

# Maternal Education and Child Mortality in Nigeria

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DOI:10.36108/NJSA/8102/61(0170)

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## **Abstract**

*Reports have shown that child mortality is still pervasive in Nigeria despite several intervention programmes. While most authors have been preoccupied with searching for long-lasting solutions to the syndrome, this article argues that the relationship that subsists between maternal education and child mortality in Nigeria cannot be fully understood without examining certain background variables of the mothers such as familial, economic and religious factors among others. Data were sourced from the Nigerian Demographic Health Survey of 2013 and were analyzed with both descriptive and inferential statistics. The study found that child mortality is particularly high among mothers without formal education and relatively lower among those with other levels of education although factors such as family size, religious affiliation, wealth index and sex of household head had strong influence on these women.*

**Keywords:** Child mortality, maternal education, Nigeria, socio-economic development

## **Introduction**

Reports have shown that child mortality, which is the likelihood of a child dying before the fifth birthday (Adepoju, Akanni & Falusi, 2012; NDHS, 2013), is still extremely high, in less developed countries particularly sub-Saharan Africa (Black & Liu, 2012; Gambrah & Adzadu, 2013; Antai, 2011; UNDP, 2017). Mortality among under-five children in sub-Saharan Africa, was about 84 deaths per 1,000 live births in 2015 (UNDP, 2016), which seems not to have changed. For instance, the Uganda Demographic and Health Survey Report (UDHS, 2006) revealed that one in thirteen children dies in the first year of birth and 67 out of 1000 do not live to see their fifth birthday. In Ethiopia, child mortality rate stood at 88 deaths per 1000 live births in 2011 (ICF International, 2012). With these figures, Ethiopia is reputed to have the second highest rate of child mortality in East Africa, next to Uganda. In Nigeria, about 20% of the 5.3 million children that are given birth yearly die before the age of five (Bello & Joseph, 2014; World Bank, 2016). The foregoing reports clearly confirm that half of the global childhood mortality event takes place in sub-Saharan Africa despite that data reveals that children's population in the region constitutes about one-fifth of the global figures, with regard to this cohort of young people (Smith, 2010).

Given the criticality of children as agents of continuity of any society, childhood mortality or survival rate is not only a core indicator of child health

and wellbeing but also a pointer to socio-economic development of any country (Adetoro & Amoo, 2014). Hence, the rationale for, the then, fourth and fifth Millennium Development Goals were to reduce the under-five mortality rate and improvement in maternal health respectively, which by implication increases the chances of child survival (Desta, 2011; Fayehun & Omololu, 2011). In addition, one of the aims of the United Nations' Sustainable Development Goals is to end preventable deaths of under-five children by 2030 (UNDP, 2017). These targets can be linked to article six of the United Nations Convention on the Rights of the Child that every child has a right to live (UNICEF, 2010). Also, in October 2008, the National Health Insurance Scheme (NHIS) launched a pilot health project in Nigeria, titled the NHIS/MDG Maternal and Child Health Project, which focuses on reducing maternal and childhood mortality. Despite these and other initiatives, child mortality rates still remain unacceptably high in Africa, including Nigeria (Schellenberg *et al.*, 2002; Ayotunde, Obiyan, Agunbiade & Faniyi, 2009; Antai, 2011; Akinyemi, Bamgboye & Ogunjimi, 2013; Smith-Greenaway, 2013; Ibe & Ikorok, 2012; Balogun *et al.*, 2017; Adepoju *et al.*, 2012; NPC, 2014; Adetoro & Amoo, 2014).

Several causal factors have been identified as responsible for the persistently high rate of child mortality nationally and globally. For instance, it has been observed that the relationship between child mortality and maternal age at child birth is similar to that between the former and birth order given that maternal age and birth order are usually correlated (Akinyemi *et al.*, 2013). In addition, children born after a short interval to the previous birth generally present higher mortality risks (Manda, 1999). Also, the knowledge and use of pre-natal, post-natal and other healthcare services are important behavioural determinants of childhood mortality (Rutstein *et al.*, 2009; Bello & Joseph, 2014). Furthermore, child morbidity such as diarrhoea, measles, tetanus, and pertussis, accounted for more than 65% of all deaths of children in developing countries (Black *et al.*, 2010). These factors are directly related to provision and utilization of healthcare services (Bello & Joseph, 2014). Ngowu *et al.* (2008) discovered that literacy and healthcare spending rather than immunization are important factors driving child mortality. Use of bednets is one of the strategies for the prevention of childhood malaria which is a leading cause of death in children. While bednet use is one of the factors responsible for mortality decline among children in Ghana (Nakamura *et al.*, 2011) and Rwanda (Hong *et al.*, 2009), the lack of sufficient bednet was responsible for the rise of child mortality in Nigeria (Bello & Joseph, 2014).

Furthermore, the physical environments which children are exposed to influence mortality. For instance, Franz & FitzRoy (2006) identified potable safe water and sanitation as critical for child survival. Also, Lyun (2000) argued that proximate determinants of childhood mortality in Nigeria are closely associated with neighbourhood and household level characteristics (Lyun, 2000). Specifically, mothers and fathers in rural areas experienced childhood mortality than those in urban areas (Bocquier *et al.*, 2011; Ezech *et*

*et al.*, 2015; Yaya *et al.*, 2017). However, the urban advantage is however partly reduced or reversed whenever socioeconomic and other demographic variables at an individual, household, and community levels are controlled for (Bocquier *et al.*, 2011). In addition, children from households with unimproved toilet experienced highest mortality rate than those with improved toilet (Ezeh *et al.*, 2015). Hence, the location of residence and availability of potable water and proper sanitation are environmental determinants of childhood mortality.

More so, Schellenberg *et al.* (2002), Delgado *et al.* (2002), Hurt *et al.* (2003), Grépina & Bharadwaj (2015), Adeolu, Akpa, Adeolu & Aladeniyi (2016), Lartey, Khanam & Takahashi (2016) and Balogun *et al.* (2017) all noted that child mortality was high and low among mothers with no educational and tertiary education respectively. Also, the risk of childhood mortality is lower among educated fathers and mothers than those with no formal education (Yaya *et al.*, 2017). Lastly, economic well-being may have an effect on mortality. Specifically, the risk of childhood mortality is significantly lower in middle, richer and richest economic quintiles when compared to the risk of childhood mortality with spouse (i.e., fathers and/or mothers) who are poorest (Kembo & Van Ginneken, 2009; Izugbara, 2014; Lartey *et al.*, 2016; Yaya *et al.*, 2017). In addition, mortality risk of the child increased as the size of family increases and vice versa (Gebretsadik & Gabreyohannes, 2016).

It is clear from the foregoing that while considerable attention has been given to bio-demographic factors (Manda, 1999; Akinyemi *et al.*, 2013), health factors (Ngowu *et al.*, 2008; Hong *et al.*, 2009; Rutstein *et al.*, 2009; Black *et al.*, 2010; Nakamura *et al.*, 2011; Akinyemi *et al.*, 2013; Bello & Joseph, 2014) and environmental factors (Lyun, 2000; Franz & FitzRoy, 2006; Bocquier *et al.*, 2011; Ezeh *et al.*, 2015; Yaya *et al.*, 2017), few had examined the influence of socio-demographic factors on child mortality (Schellenberg *et al.*, 2002; Delgado *et al.*, 2002; Hurt *et al.*, 2003; Kembo & Van Ginneken, 2009), especially in Nigeria (Adeolu *et al.*, 2016; Yaya *et al.*, 2017; Balogun *et al.*, 2017). However, none of the known past studies have examined the influence of structural factors such as wealth index, sex of household head, religious affiliation, and family size on the relationship between maternal education and child mortality. It is against this backdrop that this article examined the influence of maternal education on child mortality in Nigeria and how certain confounding variables, have contributed to the relationship between them.

This study was justified on the basis that child health constitutes one of the main indicators of development of a country and child mortality is one of the most used measures of child health. Also, childhood mortality is a fundamental measurement of a country's level of socio-economic and demographic development, and quality of life, especially of families (Yaya *et al.*, 2017). This makes child mortality a development issue. Given the important roles of education and children in Nigeria, this study contributes to the existing body of knowledge on the influence of maternal education on childhood mortality. It specifically contributes to development studies through understanding how the relationship between the aforementioned variables can help in achieving the

United Nation's Sustainable Development Goals (SDGs) to end preventable deaths of under-five children by 2030.

### **Theoretical Framework**

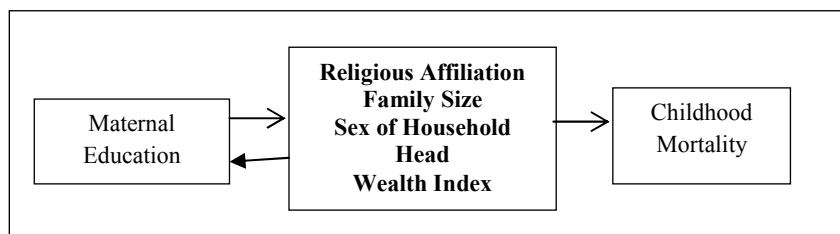
Most of the previous studies have largely adopted the Mosley & Chen (1984) model to explain how education as a maternal factor predicts child mortality (Black *et al.*, 2010; Nakamura *et al.*, 2011; Akinyemi *et al.*, 2013; Bello & Joseph, 2014; Ezeh *et al.*, 2015; Yaya *et al.*, 2017). The Mosley & Chen (1984) framework was developed to 'clarify our understanding of the many factors involved in the production of healthy children by families in order to provide a foundation for formulating health policies and structures' (p. 144). It explains how certain groups of proximate determinants influence the survival of children in less developed countries. The proximate determinants are grouped into five categories: maternal factors; environmental contamination; nutrient deficiency; injuries; and personal illness control (prevention and treatment). However, these proximate determinants can only serve as intervening variables between socioeconomic determinants (individual, household and community social factors) and child mortality or survival as the case may be. However, the major interest of this article is to examine the influence of maternal education on child survival/mortality as moderated by other socio-economic determinants (both at individual and household levels). Hence, structural-functionalism was considered more relevant for this study.

Functionalism is indeed one of the most resilient theories in sociology till date (Akanle and Olutayo, 2013). Proponents of the functionalist perspective include, but not limited to August Comte, Bronislaw Malinoski, Herbert Spencer, Alfred Reginald-Brown, Emile Durkheim, Robert Merton, Talcott Parsons, Geoge Murdock, Harriet Martineau, Wilbert Moore, Kingsley Davis, Marcel Mauss, Gabriel Almond and Bingham Powell. While most functionalist theorists have some area of convergence, there exists some degree of divergence. For instance, functionalists argued that every society consists of social intuitions (economy, law, education, religion, family, mass media, politics) which are interrelated and interdependent. This connotes that a defect or perhaps, a change in one (whether positively or negatively) will affect the whole system. Hence, all functionalist theorists submitted that for any society to survival, these social institutions must be at equilibrium. Also, scholars within this paradigm argued that, though change within a social system is inevitable, efforts must be made to accommodate this change immediately. However, for the purpose of this article, the Parsonian assumption within the structural-functionalist theory was considered germane.

Parsons (1951) assumes that, for any society to be at equilibrium, some functional imperatives are required to supply the needs of actors within the social system. That was his much stressed AGIL Scheme. By A - Adaptation, Parsons meant the need of securing sufficient resources from the environment. He further stressed that the economic system is one capable of fulfilling this function. G – Goal attainment means the mobilization of these resources

identified initially by Parsons to attain the goal of actors in the system. For this to be achieved, the political system is needed to constitute itself as decision making bodies in order to direct these resources in an effective and efficient manner. I – Integration is central to all the functional imperatives because of its function to coordinate, adjust and regulate relationships between various actors or unit within the system. The legal institutions are responsible for this function. L – Latency is the ability to make sure that actors are sufficiently motivated to play their respective roles in such a way that shared value is maintained among actors in the social system. Institutions responsible for this, according to Parsons, are the religion and family institutions. While these are strictly correct, the responsibilities of fulfilling these functional imperatives may take other forms in different contexts. For example, the political system of a country may be responsible for the goal attainment and integration function. However, Parsons (1951) stressed that should any problem occur with the performance of these imperatives, social order will be threatened.

From the foregoing, it may be not out of place to say that for Nigeria to successfully reduce child mortality there is a need for all actors in the social system to play their respective roles. Should any of these actors fail in their duties; the performance of other functions by actors in other social systems will be affected, hence, child mortality will be on the increase. At the maternal level, the reduction of child mortality among mothers will also be predicated not only on education but also, the contribution of other micro-structural factors such as religious affiliation, maternal family size, sex of household head and wealth Index. This is because the structural functionalists argued that the contribution of education in reducing child mortality may not be complete without the contribution of other factors, hence, this study shall examine the contribution of social determinants such as religious affiliation (religious factor), family size (family factor), sex of household head (political factor), and wealth index (economic factor) in the relationship that subsists between maternal education and child mortality. These factors will be controlled for in order to examine the relationship between maternal education and child mortality. Put differently, it is also the interest of this article to identify other social factors that affect the relationship between maternal education and child mortality.



**Figure 1: Conceptual Framework**

Source: Authors, 2018

As stated in the objective of the study and argued in the theoretical section of this article, the stand of this paper is that the relationship that subsists between maternal education and child mortality cannot be fully captured without examining the influence of confounding variables such as religious affiliation, family size, sex of household head and wealth index of mothers. There is need to reemphasize that the relationship between maternal education and child mortality can only be captured when other background variables are held constant. For instance, while it is true that higher educational qualification reduces the experience of child mortality, there is a need to know whether this claim is specifically true among Christian and Muslim mothers, poor, middle and rich households, small, large and medium households and among patriarchal and matriarchal households.

## **Methodology**

### ***Study Area***

The study area was Nigeria. Nigeria lies between latitudes 4°16' and 13°53' north and longitudes 2°40' and 14°41' east in the West African sub-region. It shares borders with Niger in the north, Chad in the northeast, Cameroon in the east, and Benin in the west and in the south by approximately 850 kilometers of Atlantic Ocean, stretching from Badagry in the west to the Rio del Rey in the east (National Population Commission, 2009). According to the 2006 population and housing census, Nigeria's population was 140,431,790 with a national growth rate of 3.2% per annum (National Population Commission, 2009). The country is the most populous in Africa and the sixth largest in the world after China, India, USA, Indonesia, and Brazil. In 2017, female population for Nigeria was 94.2 million persons. Over the last 50 years, female population of Nigeria grew substantially from 26.8 million to 94.2 million persons rising at an increasing annual rate that reached a maximum of 2.99 % in 1978 and then decreased to 2.61 % in 2017.

### ***Data Source(s) and Analysis Plan***

This study utilized secondary data from the Nigeria Demographic and Health Survey (NDHS) conducted in 2013 having obtained permission from ICF Macro Inc., USA before downloading the datasets. The survey was the sixth conducted in the series of NDHS. It provided information about women aged 15–49 and children of age 0–5 years across Nigeria. The information in the sample survey included maternal education and child mortality at the national, geopolitical and state levels across rural and urban settlements. This article purposively selected the 'highest educational level' of women whose child, especially those who fall into the age category of 1–4 years (i.e., child mortality), are either alive or dead. While the independent variable for this study is maternal education, the dependent is the child survival/mortality variable. Meanwhile, out of the 119,386 women that were surveyed, a total of 30,616 women was considered because they were those who have children between the ages of 12–48 months who are either is either alive or dead (this

was specifically needed for the Logistic regression). Though this study is interested in mortality and not survival; however, there is a need to examine women who are yet to experience child mortality in order to examine what they did differently in terms of education to keep their child alive. However, the sample size for this study was 8255 women. This is because they are the ones who have experienced child mortality. Table 1 shows how variables of interests were measured:

**Table 1: Variable Measurement Matrix**

| Variable Type        | Variable Name       | Variable Measures                      | Coding |
|----------------------|---------------------|--|--------|
| Independent Variable | Education Factor    | <b>Highest Educational Level</b>       |        |
|                      |                     | No formal Education                    | 0      |
|                      |                     | Primary Education                      | 1      |
|                      |                     | Secondary Education                    | 2      |
|                      |                     | Higher Education                       | 3      |
| Cofounding Variables | Family Factor       | <b>Household Member Size (Recoded)</b> |        |
|                      |                     | 1 – 3                                  | 1      |
|                      |                     | 4 – 6                                  | 2      |
|                      |                     | More than 6                            | 3      |
|                      | Religious Factor    | <b>Religion (Recoded)</b>              |        |
|                      |                     | Christian                              | 1      |
|                      |                     | Islam                                  | 2      |
|                      | Economic Factor     | <b>Wealth Index (Recoded)</b>          |        |
|                      |                     | Poor                                   | 0      |
|                      |                     | Middle                                 | 1      |
|                      |                     | Rich                                   | 2      |
|                      | Political Factor    | <b>Sex of Household Head</b>           |        |
|                      |                     | Male                                   | 1      |
|                      | Geographical Factor | <b>Type of Place of Residence</b>      |        |
|                      |                     | Urban                                  | 1      |
| Rural                |                     | 2                                      |        |
| Dependent Variable   | Child Mortality     | <b>Is Child Alive?</b>                 |        |
|                      |                     | No                                     | 0      |
|                      |                     | Yes                                    | 1      |

Source: Authors, 2017

The major aim of this article is to examine maternal education and child mortality in Nigeria. In achieving this, certain variables were controlled for and were recoded to suit the analysis plan. This article has 5 models. The justification of these models was as a result of the basic assumptions of the theoretical underpinning of this article. As stated before now, the major assumption of structural functionalism is that every society consists of social intuitions (i.e., economy, education, religion, family, politics etc.) which are interrelated and interdependent. This connotes that a defect in one will affect the whole system. Hence all functionalist theorists submitted that for any

society to survival, these social institutions must be at equilibrium (i.e., stable). This also means that an absence of one institution will affect the functional performance of other institutions. Hence in model 1, the study tested the relationship between maternal education (i.e., educational factor) and child mortality. However, in the model 2, household member size (i.e., family factor) was controlled for. This was to identify the role of household size in the relationship that subsists between maternal education and child mortality. Likewise, in Model 3, religious affiliation (i.e., religious factor) of women was added to the model 2, while wealth index (i.e., economic factor) and sex of household head (i.e., political factor) were added to model 4 and 5 respectively. The whole essence of this was to arrive at a true value that explains the relationship between maternal education and child mortality when other factors (i.e., family, religious, economic and political factors) are controlled for.

Lastly, this article employed both descriptive and inferential statistical techniques. The descriptive statistics made use of frequency distribution and simple percentages. However, chi-square, logistic regression analysis and One-way Analysis of Variance (i.e., ANOVA) were used to test for associations, relationships and differences respectively between variables of interest. This was done through the help of the Statistical Package for Social Sciences (SPSS) version 21.0.



**Results and Discussions****Table 2: Selected Socio-demographic Characteristics of Respondents**

| Variables and Categories                 | Frequency   | Percentages  |
|--|-------------|--------------|
| <b>Region</b>                            |             |              |
| North Central                            | 531         | 6.4          |
| North-East                               | 2116        | 25.6         |
| North-West                               | 4153        | 50.3         |
| South-East                               | 520         | 6.3          |
| South-South                              | 463         | 5.6          |
| South-west                               | 472         | 5.7          |
| <b>Type of Place of Residence</b>        |             |              |
| Urban                                    | 1726        | 20.9         |
| Rural                                    | 6529        | 79.1         |
| <b>Religion</b>                          |             |              |
| Christian                                | 1845        | 22.4         |
| Islam                                    | 6323        | 76.6         |
| Traditionalist                           | 87          | 1.1          |
| <b>Highest Educational Qualification</b> |             |              |
| No formal Education                      | 5897        | 71.4         |
| Primary Education                        | 1474        | 17.9         |
| Secondary Education                      | 788         | 9.5          |
| Higher Education                         | 96          | 1.2          |
| <b>Sex of Household Head</b>             |             |              |
| Male                                     | 7460        | 90.4         |
| Female                                   | 795         | 9.6          |
| <b>Household Size</b>                    |             |              |
| 1 – 3                                    | 763         | 9.2          |
| 4 – 6                                    | 3023        | 36.6         |
| More than 6                              | 4469        | 54.1         |
| <b>Wealth Index</b>                      |             |              |
| Poor                                     | 5588        | 67.7         |
| Middle                                   | 1388        | 16.8         |
| Rich                                     | 1279        | 15.5         |
| <b>Total</b>                             | <b>8255</b> | <b>100.0</b> |

Source: NDHS, 2013

Table 2 shows that 82.3%, which constitute a majority of women from the northern part of the country, have experienced child mortality compared to the mothers in the southern part that recorded only 18.7% of the overall child mortality in Nigeria. Also, the majority (79.1%) of respondents are rural dwellers. However, only 20.9% were found to be residing in the urban centers. Religion-wise, the majority of the respondents are Muslims while the remaining 22.4% and 1.1% of the mothers practice Christianity and traditionalism. Meanwhile, 71.4% of the surveyed mothers have no formal education, while the remaining 17.9%, 9.5%, and 1.2% had primary, secondary and tertiary education respectively. Obviously, the majority of the mothers who have experienced child mortality are illiterate. In terms of household political

relations, the study found that majority (90.4%) of the household of mothers that were relevant for this study were headed by males while 9.6% of the household were matriarchal in nature. Furthermore, 54.1% of the respondent has a large household size, while 36.6% and 9.2% have medium and small household sizes respectively. Lastly, in economic terms, the table above shows that the majority of the respondents are poor, while the wealth index of 16.8% and 15.5% of mothers signifies middle and rich.

**Table 3: Association between Highest Educational Qualification and Selected Socio-demographics**

| Socio-demographic Variables       | Highest Educational Qualification |                   |                     |                  | Test of Association  |
|-----------------------------------|-----------------------------------|-------------------|---------------------|------------------|--|
|                                   | No formal Education               | Primary Education | Secondary Education | Higher Education |  |
| <b>Region</b>                     |                                   |                   |                     |                  |  |
| North Central                     | 230(3.9)                          | 199(13.5)         | 78(9.9)             | 24(25.0)         | $\chi^2 = 3499.6$ ;<br>df = 15;<br>Sig. = 0.000;<br>Cramer's V = 0.376 |
| North-East                        | 1707(28.9)                        | 304(20.6)         | 89(11.3)            | 16(16.7)         |  |
| North-West                        | 3733(63.3)                        | 317(21.5)         | 100(12.7)           | 3(3.1)           |  |
| South-East                        | 92(1.6)                           | 238(16.1)         | 162(20.6)           | 28(29.2)         |  |
| South-South                       | 50(0.8)                           | 242(16.4)         | 160(20.3)           | 11(11.5)         |  |
| South West                        | 85(1.4)                           | 174(11.8)         | 199(25.3)           | 14(14.5)         |  |
| <b>Type of Place of Residence</b> |                                   |                   |                     |                  |  |
| Urban                             | 831(14.1)                         | 466(31.6)         | 365(46.3)           | 64(66.7)         | $\chi^2 = 697.1$ ;<br>df = 3;<br>Sig. = 0.000;<br>Cramer's V = 0.29.1  |
| Rural                             | 5066(85.9)                        | 1008(68.4)        | 423(53.7)           | 32(33.3)         |  |
| <b>Religion</b>                   |                                   |                   |                     |                  |  |
| Christian                         | 374(6.3)                          | 817(55.4)         | 575(73.0)           | 79(82.3)         | $\chi^2 = 3176.1$ ;<br>df = 6;<br>Sig. = 0.000;<br>Cramer's V = 0.439  |
| Islam                             | 5461(92.6)                        | 635(43.1)         | 210(26.6)           | 17(17.7)         |  |
| Traditionalist                    | 62(1.1)                           | 22(1.5)           | 3(0.4)              | 0(0.0)           |  |
| <b>Sex of Household Head</b>      |                                   |                   |                     |                  |  |
| Male                              |                                   |                   |                     |                  | $\chi^2 = 161.2$ ;<br>df = 3;<br>Sig. = 0.000;<br>Cramer's V = 0.236   |
| Female                            | 5577(94.6)                        | 1222(82.9)        | 589(74.7)           | 72(75.0)         |  |
|                                   | 320(5.4)                          | 252(17.1)         | 199(25.3)           | 24(25.0)         |  |
| <b>Wealth Index</b>               |                                   |                   |                     |                  |  |
| Poor                              | 4816(81.7)                        | 635(43.1)         | 136(17.3)           | 1(1.1)           | $\chi^2 = 2697.0$ ;<br>Df = 6;<br>Sig. = 0.000;<br>Cramer's V = 0.404  |
| Middle                            | 766(13.0)                         | 429(29.1)         | 178(22.6)           | 15(15.6)         |  |
| Rich                              | 315(5.3)                          | 410(27.8)         | 474(60.2)           | 80(83.3)         |  |
| <b>Household Member Size</b>      |                                   |                   |                     |                  |  |
| 1 – 3                             | 456(7.7)                          | 154(10.4)         | 134(17.0)           | 19(19.8)         | $\chi^2 = 251.8$ ;<br>Df = 6;<br>Sig. = 0.000;<br>Cramer's V = 0.123   |
| 4 – 6                             | 1971(33.4)                        | 616(41.8)         | 388(49.2)           | 48(50.0)         |  |
| More than 6                       | 3470(58.8)                        | 704(47.8)         | 266(33.8)           | 29(30.2)         |  |
| <b>Total</b>                      | 16242(53.1)                       | 6121(20.0)        | 6730(22.0)          | 1523(5.0)        |  |

Note: Values in parentheses are the percentage distributions of frequencies outside the parentheses

Source: NDHS, 2013

Table 3 shows the degree of association between region, type of place of residence, religion, sex of household head, wealth index, household member's size of mothers who have experienced child mortality and their highest educational qualification. The table specifically shows that there is a moderate positive association between mothers region and their educational qualification. A close examination of table 3 shows that 63.3%, which constitute a majority, of mothers that are uneducated are from the north-western part of Nigeria. However, the southwest and South-south part of the country has the lowest (1.4% and 0.8% respectively) portion of mothers that are uneducated. Women who experienced child mortality despite the

acquisition of more primary (21.5%), secondary (25.3%) and higher educations (29.2%) were found in the north-west, southwest, and southeast regions of the country. Therefore, it is convenient to state at this junction that, while no formal and primary education is more associated with women in the northwestern part of the country, secondary and higher education are more associated with mothers in the south-west and southeast regions respectively.

In terms of the type of place of residence, table 3 found that there is a weak positive association between maternal education and mother's type of place of residence. Specifically, more women with no formal education (85.9%), primary education (68.4%) and secondary education (53.7%) reside in the rural areas. However, 66.7% of mothers with higher educational qualifications are found to be urban dwellers. Invariably, mothers with no formal education, primary education, and secondary education are more associated with the rural centers, while those with higher education are mainly associated with mothers who reside in the urban centers.

Also, there is also a moderate but positive association between maternal education and mother's religious affiliation. Pointedly, the majority of mothers with no formal education (92.6%) are Muslims, while 55.4%, 73.0% and 82.3% of mothers with primary, secondary and tertiary education are Christians. Hence, while illiteracy is more associated with mothers who are religiously affiliated to Islam, mothers that are affiliated to Christianity are largely literates. Furthermore, there is a weak positive association between maternal education and the sex of household head. Precisely, 94.6%, 82.9%, 74.7% and 75.0% of mothers with no formal education, primary, secondary and higher education respectively are from households headed by a male. Therefore, all categories of maternal education are slightly associated with the patriarchal household.

Meanwhile, there is a moderate association between maternal education and maternal household economic capacities as indicated by their wealth index categories. Specifically, 81.7% and 43.1% of women with no formal education and primary education respectively are mainly from a poor household. However, women with secondary (60.2%), higher educational qualifications (83.3%) are mainly from rich households. Therefore, women with no formal education and primary education are associated with poor households. However, mothers that acquired secondary and higher education are mainly concentrated in rich households. This literally means that mothers acquire more educational qualifications as the wealth index of maternal household increases. Lastly, maternal education is fairly and positively associated with household member size. This is reflected in table 3 as 58.8% and 47.8% of mothers with no formal education have more than 6 household members. However, the majority of mothers with secondary (49.2%) and higher education (50.0%) have a household member size of 4 – 6. This suggests that more education is guaranteed among mothers with a moderate household member's size, while the low educational level of mothers is predicated on the large household members they have.

**Table 4: Association between Child Mortality and Selected Socio-demographics**

| Socio-demographic Variables       | Test of Association |             |   |
|-----------------------------------|---------------------|-------------|---|
|                                   | No                  | Yes         |   |
| <b>Region</b>                     |                     |             | $\chi^2 = 1656.6$<br>df = 5<br>Sig. = 0.000<br>Cramer's V = 0.233 |
| North Central                     | 531(6.5)            | 3388(15.2)  |   |
| North-East                        | 2116(25.6)          | 4596(20.6)  |   |
| North-West                        | 4153(50.3)          | 6831(30.5)  |   |
| South-East                        | 520(6.3)            | 1974(8.8)   |   |
| South-South                       | 463(5.6)            | 2736(12.2)  |   |
| South West                        | 472(5.7)            | 2836(12.7)  |   |
| <b>Type of Place of Residence</b> |                     |             | $\chi^2 = 481.5$<br>df = 1<br>Sig. = 0.000<br>Phi = 0.125         |
| Urban                             | 1726(20.9)          | 7582(33.9)  |   |
| Rural                             | 6529(79.1)          | 14779(66.1) |   |
| <b>Religion</b>                   |                     |             | $\chi^2 = 903.7$<br>df = 2<br>Sig. = 0.000<br>Cramer's V = 0.172  |
| Christian                         | 1845(22.4)          | 9141(40.9)  |   |
| Islam                             | 6323(76.6)          | 12993(58.1) |   |
| ATR                               | 87(1.1)             | 227(1.0)    |   |
| <b>Sex of Household Head</b>      |                     |             | $\chi^2 = 7.415$<br>df = 1<br>Sig. = 0.000<br>Phi V = 0.016       |
| Male                              | 7460(90.4)          | 19968(89.3) |   |
| Female                            | 795(9.6)            | 2393(10.7)  |   |
| <b>Wealth Index</b>               |                     |             | $X^2 = 1452.8$<br>df = 2<br>Sig. = 0.000<br>Cramer's V = 0.218    |
| Poor                              | 5588(67.7)          | 9981(44.6)  |   |
| Middle                            | 1388(16.8)          | 4488(20.1)  |   |
| Rich                              | 1279(15.5)          | 7892(35.3)  |   |
| <b>Household Member Size</b>      |                     |             | $X^2 = 119.9$<br>df = 2;<br>Sig. = 0.000;<br>Cramer's V = 0.063   |
| 1 – 3                             | 763(9.2)            | 1986(8.9)   |   |
| 4 – 6                             | 3023(36.6)          | 9718(43.5)  |   |
| More than 6                       | 4469(54.1)          | 10657(47.7) |   |
| <b>Total</b>                      | 8255(27.0)          | 22361(73.0) |   |

Note: Values in parentheses are the percentage distributions of frequencies outside the parentheses

Source: NDHS, 2013

Table 4 shows the association between maternal social features and child survival/mortality. Specifically, the table shows that there is a weak positive association between maternal region and child mortality. In a more precise term, child mortality is mainly experienced by mothers in the northern part of the country (82.4%), with the northwest, northeast and north-central recording 50.3%, 25.6% and 6.4% of the total child death respectively. However, mothers in southern part experienced less child death as 17.6% was recorded in the region, with the south-southern part recording the least (5.6%), closely followed by Southwest (5.7%) and southeast (6.3%). Therefore, it is safe to state here that child mortality is more associated with the northern part of the country while is less associated with the mothers located in the southern region.

There is also a weak positive association between maternal place of residence and child mortality. The table shows that 79.1% of the total child death in Nigeria was recorded by mothers who reside in the rural areas, while the remaining 20.9% of the total child mortality was experienced by mothers in the urban centers. Hence, the results above connote that child mortality is more associated with mothers that dwell in rural regions than those who are urban settlers. The chi-square results also show that there is a positive but weak

association between the maternal religion and child mortality. Precisely, 76.6% of the total child mortality for 2003 in Nigeria was experienced by mothers who are Muslims. However, 22.4% of Christian mothers and 1.1% of mothers who are traditionalist experienced child mortality respectively. This is to say that child mortality is more associated with mothers who practice Islam than those who practice Alternative Traditional Religion (ATR) and Christianity.

The sex of household head also influences child mortality. Specifically, 90.4% of the child mortality is more associated with mothers whose household is headed by a male (90.4%) than households headed by the females (9.6%). Meanwhile, the economic condition of a household influences the prevalence of child mortality. This is because table 5 shows that more than half (i.e., 67.7%) of child mortality recorded in Nigeria were experienced by mothers with poor wealth index. However, child mortality stands to reduce as long as a mother wealth index signifies that she is a middle-class (16.8%) or rich (15.5%). Therefore, child mortality is mainly associated with mothers with poor wealth index and specifically less associated with a mother with middle and rich wealth indexes. Lastly, the table shows that there is a weak positive relationship between household member size and child mortality. Pointedly, 54.1% of the total 1–4 child mortality is experienced by mothers that have more than 6 household member size, while 36.6% and 9.2% of the total child mortality is experienced by mothers with 4–6 and 1–3 household member sizes respectively. This is to say that child mortality is mainly associated with mothers with more than 6 family member size and specifically low among mothers with 1–3 household member size. Hence, a large household member size propels child mortality.

### ***Gendered Child Mortality***

**Table 5: Maternal Education and Rate of Gendered Child Mortality**

| <b>Maternal Education</b> | <b>Descriptive Statistics</b> |                           |                               |                           |
|---------------------------|-------------------------------|---------------------------|-------------------------------|---------------------------|
|                           | <b>Male-Child Mortality</b>   |                           | <b>Female-Child Mortality</b> |                           |
|                           | <i>Mean</i>                   | <i>Standard Deviation</i> | <i>Mean</i>                   | <i>Standard Deviation</i> |
| No Formal Education       | 0.95                          | 1.297                     | 0.84                          | 1.167                     |
| Primary Education         | 0.58                          | 0.984                     | 0.47                          | 0.841                     |
| Secondary Education       | 0.26                          | 0.631                     | 0.21                          | 0.543                     |
| Tertiary Education        | 0.13                          | 0.425                     | 0.12                          | 0.421                     |
| <b>ANOVA</b>              | <b>Inferential Statistics</b> |                           |                               |                           |
|                           | <i>F-Statistic</i>            | <i>Sig.</i>               | <i>F-Statistic</i>            | <i>Sig.</i>               |
|                           | 809.4                         | <b>0.000</b>              | 859.2                         | <b>0.000</b>              |

**Source:** NDHS, 2013

Table 5 shows the mean and standard deviation of both male and female-child mortality experienced by mothers with different educational levels. An average of 0.95 male-child mortality has been experienced by mothers with no formal education while an average of 0.58, 0.26 and 0.13 male-child mortalities have been encountered by mothers with primary, secondary and tertiary educations respectively. Furthermore, the standard deviation figures reveal that the mothers within the cohort of no formal education have experienced male-child

mortality whose rate (i.e., number of male-child mortality) are largely different from each other. However, the standard deviation figure for mothers with tertiary education shows that the rate of male-child mortality is not different among the women in the aforementioned cohort. Therefore, it is not out of place to say that mothers with no formal education experienced more male-child mortality than mothers with primary, secondary and tertiary education. On a similar vein, mothers with no formal education have experienced an average of 0.84 girl-child mortality while mothers with primary, secondary and tertiary educations have experienced an average of 0.47, 0.21, and 0.12 female-child mortality respectively. The rate of female-child mortality among women with no formal education, though high, is different from each other. However, there is no much difference in the number of female-child mortality among women with tertiary education. Lastly, the inferential statistical section of table 5.1 shows that there exists a significant difference ( $P_{0.000} < 0.05$ ) between mothers with different level of education and both male and female child mortality. However, the aforementioned statement makes no complete sense as table 5 does not show where the difference lies herein. Against this backdrop, 6 Table was computed to fill this gap.

### ***Multiple Comparisons***

**Table 6: Multiple Comparisons**

| <b>Gendered Mortality</b> | <b>Maternal Education</b> | <b>No Formal Education</b> | <b>Primary</b> | <b>Secondary</b> |
|---------------------------|---------------------------|----------------------------|----------------|------------------|
| Male-Child Mortality      | No Formal Education       |                            |                |                  |
|                           | Primary                   | 0.365***                   |                |                  |
|                           | Secondary                 | 0.687***                   | 0.323***       |                  |
|                           | Higher                    | 0.821***                   | 0.456***       | 0.133***         |
| Female-Child Mortality    | No Formal Education       |                            |                |                  |
|                           | Primary                   | 0.369***                   |                |                  |
|                           | Secondary                 | 0.630***                   | 0.261***       |                  |
|                           | Higher                    | 0.725***                   | 0.356***       | 0.095***         |

Source: NDHS, 2013

Table 7 indicates that there is a statistically significant difference in male-child mortality experienced by mothers with primary and no formal education (i.e.,  $\pi = 0.365$ ;  $P_{0.000} < 0.05$ ), between the former and mothers with secondary education ( $\pi = 0.687$ ;  $P_{0.000} < 0.05$ ) and between them and mothers with tertiary education ( $\pi = 0.821$ ;  $P_{0.000} < 0.05$ ). Also, male-child mortality differs significantly between mothers with primary and secondary education ( $\pi = 0.323$ ;  $P_{0.000} < 0.05$ ), between the former and mothers with tertiary education ( $\pi = 0.456$ ;  $P_{0.000} < 0.05$ ) and between mothers with secondary and tertiary education. The foregoing shows that male-child mortality exists mostly among mothers with no formal education, while women with higher educational qualifications experience lower male-child mortality rate. Similarly, female-child mortality experiences differ between mothers with no formal education and primary education ( $\pi = 0.369$ ;  $P_{0.001} < 0.05$ ), between the former and

mothers with secondary education ( $\pi = 0.630$ ;  $P_{0.001} < 0.05$ ), and between them and mothers with tertiary education ( $\pi = 0.725$ ;  $P_{0.001} < 0.05$ ). Furthermore, female-child mortality rate differs significantly between mothers with primary and secondary education ( $\pi = 0.261$ ;  $P_{0.001} < 0.05$ ), between the former and mothers with higher education ( $\pi = 0.356$ ;  $P_{0.001} < 0.05$ ), and between mothers with secondary and higher education ( $\pi = 0.095$ ;  $P_{0.001} < 0.05$ ). Just like the male-child mortality, girl-child mortality exists most among mothers with no formal education, while it is low among women with higher educational qualifications.

**Table 7: Maternal Education, Structural Factors, and Child Mortality in Nigeria**

| Independent Variables                    | Model 1  | Model 2  | Model 3  | Model 4  | Model 5  |
|--|----------|----------|----------|----------|----------|
| <b>Highest Educational Qualification</b> |          |          |          |          |          |
| No formal Education®                     | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    |
| Primary Education                        | 1.797*** | 1.794*** | 1.628*** | 1.384*** | 1.397*** |
| Secondary Education                      | 4.298*** | 4.331*** | 3.812*** | 2.790*** | 2.824*** |
| Higher Education                         | 8.473*** | 8.602*** | 7.523*** | 4.959*** | 5.008*** |
| <b>Family Size</b>                       |          |          |          |          |          |
| 1 – 3 ®                                  |          | 1.000    | 1.000    | 1.000    | 1.000    |
| 4 – 6                                    |          | 1.342*** | 1.341*** | 1.344*** | 1.291*** |
| More than 6                              |          | 1.275*** | 1.291*** | 1.303*** | 1.235*** |
| <b>Religion</b>                          |          |          |          |          |          |
| Christian ®                              |          |          | 1.000    | 1.000    | 1.000    |
| Islam                                    |          |          | 0.811*** | 0.833*** | 0.803*** |
| Traditionalist                           |          |          | 1.030    | 1.088    | 1.071    |
| <b>Wealth Index</b>                      |          |          |          |          |          |
| Poor ®                                   |          |          |          | 1.000    | 1.000    |
| Middle                                   |          |          |          | 1.378*** | 1.400*** |
| Rich                                     |          |          |          | 1.727*** | 1.736*** |
| <b>Sex of Household Head</b>             |          |          |          |          |          |
| Male ®                                   |          |          |          |          | 1.000    |
| Female                                   |          |          |          |          | 0.740*** |
| <b>Type of Place of Residence</b>        |          |          |          |          |          |
| Urban®                                   |          |          |          |          |          |
| Rural                                    |          |          |          |          | 1.000    |
|  |          |          |          |          | 1.005    |

**Dependent Variable: Child Mortality**

**Source:** NDHS, 2013

Table 7 shows the relationship between maternal education and child mortality/survival as mediated by the structural factors of interest. In model 1, the table shows that there is a significant relationship between maternal education and child mortality. Specifically, children procreated by mothers with primary education are 1.797 times more likely survive than the children of those without formal education. However, the children of mothers who acquire secondary and tertiary education are 4.298 and 8.473 times respectively more likely to survive than those without formal education. This connotes those mothers without any formal education experiences child mortality than those with primary, secondary and tertiary education. Put differently, as mothers acquire more education, there will be a corresponding decrease in their

experience of child mortality. This corroborates the findings of Schellenberg *et al.* (2002), Delgado *et al.* (2002), Hurt *et al.* (2003), Grépina & Bharadwaj (2015), Adeolu *et al.* (2016), Balogun *et al.* (2017), Yaya *et al.* (2017) who all noted that child mortality was high and low among mothers with no educational and tertiary education respectively.

Mothers with large family size experience child mortality than those with medium family size (Gebretsadik & Gabreyohannes, 2016). However, there was a sharp deviation between the finding of this study and that of Gebretsadik & Gabreyohannes (2016) as it was discovered that mothers with small family size experiences child mortality more than those with medium family size. Nonetheless, after the family size, representing maternal family factor was introduced as shown in model 2; there were a slight reduction and increase in the strength of the relationship between specific maternal educational qualifications and child mortality respectively. Specifically, there was a slight reduction in the influence of mother's primary educational qualification on child survival. This is particularly true among mothers who have large and small family sizes. Invariably, the ability of mothers with primary education to curb child mortality is weak, especially for mothers with large and small family sizes respectively. However, mothers with primary education and with medium family size have higher chances to experience child survival than those with large and small family sizes. Nonetheless, the acquisition of secondary and tertiary education by mothers enhances the chances of child survival. This is more achievable by mothers with medium family size. Therefore, while large and small family sizes reduce the chances of child survival among mothers with primary education, similar family sizes enhances it for mothers with secondary and tertiary education, especially among mothers with medium family size and higher education.

Table 7 shows that child mortality is more prevalent among Muslim mothers who are Christians. Furthermore, the maternal religious factor was introduced to the model 3 and it shows a reduction in the strength of the relationship between maternal education and child mortality. The table found that Muslim mothers who have a primary education with both large and small family sizes have higher chances of experiencing child mortality than Christian mothers with primary education and medium family size. This means that child mortality is prevalent among mothers who are Muslims with large and small family sizes than those who are Christian and with medium family size. This scenario is similar to mothers with secondary and higher educational qualifications. That is, mothers with the aforementioned educational qualifications and family sizes also experience child mortality but not much as those with primary education. Hence, child mortality is more prevalent among mothers with primary educations, who are Muslims by religion and have large and small family sizes compared to those with secondary and tertiary education who are Christians and with medium family size.

As shown in model 4, mothers who are economically rich have lesser chances of experiencing child mortality when compared to those with middle



and poor wealth index. Invariably, economic capacities of mothers enhance the chances of child survival. This is similar to the finding of Kembo & Van Ginneken (2009), Izugbara (2014), Lartey *et al.* (2016), Yaya *et al.* (2017) who discovered that the risk of childhood mortality is significantly lower among mothers in middle, rich economic quintiles when compared to the risk of childhood mortality with mothers who are poor. Nevertheless, the functionality of maternal education in the reduction of child mortality is enormous. Pointedly, there is a sharp decline in the relationship between mothers with secondary and higher education and child mortality. This is because of mothers with poor household wealth index and with primary education experience child mortality than those with middle and rich wealth indexes. This connotes that the acquisition of tertiary education, with medium family size, rich wealth index among Christian mothers reduces the chances of child mortality.

In the last model, model 5, the prevalence of childhood mortality is high among women from the matriarchal household when compared to those from the patriarchal counterpart. The introduction of the sex of household head as shown in the fifth model shows that the influence of primary, secondary and tertiary education on the reduction of the chances of child mortality is high among women from patriarchal households than those from matriarchal households. Therefore, Table 5 shows that mothers with tertiary education, medium family size who are Christians and are from patriarchal households reduces the chances of childhood mortality experience. However, the p-value for the type of place of residence in the model is not significant. The model 5 shows that the relationship that subsists between maternal education and child mortality cannot be fully captured without introducing family size, religion, wealth index, and the sex of household head as confounding variables into the relationship. It follows that the relationship maternal education and child mortality cannot be fully captured without examining the impact of structural factors such the maternal family, religion, economic and political factors. This is related to the stand of structural-functionalism which argued that the reduction of child mortality among mothers will also be predicated not only on education but also, the contribution of other micro-structural factors (social determinants). This is because the structural functionalists argued that the contribution of education in reducing child mortality may not be complete without the contribution of other factors. Therefore, the level at which education is functional to reducing child mortality is predicated on some background factors such as family size, religious affiliation, wealth index and sex of household head.

### **Conclusion**

This study has affirmed that child mortality is more prevalent among women who have no formal education, primary and secondary education than those with higher educational qualification. Consequently, mothers with no formal education, primary and secondary education have a higher likelihood of experiencing child mortality than those with higher educational qualification.

However, this relationship cannot be fully captured without examining the influence of confounding variables such as family size, religious affiliation, wealth index and sex of household head as they in turn influence the relationship between mothers' education and child mortality. Based on the findings of this study, it is concluded that the relationship between maternal education and child mortality cannot be fully understood without examining the family, political, economic, and religious characteristics of relevant mothers.

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