MULTILEVEL ANALYSIS OF WOMEN'S DECISION MAKING POWER AND NUTRITIONAL STATUS OF UNDER FIVE CHILDREN IN NIGERIA

BY

OGUNNIKA, OMOLAYO DELE

B. Tech (Hons) Statistics (FUT, Akure)

Matric Number: 172735.

A DISSERTATION SUBMITTED TO DEPARTMENT OF EPIDEMIOLOGY AND MEDICAL STATISTICS COLLEGE OF MEDICINE, UNIVERSITY OF IBADAN, IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF A MASTERS OF SCIENCE (M.Sc) IN BIOSTATISTICS.

JANUARY, 2015.

CERTIFICATION.

This is to certify that this project work was carried out by **OGUNNIKA OMOLAYO DELE** in the Department of Epidemiology and Medical Statistics, Faculty of Public Health, College of Medicine, University of Ibadan, Oyo State, Nigeria.

29/01/15

PROFESSOR O. AYENI
(Project Supervisor)

28/01/15

DR. J. O AKINYEMI
(Project Supervisor)

DEDICATION.

This project work is dedicated to Almighty God, the supporter and sustainer of my soul, most wonderful, gracious and merciful of my life and to all that contributed tremendously to the successful completion of this program in particular.

ACKNOWLEDGEMENT

I express my profound gratitude first to Almighty God who is "the beginning and the end" who teaches me to profit, who leads me in the direction I should go and flourishes my life with my heart desire and also for HIS unconditional love, care and protection over me throughout my eventful and adventurous time during this program.

My sincere appreciation goes to my Late father MR. D. O OGUNNIKA, may his gentle soul rest in peace and my dearest mother, MRS. A. A OGUNNIKA for her moral, financial, and spiritual support towards me since I was born into this world. Also to my siblings (Olasunkanmi, Atinuke, and Titilayomi) and my dearest wife "Opeyemi" and my daughter "Iyinoluwa" for their love and concern.

My tentacles of deep – seated appreciation also go to my able and dynamic supervisor Dr. J. O Akinyemi for his timely contributions, and guidance towards the success to this project. My profound gratitude also goes to all the lecturers that thought me during this program for their academic and moral supports; Dr. B. Adedokun, Dr. B. O Yusuf, Prof. O. Ayeni, Mr. Nathaniel Afolabi, just to mention a few, and other non – academic staff of the Department of Epidemiology and Medical Statistics, College of Medicine, University of Ibadan. I love them all for the inestimable knowledge impacted in me.

I cannot forget to show my gratitude and appreciation to the following people for contributing in one way or the other to the success of this program. Such people include Mr. Isaac Tajomavwo; my friends (Bakare Babatunde, Joel Obatayo, Oluwasegun Ajiboye, Omishile K. Gbenga, etc) and to my brother – friend Adeniyi Oluwaremilekun, to my church El – Bethel Church of Christ, Aladura, Amuwo – Odofin, Mile 2; I thank them very much for taking responsibility for my spiritual, moral and social upbringing and to all out there whose names have not been mentioned here, who had in one way or the other backed me up to the successful completion of this project; may the almighty God abundantly reward you all.

ABSTRACT

BACKGROUND: Nutrition is a critical part of health and development. In Nigeria, malnutrition is widespread and persisted at alarming rate and continues to be a primary cause of ill health and mortality of under-five children. Women's empowerment is considered crucial for improving nutritional outcomes. This study is aimed at examining the relationship between mother's empowerment status and the nutritional status of under five children controlling for community characteristics in Nigeria.

METHOD: This was a cross – sectional population based study that used a sample of 24,505 under five children from the 2013 Nigerian Demographic and Health Survey Dataset. Information on women's empowerment was assessed through the three aspects of decision making, namely on own health care, major household purchases, and visits to family or relatives. Children's nutritional status was assessed through the WHO standard of measurement for stunting, wasting, and underweight. The distribution of respondent by key variables was assessed and summarized using percentages. The chi square test of association was used to test for statistical significance of the variables, while Multilevel logistic regression was utilized to examine the effect of individual and community level factors on nutritional status.

RESULT: Overall, 36.4% of the under five children were stunted, 16.9% wasted, and 27.3% underweight. Involvement of women in decision making concerning large household purchases was found to be significantly associated with wasting and underweight. Wasted children were less likely to belong to women who were involved in decision making concerning large household purchases (OR = 0.82, 95% CI = (0.72 – 0.93), $P < 0.05$). Also, underweight children were less likely to belong to women who were involved in decision making concerning large household purchases (OR = 0.85, 95% CI = (0.78 – 0.95), $P < 0.05$). Malnourished (stunted, wasted, and underweight) children were less likely to belong to women with tertiary (higher) education. Stunted and Underweight children were less likely to belong to women from at least middle quintile of wealth. Wasted and Underweight children were about 2 times more likely to belong to women residing in the urban areas compared to women residing in the rural areas (OR = 1.22, 95% CI = (1.05 – 1.41), $P < 0.05$; OR = 1.16, 95% CI = (1.02 – 1.32), $P < 0.05$). Intra – community correlation for stunting, wasting, and underweight was significant. The intra – community correlation for stunting was 4.87%, for wasting was 9.76%, and it was 7.68% for underweight.

CONCLUSION: There are inter – community variation in the nutritional status of under – five children. Women's involvement in decision making concerning large household purchases was significantly associated child nutritional status. Maternal education, place of residence, and household wealth quintile were significantly associated with child nutritional status.

Keywords: Stunted, Wasted, Underweight, Intra – community correlation (ICC)

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER ONE

1.0 INTRODUCTION.

Nutrition is a critical part of health and development (WHO FACTS, 2012). It is an important element of a child's survival (UNICEF Nigeria). As children are leaders of tomorrow and future of society, mothers are the guardian of that future (WHO 2005). Hence, to ensure sound foundation and secure future of any society, health and nutrition of their children need protection (Pandey 2010). Children under age of five years require optimum attention/care, as this is the period of rapid growth and development which makes them highly vulnerable to malnutrition (Pandey 2010). In this stage of life, malnutrition has far reaching consequences on child's future by severely affecting child's physical and mental development (WHO 2005). It weakens the immune system of the child, thereby contributes to more than 50% of deaths associated with infectious disease among this age group (WHO 2005).

Children under five years of age depend on their mother for all nutritional needs. Since women are often the primary care givers, they can influence their children's nutrition especially through childcare practice (Bhagowalia et al. 2012; Smith et al. 2003a). The status of women in the home also play a crucial role in how they are able to care for their children for improving nutritional outcomes (Vdassani, 2013), as low status of women has been considered a major contributing factor to poor child health and growth (Ramalingaswami et al., 1996). For example, a woman living in a wealthy household may be able to afford good-quality food and medicine for her child, but may not be able to take part in decision making regarding her own health or large household purchases, and even decision that will benefit her child. In view of this, improving mother's status even in low economic set up will help improve the nutritional status of their children (Shroff et al., 2011).

1.1 PROBLEM STATEMENT

The issue of malnutrition has continued to remain a key health challenge in Nigeria, remaining an underlying cause of ill health in children. This may be due to constraints on women's physical mobility in many parts of the world that further restrict their ability to make independent decisions that may positively influence their health and the health of their under five children (Bruce, Lloyd, and Leonard, 1995). These constraints are a social norm that involves veiling of head and faces in some instances, as well as restrictions on unaccompanied travel to such places as shops, pharmacies, or hospitals, and limits on direct contact with unrelated males (Bruce, Lloyd, and Leonard, 1995). Even in instances where women wish to make decision regarding household consumption, expenditures, or health care, they may need help and agreement from other family members, particularly the husband or mother – in – law, in actually conducting these transactions (Thomas, 1990; Duraisamy & Malathy, 1991).

1.2 JUSTIFICATION

Many studies been conducted on women empowerment status which in turn will have positive influence on the nutritional status of their under five children, but none has pointed out which of measures of women's empowerment (*regarding decision making*) has the highest effect on child nutrition. Women participation in decision making in the household is an important influence on dietary diversity of their children which will in turn reduce the prevalence of malnutrition in Nigeria. If we take the welfare of children as a function of women's empowerment (*regarding decision making*), there are some socio – economic factors (such as level of education, type of occupation, e.t.c) limiting women to be involved in decision making that will later have positive effect on their health and the health of their child, these factors will be identified in this study after controlling for community characteristics.

1.3 Aim

This study is aimed at examining the relationship between mother's empowerment status and the nutritional status of under five children controlling for community characteristics in Nigeria.

1.3.1 Objectives

The objectives of this study are to:

- Assess the level of intra community correlation in children nutritional status in Nigeria.
- Determine the relationships between decision making power and child nutritional status controlling for intra – community correlation.
- Identify women's socio – economic and demographic factors that are associated with children nutritional status.

1.4 Research Question

- What are the socio – economic and demographic factors that are associated with nutritional status of under five children in Nigeria?
- Which of the measure of women's decision making power exert the greatest effect on child nutritional status?

1.5 OPERATIONAL DEFINITION OF WOMEN EMPOWERMENT.

Women's empowerment has been defined in various ways. According to United Nations Population Information Network, 1995, women's empowerment to encompass women having a sense of self-worth, access to opportunities and resources, choices and the ability to exercise them, control over their own lives, and influence over the direction of social change. Miles-Doan and Bishrat, 1990, defines women's empowerment as a woman's position within household power relations i.e. her bargaining power. According to NDHS 2013, to assess women's decision making power, women's participation in three types of household decisions is taking into consideration: decision on own health care, making major household purchases, and decision on visits to family or

relatives. This study defines women empowerment as the ability of women to be involved in decision making that will in turn have positive effect on their health and the health of their children.

1.6 INDICES OF CHILD NUTRITIONAL STATUS

According to WHO 2006, there are three (3) standard indices of physical growth that describe the nutritional status of children. They are:

- Height – for – age (Stunting):
- Weight – for – height (Wasting).
- Weight – for – age (Underweight).

Each of these indices gives different information about growth and body composition that can be used to assess nutritional status of children (NDHS, 2013).

CHAPTER TWO

LITERATURE REVIEW.

2.1 PREVALENCE AND EFFECT OF MALNUTRITION

Malnutrition continues to be a primary cause of ill health and mortality among children in developing countries (UNICEF 2004). It is a major public health problem that is associated with about 60% of under-five mortality worldwide (UNICEF 2004). About 150 million children in developing countries are still malnourished and more than half of the underweight children live in South East Asia Region (SEAR) (UNICEF 2004). In Nigeria, malnutrition is widespread and has persisted at alarming rate (Ngwu et al, 2014). With a population of more than 160 million, Nigeria is ranked third in the world with more than 10 million stunted children. NDHS 2013 report reveals that 37% of under-five children are stunted, 18% are wasted and 29% are underweight. Also, in the six geo-political zones (North West, North East, North Central, South South, South East and South West). there is a variation in child nutritional status., with North West having the highest proportion of stunted (55%), wasted (27%), and underweight (47%) children under five years of age, followed by the North East with 42% Stunted, 20% wasted, and 30% underweight. South West and South East has the lowest proportion of under five children who are wasted and underweight, 10% and 11% respectively. WHO reports that in developing countries, 10.7 million children die each year, and of these deaths, 49 percent are associated with malnutrition (WHO, 2000). FMOH 2013, say malnutrition is one of the underlying causes of under-five mortality in Nigeria, contributing 53% of infant mortality. The high levels of malnutrition in developing countries in which Nigeria one, pose a major challenge for child survival and development (Joshi et al, 2011). This could be reduced by increasing awareness in mother regarding the nutritional intake of their child (Joshi et al, 2011).

2.2 PROSPECTS OF WOMEN EMPOWERMENT IN NIGERIA.

The foregoing constraints (such as religious beliefs, illiteracy, discriminatory attitudes of males, and so on) notwithstanding (Lasiele, 1999), full actualization of the potentials of Nigerian women is not beyond achievement in the next millennium. In recent times, some gains have been made (Laisele 1999). For instance, there are more women in low and middle professional jobs than it is used to be.

This gives a prospect for more positions for women at top levels in the future (Okojie, 1990). Also, the enrolment of the girl – child at the different levels of education seems to be increasing (Adewole, 1997). Parents in some parts of Nigeria are now gradually embracing the idea of providing educational opportunities to the female child but the need to reach other parents who are still hostile to the idea of girl – child education cannot be over stressed (Laisele, 1999). Dantiye and Garbe (1991) identified the common features of Nigerian women as: tolerance and endurance, high need for association, frankness in matter they considered serious, persuasiveness, consideration and fairness, stubbornness to a belief, emotional stability, and forgiveness. Most of these characteristics of Nigerian women are needed to bail Nigeria out of its present predicaments (e.g moral decadence and national instability) (Lasiele, 1999). It is therefore not out of place to state that Nigeria women should be empowered to utilized their potentials especially these identified characteristics and contribute their quota to the transformation of the country (Adewole, 1997). Adefarasin (1987) observed that in order to change a country's vision and its sense of direction, the peoples orientation has to change. To reach all the people, the women should be reached first, since they can influence the children, the family and the nation at large (Adefarasin, 1987).

2.3 WOMEN'S AUTONOMY AND CHILD NUTRITION.

Constraints on women's physical mobility in many parts of the world further restrict their ability to make independent decisions. Most women in developing countries are governed by social norms that restrict their physical mobility, referred to in the literature as female seclusion. This seclusion involves the veiling of head and face in some instances, as well as restrictions on unaccompanied travel to such places as shops, pharmacies, or hospitals, and limits on direct contact with unrelated males (Bruce, Lloyd, and Leonard, 1995). Thus, even in instances where women wish to make decisions regarding household consumption, expenditures, or health care, they may need help and agreement from other family members, particularly the husband or mother-in-law, in actually conducting these transactions. Furthermore, it has often been argued that child health and investments in children are determined by intra-household resource allocation decisions (Thomas, 1990), which are related to gender inequalities in the household (Duraisamy and Malathy, 1991). In

families in which women play an important role in decision making, the proportion of family resources devoted to children is greater than in families in which women play a less decisive role Bruce, Lloyd, and Leonard, 1995; Blumberg, 1991). However, the low status of women is one of the main factors contributing to the poor nutritional status of children. The status of women in the home plays a crucial role in how women are able to care for children (Vdassani, 2013). Mothers' autonomy can influence the nutritional status of the children; in other words, the higher the level of mothers' autonomy, the better the nutritional status of the under five children (Brunson et al., 2009). Lack of maternal autonomy in obtaining healthcare for their children is associated with poor growth in children under 5 years of age (Mashal et al, 2008). Since women are often the primary care givers, they can influence their children's nutrition indirectly through their own nutritional status as well as directly through childcare practice (Smith et al. 2003a). Mother's control over purchase of dietary items, access to and control over resources can influence child's health and nutritional outcomes (Pandey, 2010). Empowered and educated girls are better able to nourish and care for their children, leading to healthier, smaller families (UNICEF 2004).

2.4 MATERNAL ATTITUDE, CULTURE AND CHILD NUTRITION.

Lack of knowledge about healthy nutrition behaviours, and practice is a major cause of poor nutrition in most of the developing countries (Abuya et al., 2012). According to a study by Ngwu et al. 2014, many mothers do not feed their infants with meat/eggs simply because of their cultural practice which can cause serious health problems to their children. Mothers' specific preference for female physicians regarding the health of their children is associated with the poor child health (Mashal et al., 2008). Regarding breast feeding, mothers believe that if they breast feed their infants exclusively, they will not retain their breast shapes in the course of breast feeding exclusively (Ngwu et al., 2014). Empowering individuals and community with the right information and decision making tools will enhanced their ability to adopt positive health behaviours and practices (Mahama Saaka and Sylvester Galaa, 2011)

2.5 MATERNAL EDUCATION AND CHILD NUTRITION.

Research shows that there is a strong linkage between maternal education and children's health. Nutritional problems are at times due to lack of education (Ngwu et al., 2014). Maternal education is considered a factor of child health promotion (Emina et al., 2011). It influences health-seeking behavior which in turn influences child nutritional status both at the community level and at the individual level (Frost et al. 2004). Child of an educated mother, being a child of mother from richest household are associated with lower risk of under-nutrition (Adedini et al., 2014). Apart from mother's education, the education of the father and other household member has significant effect on child's nutritional status (Bhumika, 2014). However, improving mothers years of schooling may have significant influence on child nutritional status and ultimately alter the poverty cycle as stunting is a key predictor of human capital (Abuya et al., 2012).

2.6 KNOWLEDGE OF BIRTH SPACING AND CHILD NUTRITIONAL STATUS.

An estimated 222 million of women in developing countries want to delay or stop childbearing (WHO fact sheet, 2013), which implies that the knowledge about birth spacing is high among women. In Nigeria, the knowledge of contraceptive methods is widespread with 85% of all women knowing at least one method of modern contraception (NDHS 2013). Women's knowledge about the reason for birth spacing were the fact that birth spacing allows mothers to have enough time to cater for their previous children, help avoid pressure on family income and resources, help mothers to regain strength in order to give birth to health children and enable mother to develop career but the actual practice is low (Nti et al., 2014). Parity and birth spacing exhibit a strong independent influence on child nutritional status (Frost et al., 2004). Unintended pregnancy poses serious health risks to mother and their infants by causing high risk of pregnancy and related complications (Yohannes, 2010). Research has shown that short birth intervals (less than 24 months) are associated with poor health outcomes, especially during infancy (Ahmed Shahjada et al. 2014), it may also compromise the care received by the child. For example, a new pregnancy may prompt weaning of the current child (Nti et al., 2014). Longer birth intervals (more than two years), on the other hand, contribute to improved health status for both mother and child (NDHS, 2013).

2.7 EFFECT OF WOMEN STATUS ON CHILD NUTRITION.

The status of women exerts significant association on their child nutritional status (Frost et al., 2005). Women with low status tend to have weaker control over resources in their households, stricter constraints on their time, limited information about health services, and poorer mental health and self – esteem (Smith et al. 2003). These factors can seriously impinge on a woman's ability to care for herself (Engle et al., 1999), they may also have long – term negative effects on children's birth weight and subsequent growth and on the quality of care provided to children (Kishor 2000). The high the status of women, the better the nutritional status of their children (Brunson et al., 2009).

2.8 MEASURES OF WOMEN EMPOWERMENT ON CHILD NUTRITIONAL STATUS.

Decision making can be a complex process, and the ability of women to make decisions that affect their personal circumstances is an essential aspect of their empowerment (NDHS, 2013). Different aspects of women's empowerment may act upon child nutrition in different ways and to varying degrees (Jejeebhoy, 2000). Women Participation in decision making is an important influence on dietary diversity (Smith et al., 2003). For example, women's decision making power () or control over resources to buy food will affect diet quality (Jejeebhoy, 2000). Similarly, women's ability to take their child to the doctor when the child is ill affects overall health and well-being (Frost et al., 2005). Women who have experienced domestic abuse might be less able to safeguard both their and their children's nutrition (Adewole, 1997). As women empowerment is a multi – dimensional concept, we can examine these notions of empowerment and ascertain which specific aspects of empowerment matter most for child nutritional status (Duflo, 2012).

CHAPTER THREE

3.0 METHODOLOGY

3.1 STUDY DESIGN

This is a secondary analysis of a nationally representative cross-sectional data from the Nigeria Demographic and Health Survey (NDHS) 2013 data using multilevel analysis approach. Data on children under five years and their mother's characteristics was analyzed using random effects model to account for variation of malnutrition in under-five children across communities.

3.2 DESCRIPTION OF THE NDHS 2013

The NDHS 2013 is the fifth in a series of demographic and health survey conducted in Nigeria. The survey covered all 36 states and the Federal Capital Territory (Abuja). The sampling frame for the survey was the list of enumeration areas (EAs) prepared for the 2006 Population Census of the Federal Republic of Nigeria, provided by the National Population Commission. The primary sampling units (PSU), which are referred to as clusters, were selected from the EAs. The NDHS sample was selected using a stratified three-stage cluster design consisting of 904 clusters, with 372 in urban areas and 532 in rural areas. Thus, an average of 45 households was selected from each cluster by the method of equal probability systematic sampling. A detailed description of the sampling procedures is reported in the NDHS 2013, final report (NPC and ICF Macro, 2009). The NDHS covers a nationally representative sample of 40,680 households based on Population and Housing Census of the Federal Republic of Nigeria, 2006. The NDHS successfully interviewed 38,948 women aged 15 to 49 years, and 17,359 men aged 15 to 49 years. The ethnic composition of the sample indicates that 28% of women are Hausa, 15% belong to Igbo ethnic group, and 14% identified themselves as Yoruba; are the major ethnic groups in Nigeria. However, the analysis will be focusing on 24,505 under five children and the characteristics of their mother.

3.3 VARIABLES INCLUDED IN THE ANALYSIS.

3.3.1 OUTCOME VARIABLES.

The outcome variable for this study is child nutritional status. It is measured with the use of the three (3) standard indices of physical growth that describe the nutritional status of children. They are:

- Height – for – age (Stunting), which is a measure of linear growth. For this analysis, the measurement is recorded. A child who is below minus two standard deviation (< -2SD) from the median of the WHO reference population in term of height-for-age is considered short for his/her age, or "Stunted". But if the child is above minus two standard deviation (> -2SD), he/she is considered to be "Not stunted". (***i.e. Not stunted = 0 or Stunted = 1***).
- Weight – for – height (wasting), which describes current nutritional status. For this analysis, the measurement is also recorded. A child who is below minus two standard deviation (< -2SD) from the median of the WHO reference population in term of weight-for-height is considered to be too thin for his/her height, or "Wasted". But if the child is above minus two standard deviation (> -2SD), he/she is considered to be "Not wasted". (***i.e. Not wasted = 0 or Wasted = 1***).
- Weight – for – age (underweight), which takes into account both acute and chronic malnutrition (acute on chronic malnutrition) effects. For this analysis, the measurement is recoded. A child who is below minus two standard deviation (< -2SD) from the median of the WHO reference population in term of weight-for-age is considered to be "underweight". But if the child is above minus two standard deviation (> -2SD), he/she is considered to be "Not underweight". (***i.e. Not underweight = 0 or Underweight = 1***).

3.3.2 EXPLANATORY VARIABLES

The explanatory variables consist of the individual level variable and the community level variable. The individual level variables include: maternal age, level of education, religion, women's occupation, wealth index, women's autonomy, marital status. The community level variables considered in this study are place of residence and region of residence. During the 2006 Population Census, Nigeria was divided into states. Each State was sub – divided into Local Government Areas (LGAs), and each LGAs was divided into communities. Each community was divided into Enumeration Areas (EAs), which is referred to the Primary Sampling Units defined on the basis from the 2006 EAs census frame.

- Maternal age is defined as the age of the women at the birth of the last child in the five years preceding the survey. This is calculated by subtracting the century month code (CMC) of the date of birth of the child from the century month code of the date of birth reported by the respondent. Maternal age is further classified into: 15 – 24, 25 – 34, and 35 – 49 years.
- Level of education is defined as the highest level of education attended by the respondent and categorized as: No education, Primary, Secondary, and Higher.
- Occupation is measured as the respondents' occupation and re-grouped into white collar job (a merger of all professional and none professional white collar jobs), manual workers (i.e. traders, pepper sellers, etc.), and not working (i.e. respondents that are not working.
- Women's autonomy is measured as women's decision making power: (1) on own health care, (2) major household purchases, and (3) visits to family or relatives. For this analysis, women's decision making power is recoded to each of the measures as: *0 = Not involved in decision making, 1 = Involved in decision making*.
- Religion is measured as the religious affiliation of the respondent. It is categorized as Christianity, Islam, and Traditionalist.

- Wealth Index measured as a standardized composite variable made up of quintiles. This is determined through Principal Component Analysis (from Factor Analysis) and based on household assets (e.g. type of flooring, water supply, electricity, radio, television, Refrigerator, type of vehicle) (Rutstein et al., 2004). It is categorized as poorest, poorer, middle, richer, and richest.
- Marital status is measured as the respondents' current marital status. It is categorized as Not married, and Married.
- Place of residence is measured as where the respondents live. It is categorized as Rural and Urban.
- Region of residence is defined as geopolitical zones with administrative boundaries and categorized as: North Cental, North East, North West, South East, South South, and South West.

3.4 STATISTICAL METHODS.

The distribution of respondents by key variables was assessed and summarized using percentages. At the bivariate level, frequencies and cross – tabulations were used to identify the distribution of the outcome variables by selected background characteristics. The chi square test of association was used to test the statistical significance of these bivariate association. Sample weight provided in the NDHS data were applied for the univariate and bivariate analyses in order to adjust for non – response and over sampling of some areas. Multilevel logistic regression was utilized to examine the effect of individual and community level factors. Multilevel analysis was considered appropriate in order to account for the hierarchical nature of the NDHS data (Antai, 2009) and to be able to estimate community level effects on the outcome variable. A two – level logistic regression model was applied in the study and this consists of two sub models at level 1 and level 2. The characteristics of women were taken as individual level (level 1) and were nested within communities (level 2). The level 1 model represents the relationship among individual level variables, while the level 2 model examines the influence of community level factors (W_j). Furthermore, a two – level model for a dichotomous outcome uses a binomial distribution and a logit link (Vu, 2005). In level 1 model, the outcome variable Yij for the individual i living in community j is written as follows:

$$\text{In}\,(P_{ij} / 1 - P_{ij}) = \beta_{0j} + \sum_{q=1}^{n} \beta_{qj} X_{qij}$$

$$\text{In}\,(P_{ij} / 1 - P_{ij}) = \beta_{0j} + \beta_{ij}X_{1ij} + \beta_{2j}X_{2ij} + \beta_{3j}X_{3ij} + \ldots + \beta_{nj}X_{nij} \quad \ldots\ldots\ldots\ldots \text{(i)}$$

where

$$\left.\begin{aligned} \beta_{0j} &= \beta_{00} + U_{0j} \\ \beta_{1j} &= \beta_{10} \\ \beta_{2j} &= \beta_{20} \\ &\vdots \\ \beta_{nj} &= \beta_{n0} \end{aligned}\right\} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(ii)}$$

Subtituting equation (ii) in equation (1), we will have two models: the intercept model and the full model which are expressed below as:

THE INTERCEPT MODEL: $In\ (P_{ij}/1 - P_{ij}) = \beta_{00} + U_{0j}$ and

FULL MODEL: $In\ (P_{ij} / 1 - P_{ij}) = \beta_{00} + \beta_{01}W_j + \beta_{10}X_{1ij} + \beta_{20}X_{2ij} + \ldots + \beta_{n0}X_{nij} + U_{0j} + U_{1j}\ X_{qij}$

Where

P_{ij} = Probability of a child to be malnourished (stunted, wasted, and underweight).

β's are the fixed effect parameters.

U's are the random effects at level 2.

X_{qij} where q = 1,..., n are the level 1 predicator variables. (i.e. X_{1ij} = Mother's age, X_{2ij} = Mother's level of education, e.t.c)

W_j = Clusters (level 2)

All the level 2 random effects are assumed to have normal distribution with mean of zero (0) and variance of σ_{qq} (Vu, 2005). A comparison of the variance component (σ_{qq}) of the intercept (β_0) with its standard error gives an indicator whether there are variations among communities in terms of nutritional status of under five children.

Overall, three models containing variables of interest were fitted for each of the outcomes variables. The first model which is the "null" model was fitted without explanatory variables. It contained no covariates, but decomposes the total variance into individual and community components. The null model was also used to determine whether the overall difference between communities and individuals in terms of nutritional status of nutritional status was significant. Also, univariate model was fitted in order to determine the significance of each of the individual and community level factors. The second model referred to as the "decision making model" include the measures of decision making power. It contains only the decision making variables to allow the assessment of the impact of decision making power on the outcome variable. Lastly, a third model was fitted which is called [illegible] explanatory variables at both the

individual and the community levels. The final model was used to test for the independent effect of community contextual variables above and over the individual variables.

In the multilevel models, fixed effects refer to the individual and community covariates and were expressed as odds ratio (OR) and the 95% confidence interval. The random effects are the measures of variation in nutritional status (stunting, wasting, and underweight) across communities (place of residence and region of residence). The ratio of the variance at the community level to the total variance is referred to as the "intra-class correlation coefficient". The precision was measured by the standard error (SE) of the independent variables (Antai, 2009). The intra-class correlation coefficient (ICC), which is a measure of general clustering of the individual outcome of interest in the communities, is calculated as:

$$\rho = (\sigma^2_\mu / (\sigma^2_\mu + \pi^2/3))$$

where

ρ is the intra-class correlation (ICC). σ^2_μ is the variance at the community level. $\pi^2/3 = 3.2907$, and represents the fixed individual variance (Snijders & Bosker, 1999).

According to the 2006 population census sampling frame used for NDHS 2013 survey, community is sub – divided into Enumeration Areas (EAs), which is referred to as cluster. For the purpose of this study, the cluster is the level 2 variable.

3.5 DATA MANAGEMENT AND ANALYSIS.

SPSS version 16.0 was used for data cleaning and also for assessing association between women's socio – economic and demographic factor and nutritional outcome of under five children. STATA 12.0 was used for estimating both fixed and random effect models by using Generalized linear and latent mixed models (gllamm) (Rabe et al., 2005).

CHAPTER FOUR

RESULTS

4.1 CHARACTERISTICS OF MOTHER'S WITH UNDER FIVE CHILDREN.

Table 4.1 below show that 49.8% of under – five children belonged to women aged 25 – 34 years. The proportion of under – five children that belonged to women between age 15 – 24 years and 35 – 49 years are 24.2% and 26.0% respectively. Majority (95.3%) of the under – five children belonged to women that are married with 67.1% of the children belong to women who residing in rural areas. Approximately, 47% of the under – five children belong to women with no education, 26.6% and 20.4% of them belong to women with secondary and primary education respectively, while only 6.1% belong to women with tertiary (higher) education.. Proportion of under – five children belonging to women from each wealth quintile varies, with 23.5% and 22.5% belonged to women from poorer and poorest quintile of wealth respectively, 19.9% belonged to women from the middle quintile of wealth, while 18.4% and 15.7% belonged to women from the richer and richest quintile of wealth respectively. Forty – four percent (44%) of under – five children belonged to women who are manual workers, while 26.9% belonged to women who are white collar job workers. Only 29.1% of the under – five children belonged to women who are not working. There is variation in the proportion of under – five children belonging to women from each region, with highest proportion (31.5%) of the under – five children belonging to women residing in the North West region, followed by 20.7% belonging to women residing in the North East region. Only 12.3% of the under – five children belonged to women resident in the South West region, while 8.9% belonged to women residing in the South East region. Low proportion of under – five children belong to women who are involved in decision making: 36.3% of the under – five children belonged to women who are involved in decision making concerning their own health, 35.7% belonged to women who are involved in decision making concerning large household purchases, while 45.3% belonged to women who are involved in decision making concerning visits to family or relatives.

TABLE 4.1: PERCENTAGE DISTRIBUTION OF UNDER FIVE CHILDREN ACCORDING TO THEIR MOTHERS' CHARACTERISTICS.

	%	Number of Observations
Mother's age		
15 – 24	24.2	7614
25 – 34	49.8	15698
35 – 49	26.0	8170
Mother's educational level		
No education	46.9	14762
Primary	20.4	6432
Secondary	26.6	8365
Higher	6.1	1923
Mother's occupation		
Not working	29.1	9099
White collar job	26.9	8424
Manual worker	44.0	13764
Marital status		
Not married	4.7	1492
Married	95.3	29990
Religion		
Christianity	40.4	12654
Islam	58.6	18354
Traditionist	1.0	314
Wealth index		
Poorest	22.5	7076
Poorer	23.5	7386
Middle	19.9	6272
Richer	18.4	5806
Richest	15.7	4942
Women's autonomy		
Decision on health care		
No	63.7	19060
Yes	36.3	10874
Decision on large household purchases		
No	64.3	19246
Yes	35.7	10683
Decision on visits to family or relatives		
No	54.7	16365
Yes	45.3	13566
Community level factors		
Place of residence		
Rural	67.1	21131
Urban	32.9	10351
Region of residence		
North Central	14.7	4614
North East	20.7	6517
North West	31.5	9906
South East	8.9	2816
South South	11.9	3747
South West	12.3	3882

4.2 PREVALENCE OF INDICES OF CHILD NUTRITIONAL STATUS.

Table 4.2 below shows the prevalence of each of the nutritional indices of under five children (24,505) analyzed in this study. Approximately, 36% of under five children are stunted, 17% are wasted, and 27% are underweight.

TABLE 4.2 PREVALENCE OF THE NUTRITIONAL INDICES BASED ON THE DATA OF UNDER FIVE CHILDREN ANALYZED.

Nutritional Indices	%	Number of Observation.
Stunting		
Not Stunted	63.6	15574
Stunted	36.4	8931
Wasting		
Not Wasted	83.1	20373
Wasted	16.9	4132
Underweight		
Not Underweight	72.7	17813
Underweight	27.3	6692

4.3 DISTRIBUTION OF WOMEN'S DECISION MAKING POWER.

Table 4.3 below shows the percentage distribution of the measures of women's decision making power. The proportion of women that are involved in decision making increases as level of education increases for all the measures of decision making (i.e. decision on health care, large household purchases, and visits to family or relatives). Similarly, the proportion of women that are involved in decision making increases as the quintile of wealth increase for all the measures of decision making. However, among women that are not working and reside in the rural areas, the proportion of involvement in decision making is low for all measures of decision making. The proportion of women that are involved in decision making is high among those residing in the southern regions compared to those residing in the northern regions for all measures of decision making. The proportion of women that are involved in decision making is high among the middle aged (25 – 34 years) women; for all measures of decision making power. This indicate that women's decision making power is high among the middle aged women, who have tertiary (higher) education, who are white collar job workers, belonging to the richest quintile of wealth, and residing in the urban areas in the south west region; for all measures of decision making power.

TABLE 4.3: PERCENTAGE DISTRIBUTION OF WOMEN'S DECISION MAKING POWER.

Variable	Decision on health care		Decision on large household purchases		Decision on visits to family or relatives	
	Number of women.	Yes (%)	Number of women	Yes (%)	Number of women	Yes (%)
Maternal age						
15 – 24	*1873*	27.0	*1802*	25.9	*2569*	37.0
25 – 34	*5849*	38.7	*5745*	38.0	*7142*	47.3
35 – 49	*3152*	40.0	*3136*	39.8	*3855*	48.9
Level of education						
No education	*2574*	17.9	*2259*	15.7	*3822*	26.5
Primary	*2771*	45.7	*2887*	47.6	*3404*	56.1
Secondary	*4278*	56.2	*4342*	57.1	*4957*	65.1
Higher	*1251*	68.0	*1195*	64.8	*1383*	75.0
Occupation						
Not working	*1723*	20.0	*1515*	17.6	*2492*	29.0
White collar job	*3714*	46.2	*3778*	47.1	*4289*	53.4
Manual worker	*5382*	41.0	*5343*	40.7	*6720*	51.2
Religion						
Christianity	*6950*	60.3	*7201*	62.5	*7997*	69.4
Islam	*3752*	20.9	*3295*	18.4	*5346*	29.8
Traditionist	*115*	38.0	*129*	42.7	*148*	48.8
Wealth index						
Poorest	*1067*	15.5	*970*	14.0	*1723*	25.0
Poorer	*1834*	26.1	*1722*	24.5	*2399*	34.2
Middle	*2310*	39.9	*2391*	41.4	*2852*	49.3
Richer	*2658*	48.6	*2695*	49.3	*3181*	58.2
Richest	*3005*	63.3	*2905*	61.2	*3411*	71.8
Place of residence						
Rural	*5889*	29.2	*5877*	29.1	*7638*	37.9
Urban	*4985*	51.0	*4806*	49.2	*5928*	60.7
Region of residence						
North Central	*2126*	48.0	*2172*	49.1	*2360*	53.3
North East	*1623*	25.9	*1294*	20.6	*2271*	36.2
North West	*1179*	12.2	*1091*	11.3	*1890*	19.5
South East	*1552*	61.3	*1539*	60.9	*1776*	70.1
South South	*1842*	55.6	*2159*	65.2	*2164*	65.4
South West	*2552*	68.8	*2428*	65.4	*3105*	83.7

4.4 BIVARIATE ANALYSIS.

Table 4.4 below shows the bivariate results of maternal factors associated with child nutritional status. With respect to **stunting**, the proportion of stunted children decreases with the increase in level of maternal education: 50.4% of stunted children belonged to illiterate women (i.e. women with no education) while only 12.6% belonged to women with tertiary (higher) education. Also, the proportion of stunted children decreases as the quintile of wealth a woman comes from increases: 54.4% of stunted children belonged to women from the poorest quintile of wealth, while 16.7% belonged to women from the richest quintile of wealth. Similarly, the proportion of stunted children decreases with women's professional occupation: 40.6% of stunted children belonged to women who are not working, 35.4% belonged to women who are manual workers, while 33.8% belong to women who are white collar job workers. Out of all the stunted children, approximately 35% belong to middle aged (25 – 34 years) women, which makes it the lowest among the age categories. The proportions of stunted children belonging to women who are married and reside in the rural areas are: 36.8% and 42.3% respectively. Stunted children belonging to women of the Islamic faith have the highest proportion (46.8%), followed 39.2% belonging to women who are traditionalist. The proportion of stunted children varies across the regions, with 55.6% belonging to women residing in the North West region, while 29.1% belonged to women residing in the North Central region. Only 21.8% of stunted children belonged to women residing in the South west region, while 15.0% belonged to women residing in the South East region. The prevalence (%) of stunted children decreases with the involvement of women in decision making. At most 30% of children are stunted with the involvement of women in decision making (*for all measures*). The difference in stunted children belonging to women across all categories of: maternal education, mother's age, occupation, marital status, religion, wealth index, place of residence, region of residence, and all measures of women's decision making power was found to be statistically significant ($P < 0.05$).

WASTING

The proportion of wasted children decreases with the increase in the level maternal education and wealth quintile the women belong. Only [illegible] wasted children belonged to women in their

extreme age (35 – 49 years), which make it the lowest among the age categories. Wasted children belonging to women of the Islamic faith have the highest proportion (21.0%), followed 11.5% belonging to Christian women. The proportions of wasted children belonging to married women and reside in the rural areas are: 17% and 17.3% respectively. The proportion of wasted children varies across the regions, with 25.4% belonging to women residing in the North West region, while 11.7% belonged to women residing in the North Central region. Only 12.5% of wasted children belonged to women residing in the South East region, while 10.8% belonged to women residing in the South West region. The prevalence of wasted children decreases with the involvement of women in decision making. At most 14% of children are wasted with the involvement of women in decision making (*for all measures*). The difference in wasted children belonging to women across all categories of: maternal education, mother's age, occupation, marital status, religion, wealth index, place of residence, region of residence, and all measures of women's decision making power was found to be statistically significant ($P < 0.05$).

UNDERWEIGHT

The proportion of underweight children decreases with the increase in the level maternal education and wealth quintile the women belong. Only 26.6% of underweight children belonged to middle aged (25 – 34 years) women, which makes it the lowest among the age categories. Under – five children belonging to women of the Islamic faith have the highest (36.7%) proportion, followed by 28.6% belonging to women who are traditionalist. The proportion of underweight children belonging to married women and resides in the rural areas are: 27.6% and 30.9% respectively. The proportion of underweight children varies across the regions, with 46.3% belonging to women residing in the North West region, while 17.9% belonged to women residing in the North Central region. Only 14.2% of underweight children belonged to women residing in the South west region, while 11.4% belonged to women residing the South East region. The prevalence of underweight children decreases with the involvement of women in decision making. At most 21% of children are underweight with the involvement of women in decision making (*for all measures*). The difference in underweight children belonging to women across all categories of: maternal education, mother's

age, occupation, marital status, religion, wealth index, place of residence, region of residence, and all measures of women's decision making power was found to be statistically significant ($P < 0.05$).

In general, the proportion of malnourished (stunting, wasting, and underweight) children decreases with increase in level of maternal education and according to the quintile of wealth the woman belong. The proportion of malnourished (stunting, wasting, and underweight) children was observed to be highest among women residing in the North West region. The prevalence of malnutrition (stunting, wasting, and underweight) decreases with the involvement of women in decision making (*for all measures*). The proportion varies for all other categories of variables considered in the bivariate analysis. All the mothers characteristics considered in the bivariate analysis were found to be statistically significant ($P < 0.05$) for all indices of child nutrition.

Table 4.4: Bivariate results of maternal factors associated with child nutritional status.

Variables	Child Nutritional Status					
	Stunting (%)	P – value	Wasting (%)	P - value	Underweight (%)	P – value
Mother's age		0.000		0.000		0.000
15 – 24	39.9		19.2		30.0	
25 – 34	34.8		16.4		26.0	
35 – 49	36.6		15.7		27.5	
Level of education		0.000		0.000		0.000
No education	50.4		20.9		38.9	
Primary	33.6		14.9		23.4	
Secondary	22.0		13.6		16.4	
Higher	12.6		9.9		8.3	
Occupation		0.000		0.000		0.000
Not working	40.6		19.2		30.9	
White collar job	33.8		14.8		24.8	
Manual worker	35.4		16.6		26.6	
Marital status		0.000		0.007		0.000
Not married	27.6		13.8		19.8	
Married	36.8		17.0		27.6	
Religion		0.000		0.000		0.000
Christianity	22.6		11.5		14.9	
Islam	46.8		21.0		36.7	
Traditionist	39.2		11.0		28.6	
Wealth index		0.000		0.000		0.000
Poorest	54.4		21.0		41.8	
Poorer	45.7		18.6		33.9	
Middle	35.3		15.7		24.5	
Richer	25.1		14.9		19.1	
Richest	16.7		13.0		13.6	
Women's autonomy						
Decision on health care		0.000		0.000		0.000
No	42.0		19.1		32.5	
Yes	28.5		13.5		19.7	
Decision on large household purchases		0.000		0.000		0.000
No	42.4		19.4		33.0	
Yes	27.6		13.0		18.7	
Decision on visits to family or relatives		0.000		0.000		0.000
No	43.2		19.8		34.0	
Yes	29.7		13.8		20.5	
Community level factors						
Place of residence		0.000		0.007		0.000
Rural	42.3		17.3		30.9	
Urban	25.4		16.0		20.6	
Region of residence		0.000		0.000		0.000
North Central	29.1		11.7		17.9	
North East	44.1		18.0		32.0	
North West	55.6		25.4		46.3	
South East	15.0		12.5		11.4	
South South	20.4		11.5		13.2	
South West	21.8		10.8		14.2	

4.5 MULTILEVEL ANALYSIS.

The bivariate relationships indicated by the data on Table 4.4 can be due to interrelationships among the various measured characteristics as well as the unmeasured characteristics at the community level. Multilevel modeling was therefore used to determine the predictors of child nutritional status (stunting, wasting, and underweight). In the multilevel models, community was considered as the random effects. The model started with an empty intercept – only model (model 1) to test the null hypothesis that community level variance for stunting, wasting, and underweight is zero and to assess if the data justify the decision to assess random effects at the community level. The result presented in Table 4.5 shows that there is considerable inter-communities heterogeneity in stunting. The community – level variance in the empty model is large and significant pointing to considerable difference in stunting across the communities. The Log-likelihood statistic in the empty model is 29716.38. The intra-class correlation in the empty model for stunting was estimated at 21.74%, which is the variance that could be attributed to the dependency of the observation within communities. Also, a univariate model to determine the effect of each of the variables one at a time was fitted. In the univariate model, maternal education is significantly associated with decreases in stunted children. Children that are stunted were less likely to belong to women with at least primary education compared to mothers with no education. Religion is significantly associated with increase in stunting. Stunted children were more likely to belong to women that are from the Islamic faith (OR = 2.23, 95% CI = (2.02 – 2.47), P < 0.05) and women who are traditionalist (OR= 1.56, 95% CI = (1.15 – 2.12), P < 0.05) compared to women who are Christians. Wealth index also showed a significant association decrease in stunted children. Children that are stunted were less likely to belong to women from at least poorer quintile of wealth (i.e. *the likelihood of stunting decrease as the quintile of wealth a woman belongs to increases*). Stunted children were less likely to belong to women residing in the urban areas (OR = 0.44, 95% CI = (0.39 – 0.51), P < 0.05) compared to those residing in the rural areas. Stunted children were more likely to belong to women resident in the North East (OR = 2.05, 95% CI = (1.75 – 2.41), P < 0.05) and North West (OR = 3.60, 95% CI = (3.10 – 4.18), P < 0.05) compared to women resident in the North central. Alternatively, stunted children were less likely to belong to women residing in the southern regions compared to women

the North central region. All measures of women's decision making power showed a significant association with the decrease in stunted children. Children that are stunted were less likely to belong to women who are involved in decision making (*for all measures*) compared to women who are not involved in decision making.

Model 2 showed result of the effects of the decision making variables. Women's involvement in decision making concerning own health care, large household purchases, and visits to family or relatives shows no significant association with stunting. However, in comparison to the empty model (model 1), the variation in stunting was significant across communities ($\sigma = 0.8498$; $P < 0.05$). The Log-likelihood statistic is 28493.24. The intra-community correlation in the model 2 for stunting indicated that 20.52% of the total variance for a child to be stunted is attributed to the dependency of the observation within communities.

Model 3 contained both the decision making variables and other variables. Results showed that the inclusion of other variables had independent effects on stunting as well as moderating effects on the association between individual/household factors and stunting. For instance with the introduction of other variables, the significance of place of residence and women's decision making power in model 1 disappeared. However, the effects of maternal education, household wealth index, religion, and region of residence remained significant but varies with slight increment in their odds across all categories. Stunted children were less likely to belong to women with at least secondary education (OR = 0.79, 95% CI = (0.71 – 0.88), $P < 0.05$; OR = 0.50, 95% CI = (0.41 – 0.60), $P < 0.05$) compared to those women with no education. Relative to women from the poorest wealth quintile, stunted children are 0.45 times less likely to belong to women from the richest quintile of wealth. In contrast, stunted children were more likely to belong to women residing in the North East (OR = 1.53, 95% CI = (1.32 – 1.77), $P < 0.05$) and North West (OR = 2.58 95% CI = (2.23 – 2.97), $P < 0.05$) compared to women residing in the South East and South South region. However, the variable marital status was omitted in the analysis because of collinearity with another variable (mother's age). Comparatively, the variance at the community level in model 3 remain significant ($\sigma = 0.1683$; $P < 0.05$). The intra-community correlation significantly reduced to 4.87% indicating that the inclusion of other variables was important for obtaining a better explanatory model. Also, the Log-

likelihood ratio test reduced to 27209.27 which makes it the smallest of all the models. The clustering of the likelihood of having stunted children at the community level is as a result of the composition of the communities by community characteristics.

TABLE 4.5.1: MULTILEVEL LOGISTIC REGRESSION ODDS RATIO OF THE EFFECTS OF THE MATERNAL AND COMMUNITY FACTORS ON STUNTING IN UNDER – FIVE CHILDREN.

Variable	Model I Empty model & Univariate model	Model 2 Decision making	Model 3 Decision making & other variables
Fixed effects	Odds ratio (95% Confidence Interval)	Odds ratio (95% Confidence Interval)	Odds ratio (95% Confidence Interval)
Individual characteristics			
Mother's age			
15 – 24(ref)			
25 – 34	0.95 (0.88 – 1.02)		0.97 (0.90 – 1.05)
35 – 49	1.00 (0.92 – 1.09)		0.98 (0.90 – 1.07)
Level of education			
No education (ref)			
Primary	0.70 (0.64 – 0.76) **		0.96 (0.88 – 1.06)
Secondary	0.45 (0.41 – 0.50) **		0.79 (0.71 – 0.88) **
Higher	0.24 (0.20 – 0.29) **		0.50 (0.41 – 0.60) **
Marital status			
Not married (ref)			
Married	1.09 (0.93 – 1.27)		
Occupation			
Not working (ref)			
White collar job	0.97 (0.89 – 1.06)		1.04 (0.96 – 1.14)
Manual worker	0.96 (0.89 – 1.03)		0.98 (0.91 – 1.06)
Religion			
Christianity (ref)			
Islam	2.23 (2.02 – 2.47) **		1.14 (1.02 – 1.28) **
Traditionist	1.56 (1.15 – 2.12) **		1.04 (0.76 – 1.41)
Wealth index			
Poorest (ref)			
Poorer	0.78 (0.71 – 0.85) **		0.87 (0.78 – 0.92) **
Middle	0.55 (0.49 – 0.61) **		0.77 (0.60 – 0.75) **
Richer	0.35 (0.31 – 0.39) **		0.57 (0.42 – 0.55) **
Richest	0.23 (0.20 – 0.26) **		0.45 (0.33 – 0.45) **
Women's autonomy			
Decision on health care			
No (ref)			
Yes	0.89 (0.82 – 0.96) **	0.98 (0.88 – 1.09)	1.08 (0.97 – 1.20)
Decision on large household purchases			
No (ref)			
Yes	0.86 (0.80 – 0.93) **	0.90 (0.82 – 1.00)	1.03 (0.93 – 1.14)
Decision on visits to family or relatives			
No (ref)			
Yes	0.89 (0.83 – 0.96) **	0.95 (0.86 – 1.04)	1.04 (0.95 – 1.14)
Community level factor.			
Place of residence			
Rural (ref)			
Urban	0.44 (0.39 – 0.51) **		0.95 (0.84 – 1.06)
Region			
North Central (ref)			
North East	2.05 (1.75 – 2.41) **		1.53 (1.32 – 1.77) **
North West	3.60 (3.10 – 4.18) **		2.58 (2.23 – 2.97) **
South East	0.45 (0.37 – 0.55) **		0.54 (0.44 – 0.65) **
South South	0.65 (0.54 – 0.77) **		0.76 (0.64 – 0.90) **
South West	0.71 (060 – 0.84) **		0.94 (0.81 – 1.10)
Random effects parameters	*Empty*		
Variance	0.9139	0.8498	0.1683
ICC (%)	21.74	20.52	4.87
Log-likelihood (-2logL)	29716.38	28493.24	27209.27

** P < 0.05

With respect to wasting, the total variance at the community level was presented in the empty model (Table 4.5.2). The variation in the odds of a woman having wasted child between communities was significant ($\sigma = 0.5744$, $P < 0.05$). The intra-community correlation coefficient as shown by the estimated intercept component variance was 14.86%, which is variance that could be attributed to the community level. Also, the Log-likelihood statistic was 21368.76. Also in model I, a univariate model to determine the effect of each of the variables one at a time was fitted. In the univariate model, all the variables considered in the study were significantly associated with wasting and follow the same pattern as with stunting, expect marital status which showed a negative association (Table 4.5.2). The likelihood of a wasted child belonging to a woman decreases as she grows older. In other words, wasted child were less likely to belong to middle aged (25 – 34 years) women (OR = 0.87, 95% CI = (0.79 – 0.94), $P < 0.05$) and women in their extreme age (35 – 49 years) (OR = 0.77, 95% CI = (0.70 – 0.85), $P < 0.05$) compared to women in their early age (15 – 24 years).

Model 2 showed result of the effects of the decision making variables on the outcome variable (wasting). Of all the measures of women's decision making power, only decision making on large household purchases showed significant association with wasting. Wasted children were less likely to belong to women who are involved in decision making concerning large household purchases (OR = 0.82, 95% CI = (0.72 – 0.93), $P < 0.05$). In comparison to the empty model (model 1), the variation of wasted child belonging to a woman was significant across communities ($\sigma = 0.5161$; $P < 0.05$). The Log-likelihood statistic was 20496.106. The intra-community correlation in the model 2 for wasting indicated that 13.56% of the total variance for a child to be wasted is attributed to the dependency of the observation within communities.

Model 3 contained both the decision making variables and other variables. Results showed that the inclusion of other variables had independent effects on wasting as well as moderating effects on the association between individual/household factors and wasting. For instance with the introduction of other variables, the significance of household wealth index, occupation, and all measures of women's decision making power disappeared as observed in model I to be significant. There is variation across all categories of other variables found to be significant. Wasted children were less likely to belong to extreme aged (35 – 49 years) women (OR = 0.81, 95% CI = (0.70 – 0.90), $P < 0.05$), who

have tertiary (higher) education (OR = 0.75, 95% CI = (0.60 – 0.95), P < 0.05) compared to women in their early age (15 – 24 years) and with no education. In contrast, wasted children were more likely to belong to women of the Islamic faith (OR = 1.18, 95% CI = (1.02 – 1.37), P < 0.05), who reside in the urban areas (OR = 1.22, 95% CI = (1.05 – 1.41), P < 0.05) compared to women who are Christians and reside in the rural areas. Similarly, wasted children were more likely to belong to women resident in the North East (OR = 1.64, 95% CI = (1.33 – 2.01), P < 0.05) and North West (OR = 2.52, 95% CI = (2.07 – 3.07)) compared to women resident in the North Central. However, the variable marital status was omitted in the analysis because of collinearity with another variable (maternal age). Comparatively, the variance at the community level in model 3 remain significant (σ = 0.3559; P < 0.05). The intra-community correlation decreased to 9.76% indicating that the inclusion of other variables was important for obtaining a better explanatory model. Also, the statistic of the Log-likelihood ratio test reduced to 20014.142 which makes it the smallest of all the models. The clustering of the likelihood of having wasted children at the community level is as a result of the composition of the communities by community characteristics.

Table 4.5.2: MULTILEVEL LOGISTIC REGRESSION ODDS RATIO OF THE EFFECTS OF THE MATERNAL AND COMMUNITY FACTORS ON WASTING IN UNDER – FIVE CHILDREN.

Variable	Model 1 Empty model & Univariate model	Model 2 Decision making	Model 3 Decision making & other variables
Fixed effects	Odds ratio (95% Confidence Interval)	Odds ratio (95% Confidence Interval)	Odds ratio (95% Confidence Interval)
Individual characteristics			
Mother's age			
15 – 24 (ref)			
25 – 34	0.87 (0.79 – 0.94) **		0.91 (0.83 – 1.00)
35 – 49	0.77 (0.70 – 0.85) **		0.81 (0.73 – 0.90) **
Level of education			
No education (ref)			
Primary	0.78 (0.70 – 0.86) **		0.99 (0.88 – 1.11)
Secondary	0.71 (0.63 – 0.79) **		0.94 (0.82 – 1.08)
Higher	0.50 (0.41 – 0.61) **		0.75 (0.60 – 0.95) **
Marital status			
Not married (ref)			
Married	1.06 (0.87 – 1.28)		
Occupation			
Not working (ref)			
White collar job	0.82 (0.74 – 0.91) **		0.95 (0.85 – 1.05)
Manual worker	0.88 (0.81 – 0.97) **		0.96(0.88 – 1.06)
Religion			
Christianity (ref)			
Islam	1.80 (1.62 – 2.01) **		1.18 (1.02 – 1.37) **
Traditionist	0.93 (0.60 – 1.44)		0.79 (0.50 – 1.24)
Wealth index			
Poorest (ref)			
Poorer	0.93 (0.83 – 1.04)		0.99 (0.88 – 1.11)
Middle	0.74 (0.65 – 0.85) **		0.91 (0.79 – 1.05)
Richer	0.67 (0.58 – 0.77) **		0.90 (0.76 – 1.07)
Richest	0.57 (0.48 – 0.67) **		0.83 (0.68 – 1.02)
Women's autonomy			
Decision on health care			
No (ref)			
Yes	0.83 (0.76 – 0.91) **	0.99 (0.87 – 1.13)	1.09 (0.95 – 1.25)
Decision on large household purchases			
No (ref)			
Yes	0.78 (0.71 – 0.86) **	0.82 (0.72 – 0.93) **	0.93 (0.82 – 1.07)
Decision on visits to family or relatives			
No (ref)			
Yes	0.83 (0.76 – 0.91) **	0.93 (0.83 – 1.05)	1.02 (0.90 – 1.14)
Community level factor.			
Place of residence			
Rural (ref)			
Urban	0.85 (0.75 – 0.97) **		1.22 (1.05 – 1.41) **
Region			
North Central (ref)			
North East	1.88 (1.55 – 2.28) **		1.64 (1.33 – 2.01) **
North West	2.94 (2.46 – 3.52) **		2.52 (2.07 – 3.07) **
South East	1.15 (0.92 – 1.45)		1.17 (0.91 – 1.49)
South South	1.03 (0.83 – 1.27)		1.17 (0.93 – 1.45)
South West	0.96 (0.78 – 1.18)		0.98 (0.78 – 1.22)
Random effects parameters	***Empty***		
Variance	0.5744	0.5161	0.3559
ICC (%)	14.86	13.56	9.76
Log-likelihood (-2logL)	21368.76	20496.106	20014.142

** P < 0.05

With respect to underweight, the total variance at the community level was presented in the empty model (Table 4.5.3). The variation in the odds of a woman having underweight children between communities was significant (σ = 1.0401, P < 0.05). The intra-community correlation coefficient as shown by the estimated intercept component variance was 24.02%, which is variance that could be attributed to the community level. Also, the Log-likelihood statistic was 26414.022. Also in model 1, a univariate model to determine the effect of each of the variables one at a time was fitted. The result of the this model follows the same pattern with the result of univariate model for stunting (Table 4.5.1 (model 1))

Model 2 showed result of the effects of the decision making variables on the outcome variable (underweight). The result of this model is the same as with that of model 2 for wasting (Table 4.5.2 (model 2)). However, the variation of underweight child belonging to a woman was significant across communities (σ = 0.9568; P < 0.05). The Log-likelihood statistic was 25351.132. The intra-community correlation in the model 2 for underweight indicated that 22.53% of the total variance for an underweight child to belong to a woman is attributed to the dependency of the observation within communities.

Model 3 contained both the decision making variables and other variables. Results showed that the inclusion of other variables had independent effects on underweight as well as moderating effects on the association between individual/household factors and underweight. For instance with the introduction of other variables, the significance of women's decision making power in model 1 disappeared. However, the result of this model follows the same pattern as that of the result for model 3 for stunting (Table 4.5.1) except for place of residence that remained significant. Underweight children were more likely to belong to women residing in the urban areas (OR = 1.16, 95% CI = (1.02 – 1.32), P < 0.05), who are of the Islamic faith (OR = 1.16, 95% CI = (1.02 – 1.32), P < 0.05), resident in the North East (OR = 1.79, 95% CI = (1.51 – 2.15), P < 0.05) and North West regions (OR = 3.55, 95% CI = (2.99 – 4.22), P < 0.05) compared to women residing in the rural areas, who are Christians and resident in the North Central. However, the variable marital status was omitted in the analysis because of collinearity with another variable (mother's age). Comparatively, the variance at the community level in model 3 remain significant (σ = 0.2736; P < 0.05). The intra-

With respect to underweight, the total variance at the community level was presented in the empty model (Table 4.5.3). The variation in the odds of a woman having underweight children between communities was significant (σ = 1.0401, P < 0.05). The intra-community correlation coefficient as shown by the estimated intercept component variance was 24.02%, which is variance that could be attributed to the community level. Also, the Log-likelihood statistic was 26414.022. Also in model 1, a univariate model to determine the effect of each of the variables one at a time was fitted. The result of the this model follows the same pattern with the result of univariate model for stunting (Table 4.5.1 (model 1))

Model 2 showed result of the effects of the decision making variables on the outcome variable (underweight). The result of this model is the same as with that of model 2 for wasting (Table 4.5.2 (model 2)). However, the variation of underweight child belonging to a woman was significant across communities (σ = 0.9568; P < 0.05). The Log-likelihood statistic was 25351.132. The intra-community correlation in the model 2 for underweight indicated that 22.53% of the total variance for an underweight child to belong to a woman is attributed to the dependency of the observation within communities.

Model 3 contained both the decision making variables and other variables. Results showed that the inclusion of other variables had independent effects on underweight as well as moderating effects on the association between individual/household factors and underweight. For instance with the introduction of other variables, the significance of women's decision making power in model 1 disappeared. However, the result of this model follows the same pattern as that of the result for model 3 for stunting (Table 4.5.1) except for place of residence that remained significant. Underweight children were more likely to belong to women residing in the urban areas (OR = 1.16, 95% CI = (1.02 – 1.32), P < 0.05), who are of the Islamic faith (OR = 1.16, 95% CI = (1.02 – 1.32), P < 0.05), resident in the North East (OR = 1.79, 95% CI = (1.51 – 2.15), P < 0.05) and North West regions (OR = 3.55, 95% CI = (2.99 – 4.22), P < 0.05) compared to women residing in the rural areas, who are Christians and resident in the North Central. However, the variable marital status was omitted in the analysis because of collinearity with another variable (mother's age). Comparatively, the variance at the community level in model 3 remain significant (σ = 0.2736; P < 0.05). The intra-

community correlation significantly reduced to 7.68% indicating that the inclusion of other variables was important for obtaining a better explanatory model. Also, the Log-likelihood ratio test reduced to 24288.94 which makes it the smallest of all the models. The clustering of the likelihood of having underweight children at the community level is as a result of the composition of the communities by community characteristics.

TABLE 4.5.3: MULTILEVEL LOGISTIC REGRESSION ODDS RATIO OF THE EFFECTS OF THE MATERNAL AND COMMUNITY FACTORS ON UNDERWEIGHT IN UNDER – FIVE CHILDREN.

Variable	Model 1 Empty model & Univariate model	Model 2 Decision making	Model 3 Decision making & other variables
Fixed effects	Odds ratio (95% Confidence Interval)	Odds ratio (95% Confidence Interval)	Odds ratio (95% Confidence Interval)
Individual characteristics			
Maternal age			
15 – 19 (ref)			
25 – 34	0.97 (0.89 – 1.04)		1.00 (0.92 – 1.08)
35 – 49	0.98 (0.90 – 1.07)		0.98 (0.89 – 1.08)
Level of education			
No education (ref)			
Primary	0.68 (0.61 – 0.74) **		0.93 (0.84 – 1.03)
Secondary	0.49 (0.44 – 0.55) **		0.83 (0.73 – 0.93) **
Higher	0.24 (0.19 – 0.29) **		0.43 (0.34 – 0.54) **
Marital status			
Not married (ref)			
Married	1.06 (0.89 – 1.26)		
Occupation			
Not working (ref)			
White collar job	0.96 (0.88 – 1.06)		1.08 (0.98 – 1.19)
Manual worker	0.95 (0.88 – 1.03)		1.00 (0.92 – 1.08)
Religion			
Christianity (ref)			
Islam	2.40 (2.15 – 2.68) **		1.16 (1.02 – 1.32) **
Traditionist	1.75 (1.26 – 2.42) **		1.22 (0.87 – 1.69)
Wealth index			
Poorest (ref)			
Poorer	0.80 (0.73 – 0.89) **		0.91 (0.83 – 1.00)
Middle	0.54 (0.48 – 0.61) **		0.75 (0.66 – 0.85) **
Richer	0.40 (0.35 – 0.45) **		0.65 (0.56 – 0.76) **
Richest	0.27 (0.23 – 0.31) **		0.54 (0.45 – 0.65) **
Women's autonomy			
Decision on health care			
No (ref)			
Yes	0.86 (0.79 – 0.94) **	1.01 (0.90 – 1.14)	1.12 (0.99 – 1.26)
Decision on large household purchases			
No (ref)			
Yes	0.81 (0.75 – 0.89) **	0.85 (0.78 – 0.95) **	0.98 (0.87 – 1.10)
Decision on visits to family or relatives			
No (ref)			
Yes	0.85 (0.78 – 0.92) **	0.91 (0.83 – 1.01)	0.99 (0.89 – 1.10)
Community level factor.			
Place of residence			
Rural (ref)			
Urban	0.54 (0.46 – 0.62) **		1.16 (1.02 – 1.32) **
Region			
North Central (ref)			
North East	2.36 (1.99 – 2.81) **		1.79 (1.51 – 2.15) **
North West	4.80 (4.09 – 5.64) **		3.55 (2.99 – 4.22) **
South East	0.63 (0.51 – 0.78) **		0.68 (0.54 – 0.86) **
South South	0.73 (0.60 – 0.89) **		0.84 (0.69 – 1.04)
South West	0.80 (0.66 – 0.96) **		0.94 (0.77 – 1.14)
Random effects parameters	***Empty***		
Variance (SE)	1.0401	0.9568	0.2736
ICC (%)	24.02	22.53	7.68
Log-likelihood (-2logL)	26414.022	25351.132	24288.94

**P < 0.05

CHAPTER FIVE

DISCUSSION, CONCLUSION, AND RECOMMENDATIONS.

5.1 DISCUSSION

This study was set to examine the relationship between mother's empowerment status and the nutritional status of under five children controlling for community characteristics in Nigeria

From result, the involvement of women in decision making concerning own health care, large household purchases, and visits to family or relatives did not have a significant association with child malnutrition (i.e. stunting, wasting, and underweight. This may be due to the fact that larger proportion of the variability in the outcome variables (stunted, wasted, and underweight) are attributed to the individual level factors after controlling for all other variables. Effect of some unmeasured community – level factors such as social norms, may cause the non – significance of women's decision making power. Also, the non – significance may be due to fact that there is enough awareness in mothers regarding nutritional intake of their under five children which in turn reduce the prevalence of malnutrition (stunting, wasting, and underweight). However, involvement of women in decision making concerning large household purchases shows significant association with wasting and underweight.

Malnourished (stunted, wasted, and underweight) children are less likely to belong to women with tertiary (higher) education. This finding agrees with a study conducted in the Democratic Republic of Congo by Emina et al. (2010), which found out that children born to non – educated women experience higher risk of malnutrition (stunted, wasted, and underweight) even after controlling for other variables, and another study carried out in Afghanistan, where children of educated mothers have lower risk of malnutrition (Mashal et al., 2010). This may imply that maternal education influence health seeking bahaviours which in turn influence child nutritional status (Frost et al., 2005).

Women's household wealth index also appears to have effect on children nutritional status (i.e. only stunting and underweight). Children of women belonging to the richest quintile of wealth are less likely to be stunted and underweight. This result is similar to the findings of the study conducted by Kumari 2013, in urban India which reported there is a great decline in the prevalence

of underweight children belonging to women from economically better – off household. This is probably due to the fact that women in the richest quintile of wealth will have enough resources to cater for needs of their children, thus making their children not to be malnourished.

Children of women belonging to the Islamic faith are more likely to be malnourished (stunted, wasted, and underweight). This may be due to the fact that most Muslims are from the Northern Regions, and due to the cultural practices of the Northerners; their children may be prone to malnutrition. This fact is similar to the findings of a qualitative study conducted by Ngwu et al. 2014, which reported that cultural practice can cause serious health problems to the health of children.

Women's regions of residence also have significant effect of under – five nutritional status. Children born to women residing in the North East and North West regions are more likely to be malnourished (i.e. stunted, wasted, and underweight). This may probably be due to the fact that most of the under-five children belong to women residing in the rural areas of the North West and North East regions where there is no awareness or lack of knowledge in women about dietary diversity of their children. This fact is similar to the findings of a descriptive cross – sectional study conducted in Western region of Nepal by Joshi et al. 2011, which reported that lack of awareness in women about nutritional intake of their children will increase the prevalence of malnutrition.

5.2 CONCLUSION.

This study has been able to show that there are intra – community variation in the nutritional status of under – five children. Children born to women who are involved in decision making concerning large household purchases are less likely to be wasted and underweight. Also, maternal education, place of residence, and household wealth quintile were significantly associated with child nutritional status.

5.3 RECOMMENDATIONS.

As a result of the findings of this study, I recommend efforts towards reduction of child malnutrition should be targeted towards women who are not involved in decision making concerning own health care, and visits to family or relatives. There should be enough awareness concerning

of underweight children belonging to women from economically better – off household. This is probably due to the fact that women in the richest quintile of wealth will have enough resources to cater for needs of their children, thus making their children not to be malnourished.

Children of women belonging to the Islamic faith are more likely to be malnourished (stunted, wasted, and underweight). This may be due to the fact that most Muslims are from the Northern Regions, and due to the cultural practices of the Northerners; their children may be prone to malnutrition. This fact is similar to the findings of a qualitative study conducted by Ngwu et al. 2014, which reported that cultural practice can cause serious health problems to the health of children.

Women's regions of residence also have significant effect of under – five nutritional status. Children born to women residing in the North East and North West regions are more likely to be malnourished (i.e. stunted, wasted, and underweight). This may probably be due to the fact that most of the under-five children belong to women residing in the rural areas of the North West and North East regions where there is no awareness or lack of knowledge in women about dietary diversity of their children. This fact is similar to the findings of a descriptive cross – sectional study conducted in Western region of Nepal by Joshi et al. 2011, which reported that lack of awareness in women about nutritional intake of their children will increase the prevalence of malnutrition.

5.2 CONCLUSION.

This study has been able to show that there are intra – community variation in the nutritional status of under – five children. Children born to women who are involved in decision making concerning large household purchases are less likely to be wasted and underweight. Also, maternal education, place of residence, and household wealth quintile were significantly associated with child nutritional status.

5.3 RECOMMENDATIONS.

As a result of the findings of this study, I recommend efforts towards reduction of child malnutrition should be targeted towards women who are not involved in decision making concerning own health care, and visits to family or relatives. There should be enough awareness concerning

nutritional intake of under – five children for women who are not educated, that belong to low – economic status, and residing in urban areas as this will help reduce the prevalence of malnutrition.

5.4 LIMITATION OF THE STUDY.

There are several limitations needed to be considered when interpreting findings in this study. Firstly, the administratively defined boundaries were used as a proxy for communities in this study. There is an inherent risk of non – differentially misclassifying individuals into inappropriate administrative boundaries, which may generate information biases and reduce the validity of the analysis. Secondly, data on household income or expenditure, which are the indicators commonly used to measure wealth, are not routinely collected in the Nigerian Demographic Health Surveys. The assets – based wealth index used is this study is only a proxy indicator for individual / household economic status and may not produce result similar to those obtained from direct assessments of income and expenditure where such data are available or can be reliably collected.

5.5 STRENGTH OF THIS STUDY.

The strength of this study is as follow:

- The NDHS surveys are nationally representative and enable the generalization of the results across the country.
- The NDHS variables are defined similarly across countries, and results are therefore comparable across countries.
- Using administrative boundaries permits the comparability of any set of DHS data on the same geographical frame, or of presenting of complex data in a simple way, provided there is a good conceptual framework for the studied territory.

REFERENCES.

Abuya A Benta, James Ciera, and Elizabeth Kimani-Murage, 2012: Effects of mother's education on child nutritional status in the slums of Nairobi. *BMC Pediatrics 2012, 12:80, doi: 10, 1186/1471-2431-12-80.*

Adefarasin, H.A. 1987: Mobilizing Nigeria women for participation in National development. *In the Report of the National Seminar on Social Development Policy of Nigeria. Vol. 2, Zaranda Hotel, Bauchi.*

Adewole, A.R. 1997: Women informal education Journal of College of Education Sokoto, *1 (3), 14 – 16.*

Aparna Pandey, 2010: Mother's Status in the family and Nutritional status of their under five children. *Regional Leprosy Training and Research Institute, Lalpur, Raipur (C.G), Pin-492001.*

Bhagowalia, P., A. R. Quisumbing, P. Menon, and V. Soundararajan, 2012: What Dimensions of Women's Empowerment Matter Most for Child Nutrition? Evidence Using Nationally Representative Data from Bangladesh. *IFPRI Discussion Paper 01192. Washington, DC: International Food Policy Research Institute.*

Bhumika Hingorani, 2014: Adult Education and Child Nutrition. *International Journal of Management and International Business Studies. ISSN 2277 – 3177 Volume 4, Number 1(2014), pp. 23 – 32.*

Bruce, J., C. Lloyd, and A. Leonard, 1995: Families in focus: New perspectives on mothers, fathers and children. *New York: The Population Council.*

Brunson K. Emily, Bettina Shell-Duncan, and Matthew Steele, 2009: Women's autonomy and its relationship to Children's Nutrition among the Rendille of Northern Kenya. *Am J Hum Biol. 2009; 21(1): 55 – 64, doi: 10.1002/ajhb.20815.*

Centre for Environment & Population, 2013: Women's Empowerment & Family Planning, *Key to Global Development.*

Christian A. Nti, Cynthia Gadegbeku, Sarah N.A. Dodoo, Bernice Ofosu, Esther Akoto, and Mabel Agbi-Dzorkar, 2014: Knowledge, Attitude and Practice of Birth Spacing among Ghanaian Mothers: Implications for Maternal and Child Nutritional Status. *World Applied Sciences Journal 31 (11): 1971 – 1978, 2014. ISSN 1818 – 4952. DOI: 10.5829/idosi.wasj.2014.31.11.1286*

Divya Kumari, 2013: Is socio – economic inequality in childhood under-nutrition increasing in urban India? *XXVII IUSSP Conference, Busan, South Korea*

Duflo, E. 2012: Women Empowerment and Economic Development. *Journal of Economic Literature, 50 (4), 1051-1079.*

Duraisamy, P. and R. Malathy, 1991: Impact of public programs on fertility and gender specific investment in human capital of children in India. Cross – sectional and time series analysis. *In Research in population economics, Vol. 7, ed. T.P. Schultz. Greenwich, Connecticut: Jai Press.*

Emina Jacques Be-Ofuriyua, Ngianga-Bakwin Kandala, Joseph Inungu, and Yazoume YE, 2013: Maternal Education and Child Nutritional status in the Democratic Republic of Congo. *Global Science Research Journals, 2013. Pp. 023-039.*

Engle, P. L., P. Menon, and L. Haddad, 1999: "Care and Nutrition: Concepts and Measurement." *World Development 27 (8): 1309–1337.*

Federal Ministry of Health report on Child Malnutrition, 2013.

Joshi H.S, Gupta R, Joshi M.C, and Mahajan Vipul, 2011: Determinants of Nutritional Status of School Children – A Cross Sectional study in the Western Region of Nepal. *NJIRM 2011; Vol. 2(1). Jan-March.*

Jejeebhoy, S. J. 2000: "Women's Autonomy in Rural India: Its Dimensions, Determinants and the Influence of Context." *In Women's Empowerment and Demographic Processes: Beyond Cairo, edited by H. Presser and G. Sen, pp. 204–238. New York: Oxford University Press.*

Kishor, S. 2000: "*Empowerment of Women in Egypt and Links to the Survival and Health of Their Infants.*" In Women's Empowerment and Demographic Processes, edited by H. Presser and G. Sen, 119–158. Oxford: Oxford University Press.

Lasiele. A and Dr. Yahaya, 1999: *Women Empowerment in Nigeria: Problems, Prospects, and Implications for counseling.* The Counsellor, Vol. (4). 132 - 137.

Michelle Bellessa Frost, Renata Forste, and David W. Hass, 2005: Maternal education and child nutritional status in Bolivia: finding the links. *Social Science & Medicine 60 (2005) 395 – 407, doi: 10.1016/j.socscimed.2004.05.010.*

Mahama Saaka and Sylvester Galaa, 2011: Improving the utilization of health and nutrition services: experience from the catholic relief services supported the Development Assistance programme in Ghana. *Primary Health Care Research & Development 2011; 12: 145 – 156, doi: 10. 1017/S1463423610000411.*

Mashal Taufiq, Takehito Takano, Keiko Nakamura, Masashi Kizuki, Shafiqullah Hemat, Masafumi Watanabe, and Kaoruko Seino, 2008: Factors associated with the health and nutritional status of children under 5 years of age in Afghanistan: Family behaviour related to women and past experience of war-related hardships. *BMC Public Health 2008, 8:301, doi: 10.1186/1471-2458-8-301.*

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

Miles-Doan R, Bishrat L, 1990: Female autonomy and child nutritional status: the extended family residential unit in Amman, Jordan Soc Sci: Med 31: 783 – 789.

National Population Commission, ICF Macro. Nigeria Demographic and Health Survey (NDHS) 2013. Abuja, Nigeria: National Population Commission and ICF Macro. 2009.

Ngwu N. C, Ezeh C. A, and Iyiani Christian, 2014: Knowledge of Infant Nutrition among Mothers in Enugu state, South Eastern Nigeria: Implication for Social Work Practice. *International Journal of Academic Research in Progressive Education and Development. 2014 Volume 3 Number 1.*

Okojie, C.E. 1990: Nigeria women in public sector. *Journal of management in Nigeria. 26(6), 47 – 53.*

Rabe-Hesketh S, Skrondal A, 2005: Multilevel and longitudinal Modeling using Stata, *College station, Texas: Stata Press; 2005 Resources 25: 635-664.*

Rutstein SO, Johnson Kiersten, 2004: The DHS wealth Index. DHS comparative report. *United States Agency for International Development: Calverton, Maryland USA.*

Smith, L. C., U. Ramakrishnan, A. Ndiaye, L. Haddad, and R. Martorell, 2003a: The Importance of Women's Status for Child Nutrition in Developing Countries. *Research Report 131. Washington, DC: International Food Policy Research Institute. Retrieved from www.ifpri.org/sites/default/files/publications/rr131.pdf.*

Thomas, D. 1990: Intra-household resource allocation: An inferential approach. *Journal of Human Resources* 25: 635 – 664.

UNICEF/Nigeria. www.unicef.org/nigeria/

United Nations Population Information Network, 1995: Guidelines on women's empowerment for the UN Resident Coordinator System. *New York: United Nations Inter-Agency Task Force on the Implementation of the ICPD Program of Action.*

Vdassani 2013. Women's empowerment and child nutrition. *International Food Policy Research Institute report.*

WHO (2012), 10 Facts on Nutrition, 2012.

World Health Organisation, Make every mother and child count, *WHO Report 2005*.

Yohannes Kinfu and Monika Sawhney, 2011: Effects of Women's empowerment and socio-economic status and use of family planning methods in Sub-Saharan Africa. *UAPS. 2011. Extended Abstract.*

World Health Organisation, Make every mother and child count, *WHO Report 2005*.

Yohannes Kinfu and Monika Sawhney, 2011: Effects of Women's empowerment and socio-economic status and use of family planning methods in Sub-Saharan Africa. *UAPS, 2011. Extended Abstract.*