post-natal services including family planning (Amowitz et al., 2002; Bloom et al., 2001; Cook & Dickens, 2002). These studies reported a low level of autonomy and are due to the overwhelming influence of power structure in patriarchal societies of Asia and Africa. Although, these studies showed women are not truly autonomous when it comes to decision making on personal and household matters, it must be stressed that it does not provide insights to the underlying wider community and socioeconomic standing which has been reported to have synergistic effect on female autonomy (Babalola & Fatusi, 2009; Olarenwaju, 2013; Shah, Din, & Ali, 2012; Montagu et al., 2011; Mumtaz, Salway, Shanner, Zaman, & Laing, 2012).

These studies also underscored an important aspect of power play and locus of control on personal and family level, albeit, it has been reported to have mixed outcome, high validity and reliability and useful for comparison across national and cultural boundaries (Ibrahim & Alkire, 2007). The greatest undoing of assessing autonomy at individual and household level, is some variables that determine autonomy might be have its roots to access of enabling factors such as equity in access to education, employment opportunities, financial institutions, the rights of women as enshrined in the Beijing Conference, regulatory role of government on culture and religion and inclusiveness in politics. These might all have consequences on shaping the attitude to, locus of control and behavior of women in all aspects of

autonomy. This is because, the determinants of autonomy, use of MHS and pregnancy outcomes is a web of social, economic, cultural, and political problems including inadequate and inappropriate health care services.

Factors beyond individual, household and local community level such as education, labor, financial and political systems are likely to change more rapidly than local cultural and religious beliefs and are more amenable to measure change over time and for international comparison. Nevertheless, it is important to state that measuring individual attitude and behavior with regard to autonomy is useful as it will provide insights for any observed pattern on the use of MHS and guide the selection of appropriate population based interventions.

Consequences of Lack of Autonomy and the use of MHS

The lack of autonomy could lead to delayed access to MHS which in extreme cases could result in the loss of life of the mother and child. The lack of autonomy cause delays along the intervention pathway commonly called the 3 Delays (3D) Model. The model categorized the stages of decision making for timely action that will prevent avoidable maternal mortality and long term disabilities during pregnancy, labor and puerperium (Thaddeus & Maine, 1994). The 3D model identified 3 forms of delay in seeking and getting appropriate MHS: a) delay in decision to seek for medical care, b) delay to reach appropriate health facility that has MHS and c) delay between reaching the health facility and the commencement of appropriate obstetric interventions.

The delay to seek for medical care is usually dependent on the decision making process at family level, the ability to recognize danger signs, socioeconomic

and cultural context of the woman (Acharya, Bell, Simkhada, van Teijlingen, & Regmi, 2010; Belton, Myers, & Ngana, 2014; Magoma et al., 2010; Thaddeus & Maine, 1994; Thorsen mail, Sundby, & Malata, 2012). Knowledge of indicators for seeking care or referral by a Traditional Birth Attendants (TBAs) is important as it reduces instances of downplaying the severity of the situation as was observed in the Eastern, Western and southern parts of Africa (Ebuehi & Akintujoye, 2012; Essendi, Mills, & Fotso, 2011; Ghebrehiwet & Morrow, 2007; Jammeh et al., 2011; Thorsen mail et al., 2012). What is common with all these studies was that, most women have limited autonomy on decision making on reproductive health issues despite, some of the women were educated and involved in gainful employment suggesting the possibility of the influence of local cultural norms and religious stereotyping. For instance, in Nepal (Acharya et al., 2010), India and Pakistan (Senathra & Gunawardena, 2009), women of older age such as mother in-law's, monogamous union and those with high parity tend to have high independence to take decision on household and reproductive health issues compared to younger age group, women in polygamous union, and women who have less than 3 children. This means the use of MHS is a proxy of a woman's level of autonomy and power in the family and those with high level of power tend to use prenatal, natal and post-natal services compared to those with little or no power within the family structure (Beegle, Frankenbers, & Thomas, 2001). However, this is contrary to the findings in Kenya (Fatso et al., 2009; Fatso, Ezeh & Oronje, 2008) and Nepal (Fatura & Salway, 2006), where the influence of woman's autonomy in terms of autonomous decision making process, financial independence and freedom of movement out of their matrimonial home have insignificant influence on the use of MHS.

Similarly, Mumtaz and Salway (2009), in an extensive study across various strata of Pakistani population reported that, freedom of going out of matrimonial home does not infer high autonomy because culturally, it is permissible for women to make frequent visit to her relations or go to the field without seeking for permission. However, same is not true among rural settlements in Kano Nigeria, where women need permission before venturing out of home even on medical grounds such as the use of MHS (Adamu & Salihu, 2002). This is suggestive that, the use of freedom of movement as a proxy of the level of women's autonomy varies due to differences of cultural norms regarding pregnancy and child birth. Further, the studies were conducted in homogenous communities that are partly bonded by their local tribal and religious beliefs.

After making a decision to seek for modern MHS, there may be delay to reach the hospital particularly for women leaving in the rural areas. This could be in form of distance, difficult terrain, availability of transport, and transport fare including the fare for relatives that will accompany the woman (Belton et al., 2014; Essendi et al., 2011; Ghebrehiwet & Morrow, 2007; Jammeh et al., 2011; Thorsen mail et al., 2012).These challenges do influence how early a woman from rural communities receives emergency obstetric services. Women in rural areas have higher risk of maternal death compared to their counterparts from urban areas even after controlling for socioeconomic status. The reason being some difficult to reach areas (mountainous, swampy or desert) have no readily available public transportation system and in many cases, families have to resort to the use of animals, which increase the time required to reach a hospital that will provide emergency obstetric care (Nour, 2008; Ramos, Karolinski, Romero, & Mercer, 2007). The second type of delay could also be due to

lack of readily available ambulance, telephone to make calls, or health worker (Midwife, Doctor) competent to make the necessary arrangement for the referral to another hospital (Belton et al., 2014).

Delay to commence appropriate management of obstetric cases have been documented in the form of long waiting time particularly where there are few staff to attend to many patients (Umar, Oche, & Umar, 2011), wrong diagnosis (Ramos et al., 2007) and out of stock of supplies and emergency packages such as blood transfusion, surgical operation packages and drugs (Garba & Umar, 2013; Ramos et al., 2007). It is also not uncommon for cases to be referred to another hospital after being evaluated which could also result in further delay to reach another hospital and commence management. This increases the risk of complications that could lead to death of the mother and fetus, because it raises the likelihood of the cases to reach the hospital in moribund state as was observed in Sokoto Nigeria (Garba & Umar, 2013).

In a recent systematic review by Knight et al (2013), a total of 32 obstacles to receiving appropriate treatment after reaching the hospital were noted. The commonest are the lack of availability of skilled health workers, emergency obstetric drugs and technology such as ultrasound that assist in the diagnosis, work overload, and low commitment by health workers due poor work incentives/benefits. This generally results in low quality of care as was observed in Tanzania, where less than half of all women who delivered in hospitals and those that had post-partum hemorrhage (PPH) had received oxytocin (Magoma et al., 2010; Nelissen et al., 2013) which is in variance with the recommendations of the WHO for the prevention of PPH (WHO, 2007) and the management of PPH (WHO, 2011). Generally, the health system in the developing countries are characterized with mal-distribution of health facilities coupled with weak institutional and technical capacity resulting in sub-optimal management of the direct obstetric causes of maternal death (Janakiraman & Ecker, 2010).

A plausible contributory factor for the delays after reaching the hospital could also be related to the level of a woman's cultural health capital. Cultural health capital is known to contribute to the unequal distribution of health outcomes. It consist of cultural skills, verbal and nonverbal competencies, attitudes and behaviors, and interactional cycles nurtured by care providers and patients that, when deployed may result in optimal heath care relationships (Shim, 2010). It cut across knowledge, beliefs, attitudes, behaviors, and practices regarding a specific disease and the ability for a constructive patient/client and health worker interpersonal communication skills. The ability to read and communicate effectively is crucial for exploring health and other socioeconomic opportunities during a person's lifetime. Literacy broadens a woman's capacity to independently think, be more confident in relating to all and communicates more effectively with health providers and more disposes to seek for appropriate MHS (Archarya et al., 2010).

It is important to note that these three phases of delay are interconnected even though each phase could act independent of the other. It has been reported that the relationship between autonomy and the use of MHS is not same across different parts of the developing countries. For instance in Pakistan (Mumtaz & Salway, 2009) observed that the use of MHS is not a predictor of the level of women's autonomy because the lack of control on family income and ability to go out of homes is commonly acceptable in significant proportion of Pakistanis (Mumtaz & Salway, 2009) and in countries around the horn of Africa (Ghebrehiwet & Morrow, 2007). Nevertheless, most studies demonstrated that women from rural communities, newly wedded brides, illiterates, polygamous union, teenage married women, nulliparous and women with few surviving children have lower autonomy and do experience all forms of delay. Hence, interventions along the delay pathway should address behavioral risks specific to given

communities that undermine women's autonomy in order to ensure timely access to antenatal, natal and post-partum MHS.

Social and Psychological Factors Affecting Pregnancy Outcome

Age at Marriage and Pregnancy Outcome

Age has been shown to be an important factor that influences the obstetric performance of a woman. Women who become pregnant at an early age (<20 years) or towards the end of their reproductive age (>35 years) have higher risk of having complications during pregnancy or delivery which could lead to loss of life of the mother and or fetus (WHO et al., 2010). In many communities across the world teenage marriage and motherhood are widely practice. This is a reflection of culturally defined attributes for ideal womanhood such as early marriage and high fertility. Early marriage and child bearing can have significant role in maternal death because it leads to longer productive years, high fertility and increase risk of complicated pregnancies that could lead to death particularly before she is fully mature.

Teenage marriage is more commonly seen in the Americas, Africa, South East Asia, and Middle East (WHO, 2013b). The prevalence of marriage among women less than 20 years in South East Asia is 54%; Americas16% and sub-Saharan Africa 44% (WHO, 1985). Bangladesh has the highest prevalence of teenage marriage, where 72% of women aged 15-19 are married (WHO, 1985). However, the practice is more common among rural areas where cultural norms and traditions are more entrenched and also due to high rate of poverty and illiteracy.

Moreover, it is related to what communities consider desirable status of ideal life of the girl child. Early marriage results in high fertility which is considered prestigious and confers higher autonomy (Acharya et al, 2010). The high fertility is due to longer period of reproductive years which increases the incidence of high risk and complicated pregnancies that may culminate in death of a woman. For instance, the South East Asia and African regions of the WHO have the highest number of teenage marriages from 1980's (Viegas et al., 1992) and to the present time (WHO, 2013a). This may partly explain why these regions accounted for the more than two thirds of the 287,000 maternal deaths recorded worldwide (WHO, 2013a). Moreover, it has been observed that teenage motherhood is more likely to end up with stillbirths, neonatal deaths and low birth weights (WHO, 2005; WHO et al., 2010), partly due to low use of MHS compared to older pregnant women aged 20-29 years (Pallikadavath, Foss, & Stones, 2004).

It must be pointed out that there exist wide variations within and between countries of these regions. For instance, among married 15-19 year olds girls worldwide, the fertility rate per 1000 girls lies between 1 in Democratic Republic of Korea and 177 in Liberia with a corresponding maternal deaths per 100, 000 live births of 81 and 770 respectively (WHO, 2013a).

In Nigeria, teenage marriage is widely practice and cut across religious and ethnic lines. Although, the percentage of married women who are under 20 years is not known in Nigeria, the median age (for females) at first marriage was put at 17.8 years (National Population Commission & ICF Macro. 2009) with MMR of 630 per 100,00 live births in 2010 (WHO, 2013a). However, this contrast to what is obtained in the developed countries like Japan and Sweden with an average age at first

marriage for females as 25.8 and 28 years respectively as of 1988 (WHO, 1992) and by 2010 recorded a MMR per 100, 000 live births of 5 and 4 respectively (WHO, 2013a). Hence, the risk of dying in Nigeria is 126 times higher than women in Sweden and Japan.

While it is true that the causes of maternal death has an intertwined relationship with a woman's social, economic, cultural and political environments; these figures however, suggest that reproductive practices amongst teenagers carried higher risk and does contribute to the sequence of events that lead to loss of life during pregnancy and delivery. Studies in the northern and southern parts of Nigeria have demonstrated that women between the ages of 15-19 years accounted for at least a quarter of maternal deaths (Adetoro, Okwerekwu, & Ogunbode, 1988; Harrison, 1989; Agboghorama & Emuveyan, 1997; Olatunji & Abudu, 1996).

Moreover, it has been shown that pregnancies among girls less than 15 years carry a higher risk of death due to pregnancy and its related complications by five folds compared to those who are more than 20 years old (Chen et al., 1979). This pattern was similarly observed to a lesser extent (two fold increase) when those 15-19 years were compared to those who are more than 20 years. This finding is plausible and consistent with the anatomical and physiological development stages of the birth canal and consistent with the higher incidence of obstructed labor among teenagers (Royston & Armstrong, 1989).

Further, the use of antenatal and delivery services was lowest among teenagers compared to elderly pregnant women (Babalola & Fatusi, 2009) due to limited involvement in decision making and lack of freedom of movement as was reported in Nigeria (Adamu & Salihu, 2002), Nepal (Acharya et al., 2010) and Tanzania

(Magoma et al., 2010). However, it is important to remember most complications and poor outcomes of pregnancy are avoidable if MHS are optimally used and appropriate interventions are timely instituted.

Age at Pregnancy and Pregnancy Outcome

After an extensive review of information on maternal deaths, Royston and Armstrong (1989), advanced that the safest period for pregnancy and childbearing in a woman's life years is 20 − 29 years after taking due consideration for differences in socioeconomic gradient. Unfortunately, nearly one fifth of all deliveries in the developing countries are among teenagers who have been reported to have a fertility rate of 192 per 1000 girls (WHO, 2013a). This contrast to what is obtained in the top 10 industrialized countries with teenage fertility rate of not more than 10 per 1000 teenagers with the exception of the United Kingdom and the United States of American that recorded 25 and 39 births per 1000 (WHO, 2013a). This further demonstrate that teenagers might be at the receiving end regarding making appropriate choices and put them at higher risk of dying during pregnancy, labor and puerperium. However, the trend of maternal deaths attributable to teenagers might be changing even in the developing countries like Nigeria, where a multi-centre study spread across all the geopolitical regions of the country aimed to identify the risk factors for maternal and neonatal deaths have reported that there is no significant statistical difference between teenagers and other age groups (Fawole et al., 2012). However, this finding must be interpreted with caution because the study was a hospital based, which might suffer from selection bias due the higher fees for services rendered. The cost for services rendered might alienate the poor segment of the

Nigerian population because the hospitals where the study was conducted do not offer free antenatal services, are located in urban centers, and are referral centers.

Older women who are ≥ 35 years are at a higher risk of maternal death. This is because of the high incidence of complications associated with pregnancies in this age group. Many studies from different parts of the world have shown that the obstetric performance of women aged 35 years and above to be poor compared to women less than 35 years (Evjen-Olsen et al., 2008; Fawole, 1996; Golan, Sandbank, & Rubin, 1980; Ojengbede, 1989; Ory & Van Poppel, 2013; Rochat, 1991; Yego et al., 2014). For example, in the United State of America, pregnancies among women that are 40 years and above have more than nine fold likelihood of dying as a result of pregnancy related complications compared to their counterparts aged 24 – 25 years (Rochat, 1991).

In some parts of Bangladesh, pregnant women more than 40 years have two fold risk of maternal death compared for those who are between 20 − 24 years after controlling for confounders (Chen et al., 1979). In Zaria, Nigeria, findings of review of 23,000 deliveries showed that the likelihood of maternal death among women aged 30 years and above was nearly 3 fold compared to those between the ages of 20 to 24 years (Harrison, 1985). However, a recent multi-center study spread across all the geopolitical zones of Nigeria including the study area noted above (Zaria, Nigeria) have shown no significant statistical association between age and risk of maternal death after controlling for parity, education, and use of ANC (Fawole et al., 2012).

However, similar study in South Eastern parts of Nigeria reported that maternal and perinatal deaths was higher among women older than 34 years compared to those between 20-24 years due to increased rate of ante and post-partum

haemorrhage, high blood pressure disorders and sepsis (Okwerekwu, 2010). This is suggestive of inconclusive pattern between age and pregnancy outcomes, particularly in Nigeria and calls for further research. The 2008 NDHS data provide an opportunity to explore relationship between age and maternal death. Findings will be more robust because the NDHS was a community based survey with a sample size of 36,800 women spread across all the 36 states (National Population Commission & ICF Macro, 2009) compared to the studies by Harrison (1985) and Fawole et al., (2012) that were hospital based, and prone to spurious associations due to Berksonian bias.

Parity and Pregnancy Outcome

Many studies in both developed and developing countries have demonstrated a strong correlation between fertility, parity and the risk of maternal death. In 2011, the fertility rate for the high income countries is 1.8; South East Asia 2.4; the Americas 2.1 and Africa 4.8 (WHO, 1013a).This variation between the developed and the developing countries is a reflection of high fertility and generally low status accorded to women in the developing countries. However, there exist variations within and between countries of African, South east Asia and the Americas. For instance, in Africa, Niger Republic has the highest parity rate of 7, followed by Somalia and Zambia 6.3; Mali 6.2; Uganda 6.1; and Nigeria trailing at 5.5.Although, this national fertility rate for Nigeria is currently put at 5.5 (WHO, 1013a), but it is important to note that it is common to find women in the rural agrarian communities in all parts of Nigeria who have 8 or more children irrespective of religion, culture or ethnicity (National Population Commission & ICF Macro, 2009).

The risk of maternal death increases with increasing parity. Studies in the United Kingdom (Ibison, Swerdlow, Head, & Marmot, 1996; Weindling, 2004), Netherland (Ory & Van Poppel, 2013); Kenya (Fatso et al., 2009; Yego et al., 2014), Tanzania (Evjen-Olsen et al., 2008), Pakistan (Begum, Nisa, & Begum, 2003); Tunisia (Kaddour et al., 2008) and Nigeria (Fawole et al., 2012, Kullima et al., 2009; Ozumba & Nwogu-Ikojo, 2008) have shown that complications that could lead to death during pregnancy and delivery are more commonly seen with primigravida and grand multipara due low use of appropriate MHS. Thus, high parity (> 4) and short interval between deliveries raises the risk of maternal death. Unfortunately, many cultures in the developing countries have misconception that childbirth becomes easier with each successive delivery. This is in variance to well established scientific findings that have shown high correlation between increasing parity, the incidence severe haemorrhage and eclampsia and likelihood of maternal death (Abdullah et al., 1992; Hoestermann, Ogbaselassie, Wacker, & Bastert, 1996; Hogberg & Wall, 1986; Olatunji & Abudu, 1996; Royston & Armstrong, 1989). For instance, studies in Lagos University Teaching Hospital Nigeria have shown that, the risk of death after the fourth child is about two times higher than a woman who had less than four children and about five times higher in women on their fifth and above pregnancies (Agboghorama & Emuveyan, 1997; Olatunji & Abudu, 1996). This assertion is inconsistent with the reports from sub-Saharan Africa that high parity is associated with higher use of MHS but, paradoxically account for significant cases of complication and maternal deaths (Magadi et al., 2007; Mekonnen & mekonnen, 2003). A plausible reason for higher use of MHS and poor pregnancy outcome, could be that grand multiparous women are more frequently anaemic and suffer from

several morbidities such high blood pressure, diabetes, obesity, uterine inertia and respond poorly to haemorrhage (Aboyeji, 1997; Chen et al., 1979; Golan, Sandbank, & Rubin, 1980; Viegas et al., 1992).

Access to Healthcare Facilities and Pregnancy Outcome

The World Health Organization reported that "(the) toxic combination of bad policies, economics, and politics is in large measure, responsible for the fact that a majority of people in the world do not enjoy the good health and that primary health care, which integrates health in all of government's policies, is the best frame" (WHO, 2008, para.2). The degree of implementation equity related policies of any government will have a profound influence on the distribution, access and use of health resources and the overall population health outcomes. Policy focused on privatization and commercialization of health services couple with the lack of universal insurance coverage is likely to marginalize a significant proportion of the populace.

Health facilities and by extension MHS, are not evenly spread in most parts of the developing countries with the rural areas having fewer numbers despite the fact that rural population have poor health outcomes compared to their counterparts in the towns and cities (WHO et al., 2010; UNICEF, 2012). However, it has been observed the urban slum population have fewer and dysfunctional health facilities compared to the parts of the cities habited by the middle and high socioeconomic segment of the population (UNICEF, 2012). For instance, there are more health care units (public and private) in South western Nigeria, and in all the 6 geopolitical zones, less than half of all rural population have access to functional health facility (Health Reform Foundation of Nigeria, 2007).This means many families have to cover long distance

which affect the use of appropriate health services due to the relationship of distance and transport fare (Stock, 1983).

The uneven spread of health resources in the developing countries might be due to lack of an updated and complete data on the location, staffing and equipments available in health facilities resulting in poor prioritization and inappropriate interventions (WHO, 2013b). The lack of equity in the distribution of MHS could affect access and use of services resulting in poor pregnancy outcomes. For instance, the high incidence of post-partum haemorrhage, prolonged obstetric labour, unsafe abortion and eclampsia as major direct obstetric causes of maternal mortality in rural parts of Nigeria, could be due to the inequitable geographical spread of MHS (Fawole et al., 2012; Ityavyar, 1984; Okwerekwu, 2010). Hence, most rural communities either lack modern MHS, dysfunctional health facilities or services are not in agreement with the local traditional values (Health Reform Foundation of Nigeria, 2007).

This is partly due to the underfunding of the health sector as observed in most developing countries. In 2010, Nigeria's total expenditure on health as a percentage of Gross Domestic Product (GDP) was 5.4. The government expenditure on health as a percentage of total expenditure of health was a mere 31.5% indicating more than two thirds of expenditure was privately borne in a country with 70% of the populace earns less than $2 per day (WHO, 2013a). The low political commitment was exemplified in the 2008 budget, when despite an increase in the total amount by about $400 million US Dollars (at 160 naira per dollar) by the Legislative arm above the amount proposed by the Executive arm of the government, health and education sectors had a

reduction of appropriated funds while the Legislators, the Presidency and Ministry of Defence benefited from the increase (Health Reform Foundation of Nigeria, 2007).

The reduction in funding of the health and education sectors will have negative effect not only on access to health care, but the quality and quantity of services that can be provided by these sectors. The fact that, baseline data are basically incomplete or non-existent in most developing countries further compounds lend credence to lack data driven planning resulting in inequitable distribution of health services.This is because the community felt need and the demand for specific intervention differ widely along the socioeconomic, cultural and political gradient which invariably influence population health outcome (Bechrucha, 2010; 2012). In order to reduce disparities and inequities on health outcome among its citizenry, government must provide legal framework that guarantees equal access to the same level (quantity and quality without regard to social class (American College of Physicians, 2008). This position holds true in the Nigerian political summersaults, evidenced by the high use of MHS when it was free before the implementation of the Structural Adjustment Programme in 1988 and thereafter, a lower use of MCH was reported when subsidies were removed and fees for services rendered was introduced (Otolorin & Marinho, 1988; Ekwempu, Maine, Olorukoba, Esseien, & Kisseka, 1990).

However, other research findings have indicated that subsidies and free services does not always lead to increase use of MCH services because cost of services received is just one of the many factors (distance, lack of transport, decision to seek for health care) that influence the use of health services as was observed in Nigeria (Foster, 1997; Harrison, 1983, Ityavyar, 1984; Oche, Umar, Adejoh, Isa, &

Ekele, 2010; Stock, 1983) and elsewhere (Auerbach, 1982; Lasker, 1981). Therefore, effort must be made to systematically engage local communities in the planning, implementation and monitoring of MHS, in order to enlist trust, mobilize communities and for communities to provide invaluable insights on cultural beliefs, so that interventions remain culture friendly.

Mother's Education and Pregnancy Outcome

A woman's ability to read, write and communicate in the official language of her country expands her opportunities to identify and optimize job and higher income opportunities. Moreover, literacy expands her world view on not only local political issues, but also on her cultural health capital in terms of ability to seek information and communicate effectively with health workers. Education expands her horizon of thinking which enhance on her autonomy in terms of ability to take independent autonomous decisions, get engage in gainful employment, insist on her fundamental human and reproductive rights and adopt behaviors that optimizes her use of MHS. Based on pooled data from 2005 to 2010, the world adult literacy level stands at 84% with WHO regional block of South east Asia, Eastern Mediterranean and Africa having less than the global average with literacy rates of 70%, 69%, and 63% respectively (WHO, 2013a). Within the African subcontinent, the West African countries (Mali, Niger, Senegal, and Sierra Leone) have lower literacy rates with some having half of their population as literate.

Nigeria's current female literacy level is 61% (WHO, 2013a), however, there are huge differences among the six geopolitical zones of Nigeria with some states in the North East and North West having female literacy of less than 20% (National Population Commission & ICF Macro, 2009). While education does relate to the

income and social status of individuals, however, evidence indicate it is strongly related to reproductive health behavior and use of MHS even after controlling for these variables (Ahmed et al., 2010; Desai et al., 2013; Ezugwu et al., 2014; Fatso et al., Ezeh & Oronje, 2008; Fatso et al., 2009; Fawole et al., 2012, Onah et al., 2006; Ory et al., 2013; Wang et al., 2011; Yego et al., 2014). In general, education help in overcoming negative cultural beliefs and practices which improves the respect for the opinion of women by all their spouse, members of their family and community at large, not only on reproductive health issues but also on all aspects of life (Mekonnen & Mekonnen, 2003).

Moreover, education increases self-confidence, better skilled optimising opportunities that will enhance her health and be a role model for other women (Acharya et al., 2010). Studies have shown that, poor pregnancy outcomes is highest among illiterates, due to low autonomy, lack of knowledge and skills (Olarenwaju, 2013; Ory et al., 2013; Wang et al., 2011; Yego et al., 2014). Further, increasing levels of educational attainment not only improves her autonomy but also delays the likelihood of early child bearing and may also affect the number of child she can bear as has been observed in Nigeria (Babalola & Fatusi, 2009; Fawole et al., 2012), Namibia (Upadhyay & Karasek, 2012) and other parts of the world (UNICEF, 2012; WHO et al., 2010). This reduces the life time risk of a woman dying from pregnancy and its related complications.

Studies have shown that women with at least secondary/high school level of education have higher rates of the ANC visits, readily accept family planning programs, and are more likely to deliver in the hospital compared to illiterate women (Ahmed et al., 2010; Desai et al., 2013; Fatso et al., 2009; Fawole et al., 2012).

However, there is no consensus among the scientific community regarding the mechanism through which formal education acts to influence woman's reproductive behavior. For instance, Cleland and Van Ginneken (1988), advanced that it is due high levels of income brought about by better job opportunity, while studies in South America (Elo, 1992) reported that it associated with place of domicile (urban) and the type of social environment under which the woman grew. Contrary to the later, a study in Nigeria, reported that the observed mortality decline is much higher among the educated women irrespective of whether they live in urban or urban areas, when compared to their peers who have not been to school and lived in similar settings (Caldwell, 1979). However, there is evidence in the literature indicating that educational achievements are not a guarantee to the use of health service (Sharp, Ross, & Cockerharn, 1983). For instance, higher proportion of educated people practice self-treatment and fail to make a follow up visit to compared to uneducated people that have similar income levels and living in the same place (Sharp, Ross, & Cockerharn, 1983). This underscores the fact that the use of health services is most probably an additive effect of many variables including past experiences. The modern communication channels including the internet facilitate in passing health related information that enhances health promotive and preventive attitude and behaviors (Ezugwu et al., 2014). However, many women have no access to mass media with only 20% of women in Nigeria that read print media or view television and this observation was affected by place of domicile and literacy status (National Population Commission & ICF Macro, 2009).

However, previous studies from other developing countries have no information on the role of the media on the use of MHS and pregnancy outcome

(Ahmed et al., 2011; Gil-González et al, 2006; Hagman, 2013; Khan et al., 2006; Magoma et al., 2010; Montagu et al., 2011; Say & Raine, 2007) and particularly from Nigeria (Ezugwu et al., 2014; Fapohunda & Orobaron, 2014; Fawole et al., 2012; Obiechina & Ekenedo, 2013; Oche et al., 2010; Ononokpono & Odimegwu, 2014; Wang et al., 2011), even though, it is known to be a veritable medium to mobilize communities on health issues. In general, access to educational materials (Shim, 2010) has potential to advance the knowledge of women regarding what, when, where, and why the need to use modern health services and improve healthy behaviors and better pregnancy outcomes. There is the need for studies to assess the role of mass media and its impact on the women's autonomy, the use of MHS and pregnancy outcomes.

Income Level and Pregnancy Outcome

Income is found to be a strong barrier to the use of modern health care facility, even when publicly provided (Knight et al., 2013). This is defined as the financial implication of receiving care, which includes transportation costs, physician fees, the cost of investigation and medication. The cost for utilization of health care facility is compounded in many parts of the developing countries, where prospective patients, especially women are culturally expected to be accompanied by relatives leading to an increase in transportation fees. This scenario is exemplified by the free family planning services provided in most parts of the developing countries but having high unmet need of nearly a third of all women involved in consensual sexual relationship and low prevalence of family planning acceptors (UNICEF, 2012; WHO, 2013a). This has been advanced as one of the major causes of under use of health services and

is therefore directly related to ability to pay. For instance, the removal of subsidies in health care through privatization and commercialization policies have led to a reduction in the use of MHS in Nigeria and partly account for the high maternal deaths (Ekwempu et al., 1990; Obiechina & Ekenedo, 2013). However, when compared with other factors, the financial cost of receiving care is often not a major determinant of the decision to seek care.

A survey conducted amongst a sample of 680 Igbo, Yoruba and Hausa people in Nigeria, (together accounts for at least 50% of population) reported that, cost ranked fourth amongst factors influencing people's decision to seek health care (Nnadi & Kabat, 1984). This pattern was further reported in a study conducted among educated segment of the Yoruba's, where cost of drugs and services received were not cited as the principal obstacle to the use of health services (Obiechina & Ekenedo, 2013). However, even when publicly provided, women with high autonomy on income scale tend to spend more on specialist medical services in private practice (Fatso et al., 2008; 2009). For instance, studies in South eastern (Osuour, Fatusi, & Chiwuzie, 2006) and North western Nigeria (Idris, Gwarzo, & Shebu, 2006), noted that, women from high income families seek the skills of specialist even in foreign countries. On the other hand women with low autonomy on income scale reported cost as an obstacle to the use of appropriate MHS and tend to patronize less skill and cheap midwives such as the TBAs. Hence, income is a major determinant for the access and use of health services irrespective of whether it is offered by private or public owners due to charges for services rendered or compulsory co-payment respectively (Obiechina & Ekenedo, 2013; United Health Foundation, 2011). This scenario is complicated by the fact that only 2% of Nigerian women in the

reproductive age have health insurance (National Population Commission & ICF Macro, 2009). This will definitely be an obstacle for timely access and use of appropriate MHS particularly for the lower socioeconomic class and contributes to poor pregnancy outcomes.

However, measuring women autonomy on income could be a double edged sword because on one hand, it has potential to provide insights on socioeconomic standing, confidence and likelihood to participate in decision making process at household level and on the other hand, it excludes significant number of women who are not engaged in gainful employment. This effect is delimited in DHS data because respondents were usually drawn based on proportionate to size multi-level cluster sampling and each variable adjusted for weight (National Population Commission & ICF Macro, 2009).

Social Change Implication

The findings from this study provided insight on the magnitude, pattern and factors influencing the use of MHS in different community settings cutting across social, economic, geographic (geopolitical zone), cultural, religious affiliations and place of domicile (rural or urban settlement). The literature has shown that the use of health services could be low even when offered at no cost (Chernichvosky & Meesook, 1986) due to failure to align services with cultural sensitive issues (Ityavyar, 1984, Stock, 1983; Stokoe, 1991; Urrio, 1991) and when health planning is vertical with no input from the intended beneficiaries of the community (Horowitz, Robinson, & Seifer, 2009). Thisstudy may be a source of additional guidance for an objective programming of population based intervention. It may stimulate an

integrated approach of all players such as health policy makers, program managers, field implementers, members of communities and community opinion leaders (traditional, political, religious, occupational/professional bodies) for the need to have an area specific strategies that will enhance community acceptance, accessibility and use of MHS. The potential of this study to bring all actors to the table has an additional advantage to enhance coordination, commitment and participation by all stakeholders towards improving access and use of modern obstetric services. This approach has potential for acceptance of strategies that could be used to sensitize communities against harmful ethno-religious practices that affect the ability of women to take independent decisions on matters concerning their reproductive health including the use of MHS.

Justification of the Study Design

The proposed design is a descriptive cross sectional study to explore the magnitude, pattern and factors that are associated with the use of MHS and pregnancy outcomes using the 2008 DHS data. The 2008 DHS data set has a large sample size of 33,385 women aged 15-49 years which has strengthen the external validity of the findings (Szklo & Nieto, 2014) because the DHS data drew participants using weighted probability sampling methods (National Population Commission & ICF Macro, 2009). The data used has information on participant's bio-socio demographic characteristics such as age, parity, income, education, tribe, religion, number of ANC visits made in the most recent pregnancy before the survey date, maternal and pregnancy outcomes and place of domicile. The information tallied with the research questions and hypothesis of this study with most of the outcome variables been

dichotomous categorical (live birth/fetal death; had four ANC visits/had less than four ANC visits; delivered at home/delivered in hospital) which is appropriate for Univariate and Multivariate logistic regression to develop models that best predicts the use of MHS and pregnancy outcomes. A similar approach was used using the 2003 DHS data to identify how religion influences none, partial, and complete childhood immunization (Antai, 2009). Further, Fapohunda and Orobaron (2014) have used 2008 NDHS data and similar analytical approach to identify factors associated with women who deliver with no one present.

Tribe/ethnicity as an example of variables in the DHS data has facilitated the process to explore whether race predicts or is associated with specific health behavior or health status while controlling for other predictors/independent variables (Frankfort-Nachmias & Nachmias, 2008; Pallant, 2011). The study design and approach using secondary data was similarly used in the U.S.to estimate the prevalence of obesity (Caprio et al., 2008; Ogden & Carroll, 2010; Ogden, Carroll, Curtin, Lamb, & Flegal, 2010); in Australia to explore cultural determinants on maternal weight and occurrence of gestational diabetes (Von Katterfeld, Li, McNamara, & Langridge, 2012) and in Israel to explore the role of preconception physical exercise on maternal weight gained, occurrence of some weight related diseases such as diabetes, heart diseases and diabetes and the impact on their babies birth weight (Friedlander et al., 2009).

Conclusions

Overall, from the various studies reviewed above, there is a general lack of consistent unidirectional relationship between a woman's socioeconomic standing and

the use of MHS and pregnancy outcomes. The influence of culture and religion within and between different regions and countries within the developing countries probably due to differences in family and community values rather than a product of religious practices. Generally, data on MHS in developing countries was useful in guiding policy and programming. However, the slow progress over the decades called for additional information particularly in heterogeneous communities of Nigeria, with varied beliefs and cultures that influence the use of MHS and pregnancy outcomes, which this study intend to achieve.

Chapter 3: Research Method

Introduction

This chapter follows the current problem (presented in Chapter 1) and state of knowledge on the use of MHS and pregnancy outcomes. Chapter 3 also follows the existing gaps in the literature (presented in Chapter 2), which led to the development of the research questions and hypothesis (presented in Chapter 1) of this research. Chapter 3 provides the methods that were used to answer the research questions and hypothesis stated in chapter 1. The outline of the chapter is (a) background of the country, which will provide information on the geographical location of Nigeria, population size and distribution/composition, political environment, economic development, health care system, and health status of Nigerians; (b) study design; (c) source of data and sampling methods used in gathering the data; (d) study variables;(e) data analysis methods; and (f) ethical considerations.

Study Design

This study was a population-based retrospective, cross-sectional design using secondary data from the 2008 Nigerian DHS to examine the association between biologic, socioeconomic, and cultural factors and use of MHS.

Sources of Data

The 2008 NDHS data was funded by the United States of Agency for International Development (USAID) and was the source of data for this study. The 2008 DHS survey was a cross sectional study with information on key population indicators that cuts across all the millennium development goals (MDGS) at the level of all the 36 states, the Federal Capital Territory (FCT), the six geopolitical zones, and

the national levels (National Population Commission & ICF Macro, 2009). The raw data files were obtained from MEASURES DHS+ after obtaining permission from ORC Macro and ICF International who are the custodians of the data (National Population Commission & ICF Macro, 2009) and Walden University IRB with an approval number 01-23-15-0338613 dated January 24th, 2015.

Sample Size and Recruitment of Participants

The sampling frame (enumerating areas) was developed using the 2006 Nigerian national census and from the list, clusters were selected. Female interviewers were used for data collection. The interviewers were selected based on having a minimum educational qualification of post-secondary and ability to speak the local language fluently of the survey site/area assigned to each specific interviewer. The interviewers also took pre and posttest following a training session on the operationalization of the survey including practical simulation in villages and towns that were not part of the survey sites. To ensure the quality of implementation of the survey, a second interviewer cross checked the adherence to sampling guidelines, the data collection process, and both were supervised by the national level supervisors comprising of personnel of USAID, the National Population Commission and other UN related partner agencies. Local leaders were duly informed on the objectives of the survey and also participated in household numbering of households in selected survey sites.

Using stratified two stage cluster design, a total of 888 study clusters comprising of 286 and 602 for urban and rural areas respectively were selected. In each cluster, the numbering of household was established, which was used as the

sampling frame of selecting houses using table of random numbers. Thereafter, 33,385 women aged 15-49 years who had given birth between January 2003 and December 2008 and were physically present in a given cluster during the data collection phase of the survey were recruited and interviewed irrespective of their actual place of residence (National Population Commission & ICF Macro, 2009). They were questioned on their use of prenatal, delivery and post-natal services during her most recent child birth. They are also questioned on where and who provided each component of the maternal, newborn and child health services. Other information collected included type and age of marriage, issues on sexuality and sexual relationship with spouse, fertility preferences, family planning and bio-socio-demographic characteristics of the woman and that of her spouse/partner. The response rate was reported to be 97% which was higher than the figure recorded in the 2003 DHS. Details of the survey methods were well described in the free online survey report (National Population Commission & ICF Macro, 2009).

Validation of the DHS Data Collection Tools

The DHS questions have evolved over a period of three decades aimed to have comparable set of information across the 70 countries that are currently participating in the DHS surveys (United State Agency for International Development & ICF Macro, 2006)**.** The DHS questionnaires were reviewed at least once during each of the four phases of the program. The first revision of the questionnaires was in 1984 which was used and further reviewed during the DHS 2 in 1988. The third and fourth revisions were done in 1992 and 1997 respectively under the direct supervision of the USAID in order to accommodate feedback received from field officers, data analysis

team, and partner agencies such as UNICEF, UNFPA, WHO and the World Bank (United State Agency for International Development & ICF Macro, 2006)**.** Pilot survey was conducted for each of the revised data collection tools before wider application during national surveys and the data generated during each of the pilot surveys was analyzed for concordance between interviewers and repeatability across various regions of the world (United State Agency for International Development & ICF Macro, 2006). Overall, these revisions addressed the gaps and challenges learned from each previous phase and had enhanced the attainment of DHS objectives for comparable data between and within different countries from all parts of the world.

DHS Data Storage and Protection

The DHS survey was approved by the ethical committee of Macro International Cleveland, USA and the Nigerian National Ethical Committee and before the collection of data, the consent of each participant was sought (National Population Commission & ICF Macro, 2009). The statement for consent was read before the commencement of interview and attached to each of the individual questionnaire (National Population Commission & ICF Macro, 2009).

One of the major objectives of the DHS program is to enhance the use of data for policy implementation. The DHS data are archived electronically and raw dataset is accessible to all Researchers after going through a web based registration and approval process at http//:www.measuredhs.com (United State Agency for International Development & ICF Macro, 2006). All data set are in standard recode in order to facilitate the manipulation of data by various Researchers and for comparison within and between different countries. The data is also maintained in standard

variable and class interval for some variables like age was provided in class interval of 5 year age group (United State Agency for International Development & ICF Macro, 2006). Specific data files are maintained for defined sampled population such as a recode and raw data file for women in the reproductive age (15 − 49 years), children less than one year old, children under five years olds and men between the age of 15 − 59 years. This provides practical advantage for uniform comparison between countries. The web based DHS data uses the ISSA software package in order to facilitate the exportation of data to other data analysis software such as the SPSS, SRATA and SAS. In order to ensure the privacy of participants, all variables or information that could facilitate the tracing of the primary research participants (names of villages, streets, house numbers etc) have been removed from the data set in line with the guidelines on the use of secondary data (Safran et al., 2011).

Data Abstraction

The study was based on the total 33,385 sampled women in the reproductive age group (15 − 49 years) across 888 clusters comprising of 286 and 602 urban and rural areas respectively (National Population Commission & ICF Macro, 2009). Estimates on number of ANC visits, place of delivery, who supervised the delivery, and delivery outcome were disaggregated by the independent variables of each respective research question and hypothesis.

First, the raw data for each variable was coded to facilitate data analysis. Parity was be code as 1, 2, and 3 for prima gravida (first delivery), multipara (2 − 4) and grand multipara (≥ 5 deliveries) respectively. The prima gravidas were compared to women with categories of parity. Age was categorized into three groups as < 20

years (code 1), 20 − 34 years (code 2), and ≥ 35 years (code 3) with those < 20 years old compared to the remaining age groups. Women that have responded yes to independently decide to go out, are gainfully employed or all health related decisions is made by her alone or jointly with others were coded as 1 (fully autonomy), those that respondent yes to only one or two variables on autonomy were coded 2 (some autonomy) and those that response no to all the three measures of autonomy were coded 0 (no autonomy). Comparison was between women who had no any form of autonomy with those with some or full autonomy. Religious beliefs of women was coded as 1 for Muslims, code 2 for Christians and Traditional religion as code 3. Muslim women were compared to women of other religion. Ethnicity of women was coded as 1 for Hausa, 2 for Yoruba, 3 for Igbos, 4 for Fulani, 5 for Ijaw/Izom, 6 for Ibibio, 7 for Tiv, 8 for Kanuri/Baribari, 9 for Ekot, 10 for Igala and 11 for others which comprises of the remaining 364 ethnic groups (National Population Commission & ICF Macro, 2009). Those belonging to the Hausa ethnic group were compared to other ethnic groups. Marital status of women was coded as 1 for never married, 2 for married, 3 for living together, 4 for divorced/separated and 5 for widowed, with those belonging to the never married group were compared to other categories of marital status. Educational attainment was coded as 1 for those with no formal education, code 2 for Primary level, code 3 for Secondary level, and code for 4 Post-secondary levels. Women with no formal education were the reference group. Income level (quintile) was coded 1 for poorest, 2 for poor, 3 for middle, 4 for rich and 5 for richest with poorest compared with other categories of income level. The place of domicile (residence) was coded as 1 (rural) and 2 (urban) with the former as the reference group. Geopolitical zones of residence was code as North east (code 1),

North West (code 2), North central (code 3), South east (code 4), south west (code 5) and south-south (code 6). The North east zone was compared to the other zones. Women that have responded no or yes to distance been a major obstacle to access MHS were coded as 0 and 1 respectively, with those that respondent no as the reference group. Deliveries that were supervised by skilled health worker were coded as 1, while those attended by unskilled worker were coded 0 and the later was compared to the former. The number of ANC visits made during pregnancy before the survey was coded as 0 for those that had less than 4 while those who had four or more ANC visits as recommended by WHO (WHO, 2010) were coded as 1 and compared to the former. The place of delivery was categorized as home (coded as 0) and institutional (coded as 1) and comparison was made between the two possible types of place of delivery. Similarly, fetal outcome was code as 0 for still births/dead within first one year of life and Live births and those that have survived the first one year of life were coded as 1.

The SPSS statistical software was used to disaggregate data by women's bio-demographic variable (age and parity), cultural characteristics (Religious beliefs, tribal group/ethnicity and level of female autonomy), socioeconomic characteristics (level of education, income levels, geopolitical zone of residence, and place of domicile), community health structure (distance to nearest health care facility and the availability of skilled health care worker) and pregnancy outcomes (still birth/child death, live birth/alive at one year of life). Bivariate Pearson Chi-square test and multivariate logistic regression were used to test for associations, strength of associations and developed models that determine the outcome variables in terms of

the use of MHS and pregnancy outcomes. In order to reduce the effect of under or over representation of each stratum, sampling weighs was used.

Theoretical Framework

Theoretical framework provides the constructs that will guide the framing of testable hypothesis of the identified knowledge gaps (Krieger, 2011). It provides the underlying principles and basis for the development of all aspect of research protocol. In order to come up with potential population based intervention program, one must first understand the root causes of a given health, departures from health or health related events which will best be guided using a theory (Glanz, Rimer, & Viswanath, 2008). Theory provides the basis on how to frame research questions, and hypothesis in line with the study methodology, the known distribution, pattern and determinants (relationship among variables) of the research topic in order to increase the validity and reliability of my findings.

The ability of a woman to take decisions independently in many under developed countries, is delimited by her social status in terms of economic independence, the status of her spouse, whether she lives in the same house with her mother in-law, and the status of her family (Amowitz et al., 2002; Bloom et al., 2001; Friel & Marmot, 2011; Montagu et al., 2011). A woman's decision on reproductive health issues is influenced by her level of empowerment and socioeconomic status (Ahmed et al., 2010).

The Anderson health behavior model provides a framework to analyze the determinants of the use of health services (Anderson, 1995). The model consists of three set of individual and community level factors that provides constructs to assess

individual's capacity to access and use health services. They include a) Predisposing characteristics; b) enabling characteristics and c) need characteristics. The predisposing factors have been used to in several studies that explain the observed differences in the behavior of the use of health services based individual bio-socio-demographic variables.

The model provides constructs that could be adapted to fit the various bio-socio-demographic variables that are in tune with the Researchers research questions and hypothesis. This unique characteristic of the Anderson's model was underscored by its application in a range of medical research such as the use of health care services (Davidson & Andersen, 1997; Wolinsky & Johnson, 1991; Phillips, Morrison, Andersen, & Aday, 1998) and other social issues (Bradley et al., 2004; Broese van Groenou, Glaser, Tomassini, & Jacobs, 2006; Gaugler & Kane, 2001) is an attestation to its adaptability and usefulness from 1968 when it was first described to date. In the context of this study, the model was used in assessing the influence of certain biological (age, parity), cultural (religious beliefs, tribal group/ethnicity) and socioeconomic characteristics (education, occupation, income, place of domicile, marital status) on women's use of MHS and how it affects the outcome of a given pregnancy.

Some of the articles reviewed advanced the hypothesis that women with higher economic, social, and or cultural autonomy will make use of MHS and have positive health outcomes (Ahmed et al., 2010; Amowitz et al., 2002; Khan et al., 2006; Babalola & Fatusi, 2009; Bloom et al., 2001; Montagu et al., 2011; Vinikoor-Imler et al., 2011), which fits the sociopolitical and psychosocial theories. The sociopolitical and psychosocial theories will provide constructs on power, authority,

policies, rights and privileges (Krieger, 2011) as enshrined in formal political system and the informal cultural system within a family system, whether matrilineal or patrilineal. These theories explore social circumstances (policies, power, authority social class, formal or cultural rights/privileges), social practices (behavioral risks), and social affiliations (religion, ethnicity) that influence health and pregnancy outcomes (Krieger, 2011).

However, it must be noted these studies did not mention psychosocial and sociopolitical epidemiologic theories by name, even though the study objective and contentious issues raised have fitted the social capital and sociopolitical epidemiologic theories. Although, social capital and sociopolitical epidemiologic theories offers alternative approach towards holistic understanding of the social epidemiology of disease and health related states beyond what the common bio-medical and behavioral risk theories such as the health belief model, theory of planned behavior and theory of reasoned action, however, both the sociopolitical and psychosocial theories in my view are off shoot of the theory of reasoned action (TRA). The TRA posit that humans are rational regarding health behaviors signifying volition for an action or inaction controlled (Glanz et al., 2008; United State Department of Health and Human services [USDHHS], 2009).

The TRA constructs establish how personal or group (community) beliefs, assertiveness, and intent influence the code of conduct including health related issues. However, for holistic understanding of the use of health care, the socio-capital and psychosocial theories lacks the capacity to integrate the role of environment and structural issues, which to my mind are important influencers on the use of health care services. The Anderson's model on the use of health care has better constructs to

study pattern of MHS use when compared to the bio-medical and behavioral risk theories such as the health belief model, theory of planned behavior and theory of reasoned action as they bear minimal impact on behavioral change due to the fact that these models were built on forecasting and appreciating the association between intentions and behaviors without specifying how behavioral change goals can most effectively be pursued (Taylor et al., 2007).

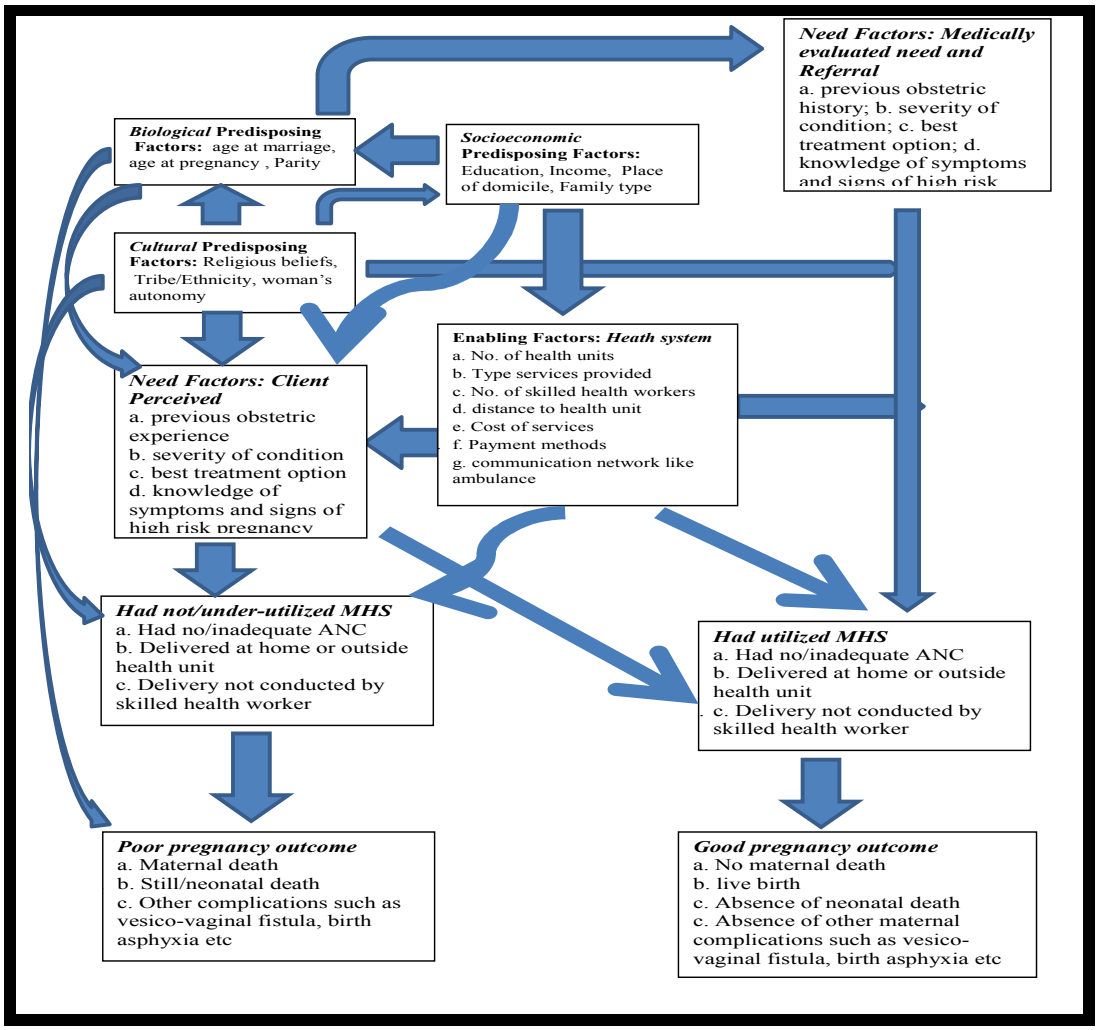
Moreover, recent studies have shown that population based interventions that are likely to have the highest effect to improve maternal indicators are those that focus on gender equality in education and work opportunities which are beyond individual characteristics but have the potential to reduce gaps in social gradient (Ahmed et al., 2010). Based on this submission, the Anderson health behavior model provides better constructs that will demonstrate the influence of biological, socioeconomic, political and cultural factors and provide guidance on appropriate choice of interventions that will bring the much needed social change regarding maternal morbidity, mortality and disability that are due to pregnancy and its complications. It will bridge the gap reported by Ahmed and colleagues (2010), on the lack of clear information on the role of cultural practices and how they interact with economic, educational, and empowerment status of women in the developing countries.

Schematic Representation Factors Influencing the Use of MHS and Pregnancy Outcomes

The research questions of this study were based on Anderson health behavior model to analyze factors that determines the use of MHS (Anderson, 1995). The Anderson model has been adapted to identify factors that influence the use of MHS

and pregnancy outcomes. Arrows indicate the likely direction of influence of each of the constructs on the use of MHS and pregnancy outcomes (Figure 3).

The research question and hypothesis on whether there is any significant association between a woman's parity, age and the number of antenatal visits and or place of delivery were both in line with the constructs of the Anderson's theory.



Key: Arrows indicate the likely direction of influence ⟶

Figure 3. Conceptual framework on factors influencing the use of maternal health services and pregnancy outcomes

The age of a woman at the time of pregnancy and the number of children she has is a product of cultural (religious beliefs, Tribe/Ethnicity, woman's autonomy) and socioeconomic (education, income, place of domicile, marital status) predisposing factors that have existed before been. It is in effect, related to where a woman was born, works and lives which influences her capacity to access and utilizes MHS.

Similarly, the Anderson model has direct bearing with the second research question and hypothesis that tries to assess whether the cultural characteristics of Nigerian women in terms of their religious beliefs, tribal /ethnic affiliation, and marital status has any significant statistical association with the use of MHS as measured by number of ANC visits and place of delivery. These cultural factors have direct influence on attitudes and behavior in all spheres of life including when to get marriage, the ideal stereotyped behavior of both sexes, the latitude for a woman to take her destiny into hands including issues that relate to her empowerment, freedom of movement and choice of reproductive health behavior. Further, religious beliefs, tribal/ethnic affiliation, and marital status may limit the level of education a woman attains which predisposes her to low socioeconomic status (Figure 3) and at risk of early marriage, teenage pregnancy and high parity with grave consequences on the use of MHS, maternal and neonatal deaths.

The conceptual model of this research is in line with the third and fourth research question and hypotheses that aimed to identify (if any) whether a woman's socioeconomic characteristics in terms of educational attainment, income level, and place of domicile (rural or urban) are significantly associated with the number of antenatal visits and place of delivery.

The conceptual model suggests that these socioeconomic characteristics could influence a woman's cultural health capital, ability to pay for transport fare, cost of MHS and specialist services. In essence, the resources available to the woman at individual level or in her community may be a major determinant on whether or not to perform a minimum of four ANC visits or whether to deliver her baby at home or in a health facility. A woman's income and place of domicile influences her user of MHS. For instance, the conceptual model of this study (Figure 3) suggest that communities with functional MHS are more likely to use modern health services compared to their counterparts who live in places without health facility and have to cover long distances or difficult terrain in order to make use of MHS providing center and the desired pregnancy outcome.

Finally, the conceptual model (Figure 3) indicate that the biological, socioeconomic and cultural predisposing factors interact with the enabling (health system factors) and need factors (perception by women and health workers) to determine the pattern of health care use and ultimately influence pregnancy outcomes (fifth research question). Women who had no or inadequate ANC, delivered in homes and had no post-natal care, are likely to have poor pregnancy outcome (maternal and fetal deaths) compared to those who have adequate number of ANC visits and did delivered in hospitals.

Study Variables

Dependent/Outcome Variables

The outcome variables were the number of ANC visits during the most recent delivery, place of delivery, and outcome. The number of ANC visits during the most

recent delivery was categorized as women who had less than or at least four antenatal visits in line with the recommendation of WHO in any given full term pregnancy (Abouzahr, 2003) (Table 1).

Table 1

Dependent/Outcome Variables of the Study

Hypothesis	Independent (Predictor)	Dependent/outcome variables		
		Variables	Definition of variable	Type of variable
1a. Null Hypothesis (HO): No association between women's age and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between women's age and a) number of ANC visits and b) place of delivery.	Age	Antenatal visits	Had < or ≥ 4 ANC visits during her most recent delivery	Ordinal
		Place of delivery	Delivered at home or Hospital	Nominal
1b. Null Hypothesis (HO): No association between parity and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between parity and a) number of ANC visits and b) place of delivery.	Parity	Antenatal visits	had < or ≥ 4 ANC visits during her most recent delivery	Ordinal
		Place of delivery	Delivered at home or Hospital	Nominal
2a. Null Hypothesis (HO): No association between religious beliefs and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between reigious beliefs and a) number of ANC visits and b) place of delivery.	Religious beliefs	Antenatal visits	had < or ≥ 4 ANC visits during her most recent delivery	Ordinal
		Place of delivery	Delivered at home or Hospital	Nominal
2b. Null Hypothesis (HO): No association between tribal/ethic affiliation and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between tribal/ethnic affiliation and a) number of ANC visits and b) place of delivery.	Tribal/ethic affiliation	Antenatal visits	had < or ≥ 4 ANC visits during her most recent delivery	Ordinal
		Place of delivery	Delivered at home or Hospital	Nominal
2c. Null Hypothesis (HO): No association between the type of family and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between the type of family and a) number of ANC visits and b) place of delivery.	**Type of family**	Antenatal visits	had < or ≥ 4 ANC visits during her most recent delivery	Ordinal
		Place of delivery	Delivered at home or Hospital	Nominal
3a. Null Hypothesis (HO): No association between education and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between education and a) number of ANC visits and b) place of delivery.	Education	Antenatal visits	had < or ≥ 4 ANC visits during her most recent delivery	Ordinal
		Place of delivery	Delivered at home or Hospital	Nominal
3b. Null Hypothesis (HO): No association between income anda) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between income and a) number of ANC visits and b) place of delivery.	Income	Antenatal visits	had < or ≥ 4 ANC visits during her most recent delivery	Ordinal
		Place of delivery	Delivered at home or Hospital	Nominal
3c. Null Hypothesis (HO): No association between place of domicile and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between place of domicile and a) number of ANC visits and b) place of delivery.	Place of domicile (rural or urban)	Antenatal visits	had < or ≥ 4 ANC visits during her most recent delivery	Ordinal
		Place of delivery	Delivered at home or Hospital	Nominal
3d. Null Hypothesis (HO): No association between a woman's autonomy and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between a woman's autonomy and a) number of ANC visits and b) place of delivery.	Autonomous decision making	Antenatal visits	had < or ≥ 4 ANC visits during her most recent delivery	Ordinal
		Place of delivery	Delivered at home or Hospital	Nominal
4a. Null Hypothesis (HO): No association between distance and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between distance and a) number of ANC visits and b) place of delivery.	Distance	Antenatal visits	had < or ≥ 4 ANC visits during her most recent delivery	Ordinal
		Place of delivery	Delivered at home or Hospital	Nominal
4b. Null Hypothesis (HO): No association between the use of skilled health care worker and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between the use of skilled health care worker and a) number of ANC visits and b) place of delivery.	Skilled health care worke	Antenatal visits	had < or ≥ 4 ANC visits during her most recent delivery	Ordinal
		Place of delivery	Delivered at home or Hospital	Nominal
5a. Null Hypothesis (HO): No association between fetal outcome (live birth/still birth) and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between fetal outcome (live birth/still birth) and a) number of ANC visits and b) place of delivery.	Antenatal visits	fetal outcome	had < or ≥ 4 ANC visits during her most recent delivery	Ordinal
	Place of delivery		Delivered at home or Hospital	Nominal
5b. Null Hypothesis (HO): No association between status of neonate (alive /dead) and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between status of neonate (alive /dead) and a) number of ANC visits and b) place of delivery.	Antenatal visits	status of neonate	had < or ≥ 4 ANC visits during her most recent delivery	Ordinal
	Place of delivery		Delivered at home or Hospital	Nominal

The place of delivery is either rural or urban and women in rural setting were compared to those living in the rural areas because access and use of MHS and its

effect on pregnancy outcomes is poor for women in the rural areas (Fapohunda & Orobaron, 2014; Friel & Marmot, 2011; Montagu et al., 2011; UNICEF, 2012). Studies in South eastern (Osuour et al., 2006) and North western Nigeria (Idris et al., 2006), indicated that women from high income families living in urban areas seek the skills of specialist and deliver in appropriate maternal health care facilities compared to their poor rural counterparts who mostly patronize less skilled and cheap midwives such as the TBAs.

Pregnancy outcomes in relation to the fetal or child life were categorized as alive or not alive. Studies have shown that the likelihood of poor pregnancy outcomes (maternal deaths and still birth) is higher among women who had no antenatal care (Ezugwu et al., 2014; Wang et al., 2011), delivered at home (Fawole et al., 2012; Magoma et al., 2010) and those delivered alone or assisted by unskilled health worker (Fapohunda & Orobaron, 2014).

Predictor/Independent variables

The predictor variables comprised of biological characteristics (age, parity), cultural (religious beliefs, tribal group/ethnicity, marital status, female autonomy) and socioeconomic characteristics (education, income levels, regional location, place of domicile, distance, and availability of skilled health workers).

The selected biological characteristics that were used as predictor variables and included age of the woman which was categorized as < 20 years, 20 − 34 years, and > 35 or more years. The parity was categorized as 1, 2 − 4 and equal to or greater than 5 children (Table 2).

Table 2

Predictor/Independent Variables of the Study

Hypothesis	Dedependent (outcome)	Independent/Predictor variables		
		Variables	Definition of variable	Type of variable
1a. Null Hypothesis (HO): No association between women's age and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between women's age and a) number of ANC visits and b) place of delivery.	Antenatal visits / Place of delivery	Age	Woman's age at the time of most recent delivery	Ordinal
1b. Null Hypothesis (HO): No association between parity and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between parity and a) number of ANC visits and b) place of delivery.	Antenatal visits / Place of delivery	Parity	Number of a woman's children before most recent delivery	Ordinal
2a. Null Hypothesis (HO): No association between religious beliefs and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between reigious beliefs and a) number of ANC visits and b) place of delivery.	Antenatal visits / Place of delivery	Religious beliefs	Woman's religious affiliation (Muslim, Christian, or Traditionalist)	Nominal
2b. Null Hypothesis (HO): No association between tribal/ethic affiliation and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between tribal/ethnic affiliation and a) number of ANC visits and b) place of delivery.	Antenatal visits / Place of delivery	Tribal/ethic affiliation	Woman's tribal group/ethnicity affiliation (Hausa/Fulani, Yoruba, Igbo, Ijaw, Kanuri or others	Nominal
2c. Null Hypothesis (HO): No association between the type of family and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between the type of family and a) number of ANC visits and b) place of delivery.	Antenatal visits / Place of delivery	Type of family	Number of wives a woman's husband has (monogamy/polygamy)	Nominal
3a. Null Hypothesis (HO): No association between education and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between education and a) number of ANC visits and b) place of delivery.	Antenatal visits / Place of delivery	Education	Highest educational attainment (No formal, primary, secondary or more then secondary)	Ordinal
3b. Null Hypothesis (HO): No association between income anda) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between income and a) number of ANC visits and b) place of delivery.	Antenatal visits / Place of delivery	Income in terms of Family Wealth Index/Quintel	Family Wealth index as quintels: Poorest, Poorer, Middle, Richer & Richest	Ordinal
3c. Null Hypothesis (HO): No association between place of domicile and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between place of domicile and a) number of ANC visits and b) place of delivery.	Antenatal visits / Place of delivery	Place of domicile	Defined as the settlement where a woman lives is coonsidered rural or urban and also which geopolitical zone of Nigeria (NE, NW, NC, SE, SW or SS geopolitical zone)	Nominal
3d. Null Hypothesis (HO): No association between a woman's autonomy and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between a woman's autonomy and a) number of ANC visits and b) place of delivery.	Antenatal visits / Place of delivery	Autonomous decision making	ability to take independent decision, gainfully employed and freedom to go of home whenever she likes to	Ordinal
4a. Null Hypothesis (HO): No association between distance and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between distance and a) number of ANC visits and b) place of delivery.	Antenatal visits / Place of delivery	Distance	Availability of health facility in the women's place of domicile (available, not available)	Ordinal
4b. Null Hypothesis (HO): No association between the use of skilled health care worker and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between the use of skilled health care worker and a) number of ANC visits and b) place of delivery.	Antenatal visits / Place of delivery	Skilled health care worker	Presence of skilled worker during the time of most recent delivery	Nominal
5a. Null Hypothesis (HO): No association between fetal outcome (live birth/still birth) and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between fetal outcome (live birth/still birth) and a) number of ANC visits and b) place of delivery.	Antenatal visits / Place of delivery	fetal outcome	Defined as whetther the delivery resulted in live baby or still birth	Nominal
5b. Null Hypothesis (HO): No association between status of neonate (alive /dead) and a) number of ANC visits and b) place of delivery. Alternative Hypothesis (HA): There is an association between status of neonate (alive /dead) and a) number of ANC visits and b) place of delivery.	Antenatal visits / Place of delivery	status of neonate	Defined as whether child is alive or dead	Nominal

The selected cultural predictor variables include religious affiliation (Islam, Christianity, Traditional); tribal/ethnic affiliation of the women were categorized as Hausa, Igbo, Yoruba, Fulani, Igala, Izom, and others; Marital status was categorized

as never married, married, living together but not married, divorced/separated and widowed.

The socioeconomic characteristics that were used as predictor variables include the woman's highest educational attainment which was categorized as no formal education, primary, secondary and post-secondary levels and these levels was similarly used for husband's highest educational attainment. Comparison was made for women who were educated to those who had no formal education in keeping with MDG two aimed to achieving universal primary education (Ahmed et al., 2010; WHO, 2013a).

Income level was divided in to five groups (quintile) in the 2008 NDHS data and categorized as poorest, poor, middle, rich and richest. Women in the poorest quintile were compared to those in the other income levels in order to fit with MDG one which is geared towards eradicating extreme poverty (Ahmed et al., 2010; WHO, 2013a). Women's place of domicile was either rural or urban while regional location of the women was categorized based on Nigeria's geopolitical zoning as North east, North west, North central, South east, South west and South-south zone. Access to mass media was considered as had no access to any type of mass media and had access every week to at least one type of mass media outlet. The lack of information on the benefits of attending ANC and delivering in hospitals results in misinterpretation of danger signs such as bleeding, delays in taking decision and reaching the hospital (Belton et al., 2014; Essendi et al., 2011; Ghebrehiwet & Morrow, 2007; Jammeh et al., 2011; Thorsen mail et al., 2012). The availability of health facilities as a proxy for distance and access to skilled health workers in the

place of domicile was analyzed as available and not available respectively (WHO, 2013a).

Data Analysis (Statistical Methods)

The data was analyzed using SPSS version 16. Bivariate Pearson's Chi-square test statistic and two stages of Multivariate regression analysis were conducted (tables 1 and 2 above) in order to identify factors influencing the use of MHS and pregnancy outcomes in Nigeria.

Descriptive statistics was used to analyze the distribution of outcome variables by the above identified predictor variables selected from participants bio-socio demographic variables in tables one and two above respectively.

The second statistical test done was a multivariate logistic regression which was conducted for each of the covariate to obtain the unadjusted odd ratio. Thereafter, a multivariate logistic regression of multi-level nature was conducted to obtain adjusted odd ratio in order to control for the effect of covariates. The first multivariate logistic regression was carried out to examine association between biological characteristics (age, parity), cultural (religious beliefs, tribal/ethnic affiliation, marital status, female autonomy) and socioeconomic characteristics (education, income levels, place of domicile, region of residence, distance, availability of skilled health workers) and the number of antenatal visits, place of delivery and pregnancy outcomes. Overall, the unadjusted odd ratio from multivariate logistic regression of one predictor variable at a time has two advantages: a) it provided information of how each of the predictor variables relates to each of the outcome variables; and b) it provided the basis for empirical comparison with the adjusted odd ratios obtained from the second stage multivariate logistic regression after controlling of potential

covariates. Multivariate logistic regression models were developed for a) ANC visits categorized as less than four visits and four or more number of ANC visits; b) place of delivery (home or institutional) and c) status of child at one year of age (alive or death). Variables that were included the model were selected established influencers from previous research and or were found to have significant statistical association from bivariate Pearson Chi-square statistic. This approach is appropriate as it reflects the hierarchical nature (multilevel) of the 2008 NDHS data and provided the possibility of assessing the influence of biological and socioeconomic factors at individual and community level on the outcome variables (Antai, 2009, 2011). The odd ratio from the regression analysis was estimated at 95% confidence interval as the critical value in testing hypothesis.

In order to reduce the effect of disproportionate sampling within and between the different geopolitical zones and or composition in each zone (sampling bias) and information bias (interviewer and non-response bias), sample weights as provided in the 2008 NDHS data was used.

Finally, in order to shed light on the epidemiological and practical implication of any significant relationship between predictor variable and the dependent variable, and for decision making on which variable to be included or excluded from the model, the Directed Acyclic Graphs (DAGs) was used. DAGs have facilitated the decision on whether a given variable is a confounder or not. DAGs was then developed to see whether a given variable is significantly associated with the a) predictor variable, b) with outcome variable, c) with both predictor and outcome variable and d) whether the inclusion of a given predictor variable in the multivariate logistic regression model could have more than ten percentage point difference in the

unadjusted and adjusted odd ratios obtained from the first and second multivariate logistic regression models respectively (Szklo & Nieto, 2014). Hence, the last criteria informed the need to first conduct a test of association (Bivariate Pearson's Chi-square), and the strength of association without controlling the covariates (unadjusted odds ratio from multivariate logistic regression) for each hypothesis. Thereafter, a multivariate logistic regression for predictor variables that were significantly associated with the outcome variable or were established influencers was conducted to assess the impact and direction if the strength of association between the predictor variables and each of the outcome variables after controlling for the covariates (adjusted odds ratio). A similar approach was used using the 2003 NDHS data to identify how religion influences none, partial, and complete childhood immunization (Antai, 2009). Further, Fapohunda and Orobaron (2014) have used 2008 NDHS data and similar analytical approach to identify factors associated with women who deliver with no one present.

Research Questions and Hypotheses Analysis Plan

Research Question (RQ) 1: Are Nigerian women's biological characteristics as measured by age and parity (number of children a woman has) associated with women's use of MHS as measured by number of antenatal visits and place of delivery?

Research Hypothesis (RH) 1:

H_{01A}: There is no significant statistical association between a woman's age and her use of MHS as measured by the number of antenatal visits.

Ha_{1A}: There is a significant statistical association between women's age and their use of MHS as measured by the number of antenatal visits.

H_{01B}: There is no significant statistical association between a woman's age and her use of MHS as measured by the place of delivery.

Ha_{1B}: There is a significant statistical association between women's age and their use of MHS as measured by the place of delivery.

H_{01C}: There is no significant statistical association between the number of children a woman has and her use of MHS as measured by the number of antenatal visits.

Ha_{1C}: There is a significant statistical association between the number of children a woman has and her use of MHS as measured by number of antenatal visits.

H_{01D}: There is no significant statistical association between the number of children a woman has and her use of MHS as measured by the place of delivery.

Ha_{1D}: There is a significant statistical association between the number of children a woman has and her use of MHS as measured by the place of delivery.

Test Statistic for Research Question 1 and Hypothesis

A Multivariate logistic regression for each predictor variable was conducted (one variable at a time) to assess the association between each of the independent variables (age, parity) and the dependent variables (ANC visits, place of delivery). This highlighted the relationship of each of the predictor variable to each of the outcome variables at 95% confidence interval (CI). This approach has provided unadjusted odd ratio. Thereafter, multiple logistic regression was conducted to obtain the adjusted odd ratio in order to develop models that best predicts how biological

characteristics of woman influences the use of MHS and pregnancy outcome after adjusting for other confounding variables.

Research Hypothesis (RH) 2:

Are Nigerian women's cultural characteristics as measured by religious beliefs, ethnicity, marital status and female autonomy, associated with women's use of MHS as measured by number of visits and place of delivery?

RH 2:

H_{02A}: There is no significant statistical association between the religious beliefs of women and their use of MHS as measured by the number of antenatal visits.

Ha_{2A}: There is a significant statistical association between the religious beliefs of women and their use of MHS as measured by the number of antenatal visits.

H_{02B}: There is no significant statistical association between the religious beliefs of women and their use of MHS as measured by the place of delivery.

Ha_{2B}: There is a significant statistical association between the religious beliefs of women and their use of MHS as measured by the place of delivery.

H_{02C}: There is no significant statistical association between the ethic affiliation of women and their use of MHS as measured by the number of antenatal visits.

Ha_{2C}: There is a significant statistical association between the ethnic affiliation women and their use of MHS as measured by the number of antenatal visits.

H_{02D}: There is no significant statistical association between the ethic affiliation of women and their use of MHS as measured by the place of delivery.

Ha_{2D}: There is a significant statistical association between the ethnic affiliation women and their use of MHS as measured by the place of delivery.

H_{02E}: There is no significant statistical association between the level of female autonomy and a woman's use of MHS as measured by the number of antenatal visits.

Ha_{2E}: There is a significant statistical association between the level of female autonomy and a woman' use of MHS as measured by the number of antenatal visits.

H_{02F}: There is no significant statistical association between the level of female autonomy and a woman's use of MHS as measured by the place of delivery.

Ha_{2F}: There is a significant statistical association between the level of female autonomy and a woman' use of MHS as measured by the place of delivery.

H_{02G}: There is no significant statistical association between marital status and her use of MHS as measured by the number of antenatal visits.

Ha_{2G}: There is a significant statistical association between marital status and her use of MHS as measured by the number of antenatal visits.

H_{02H}: There is no significant statistical association between marital status and her use of MHS as measured by the place of delivery.

Ha_{2H}: There is a significant statistical association between marital status and her use of MHS as measured by the place of delivery.

Test statistic for Research Question 2 and Hypothesis

The RQ 2 and RH 2 s were tested using the bivariate and multivariate logistic regression as explained under research RQ/RH 1 above. The first stage of multivariate logistic regression was used to assess whether an association exists between each of the independent variables (religious beliefs, tribal/ethic affiliation, marital status and female autonomy) and the dependent variables (number of ANC visits and place of delivery). Comparison was made for the unadjusted and adjusted odd ratio.

Research Hypothesis (RH) 3:

Are Nigerian women's socioeconomic characteristics as measured by geopolitical zone of residence, level of education, income levels, and place of domicile associated with use of MHS as measured by the number of ante-natal visits and place of delivery?

RH 3:

H_{03A}: There is no significant statistical association between a woman's geopolitical zone of residence and the use of MHS as measured by the number of antenatal visits.

Ha_{3A}: There is a significant statistical association between a woman's geopolitical zone of residence and the use of MHS as measured by the number of antenatal visits.

H_{03B}: There is no significant statistical association between a woman's geopolitical zone of residence and the use of MHS as measured by the place of delivery.

Ha_{3B}: There is a significant statistical association between a woman's geopolitical zone of residence and the use of MHS as measured by the place of delivery.

H_{03C}: There is no significant statistical association between a woman's level of education and the use of MHS as measured by the number of antenatal visits.

Ha_{3C}: There is a significant statistical association between a woman's level of education and the use of MHS as measured by the number of antenatal visits.

H_{03D}: There is no significant statistical association between a woman's level of education and the use of MHS as measured by the place of delivery.

Ha$_{3D}$: There is a significant statistical association between a woman's level of education and the use of MHS as measured by the place of delivery.

H$_{03E}$: There is no significant statistical association between the income level of a woman and the use of MHS as measured by the number of antenatal visits.

Ha$_{3E}$: There is a significant statistical association between the income level of a woman and the use of MHS as measured by the number of antenatal visits.

H$_{03F}$: There is no significant statistical association between the income level of a woman and the use of MHS as measured by the place of delivery.

Ha$_{3F}$: There is a significant statistical association between the income level of a woman and the use of MHS as measured by the place of delivery.

H$_{03G}$: There is no significant statistical association between a woman's place of domicile and the use of MHS as measured by the number of antenatal visits.

Ha$_{3G}$: There is a significant statistical association between a woman's place of domicile and the use of MHS as measured by the number of antenatal visits.

H$_{03H}$: There is no significant statistical association between a woman's place of domicile and the use of MHS as measured by the place of delivery.

Ha$_{3H}$: There is a significant statistical association between a woman's place of domicile and the use of MHS as measured by the place of delivery.

Test statistic for Research Question 3 and Hypothesis

The relationship between each of the independent variables (geopolitical zone of residence, level of education, income level, and place of domicile) and dependent variables (ANC visit, and place of delivery) was conducted. Thereafter, multiple logistic regressions was used in testing this research question and the respective

hypothesis for each variable in order to see what the unadjusted odd ratio will be before and after controlling for potential confounders.

RQ 4: Are Nigerian women's community health structure as measured by distance to nearest health care facility and the availability of skilled health care worker at the facility associated with women's use of MHS as measured by number of visits and place of delivery?

RH 4:

H_{04A}: There is no significant statistical association between the distance to nearest health care facility from where a woman lives and the use of MHS as measured by the number of antenatal visits.

Ha_{4A}: There is a significant statistical association between the distance to nearest health care facility from where a woman lives and the use of MHS as measured by the number of antenatal visits.

H_{04B}: There is no significant statistical association between the distance to nearest health care facility from where a woman lives and the use of MHS as measured by the place of delivery.

Ha_{4B}: There is a significant statistical association between the distance to nearest health care facility from where a woman lives and the measured by the place of delivery.

H_{04C}: There is no significant statistical association between the availability of skilled health care worker and the use of MHS as measured by the number of antenatal visits.

Ha_{4C}: There is a significant statistical association between the availability of skilled health care worker and the use of MHS as measured by the number of antenatal visits.

H_{04D}: There is no significant statistical association between the availability of skilled health care worker and the use of MHS as measured by the place of delivery.

Ha_{4B}: There is a significant statistical association between the availability of skilled health care worker and the use of MHS as measured by the place of delivery.

Test statistic for the Research Question 4 and Hypothesis

First the predictor and outcome were tested to see the relationship of each predictor variable the number of ANC visits and place of delivery respectively. This was followed by multiple logistic regressions in order to obtain adjusted odd ratio.

RQ 5: Is there an association between pregnancy outcomes as measured by fetal outcome (dead/alive) and the use of MHS as measured by number of antenatal visits and place of delivery?

RH 5:

H_{05A}: There is no association between fetal outcome (dead/alive) and the use of MHS as measured by the number of antenatal visits.

Ha_{5A}: There is an association between fetal outcome (dead/alive) and the use of MHS as measured by the number of antenatal visits.

H_{05B}: There is no association between fetal outcome (live birth/still birth) and the use of MHS as measured by place of delivery.

Ha_{5B}: There is an association between fetal outcome (live birth/still birth) and the use of MHS as measured by place of delivery.

Test statistic for Research Question 5 and Hypothesis

This hypothesis was assessed using Bivariate Pearson's Chi-square test and multivariate logistic regression to compare the unadjusted and adjusted odd ratio respectively for each of the predictor variables (number of antenatal visits and place of delivery) in relation to the outcome variables (ANC visits, and place of delivery). The critical level to reject the null hypothesis was set 95% confidence interval (CI).

Ethical Issues

The 2008 NDHS was a joint partnership coordinated and supervised by the Nigeria's National Population Commission. The proposal was approved by the United States of America Institutional Review Board (ICF International, 2012) and the research protocol was independently reviewed and approved by the Nigeria's National Health Research Ethics Committee (National Population Commission & ICF Macro, 2009). The principal Partner was USAID and ICF International, a United State based private consultancy firm and co-supported by partners like the John Hopkins University, Future Institute, Program for Appropriate Technology in Health (PATH), CAMRIS and Blue Raster all based in the United States (ICF International, 2012).

Permission to access the DHS data for Nigeria was sought from ORC Macro and ICF International based in Calverton Maryland, USA, who are the custodians of DHS data conducted in over 70 countries from 1984 to date (United State Agency for International Development & ICF Macro, 2006). Currently the database is housed in the domain called MEASURES DHS+ and supported by the United States Agency for International Development (USAID).

The permission to carry out the study using DHS data was granted by the Institutional Review Board (IRB) of Walden University via an e mail dated January 24th, 2015 with an IRB approval number 01-23-15-0338613.

Chapter 4: Results

Introduction

This study aimed to find out whether Nigerian women are biological, cultural, socioeconomic, and community health structural characteristics are associated with women's use of MHS as measured by number of antenatal visits and place of delivery. The study design was cross-sectional using the 2008 NDHS. The data of 31,985 women were analyzed and presented in this chapter. Logistic regression was used to predict which predisposing, enabling, and need characteristics based on Anderson health behavior model fit with the use of antenatal care services among participants. A multivariate logistic regression analysis was conducted. Variables that were included in the model were selected from established influencers from previous research and/or were found to have significant statistical association from the bivariate Pearson chi-square statistic.

First, a multivariate logistic regression for one predictor variable at a time was assessed for each of the outcome variables (number of ANC visits and place of delivery) and at the same time controlling for confounders such as geographical zone of residence, place of domicile, ethnicity, autonomy, exposure to mass media and marital status.

A similar approach was used using the 2003 NDHS data to identify how religion influences none, partial, and complete childhood immunization (Antai, 2009). Further, Fapohunda and Orobaron (2014) have used 2008 NDHS data and similar analytical approach to identify factors associated with women who deliver with no one present.

The findings are outlined as (a) bio-socio-demographic characteristics of respondents, (b) factors associated with ANC use and delivery services based on the bivariate Pearson chi-square test and multivariate logistic regression, (c) model on predictors of ANC use and place of delivery, and (d) conclusion.

Missing Data

Out of the 33,385 women aged 15-49 years who were interviewed, only 31,985 were included in the analysis representing 4.2% missing data. Regarding the outcome variable on the number of ANC visits, a total of 31,985 (95.8%) participants data was available and were included in the analysis. However, significant amount of missing data (44%) was observed in the case of the outcome variable on place of delivery. Participants with no data on ANC and or place of delivery were excluded in the analysis.

The independent variables like age, parity, marital status, tribal group/ethnicity, religion, Geopolitical zone of residence, education, family wealth index, place of domicile and women's autonomy have no missing data. Distance to the nearest health facility and availability of skilled health care worker have missing data of less than 1%.

Biological characteristics of respondents

Majority (47.3%) of the respondents were between 20-34 years old (modal class) with a mean age of 28.7 $\pm$ 4.4 years. However, a significant proportion (23.1%) of the sample was teenagers (Figure 4). Teenagers have lowest proportion of women who had 4 or more ANC visits in their last pregnancy.

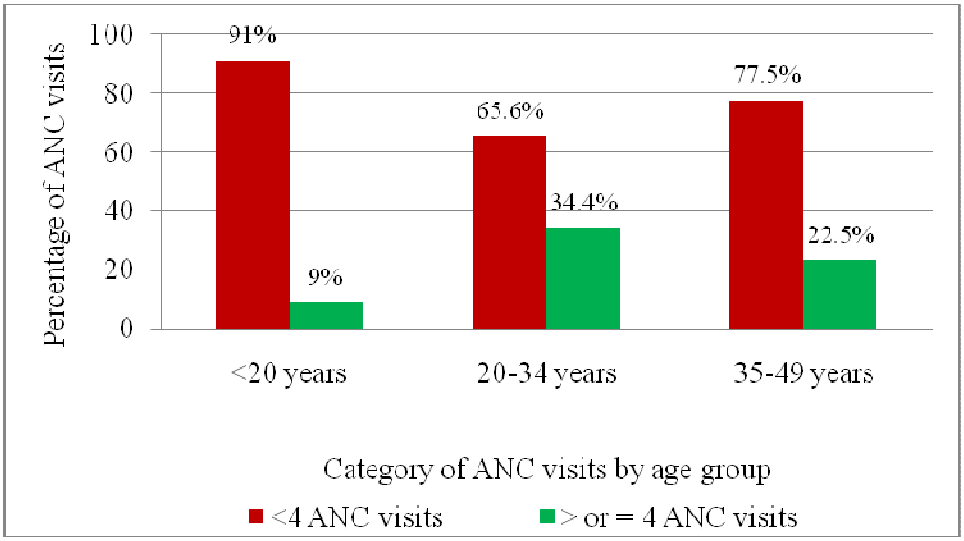


Figure 4. Age distribution of respondents.

Women with two or more children constituted 84.8% and had more number of ANC visits compared to women who have 5 or more children (Figure 5).

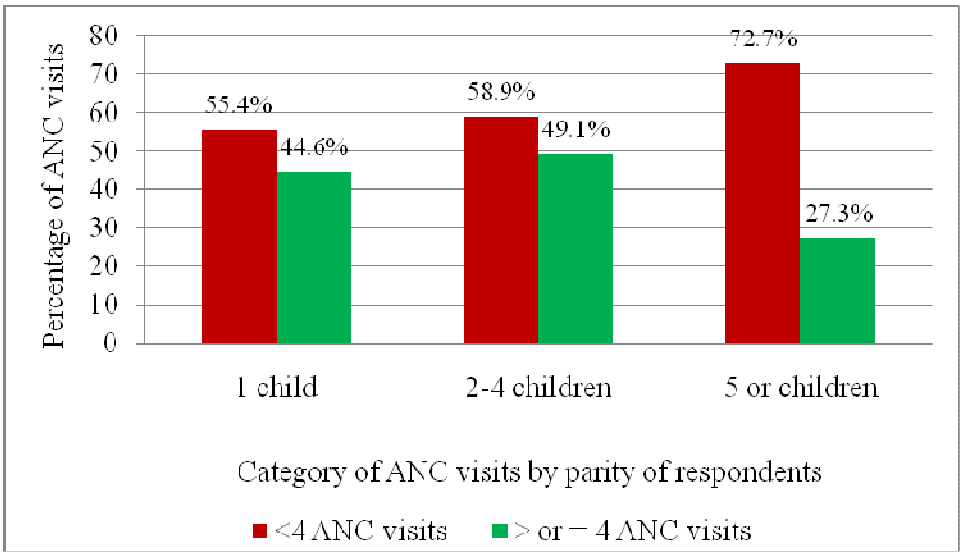


Figure 5. Parity and antenatal care visits.

The commonest birth order was the fourth or higher child (55.9%) and majority of these deliveries (49.1%) occurred 24-48 months after second to the last

delivery. However, 27.2% of the women had birth interval of less than 24 months between the last two deliveries (Table 3). The proportion of women who had adequate number of ANC visits was similar irrespective of the interval between two successive pregnancies.

Table 3

Biological Characteristics of Respondents

Independent variables	Proportion of samples (%)	Number of ANC visits < 4	≥ 4
Birth order			
First	15.1	55.4	44.6
Second	14.7	57.2	42.8
Third	14.2	58.9	41.1
Fourth or higher	55.9	70.0	30.0
Birth interval between the last two deliveries			
Less than 24 months	27.2	67.9	32.1
24-48 months	49.1	65.3	34.7
49+	23.7	65.0	35.0

Cultural Characteristics of Respondents

More than two thirds (69.4%) of the respondents were married followed closely by those who were never married (24.9%). Women who were married or are living with their partner have higher use rates for ANC compared to never married, widowed, divorced or separated.

The ethnic distribution showed that, out of the 31,985 of women, the Hausas (21.3%), Igbo's (14.4%), Yoruba's (13.3%) and Fulani's (7.6%) accounted for 56.6% of the whole sample. Yoruba women from south west zone of Nigeria have the highest use rate for ANC (36.8%), while the Kanuri/Beriberi women of North east zone had the lowest of 14.6% (Table 4).

Table 4

Cultural Characteristics of Respondents

Independent variable	Proportion of samples (%)	Number of ANC visits	
		< 4	≥ 4
Marital status			
Never married	24.9	97.0	3.0
Married	69.4	67.0	33.0
Living together	1.40	66.5	33.5
Divorced/separated	1.90	74.0	26.0
Widowed	2.30	84.0	15.2
Ethnicity			
Hausa	21.3	83.4	16.6
Yoruba	14.4	63.2	36.8
Igbo	13.3	73.1	26.9
Fulani	7.6	85.3	14.7
Ijaw/Izom	3.6	80.4	19.6
Ibibio	2.1	72.7	27.3
TIV	2.8	81.0	19.0
Kanuri/baribari	2.6	85.4	14.6
Ekot	1.8	68.5	31.5
Igala	1.6	70.8	29.2
Others	29.1	71.6	28.4
Religion			
Islam	46.8	78.4	21.6
Christianity	51.6	71.8	28.2
Traditional	1.6	80.3	19.7

Islam and Christianity are the dominant religions accounting for 46.8% and 51.6% respectively (Table 4). Moreover, Christians have higher proportion of women that had 4 or more ANC visits (28.2%) compared to women belonging to Islamic faith (21.6%).

In this study, Women that have responded yes to: (a) independently decide when to go out of their matrimonial home; (b) are gainfully employed and (c) all health related decisions was made by her alone or jointly with others were considered to have full autonomy. Those that respondent yes to only one or two of these variables are categorized as having some autonomy while those that response no to all the three

measures of autonomy were adjudged as having no autonomy. The level of women's autonomy showed that 43.1% had no autonomy, while 38.2% of the women had full autonomy (Figure 6).

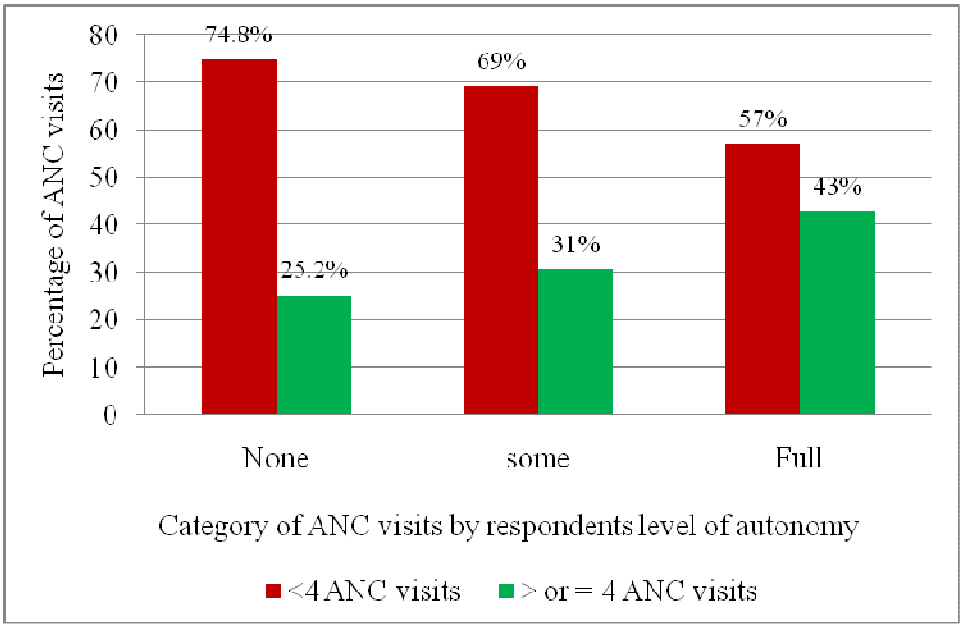


*Figure 6***.** Women autonomy and antenatal visits.

Socioeconomic characteristics of respondents

Majority of the study sample were from the northern part of Nigeria accounting for 60.4% of all participants. The North west and South east zones had the highest (22%) and lowest (10.6%) proportion of participants respectively (table 3). Women from the North West and South west zones had the lowest (13.2%) and highest (38%) proportion of women who had made 4 or more ANC visits in their last pregnancy before the survey respectively (Figure 7).

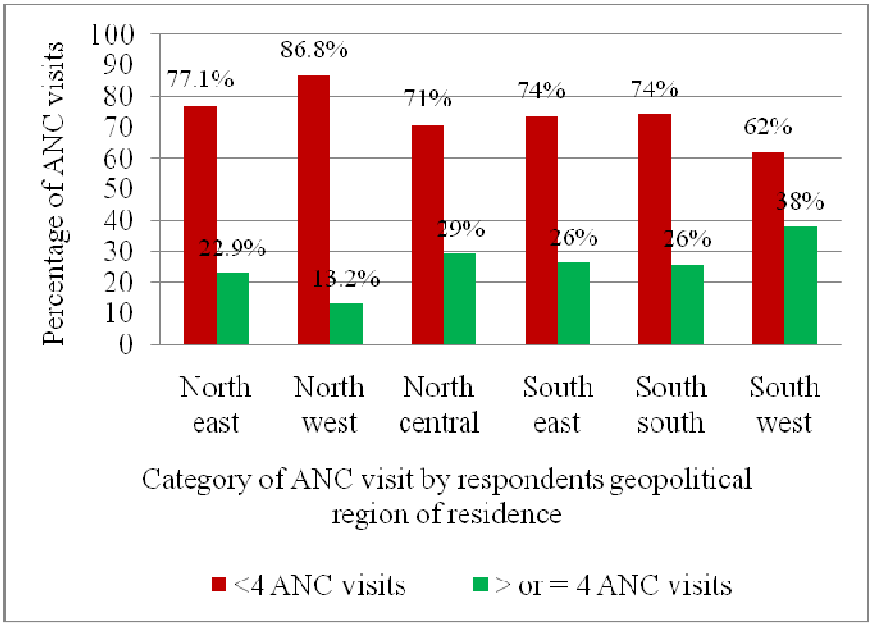


Figure 7. Regional distribution of the participants and antenatal visits.

Women living in rural areas constituted 68.8% of the sample and only 24.3% of these women had 4 or more ANC visits (Table 5). Less than a quarter of the respondents have reported that distance is a major obstacle to access and use of MHS, with only 28.1% of these women who have made four or more ANC visits (Table 5).

Table 5

Social Characteristics of Respondents

Independent variable	Proportion of sample (%)	Number of ANC visits	
		< 4	≥ 4
Place of domicile			
Rural	68.8	78.6	21.4
Urban	31.2	67.2	32.8
Distance			
No	76.1	68.7	31.3
Yes	23.9	71.9	28.1
Access to media			
Never/rarely	49.7	80.2	19.8
Almost/always	50.3	69.9	30.1

As a proxy for the source of information on MHS, only 50.3% of the respondents have regular access to the media with women who have no access to the media having a lower use rate (19.8%) compared to those who have access to the media (30.1%) (Table 5).

Economic Characteristics of Respondents

The DHS data does not have specific questions on individual income level rather it uses information on asset owned by the family of each participant in order to categorize them by wealth index. Hence, the Family Wealth Index (FWI) provides a holistic approach to assess the standard of living by bringing together information on household assets like vehicles, televisions, whether they own a house, quality and quantity of food items consumed. The FWI is calculated by scoring each type of asset and ultimately scores are categorized into quintiles as poorest, poor, middle, rich and richest (National Population Commission & ICF Macro, 2009)

Majority of the women (42.8%) belonged to the poor/poorest income quintiles, while the richest constituted only 18.3% of the sample (Table 6).There is an increasing proportion of women who have achieved four or more ANC visits with increasing income level with the highest (34.1%) and lowest (12.4%) among the richest and poorest women respectively (Table 6).

A significant proportion (40%) of the women and 43% of their husbands/partners had no any form of formal education. Similarly, only 7.9% and 11.8% of the women and their husbands/partners respectively had gone beyond secondary (high school) education level (Table 6).

Table 6

Economic Characteristics of Respondents

Independent variable	Proportion of sample (%)	Number of ANC visits (N = 31,985)	
		< 4 visits (%)	≥ 4 visits (%)
Family wealth index			
Poorest	22.4	87.6	12.4
Poorer	20.4	79.6	20.4
Middle	19.5	71.7	28.3
Rich	19.3	67.6	32.4
Richest	18.3	65.9	34.1
Respondent highest education level			
No formal education	40.0	83.5	16.5
Primary	19.5	64.0	36.0
Secondary	32.6	72.4	27.6
Higher	7.9	70.1	29.9
Total years of schooling			
Zero	40.4	83.4	16.8
less than 6 years	19.6	64.2	35.8
6 -12 years	35.2	72.6	27.4
13+ years	4.8	67.3	32.7
Respondent occupation			
Not working	38.6	83.6	16.4
Unskilled worker	45.4	70.7	29.3
Skilled worker non professional	12.3	67.0	33.0
Professional	3.7	65.2	34.8
Husband/Partner highest education level			
No formal education	43.0	85.1	14.9
Primary	20.5	62.7	37.3
Secondary	24.7	50.1	49.9
Higher	11.8	49.9	50.1
Husband/Partner occupation			
Not working	1.4	65.5	34.5
Unskilled worker	48.0	77.8	22.2
Skilled worker non professional	22.6	56.1	43.9
Professional	28.0	59.8	40.2

When the women were disaggregated by total years of schooling, only 4.8% had more than 12 years of schooling which is equivalent to the completion of secondary/high school based on the Nigerian education system (National Population Commission and ICF Macro, 2009).

In general, women who had at least primary level of education have more than 4 times the proportion of women who had more or more ANC visits compared to those no education (Figure 8).

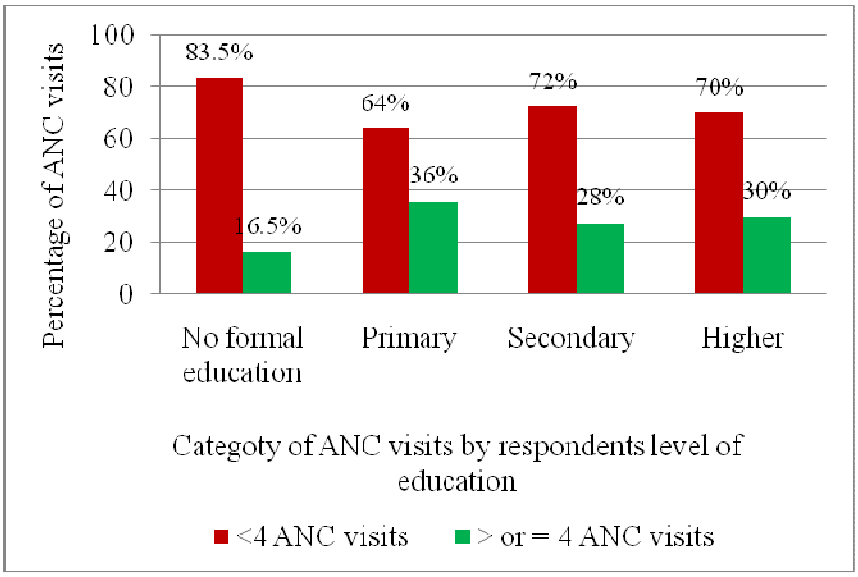


Figure 8. Level of education and antenatal visits.

A significant proportion of the women (38.6%) compared to only 1.4% their husbands/partners are unemployed. Majority of those employed are unskilled manual workers (Laborers, Laundry workers, Tanners, Road side vendors of various daily consumables, Bus conductors, Petty shop owners, Agricultural workers, miners, etc), accounting for 45.4% and 48% among women and their husbands/partners

respectively. Professional groups such as health worker (Doctors, Nurses, Midwives, Lab scientist), Engineers, Architects, Lawyers, Teachers etc), constituted only 3.7% of women compared to the 28% among their husbands/partners. The lowest use of ANC services was women who are unemployed (Table 6).

Respondents' Health System Characteristics

The majority of the women (98.2%) have no any form of health insurance irrespective of socioeconomic level, and geographical location (Table 7). Higher proportion of women who had adequate ANC visit was recorded among those with health insurance showing approximately 10 percentage point difference when compared to those with no health insurance.

Table 7

Respondents Health System Characteristics

Independent variables	Proportion of sample (%)	No of ANC visits (N = 31,985)	
		< 4 visits (%)	≥ 4 visits (%)
Have health insurance			
No	98.2	75.2	24.8
Yes	1.8	66.0	34.0
Received health talks during ANC			
No	55.7	93.3	6.7
Yes	44.3	52.0	48.0
When first ANC was made			
First trimester	26.5	9.3	90.7
Second trimester	61.2	15.9	84.1
Third trimester	12.3	38.8	61.2

More than half (57.7%) of the respondents have not received health education during ANC visits and these women had a significantly lower proportion of women had 4 or more ANC visits (6.7%) compared to 48% among those who have had health education (Table 7).

Two thirds of the respondents commenced their ANC in the second and third trimesters and those who commenced in the third trimester have the lowest proportion of women with adequate number of ANC visits (Table 7).

Hypothesis Testing to Identify Factors Associated with the use of ANC and Pregnancy

Bivariate Pearson Chi-square test and Multivariate logistic regression were conducted to test for associations between independent and dependent variables for each of the 5 research questions and their respective hypothesis. Thereafter, predictive models on the use of MHS and pregnancy outcomes were developed and presented. In general, in each stage of the Multivariate logistic regression analysis, covariates such as geographical zone of residence, place of domicile, ethnicity, autonomy, exposure to mass media and marital status were controlled in order assess whether predictive variables are consistently significantly associated with the outcome variables namely number of ANC visits, place of delivery, and fetal outcome. Comparisons were made between the unadjusted odds ratio (UOR) and the adjusted odds ratio (AOR).

Research Question (RQ) 1: Are Nigerian women's biological characteristics as measured by age and parity (number of children a woman has) associated with women's use of MHS as measured by number of antenatal visits and place of delivery?

Research Hypothesis (RH) 1:

H_{01A}: There is no significant statistical association between a woman's age and her use of MHS as measured by the number of antenatal visits.

Ha_{1A}: There is a significant statistical association between women's age and their use of MHS as measured by the number of antenatal visits.

Age has been found to be statically associated with the number of ANC visits made ($\chi^2 = 1761.827$; df = 2; $p < .0001$). Women between the ages of 20 - 34 years had ≥ 4 ANC visits compared to those in the extreme of ages (less than 20 years and older than 34 years). Women < 20 years are times less likely to have adequate number of ANC visits compared to those older than 20 years (UOR = 5.329; CI 4.887 – 58.11). While remaining statistically significant, after controlling for covariates the above observed effect of age on the number of ANC visits decreased by about 5 and 4 folds among women aged 20 - 34 years (AOR = 1.365; CI 1.160 - 1.606; $p < .0001$) and 35 – 39 years (AOR = 1.368; CI 1.122 – 1.668; $p < .0001$) respectively (Table 8).

Table 8

Association Between Women's Age and the Number of Antenatal Visits

Independent variable	Number of ANC visits (n = 31,985)		Bivariate analysis	Multivariate logistic regression analysis					
Age	< 4visits	> 4 visits	Pearson's Chi-square	UOR	95% CI for UOR Lower limit	95% CI for UOR Upper Limit	AOR	95% CI for AOR P values	95% CI for AOR Lower limit	95% CI for AOR Upper limit
<20	6741	663	0.001*	1.000			1.000			
20-34	9927	5203		5.329	4.887	5.811	1.365	0.001*	1.160	1.606
35-49	7329	2122		2.944	2.682	3.232	1.368	0.001*	1.122	1.668

***** p is significant at the 0.05 level.
Note: Variables adjusted in the model: income, religion, education, parity and distance

H_{01B}: There is no significant statistical association between a woman's age and her use of MHS as measured by the place of delivery.

Ha_{1B}: There is a significant statistical association between women's age and their use of MHS as measured by the place of delivery.

Age has been found to be statistically associated with place of delivery ($\chi^2 = 43$; df = 2; $p < .001$). During unadjusted analyses, I found women between 20 – 34 and 35-49 years had a higher likelihood to deliver in a health facility compared to women who are < 20 years old (UOR = 1.436; CI 1.287 – 1.601) and (UOR=1.341; CI 1.192-1.509) . This association did not remain statistically significant after controlling for covariates (Table 9).

Table 9

Association Between Women's Age and Place of Delivery

Independent variables	Place of delivery (n = 17,949)		Bivariate analysis	Multivariate logistic regression analysis						
			Pearson's Chi-square	UOR	95% CI for UOR		AOR	95% CI for AOR		
Age	Home	Facility			Lower limit	Upper limit		P values	Lower limit	Upper limit
<20	1329	512	0.001*	1.000			1.000			
20-34	7257	4014		1.436	1.287	1.601	1.248	0.918	0.846	1.845
35-49	3189	1648		1.341	1.192	1.509	1.193	0.271	0.787	1.808

***** p is significant at the 0.05 level.
Note: Variables adjusted in the model: income, religion, education, parity, availability of skilled health worker and distance

H_{01C}: There is no significant statistical association between the number of children a woman has and her use of MHS as measured by the number of antenatal visits.

Ha_{1C}: There is a significant statistical association between the number of children a woman has and her use of MHS as measured by number of antenatal visits.

There appeared to be an association between parity and having the required number of ANC visits ($\chi^2 = 531.946$, df = 2; $p < .05$). Specifically, I found compared to those who've had 1 child, those who have had 2 − 4 children or greater than 5 children are statistically significantly less likely to have > 4 ANC visits. However, after controlling for covariates, this association did not remain statistically significant for both those who have had 2 − 4 children (AOR = .848; CI .837 – 1.118; $p > 0.05$) or greater than 5 children (AOR = 1.179; CI .894 – 1.195; $p > 0.05$) (Table 10).

Table 10

Association Between Parity and the Number of Antenatal Visits

Parity	Number of ANC visits(n = 31,985)		Bivariate analysis	Multivariate logistic regression analysis					
	<4visits	>4visits	Pearson Chi-square	UOR	95% CI for UOR		AOR	95% CI for AOR	
					Lower limit	Upper limit		P values	Lower limit	Upper limit
1	1875	1510	0.001*	1.000			1.000			
2-4	5507	3846		0.867	0.801	0.939	0.848	0.654	0.837	1.118
5+	6989	2625		0.466	0.430	0.506	1.179	0.512	0.894	1.195

***** p is significant at the 0.05 level.
Note: Variables adjusted in the model: income, religion, education, age and distance.

H_{01D}: There is no significant statistical association between the number of children a woman has and her use of MHS as measured by the place of delivery.

Ha_{1D}: There is a significant statistical association between the number of children a woman has and her use of MHS as measured by the place of delivery.

There appeared to be a significant association between parity and place of delivery ($\chi^2 = 454.82$, df = 2; $p < .001$). In fact, having a home birth was the most common place of delivery among women in all three parity categories. However, it appears that women having their first child were more likely to have delivered in an institution compared to women with > 2 children and this finding remained statistically significant even after controlling for confounding for those with 2 – 4 children (AOR = 1.872; CI 1.733 – 2.024; $p <.05$) and those who had ≥ 5 children (AOR = 2.933; CI 2.079 – 4.348; $p <.05$) (Table 11).

Table 11

Association Between Parity and the Place of Delivery

Parity	Place of delivery (n = 17,949)		Bivariate analysis	Multivariate logistic regression analysis						
	Home	Health Facility	Pearson Chi-Square	95% CI for UOR			AOR		95% CI for AOR	
				UOR	Lower limit	Upper limit		P values (AOR)	Lower limit	Upper limit
1	1686	1366	0.001*	1.000			1.000			
2-4	4935	3066		0.767	0.705	0.834	1.872	0.015*	1.733	2.024
5+	5154	1742		0.417	0.381	0.456	2.933	0.005*	2.079	4.348

* p is significant at the 0.05 level.

Note: Variables adjusted in the model: income, religion, education, age, availability of skilled health worker and distance.

RQ2: Are Nigerian women's cultural characteristics as measured by religious beliefs, ethnicity, marital status and female autonomy, associated with women's use of MHS as measured by number of visits and place of delivery?

RH 2:

H_{02A}: There is no significant statistical association between marital status and her use of MHS as measured by the number of antenatal visits.

Ha_{2A}: There is a significant statistical association between marital status and her use of MHS as measured by the number of antenatal visits.

There was an association between marital status and having the required number of ANC visits. ($\chi^2 = 2862.606$; df = 4; $p < .0001$). Unadjusted analyses showed that compared to those who were never married, those who were married, living with a partner, or even widowed were statistically significantly more likely to have the required number of ANC visits. However, after controlling for covariates, this association diminished (Table 12).

Table 12

Association Between Woman's Marital Status and the Number of Antenatal Visits

Marital status	ANC visits (n = 31,985)		Bivariate analysis	Multivariate logistic regression analysis						
	< 4 visits	> 4 visits	Pearson's Chi-square	UOR	95% CI for AOR		AOR	95% CI for AOR		
					Lower limit	Upper limit		P values	Lower limit	Upper limit
Never married	7732	242	0.001*	1.000			1.000			
Married	14882	7323		15.722	13.722	17.922	0.534	0.55	0.229	1.245
Living together	294	148		16.084	12.711	20.352	2.719	0.16	0.943	7.837
Divorced/separated	460	162		11.252	9.029	14.022	0.905	0.33	0.403	2.032
Widowed	628	113		5.749	4.533	7.291	0.813	0.12	0.625	1.058

* p is significant at the 0.05 level.
Note: Variables adjusted in the model: education, income, autonomy, religion, ethnicity, and place of domicile.

H_{02B}: There is no significant statistical association between marital status and her use of MHS as measured by the place of delivery.

Ha_{2B}: There is a significant statistical association between marital status and her use of MHS as measured by the place of delivery.

Marital status has been found to be significantly associated with the place of delivery ($\chi^2 = 49.396$; df = 4; $p < .001$). Compared to those who were never married, married women and those divorced or separated were significantly less likely to deliver in a health care facility. This association remained not statistically significant even after controlling for confounding (Table 13).

Table 13

Association Between Woman's Marital Status and the Place of Delivery

Marital status	Place of delivery (n = 17,949)		Bivariate analysis	Multivariate logistic regression analysis						
	Home	Health facility	Pearson's Chi-square	95% CI for AOR			AOR	95% CI for AOR		
				UOR	Lower limit	Upper limit		P values	Lower limit	Upper limit
Never married	243	210	0.001*	1.000			1.000			
Married	11034	5620		0.589	0.489	0.711	0.380	0.183	0.284	5.311
Living together	174	123		0.818	0.609	1.099	0.687	0.360	0.351	1.378
Divorced/separated	193	122		0.731	0.980	0.980	0.403	0.439	0.311	1.617
Widowed	130	99		0.881	0.640	1.214	0.458	1.000	0.325	1.698

* p is significant at the 0.05 level.
Note: Variables adjusted in the model: education, income, autonomy, religion, ethnicity, and place of domicile.

H_{02C}: There is no significant statistical association between the religious beliefs of women and their use of MHS as measured by the number of antenatal visits.

Ha_{2C}: There is a significant statistical association between the religious beliefs of women and their use of MHS as measured by the number of antenatal visits.

A woman's religious beliefs was found to be statistically associated with the number of ANC visits ($\chi^2 = 189.956$df = 2; $p < .001$). Christian women are more likely to have 4 or more ANC visits than their Muslim counterparts (AOR = 1.172; CI 1.158 – 1.983; $p < .001$) (Table 14).

Table 14

Association Between Woman's Religious Beliefs and the Number of Antenatal Visits

	ANC visits (n = 31,985)		Bivariate analysis	Multivariate logistic regression analysis					
Religion									
	<4visits	>4visits	Pearson's Chi-square	UOR	95% CI for UOR		AOR	P values	95% CI for AOR	
					Lower limit	Upper limit			Lower limit	Upper limit
Islam	11680	3218	0.001*	1.000			1.000			
Christianity	11776	4628		1.426	1.354	1.502	1.172	0.001*	1.158	1.983
Traditional	412	101		0.89	0.713	1.11	1.202	0.231	0.889	1.624

***** p is significant at the 0.05 level.
Note: Variables adjusted in the model: income, parity, education, age and distance.

H_{02D}: There is no significant statistical association between the religious beliefs of women and their use of MHS as measured by the place of delivery.

Ha_{2D}: There is a significant statistical association between the religious beliefs of women and their use of MHS as measured by the place of delivery.

Religion has significant statistical association with the place of delivery (χ^2 = 2542.37df = 2; $p < .001$) (Table 15). Christian women are mores 5 times more likely to deliver in a health facility than their Muslim counterparts (UOR = 5.181; CI 4.844 – 5.542). However, after adjusting for confounding, this association was no longer statistically significant (AOR = 1.308; CI 0.987 – 1.733; $p > .05$). (Table 15).

Table 15

Association Between Women's Religious Beliefs and the Place of Delivery

Religion	Place of delivery (n = 17,949)		Bivariate analysis	Multivariate logistic regression analysis					
	Home	Facility	Pearson's Chi-square	UOR	95% CI for UOR		AOR	95% CI for AOR	
					Lower limit	Upper limit		P value	Lower limit	Upper limit
Islam	8002	1909	0.001*	1.000			1.000			
Christianity	3397	4199		5.181	4.844	5.542	1.308	0.611	0.987	1.733
Tradition	296	43		0.609	0.441	0.842	0.492	0.932	0.198	1.219

* p is significant at the 0.05 level.

Note: Variables adjusted in the model: income, parity, education, age, availability of skilled health worker and distance.

H_{02E}: There is no significant statistical association between the ethic affiliation of women and their use of MHS as measured by the number of antenatal visits.

Ha_{2E}: There is a significant statistical association between the ethnic affiliation women and their use of MHS as measured by the number of antenatal visits.

Ethnicity showed a statistically significant variation ($\chi^2 = 900.570$; df = 10; $p < .001$) within and between the geopolitical zones of northern and southern Nigeria (Table 16). For instance, the highest proportion of women who had four or more ANC visits in order of magnitude were the Yoruba's (South west), Ekot (South-south), Igala (North central), Ibibio (South-south) and Igbos (South east). The lowest belonged to Kanuri/Baribari (north east), Hausa (North west) and Tiv (North central). The Fulani's of the North east and North west zones had higher proportion of women who have made four or more ANC visits compared to ethnic groups of the south such as Ijaw/Izom (South-south) and approximate what is observed among the Igbo's of the south east zone (Table 16). Compared to the Hausa's (North West), the odds for a Yoruba woman have adequate number of ANC is three fold (UOR = 2.923; CI 2.678 – 3.19), followed by Ekot (UOR = 2.31; CI 1.915 – 2.787), Igala (OR = 2.065; CI 1.69 – 2.521) and Ibibio (UOR = 1.88; CI 1.573 – 2.266) (Table 16). Women belonging to the Hausa ethnic group (Northern Nigeria) were 1.2 times less likely to achieve the 4 recommended number of ANC visits compared to Yoruba women (Southern Nigeria) even when ccovariates were controlled (AOR = 1.272; CI 1.048 – 1.543; $p < .05$). (Table 16).

Table 16

Association Between the Tribal/Ethnic Affiliation of Women and the Number of Antenatal Visits

Ethnicity	ANC visits (n = 31,985)		Bivariate analysis	Multivariate logistic regression analysis					
	<4visits	>4visits	Pearson Chi-square	UOR	95% CI for UOR		AOR		95% CI for AOR
					Lower limit	Upper limit		P values	Lower limit	Upper limit
Hausa	5670	1130	0.001*	1.000			1.000			
Yoruba	2908	1694		2.923	2.678	3.19	1.272	0.015*	1.048	1.143
Igbo	3119	1147		1.845	1.681	2.005	0.889	0.346	0.696	1.135
Fulani	2061	355		0.864	0.759	0.984	0.727	0.121	0.620	1.853
Ijaw/	913	223		1.226	1.045	1.438	0.54	0.011*	0.417	0.699
Ibibio	481	181		1.888	1.573	2.266	0.964	0.808	0.717	1.296
TIV	723	170		1.18	0.987	1.411	0.685	0.441	0.532	1.884
Kanuri/Beriberi	707	121		0.859	0.701	1.062	0.545	0.211	0.429	1.692
Ekot	391	180		2.31	1.915	2.787	1.079	0.626	0.794	1.467
Igala	367	151		2.065	1.69	2.521	1.186	0.250	0.887	1.586
Others	6657	2636		1.987	1.837	2.148	1.191	0.011*	1.041	1.163

***** p is significant at the 0.05 level.

Note: Variables adjusted in the model: education, income, autonomy, religion, geopolitical zone of residence, and place of domicile.

H_{02F}: There is no significant statistical association between the ethic affiliation of women and their use of MHS as measured by the place of delivery.

Ha_{2F}: There is a significant statistical association between the ethnic affiliation women and their use of MHS as measured by the place of delivery.

There appeared to be an association between ethnicity and place of delivery (χ^2 = 5329.865; df = 10; $p < 0.001$) (Table 17). The highest proportion (≥70%) of women who delivered in a health facility in order of magnitude were the Yoruba's in the South west (78.7%), Igala in the North central (75.9%), and Igbos in the South east (73.8%). The lowest belonged to Fulani in the north east (7.9%), Kanuri/Beriberi, north east (8.6%), and Hausa in the North west (9.6%). The odds of a Yoruba woman (South west) giving birth in a health facility is 35 folds compared to a Hausa woman (UOR = 34.817; CI 30.233 – 40.097), followed by Igala in the North central (UOR = 29.723; CI 21.509 – 41.076) and Igbo in the south east (UOR = 26.562; CI 23.035 – 30.63) (Table 17). This association remained statistically significant even after controlling for confounding.

Table 17

Association Between the Tribal/Ethnic Affiliation of Women and the Place of Delivery

Ethnicity	Place of delivery (n = 17,949)		Bivariate analysis	Multivariate logistic regression analysis					
	Home	Facility	Pearson's Chi-square	UOR	95% CI for UOR		AOR	95% CI for AOR	
					Lower limit	Upper limit		P values	Lower limit	Upper limit
Hausa	4377	464	0.001*	1.000			1.000			
Yoruba	453	1672		34.817	30.233	40.097	2.318	0.002*	1.360	3.954
Igbo	467	1315		26.562	23.035	30.63	2.130	0.037*	1.046	4.339
Fulani	1573	135		0.81	0.663	0.989	1.473	0.197	0.818	2.654
Ijaw/Izom	416	129		2.925	2.349	3.643	0.326	0.088	0.155	0.686
Ibibio	146	135		8.722	6.774	11.232	0.703	0.370	0.325	1.521
TIV	270	218		7.616	6.22	9.326	2.595	0.031*	1.092	6.17
Kanuri/Beribéri	501	47		0.885	0.647	1.211	0.977	0.956	0.425	2.245
Ekot	246	145		5.56	4.434	6.973	0.49	0.053	0.238	1.008
Igala	53	167		29.723	21.509	41.076	9.902	0.001*	3.913	25.062
Others	3273	1747		5.035	4.502	5.631	1.082	0.720	0.703	1.665

***** p is significant at the 0.05 level.

Note: Variables adjusted in the model: education, income, religion, geopolitical zone of residence, availability of skilled health worker and place of domicile.

H_{02G}: There is no significant statistical association between the level of female autonomy and a woman's use of MHS as measured by the number of antenatal visits.

Ha_{2G}: There is a significant statistical association between the level of female autonomy and a woman' use of MHS as measured by the number of antenatal visits.

Women's autonomy and the number of ANC visits demonstrated significant statistical association ($\chi^2 = 659.642$; df = 2; $p < .001$) (Table 18). Women who have full autonomy are twice more likely to achieve the recommended number of ANC visits compared to their counterpart who are incapable to make independent decision and requires permission before stepping out of her matrimonial home (UOR = 2.229; CI 2.094 – 2.373). However, after controlling for education, income, geopolitical zone of residence, place of domicile, religion and ethnic affiliation, having full autonomy does not have significant effect on the number of ANC visits (AOR = 1.000; CI 0.742 – 1.348; $p > .05$) (Table 18).

Table 18

Association Between the Levels of Women's Autonomy and the Number of Antenatal visits

Level of autonomy	ANC visit (n = 31,985)		Bivariate analysis	Multivariate logistic regression analysis					
	<4visits	>4 visits	Pearson's Chi-square	UOR	95% CI for UOR		AOR	P values	95% CI for AOR	
					Lower limit	Upper limit			Lower limit	Upper limit
None	7271	2453	0.001*	1.000			1.000			
Some	2921	1293		1.312	1.211	1.421	1.146	0.069	0.826	1.590
Full	4919	3699		2.229	2.094	2.373	1.000	0.923	0.742	1.348

***** p is significant at the 0.05 level.

Note: Variables adjusted in the model: education, income, ethnicity, religion, geopolitical zone of residence, and place of domicile.

H_{02H}: There is no significant statistical association between the level of female autonomy and a woman's use of MHS as measured by the place of delivery.

Ha_{2H}: There is a significant statistical association between the level of female autonomy and a woman' use of MHS as measured by the place of delivery.

The ability of a woman making independent decision on reproductive issues and freedom to go out of her matrimonial home at will (autonomy) is statistically associated with her choice of place of delivery ($\chi^2 = 1321.02$; df = 2; $p < .001$). Women who have full autonomy are four times more likely to have institutional delivery compared to women who lacked autonomy (UOR = 3.795; CI 3.523 – 4.088) (Table 19). Even after controlling for confounding, women with full autonomy were 12% more likely, compared to those with no autonomy to deliver in a health care facility (AOR = 1.129; CI 1.117– 1.146; $p < .05$) (Table 19).

Table 19

Association Between the Levels of Women's Autonomy and the Place of Delivery

Level of autonomy	Place of delivery (17,949)		Bivariate analysis	Multivariate logistic regression analysis					
	Home	Facility	Pearson's Chi-square	UOR	95% CI for UOR		AOR		95% CI for AOR
					Lower limit	Upper limit		P values	Lower limit	Upper limit
None	5863	1565	0.001*	1.000			1.000			
Some	2166	968		1.674	1.524	1.839	0.457	0.063	0.394	0.578
Full	3143	3184		3.795	3.523	4.088	1.129	0.001*	1.117	1.146

***** p is significant at the 0.05 level.

Note: Variables adjusted in the model: education, income, ethnicity, religion, geopolitical zone of residence, and place of domicile.

RQ 3: Are Nigerian women's socioeconomic characteristics as measured by geopolitical zone of residence, level of education, income levels, and place of domicile associated with use of MHS as measured by the number of ante-natal visits and place of delivery?

RH 3:

H_{03A}: There is no significant statistical association between a woman's geopolitical zone of residence and the use of MHS as measured by the number of antenatal visits.

Ha_{3A}: There is a significant statistical association between a woman's geopolitical zone of residence and the use of MHS as measured by the number of antenatal visits.

Comparison of use of MHS by geopolitical zones indicated that the women from the south west zone followed by the north central zone have had 4 or more ANC visits, while the north east and the north west had the lowest proportion of women who had made the recommended ANC visits (Table 20). This association is statistically significant ($\chi^2 = 1020.307 df = 5$; $p < .001$) and the women from the south west have two fold odds to make 4 or more ANC visits compared to the north east (UOR = 1.534; CI 1.288 – 1.827; $p < .0001$). A significant effect was observed upon controlling for differences in education, income, ethnicity, religion, autonomy, and place of domicile **(A**OR = 2.062; CI 1.897 – 2.241; $p < .05$) (Table 20).

Table 20

Association Between Women's Geopolitical zone of Residence and the Number of Antenatal visits

Geopolitical region	ANC (n = 31,985)		Bivariate analysis	Multivariate logistic regression analysis					
	<4 visits	>4visits	Pearson's Chi-square	UOR	95% CI for UOR		AOR	P values	95% CI for AOR	
					Lower limit	Upper limit			Lower limit	Upper limit
North East	4751	1413	0.001*	1.000			1.000			
North West	6091	930		0.513	0.469	0.562	0.404	0.101	0.356	0.458
North Central	4346	1779		1.376	1.269	1.493	1.017	0.771	0.906	1.142
South East	2503	891		1.197	1.086	1.319	1.098	0.451	0.860	1.402
South South	3351	1163		1.167	1.067	1.276	0.817	0.180	0.691	0.966
South West	2955	1812		2.062	1.897	2.241	1.534	0.001*	1.288	1.827

* p is significant at the 0.05 level.

Note: Variables adjusted in the model: education, income, ethnicity, religion, autonomy, and place of domicile.

H_{03B}: There is no significant statistical association between a woman's geopolitical zone of residence and the use of MHS as measured by the place of delivery.

Ha_{3B}: There is a significant statistical association between a woman's geopolitical zone of residence and the use of MHS as measured by the place of delivery.

The use of delivery services by geopolitical zones indicated that the 3 southern zones have higher proportion of institutional delivery ranging between 48.6% in the south-south zone to 77% in the south west. While in the three northern geopolitical zones, the proportion of institutional deliveries lies between 8.5% in the North east zone to 42.6% in the north central zone. The variation between the 6 geopolitical zones was found to be statistically significant ($\chi^2 = 5121.03$; df = 5; $p < .001$). In Particular, women from the south east, south south and south west zones were 15, 5 and 20 times more likely to use institutional delivery services compared to those from the North east zone (Table 21). However, after controlling for covariates, this association only remained statistically significant for women in the south south region, who remained more likely to use institutional facilities compared to women in the North east zone (AOR = 1.69; CI 1.049 – 2.581).

Table 21

Association Between Women's Geopolitical zone of Residence and the Place of Delivery

	Place of delivery (n = 17,949)		Bivariate analysis	Multivariate logistic regression analysis					
Geopolitical region	Home	Facility	Pearson's Chi-square	UOR	95% CI for UOR		AOR	P values	95% CI for AOR	
					Lower limit	Upper limit			Lower limit	Upper limit
North East	3403	564	0.001*	1.000			1.000			
North West	4448	414		0.562	0.491	0.642	0.959	0.855	0.614	1.498
North Central	1917	1420		4.469	3.994	5.001	1.147	0.439	0.811	1.621
South East	417	1033		14.947	12.986	17.27	0.835	0.601	0.425	1.639
South South	1073	1014		5.702	5.038	6.453	1.645	0.030*	1.049	2.581
South West	517	1729		20.178	17.672	23.04	1.419	0.016	0.918	2.193

* p is significant at the 0.05 level.

Note: Variables adjusted in the model: education, income, ethnicity, religion, availability of skilled health worker and place of domicile.

H_{03C}: There is no significant statistical association between a woman's level of education and the use of MHS as measured by the number of antenatal visits.

Ha_{3C}: There is a significant statistical association between a woman's level of education and the use of MHS as measured by the number of antenatal visits. Respondents level of education is statistically associated with the number of ANC with uneducated women having the least proportion of adequate ANC visits (χ^2 = 972.025; df = 3; $p < .001$). Women that have at least primary level education have 2.3 fold likelihood of having 4 or more ANC visits compared to those with no education (UOR = 2.856; CI 2.664 – 3.062). There is an increasing trend in the proportion of women who have had 4 or more ANC visits with increasing level of education level of their husband/partner (χ^2 = 2696.057; df = 3; $p < .001$) (Table 22). Additionally, women whose husband/partner has secondary level education or more are 5 times more likely to use ANC services compared to those whose husband/partner has no formal education (UOR = 5.691; CI 5.28 – 6.134). The effect of women's education level was consistent even after controlling for covariates (AOR = 3.208; CI 2.875 – 3.578;$p < .0001$). However, there was no significant statistical association for husband/partner educational level (Table 22).

Table 22

Association Between Women's Levels of Education and the Number of Antenatal Visits

	ANC visits (n = 31,985)		Bivariate analysis	Multivariate logistic regression analysis					
Educational status	< 4 visits	≥ 4 visits	Pearson's Chi-square	UOR	95% CI for UOR		AOR	P values	95% CI for AOR	
					Lower limit	Upper limit			Lower limit	Upper limit
None	10697	2111	0.001*	1.000			1.000			
Primary	3992	2250		2.856	2.664	3.062	2.371	0.001*	2.162	2.600
Secondary	7540	2873		1.931	1.812	2.057	3.208	0.001*	2.875	3.578
Tertiary	1768	754		2.161	1.961	2.382	2.447	0.001*	2.074	2.887
Years of schooling			0.002*							
Zero	10769	2150		1.000			1.000			
<6 years	4033	2248		2.792	2.605	2.992	3.470	0.001*	2.775	3.632
7-12 years	8168	3090		1.895	1.781	2.016	17.933	0.001*	10.396	21.261
13+	1027	500		2.439	2.17	2.74	12.937	0.001*	4.463	36.665
Husband highest education										
None			0.001*							
Primary	8654	1517		1.000			1.000			
Secondary	3044	1808		3.388	3.129	3.67	2.028	0.101	0.646	6.369
Higher	2923	2916		5.691	5.28	6.134	1.938	0.401	0.609	6.165
	1392	1398		5.729	5.225	6.282	1.792	0.201	0.567	5.668

***** p is significant at the 0.05 level.

Note: Variables adjusted in the model: parity, income, religion, age and distance.

H_{03D}: There is no significant statistical association between a woman's level of education and the use of MHS as measured by the place of delivery.

Ha_{3D}: There is a significant statistical association between a woman's level of education and the use of MHS as measured by the place of delivery.

Increasing level of education is associated with higher proportion of institutional delivery with uneducated women having the lowest proportion of institutional delivery ($\chi^2 = 5431.96$; df = 3; $p < 0.001$). Women that have at least secondary level education has more than 2 fold higher likelihood of using delivery services compared to those with no formal education after controlling for covariates (AOR = 2.009; CI 1.449 – 2.785; $p < .0001$) (Table 23). There was also an association between the use of institutional delivery services and husband/partner level of education ($\chi^2 = 3550.95$; df = 3; $p < 0.001$). Women whose husband/partner has secondary level education are more than 10 times more likely to use institutional delivery services compared to those whose husband/partner has no formal education (UOR = 10.529; CI 9.566 – 11.589) (Table 23). However, this association did not remain statistically significant after controlling for covariates.

Table 23

Association Between Women's Levels of Education and the Place of Delivery

	Place of delivery (n = 17,949)		Bivariate analysis	Multivariate logistic regression analysis					
	home	Facility	Pearson Chi-square	UOR	95% CI for UOR		AOR		95% CI for AOR
Educational status					Lower limit	Upper limit		P values	Lower limit	Upper limit
Woman's Edu status			0.001*							
None										
Primary	7878	951		1.000			1.000			
Secondary	2425	1622		5.541	5.053	6.075	1.332	0.001*	1.093	1.787
Tertiary	1378	2764		16.616	15.136	18.241	2.009	0.001*	1.449	2.785
	94	837		73.762	58.985	92.242	4.03	0.001*	2.358	6.883
Husband highest Edu			0.001*							
None	6376	736		1.000			1.000			
Primary	2212	1372		5.373	4.853	5.949	1.075	0.666	0.774	1.493
Secondary	2071	2517		10.529	9.566	11.589	1.106	0.547	0.797	1.536
Higher	665	1277		16.636	14.742	18.773	0.829	0.346	0.56	1.226

* p is significant at the 0.05 level.

Note: Variables adjusted in the model: income, religion, availability of skilled health worker, distance to the nearest health facility, age and parity.

H_{03E}: There is no significant statistical association between the income level of a woman and the use of MHS as measured by the number of antenatal visits.

Ha_{3E}: There is a significant statistical association between the income level of a woman and the use of MHS as measured by the number of antenatal visits.

Income level has shown significant statistical association with the number of ANC visits with higher proportion of women having 4 or more ANC with increasing level of income ($\chi^2 = 1154.812$; df = 4; $p < 0.001$) (Table 24). Women in the richest income quintile have about 4 fold higher likelihood of having adequate number of ANC visits compared to those in the poorest quintile (UOR = 3.654; CI 3.344 – 3.993). This effect of income was consistent even after controlling for covariates with women in the richest income quintile having 3 fold likelihood of having adequate number of ANC visits compared to those in the poorest quintile (AOR = 3.056; CI 2.625– 3.567; $p < .0001$).

Table 24

Association Between Women's Levels of Income and the Number of Antenatal Visits

	ANC visits (n = 31,985)		Bivariate analysis		Multivariate logistic regression analysis					
	< 4 visits	≥ 4 visits	Pearson's Chi-square	UOR	95% CI for AOR		AOR	P values	95% CI for AOR	
Income quintile					Lower limit	Upper limit			Lower limit	Upper limit
Poorest	6265	887	0.001*	1.000			1.000			
Poorer	5207	1333		1.808	1.648	1.983	1.739	0.001*	1.563	1.935
Middle	4483	1768		2.786	2.548	3.046	2.619	0.001*	2.344	2.926
Rich	4184	2004		3.383	3.097	3.695	3.148	0.001*	2.777	3.569
Richest	3858	1996		3.654	3.344	3.993	3.056	0.001*	2.625	3.557

***** p is significant at the 0.05 level.
Note: Variables adjusted in the model: parity, religion, education, age and distance.

H_{03F}: There is no significant statistical association between the income level of a woman and the use of MHS as measured by the place of delivery.

Ha_{3F}: There is a significant statistical association between the income level of a woman and the use of MHS as measured by the place of delivery.

Income level has shown significant statistical association with the place of delivery and demonstrated the higher the income, the more likely a woman to deliver in a health facility ($\chi^2 = 5476.24$; df = 4; $p < .001$) (Table 25). Women in the richest income quintile has about 60 times likelihood of giving birth in a health facility compared to those in the poorest quintile (UOR = 57.875; CI 49.861– 67.177). This pattern was similarly observed even after controlling for the covariates.

Table 25

Association Between Women's Income Levels and the Place of Delivery

	Place of delivery (n = 17,949)		Bivariate analysis	Multivariate logistic regression analysis					
	Home	Facility	Pearson's Chi-square	UOR	95% CI for UOR		AOR	P value	95% CI for AOR	
Income quintile					Lower limit	Upper limit			Lower limit	Upper limit
Poorest	4353	391	0.001*	1.000			1.000			
Poorer	3490	723		2.306	2.023	2.629	1.701	0.003*	1.199	3.146
Middle	2290	1206		5.863	5.175	6.642	2.316	<0.001*	1.278	4.195
Rich	1244	1785		15.975	14.079	18.125	4.802	<0.001*	2.689	8.575
Richest	398	2069		57.875	49.861	67.177	13.245	<0.001*	7.255	24.180

***** p is significant at the 0.05 level.

Note: Variables adjusted in the model: education, religion, availability of skilled health worker, distance to the nearest health facility, age and parity.

H_{03G}: There is no significant statistical association between a woman's place of domicile and the use of MHS as measured by the number of antenatal visits.

Ha_{3G}: There is a significant statistical association between a woman's place of domicile and the use of MHS as measured by the number of antenatal visits.

Place of domicile has shown significant statistical association with the number of ANC visits ($\chi^2 = 473.858$df = 1; $p < 0.001$). Women living in urban areas have higher chances of using ANC services compared to their counterparts in rural (UOR = 1.79; CI 1.698 – 1.886) (Table 26). Following the controlling of covariates, women living in urban centers have 1.3 odds higher to make the recommended ANC visits compared to rural women (AOR = 1.386; CI 1.256 – 1.491) (Table 26).

Table 26

Association Between Women's Place of Domicile and the Number of Antenatal Visits

	ANC (n = 31,985)		Bivariate analysis		Multivariate logistic regression analysis					
	< 4visits	≥ 4 visits	Pearson's Chi-square	U OR	95% CI for UOR		AOR	95% CI for AOR		
Place of domicile					Lower limit	Upper limit		P value	Lower limit	Upper limit
Rural	17280	4711	0.001*	1.000			1.000			
Urban	6717	3277		1.79	1.698	1.886	1.368	0.001*	1.256	1.491

***** p is significant at the 0.05 level.

Note: Variables adjusted in the model: ethnicity geopolitical zone, parity, autonomy, skilled health worker and distance.

H_{03H}: There is no significant statistical association between a woman's place of domicile and the use of MHS as measured by the place of delivery.

Ha_{3H}: There is a significant statistical association between a woman's place of domicile and the use of MHS as measured by the place of delivery.

There is a significant statistical association between place of residence and the place of delivery ($\chi^2 = 2020.54$df = 1; $p < 0.001$). Urban women are more likely to use modern delivery service by nearly 5 folds compared to their rural counterparts (UOR = 4.708; CI 4.389– 5.05). Following the control of covariates urban women have 11% point higher likelihood of giving birth in a health facility compared to their rural colleagues; however, this finding was not statistically significant (AOR = 1.115; CI 0.853– 1.456) (Table 27).

Table 27

Association between Women's Place of Domicile and the Place of Delivery

	Place of delivery (n = 17,949)		Bivariate analysis	Multivariate logistic regression analysis					
	Home	Facility	Pearson's Chi-square	UOR	95% CI for UOR		A OR	P value	95% CI for AOR	
Place of domicile					Lower limit	Upper limit			Lower limit	Upper limit
Rural	9894	3258	0.001*	1.000			1.000			
Urban	1881	2916		4.708	4.389	5.05	1.115	0.102	0.853	1.456

* p is significant at the 0.05 level.

Note: Variables adjusted in the model: education, religion, income, availability of skilled health worker, age and parity.

RQ 4: Are Nigerian women's community health structure as measured by distance to nearest health care facility and the availability of skilled health care worker at the facility associated with women's use of MHS as measured by number of visits and place of delivery?

RH 4:

H_{04A}: There is no significant statistical association between the distance to nearest health care facility from where a woman lives and the use of MHS as measured by the number of antenatal visits.

Ha_{4A}: There is a significant statistical association between the distance to nearest health care facility from where a woman lives and the use of MHS as measured by the number of antenatal visits.

Distance to the nearest health facility that provides MHS was found to be statistically associated with the number of ANC visits ($\chi^2 = 10.072$df = 1; $p < .001$) (Table 28). Women who responded that distance is not an obstacle have made appropriate number of ANC visits compared to their counterparts who mentioned distance as a major obstacle to access and use of MHS.

Women who responded they live close to a health facility are 1.2 times more likely to attain the recommended 4 ANC visits compared to those who have reported that they live far away from the nearest health facility (AOR = 1.176; CI 1.297 – 1.042; p =0.007).

Table 28

Association Between Distance to the Nearest Health Facility and the Number of Antenatal visits

	ANC visits (n = 31,985)		Bivariate analysis	Multivariate logistic regression analysis					
	< 4 visits	≥ 4 visits	Pearson's Chi-square	UOR	95% CI for UOR		AOR	P value	95% CI for AOR	
Distance					Lower limit	Upper limit			Lower limit	Upper limit
No	5931	2708	0.002*	1.000			1.000			
Yes	1952	764		0.857	0.779	0.943	1.176	0.007*	1.046	1.297

* p is significant at the 0.05 level.

Note: Variables adjusted in the model: parity, income, religion, education and age.

H_{04B}: There is no significant statistical association between the distance to nearest health care facility from where a woman lives and the use of MHS as measured by the place of delivery.

Ha_{4B}: There is a significant statistical association between the distance to nearest health care facility from where a woman lives and the measured by the place of delivery.

Distance to the nearest health facility is not statistically associated with the place of delivery ($\chi^2 = 1.487$df = 1; $P > .05$). Women who live near a health facility were 19% more likely to have deliveries in a health facility compared to those living far a away from the health facility; however, this association was not statistically significant after controlling for confounding (AOR = 1.11; CI 0.90 – 1.335; $p > 0.05$) (Table 29).

Table 29

Association Between Distance to the Nearest Health Facility and the Place of Delivery

	Place of delivery (n = 17,949)		Bivariate analysis	Multivariate logistic regression analysis					
	Home	Facility	Pearson's Chi-square	UOR	95% CI for UOR		AOR	P value	95% CI for AOR	
Distance					Lower limit	Upper limit			Lower limit	Upper limit
No	8855	170	0.223	1.000			1.000			
Yes	2783	64		1.198	0.896	1.602	1.11	0.953	0.9	1.335

***** p is significant at the 0.05 level.

Note: Variables adjusted in the model: education, religion, income, availability of skilled health worker, and parity.

H_{04C}: There is no significant statistical association between the availability of skilled health care worker and the use of MHS as measured by the number of antenatal visits.

Ha_{4C}: There is a significant statistical association between the availability of skilled health care worker and the use of MHS as measured by the number of antenatal visits.

The availability of skilled health worker in the nearest health facility was found to be associated with the number of ANC visits ($\chi^2 = 7183.5$,df = 1; $p < 0.003$). Women who have access to skilled health workers are 14 times more likely to achieved the minimum 4 ANC visits compared to those who had no access to skilled health workers when covariates were not controlled (UOR = 14.013; CI 12.883 – 15.243) (Table 30). This effect was diminished upon controlling for ethnicity geopolitical zone, parity, autonomy, place of domicile and distance. Women who have access to skilled health workers have 1.1 times more likelihood to make the recommended a minimum of 4 ANC visits compared to those who have no access to skilled health workers **(A**OR = 1.109; CI 0.663 – 1.854; $p = .693$).

Table 30

Association Between Availability of Skilled Health Workers and the Number of Antenatal visits

	ANC (n = 31,985)		Bivariate analysis	Multivariate logistic regression analysis					
	< 4 visits	≥ 4 visits	Pearson's Chi-square	UOR	95% CI for UOR		AOR	P value	95% CI for AOR	
Skilled health workers					Lower limit	Upper limit			Lower limit	Upper limit
No	16630	1191	0.003*	1.000			1.000			
Yes	7367	6797		1.739	1.209	2.499	1.109	0.693	0.663	1.854

***** p is significant at the 0.05 level.

Note: Variables adjusted in the model: ethnicity geopolitical zone, parity, autonomy, place of domicile and distance.

H_{04D}: There is no significant statistical association between the availability of skilled health care worker and the use of MHS as measured by the place of delivery.

Ha_{4B}: There is a significant statistical association between the availability of skilled health care worker and the use of MHS as measured by the place of delivery.

Availability of skilled health workers (SHW) was significantly associated to place of delivery ($\chi^2 = 13803.52$; df = 1; $p < .001$) (Table 29). Women whose choice of place of delivery was influenced by the availability of skilled obstetric health workers have 272 times likelihood to deliver in a health facility compared to those women who responded that their choice of place of delivery was unrelated to availability of skilled health workers (UOR = 271.893; CI 238.358 – 310.147) (Table 31).This effect was found to be consistent even after controlling for covariates, with women who have access to skilled health workers have 81.7 times higher likelihood to have institutional delivery compared to women whose choice of place of delivery was not based on the availability of SHW (AOR = 81.721; CI 66.072 – 101.706; $p <$ .0001) (Table 31).

Table 31

Association Between Availability of Skilled Health Workers and the Place of Delivery

	Place of delivery (n = 17,949)		Bivariate analysis	Multivariate logistic regression analysis					
	Home	Facility	Pearson's Chi-square	UOR	95% CI for UOR		AOR	P value	95% CI for AOR	
Skilled health workers					Lower limit	Upper limit			Lower limit	Upper limit
No	11135	374	0.001*	1.000			1.000			
Yes	635	5799		271.893	238.358	310.147	81.721	0.001*	66.072	101.076

***** p is significant at the 0.05 level.
Note: Variables adjusted in the model: education, religion, income, distance, and parity.

RQ 5: Is there an association between pregnancy outcomes as measured by fetal outcome (dead/alive) and the use of MHS as measured by number of antenatal visits and place of delivery?

RH 5:

H_{05A}: There is no association between fetal outcome (dead/alive) and the use of MHS as measured by the number of antenatal visits.

Ha_{5A}: There is an association between fetal outcome (dead/alive) and the use of MHS as measured by the number of antenatal visits.

The number of ANC visits showed significant statistical association with child being alive at birth or not within the first year of life ($\chi^2 = 164.406$; df = 1; $p < 0.001$) (Table 32). The odds of child being alive at birth is higher among women who have had adequate number of ANC visits compared to those who had inadequate number of ANC visits (UOR = 1.997; CI 1.794 – 2.224). However, the strength of this association was weakened after controlling for covariates (AOR = 1.273; CI 0.816 – 1.976; p =0.287) (Table 32).

Table 32

Association Between Fetal Outcome and the Number of Antenatal Visits

	Pregnancy outcome		Bivariate analysis		Multivariate logistic regression analysis					
	Not alive	Alive	Pearson's Chi-square	UOR	95% CI for UOR		AOR	P value	95% CI for AOR	
Had 4 or more ANC visits					Lower limit	Upper limit			Lower limit	Upper limit
No	1571	12800	0.001*	1.000			1.000			
Yes	463	7535		1.997	1.794	2.224	1.273	0.287	0.816	1.976

***** p is significant at the 0.05 level.

Note: Variables adjusted in the model: education, income, distance, and place of delivery.

H_{05B}: There is no association between fetal outcome (live birth/still birth) and the use of MHS as measured by place of delivery.

Ha_{5B}: There is an association between fetal outcome (live birth/still birth) and the use of MHS as measured by place of delivery.

The place of delivery has significant statistical association with whether a child is alive at birth or not in the first year of life ($\chi^2 = 12.294$; df = 1; $p < .001$) (Table 33). Compared to children born at home, those born in a health facility are statistically significantly more likely to be alive at birth or within the first year of life compared (AOR = 7.037; CI 3.962 – 51.465; *p =.0055*) (Table 33).

Table 33

Association Between Fetal Outcome and the Place of Delivery

	Pregnancy outcome		Bivariate analysis	Multivariate logistic regression analysis					
	Not alive	Alive	Pearson's Chi-square	UOR	95% CI for UOR		AOR	P value	95% CI for AOR	
Place of delivery					Lower Limit	Upper Limit			Lower Limit	Upper Limit
Home	872	10916	0.001*	1.000			1.000			
Facility	371	5812		1.251	1.104	1.419	7.037	0.0055*	3.962	51.465

* p is significant at the 0.05 level.

Note: Variables adjusted in the model: education, income, distance, and adequacy of ANC visit.

Use of ANC Services After Adjusting for Covariates

Logistic regression was used to predict which of the predisposing, enabling and need characteristics based on Anderson health behavior model fit with the use of ANC services. A multivariate logistic regression analysis was carried with only variables that were known influencers from previous researches, and or are found to have significant statistical association from bivariate Pearson Chi-square statistic and a multivariate logistic regression for one predictor variable at a time against the place of delivery (outcome variable) and controlling for confounders such as geographical zone of residence, place of domicile, ethnicity, autonomy, exposure to mass media and marital status (Table 34). A similar approach was used using the 2003 NDHS data to identify how religion influences none, partial and complete childhood immunization (Antai, 2009).

Table 34

Predictive Model on the use of ANC Services After Adjusting for Covariates

Model Fitting Information					R-Square		
Model	-2 Log Likelihood	Chi-Square	df	Sig.	Cox and Snell	Nagelkerke	Hosmer and Lemeshow Test
Constant	609.327	2116.779					
Final model	11783.074	2116.779	14	0.000*	0.711	0.422	0.52

* p is significant at the 0.05 level.

Further, Fapohunda & Orobaron (2014) have used 2008 NDHS data and similar analytical approach to identify factors associated with women who deliver with no

any form of assistance from traditional, skilled health worker or family member in Sokoto state Nigeria.

The model contained 6 predictive variables (age, income, religion, highest education level, parity, and distance to the nearest health facility). Age, income index, religion, respondent's highest education level, parity, and distance to the nearest health facility were found to be statistically significant on bivariate analysis (Pearson Chi-square) and the binary logistic regression and used in predicting the factors that determines the use of ANC.). Income and education level were further found to be statistically significant χ^2 (14, N=31,985) 2116.779; $p < .0001$, indicating that the model was able to distinguished between participants who have had less than 4 ANC visits and those who reported to have had 4 or more ANC visits in the most recent delivery before the survey. However, despite all the 6 variables have significant statistically association on the initial bivariate and multivariate analysis of one predictor variable at a time, together they accounted for 71.1% (Cox & Snell R Square) and 42.2% (Nagelkerke R Square) of variability among participants and correctly classified 74% of cases, which together with Hosmer and Lemeshow goodness of fit test, indicated the model being useful with the p value of the later test of 0.52 which is larger than the alpha value of 0.05 (Table 34).

Use of Delivery Services After Adjusting for Covariates

Logistic regression was used to predict which predisposing, enabling and need characteristics based on Anderson health behavior model fit with the use of delivery services (Table 35). Confounders were controlled as was done for the use of ANC.

Table 35

Predictive Model for the use of Delivery Services After Adjusting for Covariates

Model Fitting Information					R-Square		
Model	-2 Log Likelihood	Chi-Square	Df	Sig.	Cox and Snell	Nagelkerke	Hosmer and Lemeshow Test
Constant	306.7700	660.297					
Final model	1637.480	660.297	15	0.000*	0. 54	0. 38	0. 773

* p is significant at the 0.05 level.

The model contained 7 predictive variables (age, religion, income quintile, highest education level, availability of skilled health worker, parity and distance to the nearest health facility). The model was statistically significant χ^2 (15, N=17,950) 660.297; $p < .0001$), indicating that the model was able to distinguished between respondents who delivered at home and those who delivered in a health facility. The model accounted for 54% (Cox & Snell R Square) and 38% (Nagelkerke R Square) of variability among participants and correctly classified 98% of cases, which together with Hosmer and Lemeshow goodness of fit test indicated the model being useful with the p value of the later test of 0.773 which is bigger than the alpha value of 0.05.

However, only 3 of the 7 predictive variables in the model (income quintile, highest education level and availability of skilled health worker) were consistently statistically significant at all stages of analysis and with p values of < .005 and therefore significantly influenced the choice of place of delivery.

Conclusion

Although, the null hypothesis was rejected for the either one or both of the outcome variables for most of the research questions, however, only 4 independent variables (geopolitical zones, education, and income) have shown consistent significant statistical association with both the number of ANC visits and place of delivery even after controlling for covariates (Tables 20, 21, 22, 23, 24, 25, 30, 31).On the other hand, the odds for child to be alive up to the first birth day are higher with institutional delivery compared to those who were delivered in homes (Table 33).

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

This study aimed to identify factors that influence the utilization of MHS measured by the number of ANC visits and place of delivery (outcome variables) based on the Anderson health utilization model that was covered in chapters one and two. The study also assessed the influence of these outcome variables on pregnancy outcomes measured as child being alive or not in the first year of life. This chapter discusses the results of the study, provides conclusions, recommendations, and the public health implications of the findings. The chapter will also provide areas for further research.

Discussions on Findings

This study is a secondary analysis of the 2008 NDHS. The DHS data used standardized survey tools and appropriate sampling methods with sample size of 33,395 spread across all states of Nigeria, and participants recruited according to the weighted population size of each stratum (National Population Commission & ICF Macro, 2009). Generally, a large sample size and appropriate representation of the target population enhances the external validity (Yiannakoulias, 2011) and statistical precision (Kozial, & Arthur, 2011). These are necessary concerns with respect to the generalizability of the finding further than the study sites and could form the basis for policy shift within and between various parts of a given country. In general, the DHS questions have evolved in the past 3 decades aimed to have comparable set of information across the 70 countries that are currently participating in the DHS surveys

(United State Agency for International Development & ICF Macro, 2006). The comparability of DHS data and it satisfactory representation of study units have made it possible to compare MHS use among 31 developing countries from Africa including Nigeria, the Middle East, and Asia (Ahmed et al., 2010). DHS data was also used to identify the effect on the completion of childhood immunization schedule in Nigeria and other parts of Africa (Antai, 2009), and to study the determinants for self assisted deliveries in Nigeria (Fapohunda & Orobaron, 2014). Further, findings of some community based studies in Nigeria on MCH approximate the reports of the NDHS (Babalola & Fatusi, 2009; Doctor et al., 2011).

Magnitude and Pattern of the use of MHS in Nigeria

MHS is a major priority of Nigeria and the world at large as enshrined in the Millennium Development Goals (MDGs) 4 and 5. However, while significant progress was recorded in terms of reduction in maternal and child mortality, the country has not achieved any of the MDGs based the current WHO statistics (WHO, 2014). Among the reasons for the failure to achieve MDGs 4 (reduce child mortality) and 5 (reduce maternal mortality) was due to lack of access and use of health services. In 2010, 53 % of the estimated 8.3 million pregnant women in Nigeria, have not received antenatal care, while among those who did, 45% made less than the 4 recommended number of ANC visits and far less (34%) were attended by skilled health workers (WHO, 2013a).

In this study, the proportion of women who had four or more ANC visits and have delivered in health facility was found to be 45% and 36% respectively. Although, it approximates the figures reported by the WHO cited above n (WHO,

2013a), however, there exist wide variations across geopolitical zones, ethnicity, religious affiliations and other variables of social exclusion.

Geopolitical Zones and the use of MHS

In this study, geopolitical region of residence has shown the widest variation in the use of MHS and pregnancy outcomes. People in each of the 6 geopolitical zones are to some extent homogeneous in terms of ethnic and religious affiliations. The analysis of use of MHS by geopolitical zone provided a composite effect of individual and community level factors such as distance, availability of skilled health workers, ethnicity, religion, marital status, autonomy, education, occupation, and family wealth index. The southern zones of Nigeria have higher proportion of women who had 4 or more number of ANC visits and institutional delivery. The lowest proportion was women from the North West and North East geopolitical zones. This is consistent with areas with the highest maternal and infant mortality rates, high poverty level and low women literacy levels (Health Reform Foundation of Nigeria, 2007, National Population Commission & ICF Macro, 2009; UNICEF, 2009). Further, this variation between the various geopolitical zones of Nigeria is a reflection of the availability, comprehensiveness, affordability, and the quality of MHS, and a reflection of the attitudes and beliefs of the population towards the use of MHS in each zone. For instance, the results of this study, indicate that the South West has the highest proportion of adequate number of ANC visits (38%) and institutional delivery (77%), and probably because the South West has the highest number of health facilities and skilled health workers (Health Reform Foundation of Nigeria, 2007). Further, the South West zone has the highest literacy rate (males and females) and the highest

number of media outfits that support the sensitization of the populace (Health Reform Foundation of Nigeria, 2007; National Population Commission & ICF Macro, 2009). On the other hand, the North east geopolitical zone, has the lowest proportion of women who had 4 or more ANC visits (22.9%) and delivered in a health facility (14.2%) due to having the lowest number of health resources, lowest literacy levels and lowest number of media outfits (Health Reform Foundation of Nigeria, 2007; National Population Commission & ICF Macro, 2009). Other possible reasons for the poor state of health resources and population health outcome in the North West and North East zones is high poverty rates and low level of female autonomy due to religious and ethnic norms/traditions which influence the use of MHS and increase the proportion of high risk pregnancies. This assertion is consistent with the finding of other studies that were conducted across the six geopolitical zones of Nigeria (Babalola & Fatusi, 2009; Doctor et al., 2011; Fapohunda & Orobaron, 2014; Fawole et al., 2012). These high risk pregnancies, poor geographical distribution of health resources coupled with limited use of the few MHS centers and skilled health workers are part of the reasons for the patronage of MHS in the North West and North East geopolitical zones of Nigeria. The findings of this study are consistent with other reports that indicated the North West and North East zones have the highest maternal and perinatal fetal deaths (Fapohunda & Orobaron, 2014). The high prevalence of high risk pregnancies such as pregnant teenagers, pregnancies among women greater than 35 years, short interval between births, and grand multipara were found to be commonly associated with high incidence of direct obstetric causes of maternal (Adeoye, Onayade & Fatusi, 2013; WHO et al., 2010; UNICEF, 2012) and neonatal deaths (Lawn et al., 2005; Owais et al., 2013). A combination of high risk pregnancies

poor access and use of MHS have contributed to making Nigeria among the 12 countries that have neonatal deaths of >45/1000 live births (Lawn, et al., 2005) and MMR of > 600 per 100,000 live births (WHO et al., 2010). The 3 geopolitical zones of Northern Nigeria, have the lowest t access and use of MHS and the highest infant mortality rate due poor distribution of health resources, ignorance, and poverty resulting in geographical, economic, cultural, and or technical barriers as was similarly reported in South Africa (Wabiri, et al., 2013), Bangladesh (Anwar et al., 2015), India (Sexana et al., 2013), and Ghana (Ganle, Parker, Fitzpatrick, & Otupiri, 2014). These barriers marginalized pregnant women, particularly those in lowest income quartile due to their inability to bear the cost of modern health services (Coast et al., 2012; Ganle et al., 2014; Obiechina & Ekenedo, 2013; United Health Foundation, 2011).

ANC is an objective strategy to effectively identify high risk pregnancies. However, the low proportion of women who had four or more number of ANC visits means that, many high risk pregnant women may not be detected and may result in life threatening condition and in extreme cases could lead to the death of a woman and or her baby. The scenario is further compounded if such women delivered in homes or reach the hospital in moribund condition after several days in labor. A combination of these factors with low utilization rates for ANC and institutional delivery as was observed in this study, resulted in the country been among the worst list of countries for a woman to bear children (WHO et al., 2010) and for a child to be born (Owais, et al., 2013).Plausible reasons that could be advanced for low MCHS patronage in this study, are factors relating to availability and affordability of such services, since 70%

of Nigerian population lives in rural areas, and living on less than $2 U.S. Dollars per day (WHO, 2014).

Although, uneven distribution of health resource across the geopolitical zones, rural/urban areas, ethnicity, religious and levels of female autonomy could be possible negative factors that prevent an optimal use of MHS, however, these factors were not found to be consistently statistically significant after controlling for covariates such as education and income levels. The low use of MHS as observed in this study is in keeping with the findings of other previous studies which noted that, Muslim women in Northern Nigeria are less likely to deliver in health facilities or be attended by skilled health workers during delivery, compared to their Christian counterparts living in the Southern region of the country (Babalola & Fatusi, 2009). However, this finding is not consistent when confounders such as ethnicity, income and level of education were controlled. For instance, a study from South west geopolitical zone among the Yoruba's who are predominantly Christians, reported that at least two thirds of women sampled had delivered in homes intentionally and 80% of those that delivered in homes used unskilled birth attendants, delivered on dirty surfaces and used kitchen knives to cut the umbilical cord (Adelaja, 2011). This is in variance to my finding that Yoruba women from the South west have the highest literacy rate, engaged in gainful employment and have high level of autonomy compared to the Hausa's of North West Nigeria. Moreover, after controlling for ethnicity and other socioeconomic covariates, religion was not among the statistically predictive models for ANC visits and institutional delivery. The 4 independent variables comprising of geopolitical zone of residence, availability of skilled health worker, level of education and income level were statistically significant in the

predictive model for ANC utilization (Table 20, 22, 24, 30) and place of delivery (tables 21, 23, 25, 31) even after controlling for covariates. The characteristics of areas with lowest use of MHS (North East and North West geopolitical zones) are predominantly inhabited by Muslims and most of the populace belonged to the 3 major ethnic group in the north (Hausa, Fulani and Kanuri) who were also known to be having the lowest literacy rate, skilled manpower and income levels compared to other regions of Nigeria (Health Reform Foundation of Nigeria, 2007; National Population Commission & ICF Macro, 2009). This scenario further, suggest that the influence of religion on the use of MHS and pregnancy outcome might be indirect. Hence, my analysis further demonstrates that religion might not be the major underlying reason for the practice of home delivery in Nigeria. Hence, the role of ethnicity and religion needs to be studied further as both shape the attitude and behaviors of any specific part of the country.

Overall, differences in the use of MHS among the 6 geopolitical zones of Nigeria highlighted the differences that exist in terms of health system resources, and how individual and community norms and traditions influence the use of MHS. The differences in the distribution of resources was similarly observed even when the data was disaggregated by place of domicile (rural or urban), with rural areas having less likelihood of making the recommended number of ANC visits and having their babies in a health facility. These differences by geopolitical zones of residence and place of domicile have underscored the differential level of risk of maternal and child morbidity, mortality and disability in Nigeria. It also underscored the need to take into consideration of geopolitical zones and place of domicile in order to develop a

holistic plan that addresses not only individual risk factors but also community level influencers that are associated with access and use of MHS.

Parity and the use of MHS

Parity is a known risk factor associated with the use of MHS and pregnancy outcomes (Fatso et al., 2009; Fawole et al., 2012; Ory & Van Poppel, 2013; Yego et al., 2014). Although, following the control of covariates, parity has no impact on the choice of the place of delivery. However, the overall picture in this study is that, grand multipara's (having five or more children) have lowest use rate of ANC and delivery services. This might be due to a false confidence that increasing births builds capacity of a woman in understanding of pregnancy, its complication and ability to deal with any complication at home.Thus, grand multipara have misconception that childbirth becomes easier with each successive delivery as was similarly reported in India (Singh, Kumar, & Pranjali, 2014). This type of false beliefs have no scientific basis and studies have shown that such group of women carries higher risk of complications such as severe haemorrhage and cardiovascular related disorders (Hogberg & Wall, 1986; Ory & Van Poppel, 2013; Royston & Armstrong, 1989; Yego et al., 2014). However, in this study, elderly grand multipara women have lower use rate of MHS was invariance with findings from Ethiopia (Mekonnen & mekonnen, 2003) and pooled DHS survey from several African countries that made comparison on the use of MHS among the extremes of ages (< 20 and > 34 years) among women of reproductive age groups (Magadi et al., 2007). However, the results of both studies showed discordance by reporting high use of MHS and ironically high maternal deaths. In particular, the study by Magadi et al., (2007) used data from 21

African countries that were conducted at different times and the different time span was not taken into consideration when interpreting their results. In order to have an objective assessment on the influence of parity on the use of MHS and pregnancy outcomes, there is the need to conduct studies that focus on biological characteristic of women, while controlling for health system factors and other biological and socioeconomic variables like age and family wealth index.

Age and the use of MHS

In this study, Teenagers and elderly women (≥ 35 years) have low use rate of MHS. The former might be related to their general lack of full autonomy on taking decision regarding their reproductive health desires, and freedom of movement particularly in northern Nigeria, where purdah (seclusion) is commonly practiced (National Population Commission &ICF Macro, 2009). Moreover, they lack economic independence to overcome economic and geographical barriers to the use of health services. Similar assertion was observed in India among adolescent girls who were married or in consensus union, particularly among Muslim adolescent females who accounted for higher proportion of non-use of MHS (Say & Raine, 2007; Singh et al., 2014). On the other hand, the low use of MHS among women who are more than 34 years old could be the false belief and confidence that increasing age and parity improves positive obstetric performance. In general, the lack of independence on decision making process on reproductive health needs among Muslim women and the lack of economic independence might be the root factor for the low use of antenatal and delivery services as was observed in the North West and north east zones of Nigeria (National Population Commission & ICF Macro, 2009). The practice

of seclusion of women (purdah) puts them at disadvantage of seeking modern information on pregnancy and MHS in addition to robbing them of an opportunity to sharpen their Inter-Personal Communication (IPC) which is important during health worker - patient dialogue in order to achieve optimum management outline and compliance to treatment. Although, after controlling for covariates, there is no significant statistical association between parity or age with the number of ANC visits and place of delivery (Tables 8 and 9), women with low autonomy, in extreme of ages (teenagers and > 34 years) and extreme of parity (primipara and grand multipara) have higher risk of dying as a result of pregnancy and its complication. This raises the need for policy interventions in order to consolidate the gains recorded towards attaining or sustaining the gains of the MDGs. The practices of early (teenage) marriage, teenage pregnancy and high parity are commonly seen in the Northern parts of the country and calls for policies that will encourage the need for girls to achieve a minimum of secondary education in order to delay age at marriage and child bearing.

Education and use of MHS

This study demonstrated that education is a major influencer for the appropriate use of MHS. Moreover, increasing years of education has been shown to have direct influence on increasing the proportion of women who have 4 or more ANC visits and the likelihood of delivering in the health facility. The low use of MHS in the North West and North East geopolitical zones in Nigeria might be attributable to the low level of adult female literacy rate of less than 20% compared to 70% in the south west geopolitical zone (National Population Commission & ICF Macro, 2009) that had the highest use rate in this study. The literacy rate in the South West zone is

higher than the average national literacy of 61% (WHO, 2013a). The likely effect of education includes delayed marriage, delayed child bearing, reduction in the fertility rate, higher autonomy on decision making, freedom of movement and economic independence. It increases a woman's health cultural capital through ability to access relevant health information and be able to partake in a meaningful conversation with health workers (Shim, 2010). Although, education does relate to other socioeconomic variables like income and family wealth index, however, it has been found to be statistically significant in the models that predict the use of ANC and delivery services even after controlling for these variables. Similar findings were observed in a study on the role of education, employment and empowerment on the use of MHS in thirty one countries of Africa and Asia (Ahmed et al., 2010). The findings in this study is consistent with other studies from Nigeria (Fawole et al., 2012; Ononokpono & Odimegwu, 2014), Kenya (Desai et al., 2013; Yego et al., 2014), Netherlands (Ory et al., 2013), and other developing countries (Wang et al., 2011). The findings from these studies and my study have ample evidence that demonstrate that education is strongly related to reproductive health behaviour and use of MHS even after controlling for income, family wealth index and place of domicile.This might be because, education expands a woman's world view, enhance the level of autonomy, better job opportunities, ability to negotiate her fundamental human rights including reproductive health rights and ultimately overcome any old aged traditions that neither promote her health status nor prevent disease.

Income and use of MHS

The likelihood of having 4or more ANC visits and or deliver in a health facility depends on the ability of the woman to be able to pay for the services rendered. Hence, income and family wealth index is an important obstacle to optimal use of MCHS (Knight et al., 2013). Women belonging to the higher income quintile tend to use MHS by several folds compared to their colleagues in the poorest wealth quintile. Unfortunately, the poorest quintile are also those commonly practising early child marriage and child bearing, high parity, illiterates, more adherent to local norms, and living in difficult to reach rural communities that lacked modern health resources. These issues increase the risk of complicated pregnancy which could result in loss of life of the mother and her new-born baby. The lack of universal health insurance for more than 90% of women in the reproductive age group in Nigeria further aggravate a poor woman's financial barrier to optimal use of MHS. For instance, the removal of health subsidies by the Federal Government of Nigeria due to the economic crises of the late 1980's and in the last four years, has led to a decrease in the us of MHS in both the Northern and Southern parts of the country (Ekwempu et al., 1990; Obiechina & Ekenedo, 2013).This is further exemplified by fact that, payment for services rendered are generally settled as out of pocket payment. This type of payment has been on the increase since the removal of subsidy on health, resulting in out of pocket payment for health services accounting for more than half of total health expenditure in 2001 to 95.6% in 2011 (WHO, 2014). Such retrogressive policies has further alienated the high risk groups like the poor illiterate rural dwellers and people living in urban slums from access to modern health care services despite the fact that they account for the majority of maternal and child deaths.Hence, income and family

wealth index is a major factor influencing the access and use of health services irrespective of whether it is offered by private or public owner (National Population Commission & ICF Macro, 2009, Obiechina & Ekenedo, 2013).

Conclusions

This study demonstrated that individual and community level factors are important determinant for the use of ANC and delivery services. The 3 independent variables that demonstrated strong significant statistical association with the number of ANC visits and place of delivery in order of importance include educational level, income, and geopolitical zone of residence. These variables have remained significantly associated with the number of ANC visits and place of delivery even after controlling for covariates.

Further, these variables seem to represent a multipronged and multistage intervention. Education may avert early marriage, teenage pregnancy and high parity that will ultimately improve the employment opportunity and autonomy to the woman. Income on the other hand, will overcome the cost of services rendered irrespective of place of domicile. The availability of skilled health worker not only provides the woman with quality obstetric care but is an opportunity to receive appropriate information on reproductive health including family planning services.

The variables also represent the 3D model as discussed in chapter three above and they also summarize MDGs numbers one to five which are eradication of extreme poverty and hunger, universal basic education, gender equality, reduction of child and maternal mortalities respectively with female education (MDG 2) as a fulcrum to drive all the other MDG goals.

Public Health Implications of the Findings

Overall, whether these 4 predictor variables are viewed in the context of the 3D model or in the context of MDGs 1− 5, there are strong public health implications which require the strengthening of social services such as education, health and agricultural sectors with involvement of local community members and structures in order to drive specific culturally related interventions.

Limitations of the Study

In view of the study is cross sectional design, it does not prove causality rather only insights on the association between independent and dependent variables. Moreover, pregnancy outcomes like puerperal psychosis, pregnancy related suicide, and vesico-vaginal fistulas were not assessed even though they may be influenced by the bio-socio demographic and socioeconomic variables and the use of MHS. These conditions were not assessed the DHS data does not have information on them.

Finally, the DHS data was primarily based on individual level characteristics and therefore association might not be a true reflection of community level. There is the need for further studies that will address these limitations.

Recommendations

1. A long term approach is to strengthen or revise policies relating to universal basic education (MDG 2) for girls in order to increase the uptake and ensure the retention up to completion of secondary (high) school. This will be pivotal towards reduction of poverty (MDG 1), gender equality (MDG 3) and reduction of child (MDG 4) and maternal (MDG 5) mortalities through creating gender equality in high paying jobs which will lead to prosperous and an informed

community that make use of MHS.

2. Redistribution of health resources based on need. This could be in the form of upgrading health facilities to deal with obstetric care, special motivation for health workers posted to rural areas, and strengthening capacity of the referral system.
3. Providing decision making, management and or leadership opportunities to community members in the running of health facilities in their own areas. This enhances proactive participation and discussions on ethno-religious issues that affect the use of MHS.
4. Using trained community volunteers to conduct home visits to provide follow up in the first two months of life and also as educators on MHS and basic sanitation. These volunteers will also provide a link between health facility and the community and share information regularly with health workers in the nearest health facility. Additionally, such an approach has potential to strengthen maternal health surveillance and the detection of any of the nationally notifiable diseases through simple field operational community case definitions that could facilitate the identification and notification of suspected cases by the community.
5. Systematically sensitize and engage community leaders (traditional, religious, and political) on culturally related practices such as teenage marriage and pregnancy, girl's education and child spacing in order that they include these topical issues in their sermons. These people should also be part of maternal dead review committee as they can provide insights in the first and second levels of delay.
6. Prevent high risk pregnancies with particular emphasis on grand multipara and those aged 35 years and above. This group of women should be the targeted by family planning providers.

7. Measure progress, by way of provision of funds for research and evaluation, so that lapses will be easily detected and corrected.
8. Research should be conducted on perceived (individual) and evaluated needs (clinical and laboratory opinion), causes of delays on arrival to health facilities and how religion interacts with socioeconomic variables to influence the use of health services because such information is not available in the NDHS data used in this study.

References

Abasiekang, E. M. (1981). Familism and hospital admission in rural Nigeria: A casestudy. *Social Science and Medicine, 15*(B), 45–50.

Abdullah, S. A., Abolayoun, E. M., Abdel-Aleem, H., Moftah, F. M., & Ismail, S.(1992). Maternal mortality in Assuit, Egypt. *International Journal of Gynaecoloy Obstetrics, 39*, 197–204.

Abouzahr, C.,Wardlaw, T., Stanton, C. and Kenneth, H.(1996). Maternal mortality.*World Health Statistic Quarterly, 49*, 77–87

Aboyeji, A. P. (1997). Ruptured uterus in Ilorin, Nigeria - A five year review. *Nigerian Medical Practitioner, 33*(1/2), 5–7.

Acharya, D. R.,Bell, J. S., Simkhada, P., vanTeijlingen, E. R., & Regmi, P. R. (2010).Women's autonomy in household decision making: A demographic study inNepal. *Reproductive Health,7*, 15. doi: 10.1186/1742-4755-7-15

Adamu, Y. M., & Salihu, H. M. (2002). Barriers to the use of antental and obstetric care services in rural Kano, Nigeria. *Journal of Obstetrics and Gynaecology, 22*(6)*,* 600–603.

Adelaja, L. M. (2011). A survey of home delivery and newborn care practices among women in suburban area of South western Nigeria. *ISRN Obstetrics and Gynaecolology, 11*, 1–9. doi:10.5402/2011/983542

Adetoro, O. O., Okwerekwu, F. O., & Ogunbode, O. (1988). Maternal mortality at Ilorin; Nigeria.*Tropical Journal Of Obstetrics and Gynaecology, 1*(I), 18–21.

Agboghorama, O. C. & Emuveyan, E. E. (1997). Maternal mortality in Lagos, Nigeria" A ten year review: 1986–1995.*Nigeria Quarterly Journal of Hospital Medicine, 7*(3), 230–233.

Ahmed, S., Creanga, A. A., Gillespie, D. G., & Tsui, A. O. (2010). Economic status, education and empowerment: Implication for maternal health services utilization in Developing countries. *PLoS ONE*, *5*(6), e1190. doi: 10.1371/journal.pone.0011190

Ajen,I., Fishbein, M. (1980). Understanding attitudes and predicting social behavior. Upper Saddle River, New Jersey: Prentice-Hall, Inc.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211. doi:10.1016/0749-5978(91)90020-T

American College of Physicians (2008). Achieving a High-Performance Health Care System with Universal Access: What the United States Can Learn from Other Countries..*Annals of Internal Medicine, 148*, 55–75. Retrieved from http://www.annals.org/content/148/1/55.full.pdf+html

Amowitz, L. L., Reis, C., & Lacopino, V. (2002). Maternal mortality in Herat Province, Afghanistan, in 2002: An indicator of women's human rights. *Journal of the American Medical Association, 288*(10)*,* 1284–1291 Retrieved from http://jama.jamanetwork.com/article.aspx?articleid=195273

Andersen, R. M. (1995). Revisiting the behavioral model and access to medical care: does it matter? *Journal of Health Social Behavior, 36*, 1–10.

Andersen, R. M. and Newman, J. F. (2005). Societal and individual determinants of medical care utilization in the United States. *The*

MilBank Quarterly, 83(4), 1-28.

Antai, D. (2009). Faith and child survival: the role of religion in childhood immunization in Nigeria. *Journal of Biosocial Science, 41*, 57–76. doi:10.1017/S0021932008002861.

Anwar, I., Nababan, H. Y., Mostari, S., Rahman, A., &Khan, J. A. M. (2015). Trends and Inequities in Use of Maternal Health Care Services in Bangladesh, 1991- 2011. *PLoS ONE, 10*(3), e0120309. doi:10.1371/journal.pone.0120309

Auerbach, L.S. (1982).Childbirth in Tunisia: Implication of a decision – makingmodel. *Social Science and Medicine, 16*, 1499-1506.

Babalola, S., & Fatusi, A. (2009). Determinants of use of maternal health services in Nigeria – looking beyond individual and household factors. *BMC Pregnancy and Childbirth, 9*, 43. doi: 10.1186/1471-2393-9-43. Retrieved from http://www.biomedcentral.com/content/pdf/1471-2393-9-43.pdf

Beegle, K., Frankenbers, E., & Thomas, D. (2001). Bargaining power within couples and use of prenatal and delivery care in Indonesia. *Studies in Family Planning, 32*(2), 130-146.

Belton, S., Myers, B., & Ngana, F. R. (2014). Maternal deaths in eastern Indonesia:20 years and still walking: An ethnographic study. *BMC Pregnancy & Child Birth*, 14, 39

Bezruchka, S. (2010). Health equity in the U.S. Social Alternatives*, 2*(2), 50–56

Bezruchka, S. (2012). The hurrider I go the behinder I get: The deteriorating international ranking of the U.S. health status. *Annual Review of Public*

*Health, 33,*157–73. *doi:10.1146/annurev-publhealth-031811-124649*

Bloom, S. S., Wypij, D. & das Gupta, M. (2001). Dimensions of women's autonomy and the influence on maternal health care utilization in a north Indian city. *Demography,38(1)*, 67–78.Retrieved from Walden library databases using google scholar http://link.springer.com/article/10.1353/dem.2001.0001

Bradley, E. H., Curry, L. A., McGraw, S. A., Webster, T. R., Kasl, S. V., & Andersen,R. (2004). Intended use of informal long-term care: The role of race and ethnicity. *Ethnicity & Health, 9*(1), 37-54.

Broese van Groenou, M., Glaser, K., Tomassini, C., & Jacobs, T. (2006). Socio- economic status differences in older people's use of informal and formal help: A comparison of four European countries. *Ageing and Society, 26*(5), 745–766.

Burchardt, T., Evans, M., & Holder, H. (2010). Measuring inequality: Autonomy the degree of empowerment in decisions about one's own life. Centre for Analysis of Social Exclusion, Oxford University, Oxford, United Kingdom. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/85543/measuring-autonomy.pdf

Caldwell, J. (1979). Education as a Factor in Mortality Decline: An Examination of Nigerian data. *Population Studies,_33*, 395.

Caprio, S., Daniels, S.R., Drewnowski, A.,Kaufman, F.R.,Palinkas, L.A., Rosenbloom, A. L., & Schwimmer, J. B. (2008). Influence of Race, Ethnicity, and Culture on Childhood Obesity: Implications for

Prevention and Treatment a consensus statement of Shaping America's Health and the Obesity Society *Diabetes Care, 31*(11), 2211–2221, doi: 10.2337/dc08-9024. Retrieved from http://care.diabetesjournals.org/content/31/11/2211.full

Chen, L. C., Gesche, M. G., Ahmed, S., Chowdhuru, A. I. & Mosley, W. H. (1979). Maternal Mortality in rural Bangladesh. *Studies in Family Planning, 5*(11), 334–341.

Chernichvosky, D. & Meesook, O.A. (1986).Utilization of health services in Indonesia. *Social Science and Medicine, 23*(6), 611–20. Retrieved from http://www.sciencedirect.com/science/article/pii/0277953686901553

Cleland, J.G. and Van Ginnekan, J.K. (1988). Maternal education and child survival in Developing Countries. The search for pathways of influence. *Social Science & Medicine, 27*, 1357.

Harrison, K. A. (1983). Obstetric Fistula: One social calamity too many. *British Journal of Obstetrics & Gynaecology, 90*, 385–386.

Coast, E., McDaid, D., Leone, T., Pitchforth, E., Matthews, Z., Lemmi, V., Jones, E. (2012). What are the effects of different models of delivery for improving maternal and infant health outcomes for poor people in urban areas in low income and lower middle income countries? Department for International Development, London, United Kingdom. Retrieved from http://eprints.lse.ac.uk/41908/1/What_are_the_effects_of_different_models_of_delivery_for_improving_maternal_and_infant_outcomes_for_poor_people_i

n_urban_areas_in_low_income_and_lower_middle_income_countries_%28LSERO%29.pdf

Cook, R.J. & Dickens, B.M. (2002). Human rights to safe motherhood. *International Journal of Gynecology & Obstetrics, 76*,225–231 Retrieved from http://www.scielosp.org/pdf/bwho/v85n10/a19v8510.pdf; http://www.ncbi.nlm.nih.gov/pubmed/11818128

Court, C. (1996). WHO claims maternal deaths has been under estimated. *British Medical Journal, 313*(7028), 398.

Davidson, P. L., & Andersen, R. (1997). Determinants of dental care utilization for diverse ethnic and age groups. *Advances in Dental ~ Research, 11*(2), 254–262.

Desai, M.,Howard, P. A. P., Odhiambo, F. O., Katana, A., Ouma, P., Hamel, M. J.....Laserson, K. F. (2013). An analysis of pregnancy related mortality in the KEMRI/CDC health and demographic surveillance system in western Kenya. *PLOS ONE, 8*(7), e68773. Doi: 10.1371/journal.pone.0068773

Doctor, H. V., Bairagi, R., Findley, S. E., Helleringer, S., & Dahiru, T. (2011). Northern Nigeria, Maternal, Newborn, and Child Health Program: Selected analysis from population based baseline study. *The Open Demographic Journal*, *4*, 11–21.Doi: 1874-9186/11

Drife, J. O. (1993). Maternal near miss reports? Difficulties in defining which cases to include? *British Medical Journal, 307*, 1087–1088. Retrieved from http://www.google.com.ng/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&ved=0CDMQFjAD&url=http%3A%2F%2Fpubmedcentralcanada.ca%2Fpmcc%2

Farticles%2FPMC1679097%2Fpdf%2Fbmj00045-0007.pdf&ei=Pf85U7y_LJC3hAfHhoCwCA&usg=AFQjCNHjS2O-omKWmu8vfDzKoizaftrdLQ

Ebuehi, O., & Akintujoye, I. (2012). Perception and utilization of traditional Birth attendants by pregnant women attending primary health care clinics in a rural local government area in Ogun State, Nigeria. *International Journal of Women's Health*, *4*, 25–34. doi: 10.2147/ijwh.s23173

Egunjobi, L. (1983). Factors influencing choice of hospitals. A case study of the Northern part of Oyo State, Nigeria. *Social Science and Medicine*, *17*(9), 585-589.

Ekwempu, C.C., Maine, D., Olorukoba, M.B., Esseien, E.S. and Kisseka, M. N. (1990). Structural Adjustment and Health in Africa. *The Lancet, 336*, 56–57. Retrieved from http://www.thelancet.com/journals/lancet/article/PII0140-6736(90)91573S/fulltext

Elo, I. (1992). Utilization of maternal health care services in Peru; The role of women's education. *Health Transaction Review, 2*, 49.

Emmanuel, J. O. & Abimbola, A. K. (2012). Sociocultural factors affecting pregnancy outcome among the Ogu speaking people of Badagry area of Lagos state Nigeria. *International Journal of Humanities and Social sciences*, *2*(4), 133–144.

Essendi, H., Mills, S., & Fotso, J. (2011). Barriers to formal emergency obstetrics care services utilization. *Journal of Urban Health, 88*, 356–369.

doi: 10.1007/s11524-010-9481-1

Evjen-Olsen, B., Hinderaker, S. G., Lie, R. T., Bergsjø, P., Gasheka, P., & Kvåle, G. **(**2008**)**. Risk factors for maternal death in the highlands of rural northern Tanzania;A case control study.*BMC Public Health, 8*, 52. doi:10.1186/1471-2458-8-52 Retrieved from http://www.biomedcentral.com/1471-2458/8/52

Ezugwu, E. C., Agu, P. U., Nwoke, M. O., & Ezugwu, F. O. (2014).Reducing maternal deaths in poor resource setting in Nigeria. *Nigerian Journal of Clinical Practice, 17*(1), 62–66.Doi: 10.4103/1119-3077.122842.

Fapohunda, B., & Orobaron, N. (2014). Factors influencing the selection of delivery with no one present in Northern Nigeria: implications for policy and programs. *International Journal of Women's Health, 6*, 171–183. Doi: 10.2147/IJWH.S54628.

Fatso, J. C., Ezeh, A. C., & Essendi, H. (2009). Maternal Health in poor Resource urban settings: How does women's autonomy influence the utilization of obstetric care services? *Reproductive Health, 6*, 9. Doi: 10.1186/1742-4755-6-9. Retrieved from http//www.reproductive-health-journal.com/contents/6/1/9

Fatso, J. C., Ezeh, A. C., & Oronje, R. (2008). Provision and use of maternal health services among urban poor in Kenya: What do we know and what can we do? *Journal of Urban Health, 85*(3), 428–442.

Fawole, A. A. (1996). Pregnancy and its outcome among mothers, 40 years and above at Ilorin. *Nigerian Medicine, Practice, 32*(1/2), 2–6.

Fawole, A. O. Shah, A., Fabanwo, A. O., Adegbola, O., Adewunmi, A. A.,

Eniayewun, A. B., Dara, K., ……Sa'id M. (2012). Predictors of maternal mortality in institutional deliveries in Nigeria. *African Health Science, 12*(1), 32–40. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/23066417

Field, D. (2009). *Discovering statistics using SPSS* (2nd Ed*). Chapter, 8, "Logisticsregression"(pp.* 264–268*).* Thousand Oaks, California; Sage Publications ltd.

Foster, G. (1997).Medical anthropology and international health planning. *Social Science and Medicine, 11*, 527–534.

Frankfort-Nachmias, C., &Nachmias, D. (2008).*Research methods in the social sciences*. New York, NY: Worth Publishers.

Frautschi, S., Cerulli, A., & Maine, D. (1994). Suicide during pregnancy and its neglect as a component of maternal mortality. *International Journal of Gynecology & Obstetrics, 47*(3), 275−284.

Friedlander, Y., Manor, O., Paltiel, O., Meiner, V., Sharon, N., Calderon, R., Hotchner, H.,….Siscovick, S., D. (2009). Birth weight of offspring, Maternalpre-pregnancy characteristics, and mortality of mothers: the Jerusalem perinatal study cohort. *Annals Epidemiology, 19*(2), 112–117. Doi: 10.1016/j.annepidem.2008-11-002

Friel, S., & Marmot, M. G. (2011). Action on the social determinants of health and health inequities goes global. *Annual Review of Public Health, 32*, 225–236. Retrieved from the Walden University library databases.

Furuta, M., & Salway, S. (2006). Women's position within the household as a Determinant of maternal health care use in Nepal. *International Family*

Planning Perspectives, – 32(1), 17–27.

Gabrysch, S., Zanger, P., & Campbell, O. M. R. (2012). Emergency obstetric care availability: A critical assessment of the current indicator. *Tropical Medicine and International Health, 17*(1), 2–8.

Ganle, J. K., Parker, M., Fitzpatrick, R., & Otupiri, E. (2014). Inequities in accessibility to and utilisation of maternal health services in Ghana after user-fee exemption: a descriptive study. *International Journal for Equity in Health, 13*, 89. doi: 10.1186/s12939-014-0089-z

Garba, J. A., & Umar, S. (2013). Aetiology of maternal mortality using verbal Autopsy at Sokoto, North western Nigeria. *African Journal of Primary Health Care and Family Medicine, 5*(1), 442. doi: 10.4102/phcfm.v5i1.442

Gaugler, J. E., & Kane, R. A. (2001). Informal help in the assisted living setting: A 1-year analysis. *Family Relations, 50*(4), 335-347.

Ghebrehiwet, M., & Morrow, R. (2007). Delay in seeking and receiving Emergency obstetric care in Eritrea. *Journal of Eritrean Medical Association, 2*, 8–12. doi: 10.4314/jema.v2i1.52700

Gil-González, D., Carrasco-Portiño, M. & Ruiz, M. T. (2006). Knowledge gaps in scientific literature on maternal mortality: a systematic review. *Bulletin of the World Health Organization*, *84*(11), 903–909

Glanz, K., Rimer, B. K., & Viswanath, K. (Eds). (2008). *Health behavior and Health education: Theory, research, and practice* (4th ed.).

San Francisco, CA: John Wiley & Sons.

Golan A., Sandbank, O, and Rubin, A. (1980). Rupture of the pregnant uterus. *Journal of Obstetrics and Gynaecology, 6*, 549–554.

Hagman, M. (2013). Maternal mortality: Gender and access to health services: The case of Ghana. *Journal of Politics and International Studies,* 9, 173-211.Retrieved from http://www.google.com.ng/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CDIQFjAB&url=http%3A%2F%2Fwww.polis.leeds.ac.uk%2Fassets%2Ffiles%2Fstudents%2Fstudent-journal%2Fsum-13%2F130930-sum13-hagman.pdf&ei=Wdc5U7yWJsyg7Aay54HACA&usg=AFQjCNGRxW16b-C-UZThOpSN2v24tTeXLA

Harrison, K. A. (1983). Obstetric Fistula: One social calamity too many (commentary). *British Journal of Obstetrics & Gynaecology, 90*, 385–386.

Harrison, K. A. (1985).Childbearing, Health and Social Priorities: A Survey of 22,774 consecutive hospital birth in Zaria, Northern Nigeria. *British Journal Obstetrics & Gynecology, 5*(Suppl.), 3.

Harrison, K. A. (1989). Zaria maternity survey, 1976- 1979: The Influence of Maternal age and parity in childbearing with special reference to primigravidae age 15 years and under. *Transaction of the Royal Society of Tropical Medicine and Hygiene, 83*, 449–453.

Health Reform Foundation of Nigeria. (2007). *Primary Health Care in Nigeria: 30 years after Alma-Ata. The Nigerian Health review 2007*;

Health Reform Foundation of Nigeria, Mmm-nat Educational Window Consultant Ltd.

Hoestermann, C. F. L., Ogbaselassie, G., Wacker, J. & Bastert, G. (1996). Maternal mortality in the main referral hospital in the Gambia; West Africa. *Tropical Medicine and International Health, 2*(5), 710–717.

Hogberg, U., & Wall, S. (1986). Age and parity as determinants of maternal mortality in Sweden from 1781 to 1980. *Bulletin of the World Health Organisation*, *64*(1), 85-91. Retrieved from http://www.google.com.ng/url?sa=t&rct=j&q=&esrc=s&source=web&cd=10&ved=0CIYBEBYwCQ&url=http%3A%2F%2Fwhqlibdoc.who.int%2Fbulletin%2 F1986%2FVol64-No1%2Fbulletin_1986_64%281%29_85-91.pdf&ei=q282U6XuF86qhAeMxIHAAg&usg=AFQjCNFLpdUSAEyEonm20nl9cIp8Ge6Z6g

Horowitz, C. R., Robinson, & Seifer, S. (2009). **C**ommunity based participatory research from the margin to the mainstream: Are Researchers prepared? *Circulation, 119*, 2633–2642. doi: 10.1161/CIRCULATIONAHA.107.729863. Retrieved from http://circ.ahajournals.org/content/119/19/2633.full.pdf+html

Hunt, K (1998). *The Theory of Reason Action and theory of planned behaviour* (P.181-183). Retrieved from http://www.kendallhunt.com/uploadedFiles/Kendall_Hunt/Content/Higher_Education /Uploads/Frymier_2e_Ch8.Pdf

Ibison, J. M., Swerdlow, A. J., Head, J. A. & Marmot, M.(1996). Maternal Mortality in England and Wales, 1970-1975: An Analysis by country

of birth, *British Journal of Obstetrics. & Gynaecology,* 103, 973-980.

Ibrahim, S., & Alkire, S. (2007). *Agency and power: A proposal for internationally comparable indicators-OPHI working paper*. Retrieved from http://www.google.com.ng/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CD4QFjAA&url=http%3A%2F%2Fwww.ophi.org.uk%2Fwp-content%2Fuploads%2FOPHI-wp04.pdf%3F79d835&ei=uIV3U73AFImsO4qwgeAI&usg=AFQjCNEmuYgEzbs_GZNgbEZVCv2PdQYdeQ&bvm=bv.66917471,d.ZGU

ICF International. (2012). *Survey organization manual for the demographic and Health Surveys (DHS).MEASURE DHS*. Calverton Maryland: ICF International. Retrieved from http://www.google.co.zw/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CCoQFjAB&url=http%3A%2F%2Fdhsprogram.com%2Fpubs%2Fpdf%2FDHSM10%2FDHS6_Survey_Org_Manual_7Dec2012_DHSM10.pdf&ei=KZulU4_MIYTE0QXjtIDgCA&usg=AFQjCNFGulX5sIhta6v-J4FYtDGIGOt2dg&bvm=bv.69411363,d.d2k

Idris, S. H., Gwarzo, U. M. D., & Shebu, A. U. (2006). Determinants of place of delivery among women in semi urban settlement in Zaria, Northern Nigeria. *Annals of African Medicine*, *5*(2), 68–72.

Imran, A., Shah, M., Din, G. U., & Ali, A. (2012). Do cultural barriers impede women economic empowerment in district Swat? Universal Journal of Management and Social Sciences, *2*(8), 67–72.

Retrieved from http://www.google.com.ng/url?sa=t&rct=j&q=&esrc=s&source=web&cd=5&ved=0CEcQFjAE&url=http%3A%2F%2Fcprenet.com%2Fuploads%2Farchive%2FUJMSS_12-11832.pdf&ei=A5gcU5iCLsS3hQfW3YHYDg&usg=AFQjCNHjFq0VIh5Mg50EzLPJ6D40dwaMAg

Ityavyar, D. A. (1984). A traditional midwife practice in Sokoto state, Nigeria. *Social Science and Medicine*, *18*(6), 497–501.

Jammeh, A., Sundby, J., & Vangen, S. (2011). Barriers to emergency obstetric care services in prenatal deaths in rural Gambia: A qualitative in-depth interview study. *Obstetrics & Gynecology, 2011*, 981096. doi: 10.5402/2011/981096

Janakiraman, V., & Ecker, J. (2010). Quality in obstetric care: Measuring what matters. *Obstetrics & Gynecology, 116*, 728–732.

Kaddour, C., Souissi, R., Haddad, Z., Zaghdoudi, Z., Magouri, M., Souissi, M., & Abbassi, S. (2008). Causes and risk factors of maternal mortality in the ICU. *Critical Care, 12*(suppl 2), 492. doi:10.1186/cc6713. Retrieved from http://ccforum.com/content/12/S2/P492

Khan, S. K., Wojdyla, D., Say, L., Gulmezoglu, M., & Van Look, P. F. A. (2006). WHO analysis of causes of maternal deaths: A systematic review. *Lancet, 367*, 1066-1070. doi: 10.1016/50140-6736(06).

Knight, H. E., Self, A., & Kennedy, S. H. (2013). Why are women dying when they reach hospital on time? A systematic review of the third delay. *PLoS One, 8*(5), e63846. doi: 10.1371/journal.pone.0063846.

Konziol, N., & Arthur, A. (2011). An introduction to secondary data analysis. Retrieved from http://r2ed.unl.edu/presentations/2011/RMS/120911_Koziol/120911_Koziol.

Krieger, N. (2011). *Epidemiology and the people's health: Theory and context. Chapter 6, "Social Epidemiologic Alternatives: Sociopolitical and Psychosocial Frameworks" (pp. 163–201).* New York, NY: Oxford University Press.

Kullima, A. A., Kawuwa, M. B., Audu, B. M., Geidam, A. D., & Mairiga, A. G. (2009). Trends in maternal mortality in a tertiary institution in Northern Nigeria. *Annals of African Medicine*, *8*(4), 221−4. doi: 10.4103/1596-3519.59575.

Lasker, J. N. (1981). Choosing among therapies: Illness behaviour in the Ivory Coast. *Social Science and Medicine, 15*(A), 157–168

Lawn, J. E., Causens, S., & Zupan, J. (2005). 4 million neonatal deaths: when, where, why? *The Lancet Neonatal Survival Series, 1*, 18. Retrieved from http://www.who.int/maternal_child_adolescent/documents/pdfs/lancet_neonatal_survival_paper1.pdf

Macaulay, A.C.,Paradis, G., Potvin, L., Cross, E.J., Saad-Haddad, C., McComber, A., Desrosiers, S., ….& Rivard, M. (1997). The

Kahnawake Schools Diabetes Prevention Project: Intervention, evaluation, and baseline results of a Diabetes Primary Prevention Program with a Native Community in Canada. *Preventive Medicine, 26*(6), 779–790. *Retrieved from* http://www.sciencedirect.com/science/article/pii/S0091743597902413

Magadi, M. A., Agwanda, A. O., & Obare, F. O. (2007). A comparative analysis of the use of maternal health services between teenagers and older mothers in sub-Saharan Africa: Evidence from Demographic and Health Survey (DHS). *Social Science and Medicine, 64*(6), 1311-1325

Magoma, M.,Requejo, J., Campbell, O. M. R., Cousens, S., & Fillipi, V. (2010). High ANC coverage and low skilled attendance in a rural Tanzanian district: A case for implementation of birth plan intervention. Gender, class and exclusion. *BMC pregnancy and childbirth,* 10,13. Doi: 10.1186/1471-2393-10-13

Mahler, H, (1987). The safe motherhood initiative: A call for action. *The Lancet,* 1(8534), 668–670.

Mason, K. O. (1986). The status of women: Conceptual and methodological issues in demographic studies. *Social Forum, 1*(2), 284–300.

Mason, K. O., & Smith, H. L. (2003). *Women's empowerment and social context: Results from five Asian countries.* Rockefeller's Foundation Bellagio study and conference center. Retrieved from http://www.google.com.ng/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0C

C0QFjAB&url=http%3A%2F%2Fsiteresources.worldbank.org%2FINTEMPOWERMENT%2FResources%2F13323_womens_empowerment.pdf&ei=A5gcU5iCLsS3hQfW3YHYDg&usg=AFQjCNHZUOQnsex62UElsmobB6NqsgNcWA

Mekonnen, Y., & Mekonnen, M. (2003). Factors influencing the use of Maternal health care services in Ethiopia. *Journal of Health, Population and Nutrition, 21*(4), 374–378.

Montagu, D., Yamey, G., Visconti, A., Harding, A., & Yoong, J. (2011). Where do poor women in developing countries give birth? A multi-country analysis of demographic and health survey data. *PLoS One, 6*(2), 1–8. Retrieved from the Walden Library databases.

Mullany,B. C., Becker, S., & Hidin, M. J. (2007). The impact of including husbands in antenatal health education services on maternal health services in urban Nepal: Results from a randomized controlled trial. *Health Education Research, 226*(2), 166–179.

Mumtaz, Z., & Salway, S. (2009). Understanding gendered influences on women's reproductive health in Pakistan: Moving beyond the autonomy paradigm. *Social Science & Medicine, 68*(7), 1349-1356. Doi:10.1016/j.socscimed.2009.01.025.

Mumtaz, Z., Salway, S., Shanner, L., Zaman, S., & Laing, L. (2012). Addressing disparities in maternal health care in Pakistan: Gender, class and exclusion.*BMC Pregnancy and Childbirth, 12*, 80. Doi: 10.1186/1471-2393/12/80

National Population Commission & ICF Macro. (2009). *Nigeria Demographic and Health Survey 2008.* Abuja, Nigeria/ Calverton, MD USA: National Population Commission and ICF Macro. http://pdf.usaid.gov/pdf_docs/PNADQ923.pdf

Nelissen, E. J. T., Mduma, E., Ersdal, H., Evjen-Olsen, B., van Roosmalen, J. J. M., & Stekelenburg, J. (2013). Maternal near-miss and mortality in a rural referral hospital in northern Tanzania: A cross sectional study. *BMC Pregnancy & Child Birth, 13*, 141. Retrieved from http//:biomedcentral,com/1471-2393/13141

Nieburg, P. (2012). *Improving maternal mortality and other aspects of women's health: The United States' global role*. A report of the Center of Strategic and International Studies, Washington D. C. Retrieved from https://www.google.com.ng/?gws_rd=cr#q=Nieburg%2C+P.+%282012%29.+Improving+maternal+mortality+and+other+aspects+of+women%E2%80%99s+health%3A+The+United+States%E2%80%99+global+role

Nnadi, E. E. & Kabat, H. F. (1984). Choosing health care services in Nigeria: A developing nation. *Journal of Tropical Medicine and Hygiene, 87*, 47–51.

Nour, N. M. (2008). An introduction to maternal mortality. *Review of Obstetrics and Gynaecology, 1*(2), 77–81.

Nwokocho, E. E. (2008). Maternal crises and African men: A case of a Nigerian community. *African Population Studies, 22*(1), 36-56.

Obiechina, G. O., & Ekenedo, G. O. (2013). Factors affecting the utilization of University health services in a tertiary health institution in south west

Nigeria. *Nigerian Journal of Clinical Practice, 16*(4), 454–457. Doi: 10.4103/1119-3077.116888.

Oche, M., Umar, A. S., Adejoh, M. A., Isa, H. O., & Ekele, B. A. (2010). Determinants of utilization of maternity services in Gidan Igwe, Sokoto, Nigeria. *Sahel Medical Journal, 13*(3), 128–134.

Ogden, C., & Carroll, M. (2010). Prevalence of obesity among children and Adolescents: United States, Trends 1963–1965 through 2007–2008. Retrieved from http://www.cdc.gov/nchs/data/hestat/obesity_child_07_08/obesity_child_07_08.pdf

Ogden, C. L., Carroll, M. D., Curtin, L. R., Lamb, M. M., & Flegal, K. M. (2010). Prevalence of high body mass index in U.S. children and adolescents, 2007–2008. *Journal of American Medical Association, 303*(3), 242–249.. Retrieved from https://carmenwiki.osu.edu/download/attachments/26513653/JAMA+2010+Obesity+Trends.pdf

Ojengbede, O. A. (1989). Pregnancy and delivery at 40 years and above. *Tropical Journal of Obstetrics and Gynaecology, 7*, 11-13.

Okeshola, F. B., & Sadiq, I. T. (2013). Determinants of home delivery among Hausas in Kaduna south local government area of Kaduna state, Nigeria. *American International Journal of Contemporary Research*, *3*(5), 78-85.

Okwerekwu, F. E. O. (2010). Maternal mortality in Nigerian women aged 35 Years and above. *Asia-Oceania Journal of Obstetrics and Gynaecology*, *17*, 37–44. doi: 10.1111/j.1447-0756.1991.tb00249.x

Olatunji, A. D., & Abudu, O. O. (1996). A review of maternal mortality in Lagos University Teaching Hospital (1976-1985). *Nigerian Medical Practitioner, 31*(1/2), 2-6.

Olarenwaju, F. O. (2013). Women empowerment as a determinant for investment in children in selected rural communities in Nigeria. *African Research Review, 7*(4), 138-161. doi: http//:dx.doi.org/10.4314/afrrev.7i4.9

Onah H. E., Ikeako, L. C., & Iloabachie, G. C. (2006). Factors associated with the utilization of maternal services in Enugu, Southern Nigeria. *Social Science &Medicine, 63*(7), 1870-1878.

Onakewhor, J. U., & Gharoro, E. P. (2008). Changing trends in maternal mortality in a developing country. *Nigerian Journal of Clinical Practice, 11*(2), 111-120. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/18817049

Ononokpono, D. N., & Odimegwu, C. O. (2014). Determinants of maternal health care utilization in Nigeria: a multilevel approach. *Pan African Medical Journal, 17*(Supp 1), 2. Doi: 10.11694/pamj.supp.2014.17.1.3596

Osubour, K. M., Fatusis, A. O., & Chiwuzie, J. C. (2006). Maternal health seeking behaviour and associated factors in rural Nigerian communities. *Maternal and Child Health Journal, 10*(2), 159–169.

Ory, B. E., & Van Poppel, F. W. A. (2013). Trends and risk factors of maternal mortality in the late nineteenth century Netherlands. *The History of the Family, 18*(4), 481−509. DOI: 10.1080/1081602X.2013.836457. Retrieved from http://www.tandfonline.com/doi/full/10.1080/1081602X.2013.836457#.UzaEkc7yGPg

Otolorin E. O., Marinho, A. O., Ojengbede, O., Odukoya, A.O., & Palmer, C. K. (1988). Maternity care monitoring. A constant at 2 levels of health care delivery in Ibadan Nigeria, *International Journal of Gynaecology and Obstetrics26*, 367. Retrieved from http://www.sciencedirect.com/science/article/pii/0020729288903311

Pallant, J. (2011). *SPSS Survival manual: A step by step guide to data analysis using SPSS* (4th edition), Crows Nest, Australia, Allen & Unwin

Pallikadavath, S., Foss, M., & Stones, R. W. (2004). Antenatal care: provision And inequality in rural north India. *Social Science & medicine*, 59:1147-1158

Parvanta, C,F., Nelson, D.E., Parvanta, S.A., & Harner, R.N. (2011). *Essentials of public health communication.* Sudbury, Massachusetts: Jones & Bartlett Learning, publishers.

Pattinson, R., Say, L., Souza, J. P., Van den Broek, N., Rooney, C., & WHO Working Group on maternal mortality and morbidity classification (2009). WHO maternal deaths and near miss classifications. *Bulletin of the World Health Organization, 87*, 734−734. doi: 10.2471/BLT.09.071001. Retrieved from http://www.who.int/bulletin/volumes/87/10/09-071001/en/

Phillips, K. A., Morrison, K. R., Andersen, R., & Aday, L. A. (1998). Understanding the context of healthcare utilization: Assessing environmental and provider- related variables in the behavioral model of utilization. *Health Services Research, 33*(3), 571–596.

Ramos, S., Karolinski, A., Romero, M., & Mercer, R. (2007). A comprehensive assessment of maternal deaths in Argentina: translating multicenter collaborative research into action. *Bulletin of the World Health Organization, 85*(8), 569−648. Retrieved from http://www.who.int/bulletin/volumes/85/8/06-032334/en/

Rochat, R.W. (1991). Maternal Mortality in the United States of America. *World Health Statistics Quarterly, 34*, 2–13

Rosenfield, A. (1989). Maternal mortality in developing countries: An ongoing but neglected epidemic, *Journal of American Medical Association, 262*(2), 376–379.

Rosenfield, A. & Maine, D. (1985). Maternal mortality - A neglected Tragedy: Where is the M in MCH? *The Lancet, 2*(8446), 83–85.

Royston, E., & Armstrong, S. (1989). *Preventing Maternal Deaths* (Eds). Geneva, World Health Organization. Retrieved from http://scholar.google.com/scholar_url?hl=pt-BR&q=http://apps.who.int/iris/bitstream/10665/39933/1/9241561289_eng.pdf&sa=X&scisig=AAGBfm3YsTAgRDp6k0wY1nQEe0G6yVCgLQ&oi=scholarr

Safran, C., Bloomrosen, M., Hammond, E., Labkoff, S., Markel-Fox, S., Tang, P. C., & Detmer, D. E. (2007). Towards a national framework for the secondary use of health data: An American Medical Information Association white paper. *Journal of American Medical Information Association, 14*(1), 1-9. Doi: 10.1197/jammia.M2273.

Savona-Ventura, S. and Grech, E. S. (1987). Maternal mortality in Maltese Island. *International Journal of Gynaecology and Obstetrics, 25*, 283–290.

Saxena, D., Vangani, R., Mavalankar, D. V., & Thomsen, S. (2013). Inequity in maternal health care service utilization in Gujarat: analyses of district level health survey data. *Global Health Action, 13*, 6. doi: 10.3402/gha.v6i0.19652

Say, L., Souza, J. P., & Pattinson, R. C. (2009). Maternal near miss: Towards a standard tool for monitoring quality of maternal health care. *Best Practice & Research Clinical Obstetrics & Gynaecology, 23*, 287–96 doi: 10.1016/j.bpobgyn.2009.01.007

Say, L. & Raine, R. (2007). A systematic review of inequalities in the use of maternal health care in developing countries: examining the scale of

the problem and the importance of *context. Bulletin of the World Health Organization, 85*, 812–819.

Senerath, U., & Gunawardena, N. S. (2009). Women's autonomy in decision making for health care in South Asia. *Asia-Pacific Journal of Public Health, 21*, 137–143.

Sharp, K., Ross, C. E. & Cockerharn, W. C. (1983). Symptoms, beliefs and the use of physician services among the disadvantaged. *Journal of Health and Social Behaviour, 29*(9), 255–263.

Shim, J. K. (2010). Cultural Health Capital: A theoretical approach to understanding health care interactions and the dynamics of unequal treatment. *Journal of Health and Social Behavior, 51*(1), 1–15. doi:10.1177/0022146509361185

Smith, A. K., Ayanian, J. Z., Covinsky, K. E., Landon, B. E., McCarthy, E. P., Wee C. C., & Steinman, M. A. (2011). Conducting high-value secondary dataset analysis: An introductory guide and resources. *Journal of General Internal Medicine, 26*(8), 920–929. Retrieved from the Walden Library databases. http://web.ebscohost.com.ezp.waldenulibrary.org/ehost/pdfviewer/pdfviewer?sid=e1e499c2-d86c-4cbf-b4eb-ef4427b66933%40sessionmgr111&vid=2&hid=103

Sorenson, H. T., Sabroe, S., & Olsen, J. (1996). A framework for evaluation of secondary data sources for epidemiological research. *International Journal of Epidemiology, 25*(2), 435–442.

Stock, R. (1983).Distance and the utilization of health facilities in rural

Nigeria. *Social Science and Medicine, 17*(9), 563-570. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/6879255

Stokoe, U. (1991). Determinants of maternal mortality in developing world. *Australian and New Zealand Journal of Obstetrics and Gynaecology, 31*, 8–16.

Szklo, M., & Nieto, F. J. (2014). Understanding a Lack of Validity: Bias *in Epidemiology: Beyond the basics* (3rd ed.). Sudbury, MA: Jones and Bartlett.

Taylor, D., Bury, M., Campling, N., Carter, S., Garfied, S., Newbould, J., & Rennie, T. (2007). *A Review of the use of the Health Belief Model (HBM), the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB) and the Trans- Theoretical Model (TTM) to study and predict health related behaviour change*. The Department of Practice and Policy, University of London in collaboration with the National Institute for Health and Clinical Excellence, London, U.K. Retrieved from http://www2.warwick.ac.uk/fac/med/study/ugr/mbchb/phase1_08/semester2/healt hpsychology/nice-doh_draft_review_of_health_behaviour_theories.pdf

Thaddeus, S., & Maine, D. (1994). Too far to walk: maternal mortality in context. *Social Science and Medicine, 38*, 1091–1110. doi: 10.1016/0277-9536(94)90226-7. Retrieved from http://scholar.google.com/scholar_url?hl=pt-BR&q=http://www.researchgate.net/publication/11134243_Too_far_towalk

maternal_mortality_in_context/file/9c9605283b7590b668.pdf&sa=X&scisig=AAGBfm2Nc3Eplu6M7tRw3Rw2zfrJ2ul8Ng&oi=scholarr

Thorsen mail**,** V. C., Sundby, J., & Malata, A. (2012). Piecing together the maternal death puzzle through narratives: The three delays model revisited. *PLOS One, 17*(12), e52090. Doi: 10.1371/journal.pone.005209. Retrieved from http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.005 2090

Umar, I., Oche, M., & Umar, A. S. (2011). Patient waiting time in a tertiary health institution in Northern Nigeria. *Journal of Public health and Epidemiology, 3*(2), 78–82.

UNICEF. (2009). *Nigeria national report global study on child poverty and disparities*. Retrieved from http://www.google.com.ng/url?sa=t&rct=j&q=&esrc=s&source=web&cd=6&ved=0CD4QFjAF&url=http%3A%2F%2Fwww.unicef.org%2Fsocialpolicy%2Ffiles%2FNigeria_GLOBAL_STUDY_ON_CHILD_POVERTY_AND_DISPARITIES_smaller.pdf&ei=KaqiU6XVEuSv7AaiyoHgDw&usg=AFQjCNFYjDRacvW6- QZY9u0s1S_wtNr68A

United Nations. (2010). The world's women 2010: Trends and statistics. United Nations: New York. Retrieved from http://unstats.un.org/unsd/pubs/gesgrid.asp?id=428

UNICEF. (2012). State of the world's children 2012. UNICEF, New York, USA. Retrieved from http://www.unicef.org/sowc2012/pdfs/SOWC-2012-Main- Report_EN_21Dec2011.pdf

United Health Foundation. (2011). *Americas health ranking: A call to action*

for individuals and their communities. United health Foundation, Minnetonka, USA. Retrieved from http://www.americashealthrankings.org/SiteFiles/Reports/AHR%202011editio n.pdf

United State Agency for International Development & ICF Macro. (2006). *Guide to DHS Statistics: Demographic and Health Survey Methodology*. Calverton, Maryland USA: USAID and ICF Macro. Retrieved from http://dhsprogram.com/pubs/pdf/DHSG1/Guide_to_DHS_Statistics_29Oct201 2_DHSG1.pdf

Upadhay**,** U. S., & Karasek, D. (2012).Women's empowerment and ideal family size: An examination of DHS empowerment measures in sub-saharan Africa. *International Perspectives on Sexual and Reproductive Health, 38*(2), 78–89. doi: 10.1363/3807812

Urrio, T., F.(1991). Maternal deaths at Sognea Regional Hospital, Southern Tanzania. *African Medical Journal, 68*, 81–87.

United State Department of Health and Human services. (2009).*Making Health Communication Programs Work.* National Institutes of Health, National Cancer Institute. Retrieved from http://www.cancer.gov/cancertopics/cancerlibrary/pinkbook/page3

Viegas, O. A. C., Wiknsosastro, G., Sahagun, G. H., Chaturachinda, K., & Ratnam, S. S. (1992). Safe motherhood: Safe childbirth needs more than medical services, *World Health Forum, 13*, 58–65.

Vinikoor-Imler, L. C., Messer, L. C., Evenson, K. R., & Laraia, B. A. (2011). Neighborhood conditions are associated with maternal health

behaviors and pregnancy outcomes. *Social Science and Medicine, 73*(9), 1302–1311. Retrieved from the Walden Library databases.

Wabiri, N., Chersich, M., Zuma, K., Blaauw, D., Goudge, J, & Dwane, N. (2013). Equity in maternal health in South Africa: Analysis of health service Access and health Status in a National Household Survey. *PLoS One, 8*(9), e73864. doi:10.1371/journal.pone.0073864

Waboso, M. W. (1993). The cause of maternal mortality in Eastern states of Nigeria. *Nigerian Medical Journal, 3*(2), 99–104.

Wado, Y. D. (2013). Women's autonomy and reproductive health care seeking behavior in Ethiopia. Calverton, Maryland: ICF Macro. Retrieved from http://www.google.com.ng/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=7&ved=0CGcQFjAG&url=http%3A%2F%2Fwww.measuredhs.com%2Fpubs%2Fpdf%2FWP91%2FWP91.pdf&ei=XprhUuD6K8rF0QWyhoDoAw&usg=AFQjCNEyzDExLpcuHCqxlxWDhcTQsGH7Kw

Walden University. (2012). Article analysis matrix. Retrieved from http://researchcenter.waldenu.edu/Search.htm?

Wang, W., Alva, S., Wang, S., & Fort, A. (2011). Levels and trends in the utilization of maternal health services in developing countries. Calverton, Maryland: ICF Macro. Retrieved from http://www.measuredhs.com/publications/publication- cr26-comparative-reports.cfm

Weindling, M. (2004). *Why mothers die 2000-2002: The sixth report of the confidential enquiries in to maternal deaths in the United Kingdom*.

Retrieved from http://www.google.com.ng/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CCcQFjAB&url=http%3A%2F%2Fwww.hqip.org.uk%2Fassets%2FNCA POP-Library%2FCMACE-Reports%2F33.-2004-Why-Mothers-Die-2000-2002- The-Sixth-Report-of-the-Confidential-Enquiries-into-Maternal- Deaths-in-the-UK.pdf&ei=Pf85U7y_LJC3hAfHhoCwCA&usg=AFQjCNHy94UU4KPODyBVwiUNHSxudDztFA

Wolinsky, F. D., & Johnson, R. J. (1991). The use of health services by older adults. *Journals of Gerontology Series B-Psychological Sciences and Social Sciences, 46*(6), S345–S357.

World Bank (2010). Better health for women and families: The World Bank Reproductive Action Health Plan 2010-2015. Retrieved from http://www.google.com.ng/url?sa=t&rct=j&q=&esrc=s&source=web&

World Health Organization. (n.d.). Maternal health. Retrieved from http://www.measuredhs.com/Topics/Maternal-Health.cfm

World Health Organization. (1985).*Women, Health and Development*: A report of the Director General, WHO offset publication, WHO, Geneva, Switzerland No. 90. Retrieved from http://www.google.com.ng/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CE0QFjAB&url=http%3A%2F%2Fwhqlibdoc.who.int%2Foffset%2FWHO_OFFSET_90.pdf&ei=0DZ5U8WmI4LOOOb8gMAN&usg=AFQjCNGmQG2wGAv62AaVCkTdKBKEKJAsDw

World Health Organization. (1992). *Women's Health: Across age and Frontier.* WHO, Geneva, Switzerland. Retrieved from http://apps.who.int/iris/handle/10665/37677

World Health Organization (2005).*World Health report 2005: Making every mother and child count.* Geneva, Switzerland. World Health Organization. Retrieved from http://www.who.int/whr/2005/whr2005_en.pdf

World Health Organization. (2007). *WHO Recommendations for the prevention of postpartum hemorrhage.* WHO, Geneva, Switzerland. Retrieved from http://www.google.com.ng/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CC0QFjAB&url=http%3A%2F%2Fwww.afro.who.int%2Fen%2Fdownloads%2Fdoc_download%2F3210-who-recommendations-for-the-prevention-of-postpartum-haemorrhage.html&ei=m8d4U62_KcWYPc6OgLgH&usg=AFQjCNEHHBFY lLvturluES9WcH6Ge2pcOQ&bvm=bv.66917471,d.ZGU

World Health Organization. (2008). *Inequities are killing people on a "grand scale": The Reports WHOs commission on health inequalities.*News release WHO/29, August 28, WHO, Geneva, Switzerland. Retrieved from http://www.who.int/mediacentre/news/releases/2008/pr29/en/index.html

World Health Organization & Center for Disease Control and Prevention. (2010). *Technical Guidelines for Integrated Disease Surveillance and Response in the African Region*, Brazzaville, Republic of Congo and Atlanta, USA. 1-398. Retrieved from http://www.afro.who.int/en/clusters-a-programmes/dpc/integrateddisease-surveillance/features/2775-technical-guidelines-for-integrated-disease-surveillance-and-response-in-the-african-region.html

World Health Organization, United Nations Children's Fund, United Nations Population Fund & the World Bank. (2010). *Trends in Maternal Mortality: 1990 to 2008 – Estimates developed by WHO, UNICEF, UNFPA, and the World Bank*, WHO, Geneva, Switzerland. Retrieved from http://whqlibdoc.who.int/publications/2010/9789241500265_eng.pdf

World Health Organization. (2011). *Evaluating the quality of care for severe pregnancy complications: The WHO near-miss approaches for maternal health*. WHO, Geneva, Switzerland. Retrieved from http://www.who.int/reproductivehealth/publications/monitoring/9789241502221/en/

World Health Organization. (2013a). *World Health Statistics 2013*. WHO, Geneva, Switzerland. Retrieved from http://www.who.int/gho/publications/world_health_statistics/2013/en/

World Health Organization. (2013b). *Maternal death surveillance and*

*response: Technical guidance. Information for action to prevent maternal death.*WHO, Geneva, Switzerland. Retrieved from http://www.who.int/maternal_child_adolescent/documents/maternal_deathsurveillance/en/

World Health Organization. (2014). *World Health Statistics 2014*. WHO, Geneva, Switzerland. Retrieved from http://www.who.int/gho/publications/world_health_statistics/2014/en/

Yahaya, M. K. (2002). Analysis of Women's Reproductive Health Situation in Bida Emirate of Niger State, Nigeria. *African Journal of Reproductive Health, 6*(1), 50–64

Yar' vezer, I. S., & Said, I. Y. (2013). Knowledge and barriers to the utilization of maternal health care services in Kano state, North Western Nigeria. *European Journal of Biology and Medical Science Research, 1*(1), 1–14.

Yego, F., D'Este, C., Byles, J., Williams, J. S., & Nyongesa, P. (2014). Risk factors for maternal mortality in a tertiary hospital in Kenya: A case control study. *BMC Pregnancy and Childbirth, 14*, 38. doi:10.1186/1471-2393-14-38. Retrieved from http://www.biomedcentral.com/1471-2393/14/38

Yiannakoulias, N. (2011). Understanding identifiability in secondary health data. *Canadian Journal of Public Health*, *102*(4), 291–293. Retrieved from the Walden Library databases.

http://web.ebscohost.com.ezp.waldenulibrary.org/ehost/pdfviewer/pdfviewer?sid=9c509607-a1c1-4194-b4dc-15fb53cec358%40sessionmgr114&vid=2&hid=103