INTERNAL FEMALE MIGRATION AND CHILDHOOD MORBIDITY IN NIGERIA

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CERTIFICATION

THIS IS TO CERTIFY THAT THIS PROJECT WAS CARRIED OUT BY ALABI ALEEMAH OLOLADE OF THE DEPARTMENT OF EPIDEMIOLOGY AND MEDICAL STATISTICS, FACULTY OF PUBLIC HEALTH, COLLEGE OF MEDICINE, UNIVERSITY OF IBADAN, IBADAN.

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To ALLAAH (SWT) and HIS Messenger - Prophet Muhammad (SAW)

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Indeed, after hardship, there is ease (Q94: 6). All Praise and Adoration is due to ALLAH (SWT), the Lord of the world.

My special thanks go to my Loving and Caring parents, Alh. & Alh. Alabi, who have always been supporting me right away from my cradle. I pray Allah have mercies on them, and make them inmates of Al- Jannah (amin).

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ABSTRACT

Individuals move between rural and urban centres and vice versa due to socio-economic, demographic and cultural factors without considering its effect on the lives of their children. The few previous studies on migration and child health in Nigeria has focussed on child mortality and immunization with consideration for just three migration streams. This study was therefore conducted to investigate the relationship between six streams of internal female migration and childhood morbidity in Nigeria.

Children data from the 2008 Nigeria Demographic and Health Survey (NDHS) was used for this study. The type of place of residence, place of previous residence and years lived in place of residence were used to derive six migration streams. Childhood morbidities were measured by the occurrence of symptoms of diarrhea, fever, and cough within two weeks preceding the survey. Analysis was limited to children alive and whose mothers were not visitors at the time of the survey. The data was weighted to adjust for the stratified two-stage cluster sampling technique adopted during the survey and was analyzed using descriptive statistics, Chi-square tests, simple and multiple logistic regression models at 5% significance level.

Overall, 24,975 children were included in the analyses of which 28.8% belonged to women aged 25-29 years. The majority of the under-five mothers were currently married (94%). Almost half (45.4%) of the mothers have no formal education and about one-third (30.4%) of the children belonged to mothers who were housewives. A high proportion (63.0%) of the children were delivered at home and 36.3% of children never had vaccination. Rural-rural migration was found to be the most common form of internal female migration (33.4%). The percentages of rural non-migrants, rural-urban, urban non-migrant, urban-urban and urban-rural were 22.5%, 6.3%, 7.0%, 18.5%, 13.3% respectively. The prevalence of childhood morbidity was 26%. Overall, 16% of under-five children were reported to have had fever, 13% had cough while 10%

had diarrhea in the two weeks prior to the survey The process of migration had a significant effect on childhood morbidity especially among rural-rural {OR=1.33, C.I=1.18-1.49} and urban-rural migrants {OR=1.25, C.I=1.07-1.46}. Logistic regression provided evidence that the likelihood of childhood morbidity decreases with advance in maternal age (at least 25 years) and higher educational level was a protective factor against the occurrence of childhood morbidity {OR=0.80, C.I=0.65-0.98}. Children from the North East region had a relatively higher risk of childhood morbidity {OR=3.04, C.I=2.50-3.70}. Multiple logistic regression revealed that mother's age, region of residence, child's size at birth and wealth index are important in explaining the differentials in childhood morbidity among migrants and non-migrants' children.

This study clearly demonstrate that under-five children of rural-rural migrants and urban-rural migrants in Nigeria are significantly at higher risk of childhood morbidity than their non-migrant counterparts. Mother's age, region of residence, birth size, wealth index are important determinants of childhood morbidity. This emphasizes the need for advanced age at marriage (above 20), increased female education, and a general improvement of the socio-economic situation of people in rural community.

Key words: rural-urban migration, urban-rural migration, rural non-migrants, mothers of under-fives. childhood morbidity, Nigeria Demographic and Health Survey (NDHS).

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CHAPTER ONE

BACKGROUND OF THE STUDY

1.1 INTRODUCTION

The current health situation in Nigeria, as in many developing countries, is unsatisfactory, with women and children, particularly those in rural areas, being most affected. Migration and health have complex relationships and interactions, which operate both ways, from migration to health and from health to migration, and can be either positive or negative, from beneficial to deleterious effects on health, and from push to pull factors on migration (Garenne, 2003). Migration is a rational decision made by an individual to move from a less advantageous situation to a more advantageous one after weighing risks and benefit (Pandit et. al 2011). Migration (human) is the movement of people from one place in the world to another for the purpose of taking up permanent or semi-permanent residence, usually across a political boundary. Migrations have occurred throughout human history, beginning with the movements of the first human groups from their origins in East Africa to their current location in the world (Human Migration Guide, 2005).

Migration is an important strategy for the diversification of livelihoods for many in the world's poorest nations. Rural urban migration still accounts for most of the migratory movements in West Africa (Antai et. al, 2010). Rural- Urban Migration is the movement of people from rural areas into cities. Rural–urban migration in sub-Saharan Africa, either temporary or permanent, appears to be the most significant form of movement for long-term spatial redistribution and is therefore regarded by many policy makers and governments as the overriding internal migration pattern in the region, after the exclusion of periodic and seasonal movements (Antai et. al, 2010, Chattopadhyay et. al. 2006). Rural-Urban migration in Nigeria

occurs with the migration of rural dwellers, many of whom are young men and women seeking greener pastures in the city. The major reasons for this movement can be classified into push and pull factors (Muniz et. al., 2010). Push factors include famine, drought, flooding, lack of employment opportunities, civil war, etc. Pull factors include the chance of better job, better access to education and services, and higher standard of living. These factors have contributed to millions of people moving to cities, creating mass urbanization. As more and more people leave villages and farms to live in cities, urban growth results. Urbanization is the increasing number of people that live in urban areas. Urbanization is defined as the process of development where rural-urban migration is responsible for urbanization (Azad and Rahman. 2009; Islam and Azad, 2008; Afsar, 2000). Migration has changed the demographic composition of towns. cities, and nations (Muniz et. al., 2010).

Childhood morbidity is among the most serious health issues facing developing countries and a determinant of mortality in many developing countries. Infant and child mortality rates are exceedingly high and Nigeria ranks 15th highest with over one million children dying annually from preventable diseases. Nigeria is one of the least successful African countries in achieving improvements in child survival in the past four decades. in spite of advances in universal immunization and oral re-hydration (ORT) for diarrhea disease. and the wealth of Nigeria's human and natural resources (Antai 2010; Ogunjuyigbe 2008. Ngowu 2008). Preventable or treatable infectious diseases such as malaria, pneumonia, diarrhoea, measles and HIV/AIDS account for more than 70 per cent of the estimated one million under-five deaths in Nigeria (Ojewumi and Ojewumi, 2012; UNICEF, 2010). Diarrhea, cough and fever are the leading causes of childhood morbidity and mortality in sub-Saharan Africa (SSA) (Kandala et. al., 2008).

1.2 STATEMENT OF THE PROBLEM:

One of the most significant migration patterns has been rural to urban migration—the movement of people from the countryside to cities in search of opportunities. Nigeria is one of the countries in the world with very high rural-urban dichotomy (Nwokocha 2007). Several studies have examined the determinants of migration and its impact on economic growth. Individuals move from rural to urban centers due to the unequal infrastructure between urban and rural areas and with the hope of overcoming the challenges associated with rural life. Apart from socio-economic development, rural-urban migration have positive and negative impacts on biological and demographical characteristics of human beings such as fertility, morbidity, mortality, immunization, malnutrition, and health. Infectious diseases in under-five children are a major concern in developing countries. Health care service is of a better standard in urban compared to rural places. However, the significant contribution of migration to economic growth and urbanization has not allowed for affirmative conclusion on the effect of migration on childhood morbidity.

1.3 JUSTIFICATION:

There is need for more research on migration and child health, particularly in Nigeria where many people leave villages and farms to live in cities. Child health remains one of the most popular indicators for development as it measures the quality of life in developing countries. Much of the evidence for migration perspective in sub-Saharan Africa (SSA) consists of examples of determinants and consequences (Amankwaa et al., 2003). This research is expected to provide results that are both informative and useful for stakeholders concerned with children's well-being, as there are undoubtedly profound effects of women's migration on the lives of their children.

1.4 RESEARCH QUESTIONS

- Does maternal migration affect childhood morbidity in Nigeria?
- What factors explain the differences in childhood morbidity between migrants and non-migrants children?

1.5 OBJECTIVES OF THE STUDY

General objective:

- To assess the effect of female migration on childhood morbidity in Nigeria.

Specific objective:

- To determine the pattern of internal female migration in Nigeria.
- To determine the pattern of childhood morbidity in Nigeria
- To explore the association between different migration streams and childhood morbidity in Nigeria
- To determine the independent influence of internal migration and other variables on childhood morbidity in Nigeria.

CHAPTER TWO

LITERATURE REVIEW

2.1 MIGRATION THEORETICAL FRAMEWORK

Literatures have identified three perspectives of migration to explain the differential health outcomes between migrants and non-migrants. These are Disruption, Selection and Adaptation perspectives.

1. DISRUPTION

The disruption argument notes that the process of migration disrupts the natural progression of demographic events in the lives of migrants (Ssengonzi et al. 2002, Antai et. al, 2010) migration is detrimental due to the break in mothers' networks and support groups. A migrant mother stands to lose contact with people who would otherwise give her support and advice on childcare and treatment in the event of the children's illness. Migration may also disrupt mothers' network to obtain financial support, and even social and cultural practices (Ssengonzi et al.2002). Shorter birth intervals are associated with reduced child survival, and rural women are reported to have longer birth intervals than urban women (Vitzthum 2001), thereby improving the survival chances of their children. The disruption perspective therefore argues that despite availability of better health services in urban areas, children of rural–urban migrants will have lower survival chances than children of non-migrants owing to consequences of the migration itself (Antai et. al. 2010, Ssengonzi et.al.2002).

2. SELECTION

Migration is essentially selective. The vast majority of migration contains an element of migrant selectivity (also known as differentiation). In general, selectivity occurs because there are

distinct differences between the interests of the individuals who belong to various social groups (Muniz et. al., 2010). According to selection theory rural–urban migration is selective for those with specific demographic and socio-economic characteristics that are favourable to child survival (Antai et. al, 2010). The most commonly examined personal differences are related to age (younger people, for example, are more likely to migrate than older persons), gender, level of education, socio-professional status, marital status, and housing situation (owner or renter of property) (Muniz et. al., 2010). Selection theory argues that occupation, education, and wealth explains a person's propensity to migrate. Rural to urban migration is related to the concept of selectivity, which in turn is beneficial to infant survival (Amankwaa et.al. 2003). According to this perspective, risk of childhood morbidity decreases for children of rural- urban migrants is associated with these chacteristics that increase their propensity to migrate (Ssengonzi et al. 2002, Antai et. al. 2010, Amankwaa et al. 2003).

3. ADAPTATION

Migrant adaptation implies contact with urban environment through social interaction and increased exposure to new ideas may lead to changes in attitudes, life style, and motivations (Amankwaa et al. 2003). rural-urban migrants are more likely to have access to better medical facilities in their places of destination than in their places of origin, it may take some time for the migrants to adjust to and to begin using urban services and facilities effectively (Ssengonzi et al.2002). Migrant adaptation posits that differential health outcomes (in this case, child morbidity) among the children of rural-urban migrants and non-migrants are associated with the difficulty of migrants to adjust to, and effectively use services and facilities in the new urban environment (Antai, 2010). The length of time spent in an area is key to the level of adjustment and utilization of health services. As migrants spend more time in urban settings, they learn

urban ways of life and culture (including health seeking behaviours) develop new friendships and networks and hence become more likely to use health services just like urban non-migrants (Ssengonzi et al.2002). Social institutions, such as health services, family members already living in the host area and community groups are important in aiding the adaptation of migrants into the host population and hence child survival (Antai et.al. 2010, Stephenson et.al.2003).

2.2 MIGRATION IN NIGERIA

Human migration is the movement of people from one place to another with the intention of settling in the new location. Internal migration refers to the movement or change of residence within state boundaries which involves provinces, cities or municipalities. Rural-urban migration is one of the most significant migration patterns. It is the movement of people from the countryside to cities in search of opportunities (Human Migration Guide 2005). The burden of rural-urban migration in Nigeria is multifaceted and intertwining (Aworemi et. al. 2011, Nwokocha 2007).

There is a large volume of internal migration in the country induced by scarcity of land, impoverished soil, declining crop yields, poor harvests and soil erosion, among others (onlinenigeria). Rural-Urban migration in Nigeria assumed prominence in the Oil boom era of the early 1970s (Iruonagbe). With the shift in reliance of the Nigerian economy from agriculture to heavy dependence on crude oil as the major source of foreign revenue, the rural economy has experienced significant deterioration (Ayadi 2005, Antai et. al. 2010). For some individuals, especially young boys and men, out-migration into cities is a necessary approach to overcoming poverty and attendant powerlessness in rural areas notwithstanding the implications of such migration for individuals, families and groups in destination locations (Nwokocha, 2007).

Nigeria is a typical example of a developing nation, where there had been a tremendous

expansion of urban areas consequent to the rapid rural urban migration. In 1974 rural population was 75% of the total population but by 2001 urban population had assumed a high dimension of 44% of the country's population (Aworemi et al, 2011). Nigeria is practicing a non-regulatory system which allows for uncontrolled internal migration. Hence, the decision to out-migrate to urban centers is not usually agonizing as a result of the perceived advantages of so doing (Nwokocha, 2007).

As more and more people leave villages and farms to live in cities, urban growth results. Urbanization is the increasing number of people that live in urban areas. It predominantly results in the physical growth of urban areas, be it horizontal or vertical. The United Nations projected that half of the world's population would live in urban areas at the end of 2008 (United Nations 2008). By 2050 it is predicted that 64.1% and 85.9% of the developing and developed world respectively will be urbanized (The Economist 2012). The rapid urbanization of the world's population over the twentieth century is described in the 2005 Revision of the UN World Urbanization Prospects report. The global proportion of urban population rose dramatically from 13% (220 million) in 1900, to 29% (732 million) in 1950, to 49% (3.2 billion) in 2005. The same report projected that the figure is likely to rise to 60% (4.9 billion) by 2030 (World urbanization prospect, 2005). According to the UN State of the World Population 2007 report, sometime in the middle of 2007, the majority of people worldwide will be living in towns or cities, for the first time in history; this is referred to as the arrival of the "Urban Millennium" or the 'tipping point'. In regard to future trends, it is estimated 93% of urban growth will occur in developing nations, with 80% of urban growth occurring in Asia and Africa (UNFPA 2007).

2.2.1 Determinants of migration

Population migration is a choice process that is influenced by socio-economic, demographic and cultural factors. Socio-economic factors, such as the expectation of better earnings and employment opportunities, access to modern amenities, seem to a greater extent instrumental in the motives of the rural residents to migrate into cities (Antai, 2010). The attraction of more economically developed places for migrants has always provided the incentives for some people to move. Sometimes people migrate because of a lack of employment opportunities locally, a low quality of life or poor environmental conditions, or if they fear for their own personal security. Social and political convulsions, perhaps with cultural or religious overtones, are other factors that can cause people to move from one place to another place (Muniz et. al., 2010).

People are migrating from rural areas to urban areas due to unequal infrastructure between rural and urban areas, searching job opportunity, pursuing education, treatment and other purpose (Afsar, 2000). The phenomenon of rural-urban migration is grounded in the persistent inequality in the allocation of social and economic infrastructure such as pipe borne water, good roads, electricity, health facilities, and industries, among others in rural and urban communities (Iruonagbe). Rural-urban migrants are increasing their income through job opportunity after rural-urban migration. Apart from this, rural-urban migrants have improved their life style by adopting different modern urban facilities like electricity, modern sanitation system, tap water for drinking and washing, improved housing, education etc (Azad and Rahman, 2009).

2.3 CHILDHOOD MORBIDITY IN NIGERIA

Child survival in Nigeria is threatened by nutritional deficiencies and illnesses, particularly malaria, diarrheal diseases, acute respiratory infections (ARI), and vaccine preventable diseases (VPD), which account for the majority of morbidity and mortality in childhood (Ibe, 2002). Childhood morbidity and mortality continue to be a major issue in Nigeria, despite several programs aimed at promoting child survival. Diarrhoea, cough and fever are the leading causes of childhood morbidity and mortality in sub-Saharan Africa (Kandala, 2008).

Childhood morbidity is a major determinant of mortality in children of developing countries. Under-five mortality in Nigeria is high (Okolo 2012, UNICEF 2010, Adetunji 2000). Childhood mortality rates in Nigeria are one of the highest in the world. At the dawn of the twenty-first century, it is tragic that one in seven Nigerian children die before his or her fifth birthday (Ogunjuyigbe 2008, NDHS 2003, UNICEF 2000). A baby born in Nigeria is 30 times more likely to die before age five than one born in an industrialized country (NPC/UNICEF, 2001). Infant and child mortality rates are exceedingly high, and Nigeria ranks 15th highest in the world among countries with high under-five mortality (UNICEF, 2001). With more than one million children dying annually from preventable diseases, Nigeria is one of the least successful of African countries in achieving improvements in child survival in the past four decades, in spite of advances in universal immunization and oral re-hydration therapy (ORT) for diarrhoeal disease, and the wealth of Nigeria's human and natural resources. Overall in the world since 1950, urban areas are almost universally associated with lower child mortality than rural areas (Cleland et al., 1992).

2.3.1 Determinants of Childhood Morbidity

ACUTE RESPIRATORY INFECTION

Acute respiratory infection (ARI) is among the leading causes of childhood morbidity and mortality throughout the world. Early diagnosis and treatment with antibiotics can prevent a large proportion of deaths caused by ARI (NDHS 2013). WHO estimate that acute respiratory infection (ARI) accounts for more than 4 million deaths among children under five. The key diagnostic element of this syndrome is rapid or difficult breathing due to chest problem (Sule, 2003). National Demographic and Health Survey (NDHS 2013) reported that 2 percent of children had ARI symptoms in the two weeks preceding the survey. Children ages 12-23 months are most likely to show ARI symptoms (4 percent), compared with children in other age groups. Children in the North East zone are more likely to have ARI symptoms (8 percent) than those in other zones. ARI symptoms among children decreases with increasing level of mother's education and increasing wealth quintile (NDHS 2008). ARI symptoms were reported most frequently in children whose mothers smoked cigarettes or tobacco, children in rural areas and the North East, and children whose families were in the lower wealth quintiles (NDHS 2013).

FEVER

Fever is a symptom of malaria, but it may also accompany other childhood illnesses. Malaria and other illnesses that cause fever contribute to high levels of malnutrition, morbidity, and mortality in young children (NDHS 2013). Thirteen percent had a fever in the two weeks preceding the survey among children under age five according to NDHS 2013. The Malaria Action Programme for States, MAPS, has said that malaria is responsible for the death of more than 300,000 children under the age of five in Nigeria annually. Malaria is endemic throughout Nigeria. Malaria currently accounts for nearly 110 million clinically diagnosed cases per year, 60

percent of outpatient visits, and 30 percent hospitalizations. An estimated 300,000 children die of malaria each year (NDHS 2008). In addition to the direct health impact of malaria, there are also severe social and economic burdens on communities and the country as a whole, with about 132 billion Naira lost to malaria annually in the form of treatment costs, prevention, loss of work time, etc. (FMoH and NMCP, 2009).

DIARRHEA

The World Health Organization (WHO) has estimated that diarrhea is responsible for more than 3 million deaths per annum worldwide among children under five. About half of these deaths are due to dehydration. Dehydration caused by severe diarrhea is a major cause of morbidity and mortality among young children. A simple and effective response to dehydration is a prompt increase in fluid intake. Exposure to diarrhea-causing agents is frequently related to the use of contaminated water and to unhygienic practices in food preparation and disposal of excreta (NDHS 2008).

Diarrhoea death from dehydration are preventable by oral rehydration therapy (ORT), which include administration of a solution prepared from ORS packets or a commercially prepared premixed ORS solution; or homemade fluid recommenced by the National Diarrhoea control program (i.e., recommend home fluid (RHF) such as sugar saltwater solution). Administration of increased fluids is also considered a type of ORT (Sule, 2003).

Underlying factors of child morbidity include childhood malnutrition, poor immunization status, household poverty, and food insecurity. Other factors are maternal illiteracy, poor living conditions (housing, water, and sanitation), and poor home practices for childcare during illnesses. Also, the alarming rise in prevalence of HIV/AIDS among pregnant women with

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resultant mother-to-child transmission (MTCT) adds to the burden of child mortality and morbidity in Nigeria (Ibe, 2002).

2.4 MIGRATION AND CHILD HEALTH

Child health is of intrinsic interest, both as a current measure of well-being and a source of future human capital (Stillman and McKenzie 2009). The rapid urban growth portends serious implications on the environmental and the well being of the citizenry (Aworemi et al, 2011). Urbanization is the process of global scale changing the social and environment landscape on every continent. As urban population grows, the quality of global and local ecosystems, and the urban environment will play an increasingly important role in Public health with respect to issues ranging from solid waste disposal, provision of safe water and sanitation, and injury prevention, to the interface between urban poverty, environment and health. Migration has changed the demographic composition of towns, cities, and nations (Muniz et. al., 2010). In Nigeria, most cities and towns are unsanitary due to inadequate facilities for excreta, liquid and solid waste disposal. Over the years, the quality of these services have deteriorated due to pressure of urbanization, rapid population growth, mounting costs, growing gap between the needs of these services and the resources of the government. Communicable diseases continue to take a heavy toll, both in terms of morbidity and mortality as well as environmental related non-communicable diseases or illnesses in spite of the substantial progress made in the health sector (Ogunjuyigbe, 2008). Most rural–urban migrants initially settle in poor neighbourhoods, which are characterized by lack of adequate sanitation and clean water, poor housing and overcrowding, and lack of access to modern health services (Antai, 2010). Most of the urban-migrants are living in slum areas where living standards are very low. Usually slums are more crowded, lack basic amenities like safe drinking water, hygienic sanitation system and have

highly polluted land, water, noise and indoor air (Azad and Rahman, 2009). All these factors could adversely affect the health of infant and young children.

The immediate effect of migration, particularly rural to urban is increase in population or at the extreme its explosion. Population explosion activates the housing challenge both at micro family and macro society levels. Congestion in households and communities has implications for both the health and psychology of victims. Nigerian cities such as Lagos, Port-Harcourt, Kano, Onitsha among others are characterized by human traffic, vehicular congestions, environmental pollution, consistent in-migration and spurious expansion of territories to accommodate human additions. Lagos is the mostly affected city in term of unplanned growth, around 85% of the country's industrial activity is located in Lagos and it is one of the fastest growing cities in the world. Its annual growth rate was estimated at almost 14% during the 1970s and its current population is estimated to be 15million (Census, 2006). Projections suggest that by 2020 it will be the third biggest in the world (USAID, 2002).

2.5 PREVIOUS RESEARCH

According to Azad and Rahman, 2009 who worked on Impact of rural-urban migration on childhood risk of Acute Respiratory Infection (ARI) among under-5 children in Bagladesh. The study used a large nationally representative dataset from Bangladesh (Bangladesh Demographic and Health Survey- (BDHS) 2004) to examine whether rural-urban migrant children are more likely to suffer from Acute Respiratory Infections (ARI) than their non-migrant peers (urban non-migrants and rural non-migrants). Even after controlling for potential confounders such as poverty, use of solid fuels, maternal under-nutrition, child under-nutrition, maternal education and maternal age, the study revealed that rural-urban migrant children are significantly more likely to suffer from ARI than non-migrant children (OR: 1.28; 95% C.I.

[1.017---1.614]). There is no difference in childhood risk of ARI between the two non-migrant groups (rural non-migrants and urban non-migrants) once adjustments are made for household poverty and use of solid fuels.

Also, Antai et. al., 2010 conducted a study on Migration and child health inequities in Nigeria: a multilevel analysis of contextual- and individual-level factors. The result revealed that children of rural non-migrant mothers had significantly lower risks of under-five death than children of rural–urban migrant mothers. The disruption of family and community ties, low socioeconomic position and vulnerability, and the difficulties migrants face in adapting into the new urban environment, may predispose the children of rural–urban migrants to higher mortality.

Amankwaa et al., 2003 also carried out a study on Rural-Urban Migration and Its Effects on Infant and Child Mortality in Ghana to examine the socioeconomic characteristics of rural-urban migrants, child mortality and maternity child health care in Ghana. Data from the 1988 Ghana Demographic and Health Survey shows that infant mortality is lower among rural-urban migrants compared to rural non-migrants. Proportional hazards model estimates reveal that the survival chances of children of rural-urban migration persist after controlling for socioeconomic characteristics. However, these advantages disappear after demographic variables are included in the model in spite of the proximity and accessibility to medical facilities enjoyed by the migrants. This finding suggests that socioeconomic and demographic characteristics of migrants could be an important determinant of the survival of children of rural-urban migrants.

Another study conducted by Antai, 2010 on Migration and child immunization in Nigeria: individual- and community-level contexts revealed that Individual- and community contexts are strongly associated with the likelihood of receiving full immunization among migrant groups. The likelihood of full immunization was higher for children of rural non-migrant

mothers compared to children of rural-urban migrant mothers. Findings provide support for the traditional migration perspectives, and show that individual-level characteristics, such as, migrant disruption (migration itself), selectivity (demographic and socio-economic characteristics), and adaptation (health care utilization), as well as community-level characteristics (region of residence, and proportion of mothers who had hospital delivery) are important in explaining the differentials in full immunization among the children.

A study was conducted by Ssengonzi et. al., 2002 on the effect of female migration on infant and child survival in Uganda. Data from the 1996 Uganda Demographic and Health Survey was used to examine whether migration of women improves the survival chances of their children to age five. The Results show that up to 10% of children die before age five and within-group differences in mortality exist among urban and rural children depending on their mother's migration status. Only urban-urban migration was significantly related to child survival, compared to rural non-migrants, after controlling for other factors, although other streams of migration (rural-urban, urban-rural, rural-rural) were positively related to child survival.

In addition, Konseiga, 2009 conducted a study on family migration: a vehicle of child morbidity in the informal settlements of Nairobi city, Kenya. The study used a dataset that provided information from the respondent parent on child morbidity in rural and urban settings. The study contributes to understanding the health consequences of raising children in the context of increasing urban poverty in Nairobi, Kenya. The findings indicate that households who migrate together with their children in the slums of Nairobi experience higher child morbidity (43 percent have at least one sick child in the last one month) as compared to households who leave children in their upcountry homes (31 percent morbidity rate).

2.6 KNOWLEDGE GAP:

The majority of the previous studies have categorized migration status into rural-urban, rural non-migrant and urban non-migrant. However, a detailed description of internal migration in Nigeria by having six streams of migration status, namely: rural non-migrant, urban non-migrant, rural-rural migrant, rural-urban migrant, urban-urban migrant and urban-rural migrant would be beneficial.

While few studies have worked on migration and child health in Nigeria, the interest has been on child mortality and immunization. None of these previous studies have examined the influence of migration on childhood morbidity. Mortality is one of the direct consequences of morbidity, so any effort at controlling morbidity would have a multiplier effect by reducing the burden of mortality. It is therefore necessary to analyse the effect of migration on childhood morbidity in Nigeria. The Nigeria Demographic and Health Survey (NDHS) data seems to be the best of the available data sources for further studies on child health. The only available study on migration and childhood morbidity was done in Bangladesh and the interest was simply on acute respiratory infection. Findings from the study cannot be extrapolated to Nigeria. This study therefore aims at examining the influence of migration on childhood morbidity indicated by the presence of any of diarrhea, fever and cough. These diseases are the leading causes of childhood morbidity and mortality in Nigeria and sub-Saharan Africa.

CHAPTER THREE

METHODOLOGY

3.1 STUDY SETTING

The study is based on a nationally representative sample of Nigeria that covered all its 6 geo-political zones. Nigeria lies between latitude $4^0 16'$ and $13^0 53'$ north and longitude $2^0 40'$ and $14^0 41'$ 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. To the south, Nigeria is bothered by approximately 850km of the Atlantic ocean, stretching from Badagry in the west to the Rio del Rey in the east (NPC, 2009). The country is divided into 36 states and a FCT. For administrative purposes, the states and FCT are grouped into 6 geo-political zones (southwest, southeast, northwest, northeast, south south and north central). Each state is subdivided into local government areas (LGAs), and each LGA is divided into localities. During the 2006 Population Census, each locality was subdivided into convenient areas called census enumeration areas (EAs). The primary sampling unit (PSU), referred to as a cluster for the 2008 NDHS, is defined on the basis of EAs from the 2006 EA census frame. The population studied in this research is children under-five years of age.

3.2 STUDY DESIGN: ANALYSIS OF NATIONALLY REPRESENTATIVE CROSS-SECTIONAL DATA FROM NDHS 2008

The 2008 NDHS sample was selected using a stratified two-stage cluster design consisting of 888 clusters, 286 in the urban and 602 in the rural areas. A representative sample of 36,800 households was selected for the 2008 NDHS survey, with a minimum target of 950 completed interviews per state. In each state, the number of households was distributed proportionately among its urban and rural areas. A complete listing of households and a mapping

exercise were carried out for each cluster from April to May 2008, with the resulting lists of households serving as the sampling frame for the selection of households in the second stage. All private households were listed. In the second stage of selection, an average of 41 households was selected in each cluster, by equal probability systematic sampling. All women age 15-49 who were either permanent residents of the households in the 2008 NDHS sample or visitors present in the households on the night before the survey were eligible to be interviewed.

3.3 DATA SOURCE

Data from the 2008 Nigeria Demographic and Health Survey (DHS) was used in this study. Variables of interest to be used to derive migration status of mothers of under-five children (years lived in place of residence and type of place of previous residence) are not available in the 2013 NDHS dataset (Recode VI DHS, 2013). NDHS is a nationally-representative probability sample. Women in reproductive age (15-49 years) were involved in the study. This study was limited to children born during the 59 months before the interview. The unit of analysis is the child. Permission to use the DHS data in this study was obtained from ORC Macro Inc.

3.4 VARIABLES

✓ **Dependent/ Response variable: Childhood Morbidity.**

The focus in this work and in the analysis was on childhood morbidity indicated by presence of any of these diseases: diarrhea, fever and cough with difficulty of breathing (a symptom of respiratory infection). However, each of these conditions was also analyzed separately. These diseases are still a major cause of morbidity and mortality among children in many developing countries, particularly in Sub-Saharan Africa.

Childhood morbidities were measured by the occurrence of symptoms of diarrhea, fever, and cough within two weeks preceding the survey. The key variables were re-categorized from DHS data for this study.

- Diarrhea

Response to question: Had diarrhea in the last 2 weeks?

- Fever

Response to question: Had fever in the last 2 weeks?

- Cough

Had cough in the last 2 weeks?

- ARI

Computed from response to questions: Had cough and had short rapid breathing in the last 2 weeks?

✓ **Independent/ explanatory variable: Migration Status**

Migration status was defined as a person changing their place of residence across an administrative boundary. Main independent variable was migration status which was divided into 6 categories/ stream: Rural non-migrant, Urban non-migrant, Rural-Rural migrant, Rural-Urban migrant, Urban-Urban migrant and Urban-Rural migrant. Other control variables were demographic, socio-economic, and health care utilization variables. The key variables were re-categorized from DHS data for this study. Analysis was limited to children alive as at the time of the survey. Visitors, missing and "don't know" responses were excluded from the analysis.

Measurement of Migration Status

- Rural non-migrant

Type of place of residence (Rural)

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- Diarrhea

Response to question: Had diarrhea in the last 2 weeks?

- Fever

Response to question: Had fever in the last 2 weeks?

- Cough

Had cough in the last 2 weeks?

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Computed from response to questions: Had cough and had short rapid breathing in the last 2 weeks?

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Measurement of Migration Status

- Rural non-migrant

Type of place of residence (Rural)

Years lived in place of residence (Always)

- Urban non-migrant

Type of place of residence (Urban)

Years lived in place of residence (Always)

- Rural-Rural migrant

Type of place of residence (Rural)

Type of place of previous residence (Rural). Response "Countryside" was taken as Rural

- Rural-Urban migrant

Type of place of residence (Urban)

Type of place of previous residence (Rural). Response "Countryside" was taken as Rural

- Urban-Urban

Type of place of residence (Urban)

Type of place of previous residence (Urban). Response "Capital, large city, City, Town or Abroad" were taken as Urban

- Urban-Rural

Type of place of residence (Rural)

Type of place of previous residence (Urban). Response "Capital, large city, City, Town or Abroad" were taken as Urban.

Other potential and confounding variables such as Demographic characteristics of children and mothers (sex of the child, birth order/birth interval, mother's age and mother's marital status, type of family and mother's region of residence), Socio-economic variables (mother's education, mother's occupation, wealth index, type of toilet facility, water source, cooking fuel, type of floor), Health care utilization (place of delivery of child, prenatal care by

doctor, immunization status) were chosen. These variables were re-categorized from DHS data for this study.

3.5 ANALYSIS

Normalized sample weights provided in the DHS data were used for all analyses in order to adjust for non-response and enable generalization of findings to the general population. Weight was computed by dividing the sample weight (V005) by 1000000.

Logistic regression analysis using STATA (version 12) was used to estimate the effect of key explanatory variables on childhood morbidity after controlling for the effects of other confounding variables. Models were tested sequentially in stages to explore the mechanisms by which different migration status affects childhood morbidity. Odd ratios were estimated and 95% confidence intervals (CI) for the odd ratios were calculated.

CHAPTER FOUR

RESULTS

The total number of study subject (under-five children) was 24975. Table 1 shows the demographic characteristics of the study subjects. The survey respondents were mothers of under-five children (15-49 years) grouped into five-year age groups. Children who belonged to mothers within 25-29 year age-group were 28.8% while 3.4% were of 45-49 year age group. A high proportion of the respondents are from the North zone (30.4%, 16.0% and 13.7% from the North-west, North-east and North-central regions respectively). The majority of the under-five mothers were currently married (94%). With respect to sex, 50.5% of the children 0-59 months were males while 49.5% are females. More than two-thirds of the mothers reported that their husbands had no other wives (68.8%) i.e monogamous family. A high proportion of the births (77.9%) occured at least 24 months after the previous birth while the percentage of births less than 24 months were 22.1%. Almost half of the children fall between 2-4 birth order (47.0 %), however 19.3% were first births.

Table 1: Demographic characteristics of the study subjects

Variables	n(%)
Age 5-year groups of mothers	
15-19	1302(5.2)
20-24	4828(19.3)
25-29	7191(28.8)
30-34	5419(21.7)
35-39	3708(14.8)
40-44	1756(7.0)
45-49	769(3.1)
Region	
North Central	3434(13.7)
North East	3989(16.0)
North West	7594(30.4)
South East	2428(9.7)
South South	3310(13.3)
South West	4221(16.9)

Current Marital Status of mothers	
currently married	23848(94.0)
Not currently married	1490(6.0)
Sex of child	
Male	12614(50.5)
Female	12360(49.5)
Size of child at birth	
Large	11771(48.0)
Average	9362(38.1)
Small	3408(13.9)
Type of family	
Monogamy	16345(68.8)
Polygamy	7419(31.2)
Birth interval	
>=24 months	15675(77.9)
<24 months	4453(22.1)
Birth Order	
First birth	4815(19.3)
2-4 birth order	11731(47.0)
>=5 birth order	8429(33.7)

Table 2 presents the Socio-economic and household environmental characteristics of the study sample. Almost half (45.4%) of the mothers have no education while 5.8% have more than a secondary education. About one-third (30.4%) of the mothers were not working, Clerical/ Sales/ Services/ Skilled manual are the most common among occupational categories (49.0%) while a very small percentage (3.2%) of the mothers are engaged in Professional, Technical/ Management occupation. Almost half (44.8%) of mothers are in the poor wealth quintile while 36.0% are from the rich quintile. About half (52.3%) use improved toilet facility, while 16.9% use non-improved toilet facility and 30.8% have no facility. About one-third of respondents got their drinking water from non-improved sources (34.2%). The majority (81.0%) of respondents use biomass fuel for cooking. More than half (56.3%) of the respondents have "finished" floors in their household while 1.0% have rudimentary type of floor.

Table 2: Socio- economic & Household Enviromental characteristics of the respondents

Variables	n(%)
Highest educational level	
No education	11342(45.4)
Primary	5805(23.2)
Secondary	6385(25.6)
Higher	1441(5.8)
Occupation	
Not working	7540(30.4)
Agricultural self-employed/ Agricultural employee/ Household & domestic/ Unskilled manual	4336(17.5)
Clerical/ Sales/ Services/ Skilled manual	12165(49.0)
Professional, Technical/ Management	798(3.2)
Wealth Index	
Poor	11200(44.8)
Middle	4787(19.2)
Rich	8987(36.0)
Type of toilet facility	
Improved facility	12806(52.3)
unimproved facility	4136(16.9)
No facility or bush	7554(30.8)
Source of drinking water	
improved source	13191(65.8)
Non-improved source	6846(34.2)
Type of cooking fuel	
Biomass fuel	20052(81.0)
Non-biomass fuel	4690(19.0)
Type of flooring material	
Finished	13887(56.3)
Rudimentary	253(1.0)
Natural	10528(42.7)

Table 3 shows that a high proportion (63.0%) of the children were delivered at home and 32.9% at a health facility. A large percentage (76.5%) of under-five mothers did not receive prenatal care by doctor, compared to 23.5% that received prenatal care by doctor. However, 36.3% of children never had vaccination.

Table 3: Health care utilization of the study sample

Variables	n(%)
Place of delivery	
Home	15323(63.0)
Health facility	9004(37.0)
Prenatal care by doctor	
No	12514(76.5)
Yes	3842(23.5)
Ever had vaccination	
No	6962(36.3)
Yes	12236(63.7)

Table 4 presents the migration status of respondents. The most common form of internal migration among the respondents was the movement from a rural setting to another rural environment (Rural-Rural migrants 33.4%) while the least common is Rural-Urban migration (5.3%). Rural non-migrant made up 22.5% compared to urban native of 7%. Respondent who moved from one urban center to another (Urban-Urban migrants) were 18.5%.

Table 4: Migration status of the respondents

Migration status	n(%)
Rural non-migrant	5470(22.5)
Rural-Rural migrant	8114(33.4)
Rural-Urban migrant	1301(5.3)
Urban non-migrant	1704(7.0)
Urban-Urban migrant	4495(18.5)
Urban-Rural migrant	3228(13.3)

Table 5 presents childhood morbidity among under-five children according to occurrence of symptoms of any of diarrhea, fever or cough within two weeks preceding the survey. About 1 in 4 children presented with childhood morbidity (26.0%). Prevalence of diarrhea, fever, cough and Acute Respiratory Infection (ARI i.e. cough with difficulty in breathing) among the under-five children were 10.3%, 16.2%, 12.4% and 4.7% respectively.

Table 5: Childhood Morbidity

Childhood Morbidity	n(%)
Diarrhea, fever or cough	
No	18025(74.0)
Yes	6349(26.0)
Diarrhea	
No	21996(89.7)
Yes	2530(10.3)
Fever	
No	20548(83.8)
Yes	3968(16.2)
Cough	
No	21445(87.6)
Yes	3039(12.4)
ARI	
No	23771(95.3)
Yes	1159(4.7)

Table 6 shows that 12.9% of Rural-Rural migrants reported that their children had diarrhea two weeks before the survey while 7.1% of Urban-Urban migrants' children had diarrhea. Also, 19.3% of children of Rural-Rural migrants had fever compared to 11.4% of Urban non-migrants' children. Among Urban-Rural migrants' children, 15.6% suffered from Cough, while urban natives' children had the least percentage (9.7%). Children of Rural-Urban migrants have the highest percentage (5.9%) with ARI. In addition, 29.5% of Rural-Rural migrants' children presented with any of diarrhea fever or cough while 20.4% of children of urban non-migrants had any of the 3 types of illnesses two weeks preceding the survey.

Table 6: Number and proportion of children with morbidity according to migration status of the mother

Migration Status	Diarrhea n(%)	Fever n(%)	Cough n(%)	ARI n(%)	Diarrhea, fever or cough	Total
Rural non-migrant	527(9.8)	827(15.4)	550(10.2)	196(3.6)	1283(24.0)	5470 (22.5)
Rural-Rural migrant	1027(12.9)	1532(19.3)	979(12.3)	441(5.4)	2333(29.5)	8114 (33.4)
Rural-Urban migrant	132(10.4)	210(16.5)	182(14.4)	77(5.9)	339(26.9)	1301 (5.3)
Urban non-migrant	144(8.6)	190(11.4)	161(9.7)	60(3.5)	339(20.4)	1704 (7.0)

Urban-Urban migrant	317(7.1)	564(12.7)	620(13.9)	180(4.0)	1024(23.2)	4495 (18.5)
Urban-Rural migrant	328(10.4)	555(17.6)	491(15.6)	186(5.8)	891(28.3)	3228 (13.3)
Total	2475(10.4)	3878(16.2)	2983(12.5)	1140(4.7)	6209(26.1)	24312 (97.3)

Table 7 below shows that children of rural migrants (i.e. rural-rural and urban-rural) are more likely to have any of diarrhea, fever or cough compared with rural non-migrants'. Maternal age (at least 25 years) and higher educational level are protective factors against the occurrence of childhood morbidity. Children from the North east region were 3 times more likely to have had any of diarrhea, fever or cough than those from the North central (OR=3.04, C.I= 2.50-3.70). In addition, coming from a rich wealth quintile, use of non-biomass fuel for cooking, and being delivered at a health facility were negatively associated with childhood morbidity. However, polygamy, mother's not currently in a marital union, small birth size, non-improved water source, rudimentary/natural floor type are risk factors for the occurrence of childhood morbidity.

Table 7: Simple logistic regression of factors associated with childhood morbidity among under-five children in Nigeria, NDHS 2008.

Characteristics	N	n(%) reporting diarrhea or fever or cough	P-value	OR	C.I	
					lower	upper
Migration status						
Rural non-migrant	5345	1283(24.0)		1		
Rural-Rural	7909	2333(29.5)	0.00*	1.33	1.18	1.49
Rural-Urban	1260	339(26.9)	0.22	1.16	0.91	1.48
Urban non-migrant	1658	339(20.4)	0.09	0.81	0.64	1.04
Urban-Urban	4423	1024(23.2)	0.57	0.95	0.81	1.12
Urban-Rural	3149	891(28.3)	0.00*	1.25	1.07	1.46
Birth Order						
First birth	4652	1244(26.7)		1		
2-4 birth order	11478	2804(24.4)	0.01*	0.89	0.81	0.96
>=5 birth order	8244	2301(27.9)	0.22	1.06	0.96	1.17
Birth interval						
>=24 months	15345	3929(25.6)		1		
<24 months	4347	1172(27.0)	0.14	1.07	0.98	1.18
First births	4683	1249(26.7)	0.19	1.06	0.97	1.15

Sex of child						
Male	12327	3264(26.5)		1		
Female	12046	3085(25.6)	0.15	0.96	0.90	1.02
Mother's age						
15-19	1279	387(30.3)		1		
20-24	4664	1271(27.3)	0.05	0.86	0.75	1.00
25-29	7024	1798(25.6)	0.00*	0.79	0.68	0.92
30-34	5316	1343(25.3)	0.00*	0.78	0.67	0.91
35-39	3622	930(25.7)	0.00*	0.80	0.68	0.93
40-44	1725	443(25.7)	0.01*	0.80	0.67	0.95
45-49	746	178(23.9)	0.01*	0.72	0.57	0.91
Mother's marital status						
Currently married	22980	5930(25.8)		1		
Not currently married	1393	419(30.1)	0.00*	1.24	1.07	1.43
Type of family						
Monogamy	16038	4042(25.2)				
Polygamy	7220	1966(27.2)	0.02*	1.11	1.01	1.22
Region of residence						
North Central	3367	543(16.1)		1		
North East	3919	1446(36.9)	0.00*	3.04	2.50	3.70
North West	7321	1877(25.6)	0.00*	1.80	1.49	2.16
South East	2393	738(30.8)	0.00*	2.32	1.90	2.85
South South	3227	1002(31.1)	0.00*	2.34	1.90	2.90
South West	4147	743(17.9)	0.22	1.14	0.93	1.39
Birth size						
Large	11535	3007(26.1)		1		
Average	9152	2292(25.0)	0.21	0.95	0.87	1.03
Small	3345	977(29.2)	0.01*	1.17	1.04	1.31
Highest educational level						
No education	11033	2963(26.9)		1		
Primary	5661	1457(25.7)	0.29	0.94	0.85	1.05
Secondary	6259	1608(25.7)	0.37	0.94	0.83	1.07
Higher	1422	322(22.6)	0.03*	0.80	0.65	0.98
Occupation						
Not working	7324	1803(24.6)		1		
Agricultural workers	4255	1088(25.6)	0.46	1.05	0.92	1.20
Clerical staffs	11873	3239(27.3)	0.00*	1.15	1.05	1.26
Professionals	791	176(22.3)	0.31	0.88	0.68	1.13
Wealth index						
Poor	10909	3052(28.0)		1		
Middle	4666	1213(26.0)	0.08	0.90	0.81	1.01
Rich	8799	2084(23.7)	0.00*	0.80	0.71	0.91
Toilet facility						
Improved	12464	3189(25.6)		1		
Unimproved	11450	3047(26.6)	0.28	1.05	0.96	1.16

Sex of child						
Male	12327	3264(26.5)		1		
Female	12046	3085(25.6)	0.15	0.96	0.90	1.02
Mother's age						
15-19	1279	387(30.3)		1		
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40-44	1725	443(25.7)	0.01*	0.80	0.67	0.95
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Mother's marital status						
Currently married	22980	5930(25.8)		1		
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North West	7321	1877(25.6)	0.00*	1.80	1.49	2.16
South East	2393	738(30.8)	0.00*	2.32	1.90	2.85
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Occupation						
Not working	7324	1803(24.6)		1		
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Professionals	791	176(22.3)	0.31	0.88	0.68	1.13
Wealth index						
Poor	10909	3052(28.0)		1		
Middle	4666	1213(26.0)	0.08	0.90	0.81	1.01
Rich	8799	2084(23.7)	0.00*	0.80	0.71	0.91
Toilet facility						
Improved	12464	3189(25.6)		1		
Unimproved	11450	3047(26.6)	0.28	1.05	0.96	1.16

Sex of child						
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Mother's marital status						
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Not currently married	1393	419(30.1)	0.00*	1.24	1.07	1.43
Type of family						
Monogamy	16038	4042(25.2)				
Polygamy	7220	1966(27.2)	0.02*	1.11	1.01	1.22
Region of residence						
North Central	3367	543(16.1)		1		
North East	3919	1446(36.9)	0.00*	3.04	2.50	3.70
North West	7321	1877(25.6)	0.00*	1.80	1.49	2.16
South East	2393	738(30.8)	0.00*	2.32	1.90	2.85
South South	3227	1002(31.1)	0.00*	2.34	1.90	2.90
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Occupation						
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Wealth index						
Poor	10909	3052(28.0)		1		
Middle	4666	1213(26.0)	0.08	0.90	0.81	1.01
Rich	8799	2084(23.7)	0.00*	0.80	0.71	0.91
Toilet facility						
Improved	12464	3189(25.6)		1		
Unimproved	11450	3047(26.6)	0.28	1.05	0.96	1.16

Water source						
Improved	12886	3238(25.1)		1		
Non-improved	6644	1896(28.5)	0.01*	1.19	1.05	1.34
Cooking fuel						
Biomass fuel	19553	5249(26.8)		1		
Non-biomass	4598	1049(22.3)	0.01*	0.81	0.69	0.94
Floor type						
Finished	13588	3352(24.7)		1		
Rudimentary/Natural	10493	2924(27.9)	0.00*	1.18	1.06	1.31
Place of delivery						
Home	14964	4136(27.6)		1		
Health facility	8848	2068(23.4)	0.00*	0.80	0.72	0.88
Prenatal care by doctor						
No	12321	3557(28.9)		1		
Yes	3775	1035(27.4)	0.22	0.93	0.83	1.04
Ever had vaccination						
No	6805	1633(24.0)		1		
Yes	11989	3169(26.4)	0.02*	1.14	1.02	1.27

*P<0.05

Table 8 below indicates that rural-rural migrants' children are 1.4 times more likely to have diarrhea compared to rural non-migrants' (OR=1.37, C.I=1.18-1.58), while urban-urban migrants' are 29% less likely to suffer from diarrhea as compared to children of rural non-migrants (OR= 0.71, C.I= 0.57-0.88). Also, small birth size is a risk factor for the occurrence of diarrhea among under-five children (OR= 1.43, C.I= 1.24-1.60). In addition, the higher the educational level and wealth index of under-five mothers, the lesser the likelihood of their children suffering from diarrhea. Moreover, water source, cooking fuel type and health care utilization variables are significantly related to diarrhea among under-five children.

TABLE 8: Simple logistic regression of factors associated with diarrhea among under-five children in Nigeria

Characteristics	N	n(%) reporting Diarrhea	P-value	OR	C.I	
					lower	upper
Migration status						
Rural non-migrant	5386	527(9.8)		1		
Rural-Rural	7955	1027(12.9)	0.00*	1.37	1.18	1.58
Rural-Urban	1265	132(10.4)	0.70	1.07	0.75	1.54
Urban non-migrant	1671	144(8.6)	0.38	0.87	0.63	1.19
Urban-Urban	4441	317(7.1)	0.00*	0.71	0.57	0.88

Urban-Rural	3167	328(10.4)	0.52	1.07	0.88	1.30
Birth Order						
First birth	4683	461(9.8)		1		
2-4 birth order	11541	1058(9.2)	0.21	0.92	0.82	1.05
>=5 birth order	8301	1011(12.2)	0.00*	1.27	1.12	1.45
Birth interval						
>=24 months	15444	1609(10.4)		1		
<24 months	4369	460(10.5)	0.84	1.01	0.90	1.14
First births	4713	461(9.8)	0.24	0.93	0.83	1.05
Sex of child						
Male	12393	1336(10.8)		1		
Female	12133	1194(9.8)	0.02*	0.90	0.83	0.99
Mother's age						
15-19	1282	205(16.0)		1		
20-24	4702	541(11.5)	0.00*	0.68	0.57	0.82
25-29	7060	669(9.5)	0.00*	0.55	0.46	0.66
30-34	5342	501(9.4)	0.00*	0.54	0.45	0.00
35-39	3654	352(9.6)	0.00*	0.56	0.46	0.67
40-44	1732	179(10.3)	0.00*	0.61	0.48	0.77
45-49	754	83(11.0)	0.00*	0.65	0.48	0.88
Mother's marital status						
Currently married	23115	2401(10.4)		1		
Not currently married	1409	129(9.2)	0.22	0.87	0.70	1.09
Type of family						
Monogamy	16117	1435(8.9)		1		
Polygamy	7277	975(13.4)	0.00*	1.58	1.42	1.76
Region of residence						
North Central	3380	193(5.7)		1		
North East	3939	831(21.1)	0.00*	4.41	3.52	5.53
North West	7394	998(13.5)	0.00*	2.58	2.05	3.24
South East	2399	120(5.0)	0.36	0.87	0.64	1.17
South South	3248	127(3.9)	0.01*	0.67	0.50	0.91
South West	4166	261(6.3)	0.46	1.11	0.85	1.44
Birth size						
Large	11614	1155(9.9)		1		
Average	9212	890(9.7)	0.58	0.97	0.86	1.08
Small	3357	459(13.7)	0.00*	1.43	1.24	1.60
Highest educational level						
No education	11108	1565(14.1)		1		
Primary	5705	519(9.1)	0.00*	0.61	0.53	0.71
Secondary	6289	376(16.0)	0.00*	0.39	0.33	0.46
Higher	1425	71(5.0)	0.00*	0.32	0.23	0.45

Occupation						
Not working	7367	822(11.2)	0.01*	1		
Agricultural workers	4271	372(8.7)	0.48	0.76	0.62	0.93
Clerical staffs	11964	1279(10.7)	0.00*	0.95	0.83	1.09
Professionals	792	33(4.2)		0.34	0.19	0.62
Wealth index						
Poor	10985	1528(13.9)		1		
Middle	4693	441(9.4)	0.00*	0.64	0.55	0.74
Rich	8848	561(6.3)	0.00*	0.42	0.35	0.50
Toilet facility						
Improved	12555	1256(10.0)		1		
Unimproved	11506	1253(10.9)	0.16	1.10	0.96	1.26
Water source						
Improved	12960	1112(8.6)		1		
Non-improved	6704	1000(14.9)	0.00*	1.87	1.61	2.17
Cooking fuel						
Biomass fuel	19678	2300(11.7)		1		
Non-biomass	4624	218(4.7)	0.00*	0.37	0.30	0.47
Floor type						
Finished	13657	1041(7.6)		1		
Rudimentary/	10574	1468(13.9)	0.00*	1.95	1.71	2.24
Natural						
Place of delivery						
Home	15070	1996(13.2)		1		
Health facility	8890	490(5.5)	0.00*	0.38	0.33	0.44
Prenatal care by doctor						
No	12377	1683(13.6)		1		
Yes	3788	268(7.1)	0.00*	0.48	0.40	0.58
Ever had vaccination						
No	6868	837(12.2)		1		
Yes	12060	1226(10.2)	0.01*	0.82	0.71	0.94

*P<0.05

Table 9 shows that rural-rural migration is a risk factor for the occurrence of fever among under-five children (OR= 1.32, C.I= 1.16-1.49). However, children of urban non-migrants and urban-urban migrants are less likely to suffer from fever compared to children of rural non-migrants. Also, children whose mothers were not currently married are more likely to present with fever (OR= 1.25, C.I= 1.05-1.49). Belonging to a rich wealth quintile is a protective factor against the occurrence of fever among under-five children (OR= 0.76, C.I= 0.66-0.87). Use of non-biomass fuel for cooking and being delivered at a health facility are also negatively associated with the occurrence of fever among under-five children.

TABLE 9: Simple logistic regression of factors associated with fever among under-five children in Nigeria

Characteristics	N	n(%) reporting Fever	P-value	OR	C.I	
					lower	upper
Migration status						
Rural non-migrant	5384	827 (15.4)		1		
Rural-Rural	7947	1532(19.3)	0.00*	1.32	1.16	1.49
Rural-Urban	1269	210(16.5)	0.52	1.09	0.84	1.42
Urban non-migrant	1674	190(11.4)	0.01*	0.71	0.55	0.91
Urban-Urban	44446	564(12.7)	0.01*	0.80	0.67	0.90
Urban-Rural	3162	555(17.6)	0.07	1.17	0.99	1.40
Birth Order						
First birth	4682	778(16.6)		1		
2-4 birth order	11540	1692(14.7)	0.01*	0.86	0.78	0.96
>=5 birth order	8294	1498(18.1)	0.07	1.11	0.99	1.24
Birth interval						
>=24 months	15434	2455(15.9)		1		
<24 months	4370	731(16.7)	0.26	1.06	0.96	1.18
First births	4712	782(16.6)	0.33	1.05	0.95	1.16
Sex of child						
Male	12396	2075(16.7)		1		
Female	12120	1893(15.6)	0.03*	0.92	0.86	0.99
Mother's age						
15-19	1280	238(18.6)		1		
20-24	4701	776(16.6)	0.12	0.86	0.72	1.04
25-29	7065	1098(15.5)	0.02*	0.80	0.67	0.96
30-34	5336	836(15.7)	0.03*	0.81	0.68	0.98
35-39	3645	610(16.7)	0.17	0.88	0.73	1.06
40-44	1735	285(16.4)	0.19	0.86	0.69	1.08
45-49	753	123(16.3)	0.26	0.86	0.66	1.12
Mother's marital status						
Currently married	23108	3698(16.0)		1		
Not currently married	1407	270(19.2)	0.01*	1.25	1.05	1.49
Type of family						
Monogamy	16118	2538(15.7)		1		
polygamy	7265	1215(16.7)	0.17	1.07	0.97	1.19
Region of residence						
North Central	3386	331(9.8)		1		
North East	3931	872(22.2)	0.00*	2.63	2.15	3.23
North West	7387	1189(16.1)	0.00*	1.77	1.46	2.15
South East	2400	555(23.1)	0.00*	2.78	2.26	3.41
South South	3239	682(21.1)	0.00*	2.46	1.99	3.06
South West	4174	340(8.1)	0.07	0.82	0.66	1.02

Birth size						
Large	11595	1867(16.1)		1		
Average	9225	1476(16.0)	0.88	0.99	0.90	1.09
Small	3359	578(17.2)	0.25	1.08	0.95	1.24
Highest educational level						
No education	11101	1846(16.6)		1		
Primary	5712	893(15.6)	0.22	0.93	0.82	1.05
Secondary	6280	1022(16.3)	0.72	0.97	0.84	1.12
Higher	1423	207(14.5)	0.16	0.85	0.68	1.07
Occupation						
Not working	7368	1109(15.1)		1		
Agricultural workers	4276	703(16.4)	0.19	1.11	0.95	1.30
Clerical staffs	11948	2013(16.8)	0.01*	1.14	1.03	1.27
Professionals	794	125(15.7)	0.70	1.06	0.80	1.40
Wealth index						
Poor	10982	1954(17.8)		1		
Middle	4690	765(16.3)	0.10	0.90	0.79	1.02
Rich	8844	1249(14.1)	0.00*	0.76	0.66	0.87
Toilet facility						
Improved	12552	1943(15.5)		1		
Unimproved	11498	1955(17.0)	0.05	1.12	1.00	1.25
Water source						
Improved	12946	2020(15.6)		1		
Non-improved	6706	1160(17.3)	0.07	1.13	0.99	1.29
Cooking fuel						
Biomass fuel	19671	3315(16.9)		1		
Non-biomass	4620	616(13.3)	0.00*	0.76	0.65	0.89
Floor type						
Finished	13654	2078(15.2)		1		
Rudimentary/Natural	10567	11840(17.4)	0.01*	1.17	1.05	1.32
Place of delivery						
Home	15066	2583(17.1)		1		
Health facility	8883	1308(14.7)	0.00*	0.83	0.74	0.94
Prenatal care by doctor						
No	12385	2192(17.7)		1		
Yes	3794	633(16.7)	0.29	0.93	0.82	1.06
Ever had vaccination						
No	6867	977(14.2)		1		
Yes	12052	2042(16.9)	0.00*	1.23	1.08	1.40

P<0.05

Table 10 below shows that, with the exception of urban non-migrants stream, migration is positively associated with occurrence of cough among under-five. Also, the higher the birth order, the lesser the likelihood of cough among under-five. Other variables that are positively associated with the occurrence of cough among under-five in Nigeria includes preceding birth

interval less than 24 months, mothers' not currently in marital unions, education, agricultural and office occupation, rich wealth index etc.

TABLE 10: Simple logistic regression of factors associated with cough among under-five children in Nigeria

Characteristics	N	n(%) reporting Cough	P-value	OR	C.I	
					lower	upper
Migration status						
Rural non-migrant	5376	550(10.2)		1		
Rural-Rural	7941	979(12.3)	0.00*	1.23	1.07	1.42
Rural-Urban	1267	182(14.4)	0.00*	1.47	1.13	1.91
Urban non-migrant	1667	161(9.7)	0.65	0.94	0.71	1.24
Urban-Urban	4446	620(13.9)	0.00*	1.42	1.18	1.72
Urban-Rural	3154	491(15.6)	0.00*	1.62	1.34	1.96
Birth Order						
First birth	4681	662(14.1)		1		
2-4 birth order	11524	975(11.8)	0.00*	0.84	0.75	0.93
>=5 birth order	8278	1498(18.1)	0.00*	0.81	0.71	0.92
Birth interval						
>=24 months	15409	1797(11.7)		1		
<24 months	4363	576(13.2)	0.02*	1.15	1.03	1.29
First births	4711	666(14.1)	0.00*	1.25	1.12	1.39
Sex of child						
Male	12390	1499(12.1)		1		
Female	12094	1540(12.7)	0.18	1.06	0.97	1.15
Mother's age						
15-19	1285	170(13.2)		1		
20-24	4689	595(12.7)	0.64	0.95	0.79	1.16
25-29	7053	922(13.1)	0.92	0.99	0.80	1.22
30-34	5329	661(12.4)	0.51	0.93	0.75	1.15
35-39	3650	421(11.5)	0.18	0.86	0.68	1.07
40-44	1730	198(11.4)	0.20	0.85	0.66	1.09
45-49	748	72(9.6)	0.04*	0.70	0.50	0.98
Mother's marital status						
Currently married	23081	2793(12.1)		1		
Not currently married	1402	246(17.5)	0.00*	1.54	1.30	1.83
Type of family						
Monogamy	16103	2048(12.7)		1		
Polygamy	7252	794(10.9)	0.01*	0.84	0.75	0.96

Region of residence						
North Central	3383	295(8.7)		1		
North East	3924	669(17.0)	0.00*	2.15	1.74	2.65
North West	7363	474(6.4)	0.00*	0.72	0.58	0.90
South East	2401	466(19.4)	0.00*	2.52	2.01	3.16
South South	3241	720(22.2)	0.00*	2.96	2.35	3.79
South West	4173	416(10.0)	0.25	1.16	0.90	1.49
Birth size						
Large	11568	1461(12.6)		1		
Average	9215	1061(11.5)	0.06	0.90	0.80	1.01
Small	3357	469(14.0)	0.13	1.12	0.97	1.31
Highest educational level						
No education	11082	1061(9.6)		1		
Primary	5692	766(13.5)	0.00*	1.47	1.29	1.68
Secondary	6284	1008(16.0)	0.00*	1.80	1.55	2.10
Higher	1425	204(14.3)	0.00*	1.58	1.22	2.03
Occupation						
Not working	7358	804(10.9)		1		
Agricultural workers	4270	653(15.3)	0.00*	1.47	1.25	1.73
Clerical staffs	11931	1462(12.3)	0.04*	1.14	1.01	1.29
Professionals	795	109(13.7)	0.08	1.30	0.97	1.72
Wealth index						
Poor	10957	1181(10.8)		1		
Middle	4684	577(12.3)	0.06	1.16	0.99	1.36
Rich	8841	1280(14.5)	0.00*	1.40	1.21	1.62
Toilet facility						
Improved	12540	1523(12.1)		1		
Unimproved	11481	1448(12.6)	0.49	1.04	0.92	1.18
Water source						
Improved	12939	1694(13.1)		1		
Non-improved	6685	695(10.4)	0.00*	0.77	0.66	0.89
Cooking fuel						
Biomass fuel	19641	2306(11.7)		1		
Non-biomass	4620	707(15.3)	0.00*	1.36	1.14	1.62
Floor type						
Finished	13639	1853(13.6))		1		
Rudimentary/Natural	10549	1146(10.9)	0.00*	0.78	0.68	0.88
Place of delivery						
Home	15035	1686(11.2)		1		
Health facility	8885	1268(14.3)	0.00*	1.32	1.17	1.48
Prenatal care by doctor						
No	12361	1537(12.4)		1		
Yes	3795	629(16.6)	0.00*	1.40	1.22	1.60
Ever had vaccination						
No	6851	667(9.7)		1		
Yes	12045	1443(12.0)	0.00*	1.26	1.09	1.46

*p<0.05

Table 11 shows the five logistic regression models, fitted to identify independent predictors of childhood morbidity. In model 1, migration status was entered into the logistic regression model as the only explanatory variable to assess the influence of migration status on childhood morbidity. Results from model 1 showed higher risk of childhood morbidity among rural-rural (OR=1.33, C.I=1.18-1.49) and urban-rural migrants' children (OR=1.25, C.I=1.07-1.46) compared to rural non-migrant children.

Demographic characteristics were adjusted for in model 2. The association between childhood morbidity and rural-rural migrants' remained almost the same with that of model 1 (OR= 1.32, C.I= 1.17-1.48). However, the odds of morbidity was increased for urban-rural migrants' (OR=1.41, C.I= 1.21-1.65). In addition, the likelihood of childhood morbidity significantly decreased with advance in maternal age (starting from at least 30 years of age). However, the chances of childhood morbidity was highest for children from North west region (OR= 3.07, C.I=2.55-3.71). Also, children of average birth size were significantly less likely to have childhood morbidity by 14% compared with those of large size at birth (OR= 0.86, C.I= 0.78-0.93).

In model 3, socio-economic variables were controlled to test whether the effect of migration on childhood morbidity would change. However, socio-economic characteristics significantly increased the differential between rural-rural (OR= 1.37, C.I= 1.19-1.57) and urban-rural migrants' (OR= 1.49, C.I= 1.25-1.77). For instance, children from the middle and rich wealth quintile were less likely to have had childhood morbidity compared to those from the poor quintile.

Model 4 adjusted for variables related to health care utilization (place of delivery, prenatal care by doctor, ever had vaccination). After controlling for these variables, the differential between rural-rural and urban-rural migrants' in the chance of having any of diarrhea, fever or cough increased significantly. In addition, the likelihood of childhood morbidity was significantly higher for children of order 5 and above (OR=1.29, C.I= 1.08-1.55) compared to order 2-4.

Table 11: Logistic regression models of the relative Odd Ratio of childhood morbidity among under-five children.

	Model 1 Migration status	Model 2 Demographic	Model 3 Socio-economic	Model 5 Health care utilization
Migration status				
Rural non-migrant	1	1	1	1
Rural-Rural	1.33(1.18-1.49)*	1.32(1.17-1.48)*	1.37(1.19-1.57)*	1.42(1.21-1.66)*
Rural-Urban	1.16(0.91-1.48)	1.09(0.85-1.40)	1.16(0.86-1.57)	1.30(0.92-1.83)
Urban non-migrant	0.81(0.64-1.04)	0.88(0.69-1.12)	0.90(0.71-1.17)	0.97(0.70-1.33)
Urban-Urban	0.95(0.81-1.12)	1.12(0.95-1.33)	1.16(0.94-1.43)	1.20(0.94-1.54)
Urban-Rural	1.25(1.07-1.46)*	1.41(1.21-1.65)*	1.49(1.25-1.77)*	1.67(1.37-2.04)*
Birth Order				
2-4 birth order		1	1	1
>=5 birth order		0.94(0.85-1.04)	0.93(0.83-1.04)	1.05(0.91-1.20)
First births		1.15(1.01-1.31)	1.13(0.97-1.31)	1.29(1.08-1.55)*
Mother's age				
15-19		1	1	1
20-24		0.94(0.80-1.11)	0.91(0.76-1.10)	0.84(0.68-1.03)
25-29		0.88(0.74-1.05)	0.86(0.70-1.05)	0.76(0.61-0.95)*
30-34		0.82(0.68-0.99)*	0.78(0.63-0.97)*	0.68(0.54-0.87)*
35-39		0.78(0.63-0.95)*	0.73(0.58-0.92)*	0.66(0.51-0.86)*
40-44		0.78(0.62-0.98)*	0.77(0.60-1.00)	0.64(0.48-0.85)*
45-49		0.68(0.52-0.89)*	0.65(0.48-0.89)*	0.54(0.38-0.77)*
Mother's marital status				
Currently married		1	1	1
Not currently married		0.98(0.70-1.37)	0.86(0.56-1.33)	0.94(0.58-1.50)
Type of family				
Monogamy		1	1	1
Polygamy		1.07(0.98-1.17)	1.11(1.00-1.22)	1.09(0.98-1.22)
Region of residence				
North Central		1	1	1
North East		3.07(2.55-3.71)*	3.11(2.47-3.92)*	3.12(2.41-4.04)*
North West		1.79(1.51-2.13)*	1.81(1.46-2.25)*	1.88(1.48-2.41)*
South East		2.51(2.03-3.10)*	2.42(1.89-3.10)*	2.19(1.65-2.91)*
South South		2.34(1.87-2.92)*	2.60(1.98-3.42)*	2.78(2.02-3.83)*
South West		1.20(0.98-1.47)	1.21(0.95-1.54)	1.14(0.85-1.53)
Birth size				
Large		1	1	1
Average		0.86(0.78-0.93)*	0.87(0.79-0.96)*	0.87(0.77-0.97)*
Small		1.06(0.94-1.19)	1.06(0.93-1.20)	1.06(0.92-1.23)
Highest educational level				
No education			1	1
Primary			1.08(0.94-1.24)	1.02(0.88-1.19)
Secondary			1.12(0.94-1.32)	0.87(0.71-1.07)
Higher			1.14(0.86-1.50)	0.94(0.66-1.32)

Occupation				
Not working			1	1
Agricultural workers			1.05(0.89-1.25)	1.10(0.90-1.35)
Clerical staffs			1.25(1.12-1.39)*	1.33(1.18-1.51)*
Professionals			1.06(0.79-1.43)	1.14(0.78-1.67)
Wealth index				
Poor			1	1
Middle			0.84(0.72-0.99)*	0.85(0.71-1.01)
Rich			0.77(0.62-0.94)*	0.81(0.64-1.03)
Water source				
Improved			1	1
Non-improved			0.98(0.87-1.11)	1.01(0.89-1.15)
Cooking fuel				
Biomass fuel			1	1
Non-biomass			1.01(0.83-1.23)	0.99(0.79-1.25)
Floor type				
Finished			1	1
Rudimentary/Natural			0.90(0.77-1.04)	0.92(0.78-1.10)
Place of delivery				
Home				1
Health facility				0.97(0.82-1.15)
Ever had vaccination				
No				1
Yes				1.29(1.14-1.45)*

*p<0.05

Table 12 shows Logistic regression models of the relative Odd Ratio of occurrence of diarrhea among under-five children. In model 1where migration status was the only explanatory variable to assess the effect of migration status on diarrhea among under-five. Higher risk of childhood diarrhea was observed for rural-rural migrants' children (OR=1.37, C.I=1.18-1.58). In contrast, children of urban-urban migrants are less likely to have diarrhea by 41% (OR= 0.71, C.I= 0.57-0.88).

Model 2 adjusted for demographic characteristics. The association between rural-rural migrants' remained exactly the same like that of model 1. However, the negative association of urban-urban in the likelihood of childhood diarrhea remained insignificant. Meanwhile, a significant positive association was observed for urban-rural migrants' (OR= 1.49, C.I= 1.22-1.83). In addition, the chances of diarrhea decreased with older year-age group. Children from north east region had the highest likelihood for childhood diarrhea (OR= 4.24, C.I= 3.39-5.30). Other factors that were positively associated with childhood diarrhea were 5 and above birth order (OR= 1.35, C.I= 1.10-1.65) and small birth size (OR=1.18, C.I= 1.02-1.36).

Occupation				
Not working			1	1
Agricultural workers			1.05(0.89-1.25)	1.10(0.90-1.35)
Clerical staffs			1.25(1.12-1.39)*	1.33(1.18-1.51)*
Professionals			1.06(0.79-1.43)	1.14(0.78-1.67)
Wealth index				
Poor			1	1
Middle			0.84(0.72-0.99)*	0.85(0.71-1.01)
Rich			0.77(0.62-0.94)*	0.81(0.64-1.03)
Water source				
Improved			1	1
Non-improved			0.98(0.87-1.11)	1.01(0.89-1.15)
Cooking fuel				
Biomass fuel			1	1
Non-biomass			1.01(0.83-1.23)	0.99(0.79-1.25)
Floor type				
Finished			1	1
Rudimentary/Natural			0.90(0.77-1.04)	0.92(0.78-1.10)
Place of delivery				
Home				1
Health facility				0.97(0.82-1.15)
Ever had vaccination				
No				1
Yes				1.29(1.14-1.45)*

*p<0.05

Table 12 shows Logistic regression models of the relative Odd Ratio of occurrence of diarrhea among under-five children. In model 1where migration status was the only explanatory variable to assess the effect of migration status on diarrhea among under-five. Higher risk of childhood diarrhea was observed for rural-rural migrants' children (OR=1.37, C.I=1.18-1.58). In contrast, children of urban-urban migrants are less likely to have diarrhea by 41% (OR= 0.71, C.I= 0.57-0.88).

Model 2 adjusted for demographic characteristics. The association between rural-rural migrants' remained exactly the same like that of model 1. However, the negative association of urban-urban in the likelihood of childhood diarrhea remained insignificant. Meanwhile, a significant positive association was observed for urban-rural migrants' (OR= 1.49, C.I= 1.22-1.83). In addition, the chances of diarrhea decreased with older year-age group. Children from north east region had the highest likelihood for childhood diarrhea (OR= 4.24, C.I= 3.39-5.30). Other factors that were positively associated with childhood diarrhea were 5 and above birth order (OR= 1.35, C.I= 1.10-1.65) and small birth size (OR=1.18, C.I= 1.02-1.36).

Socio-economic variables were added in model 3. This slightly attenuated the relationship between rural-rural migrants' and childhood diarrhea (OR= 1.36, C.I= 1.13-1.60), but significantly increased that of urban-rural migrants (OR= 1.59, C.I= 1.27-2.00).

In model 4, health care utilization variable were added. This significantly lowered the differential between rural-rural (OR= 1.27, C.I= 1.03-1.57) and urban-rural (OR= 1.54, C.I= 1.10-2.05) migrants' children in the likelihood of diarrhea. In addition, only mothers of 40-44 year-age group had a significant negative association with childhood diarrhea (OR= 0.64, C.I= 0.42- 0.96). Children whose mothers were clerical staffs were significantly more likely to present with diarrhea compared to those that are not working (OR= 1.25, C.I= 1.03-1.51). In contrast, children delivered at health facilities are less likely to have diarrhea by 47% (OR= 0.68, C.I= 0.58-0.88).

Table 12: Logistic regression models of the relative Odd Ratio of occurrence of diarrhea among under-five children.

	Model 1 Migration status	Model 2 Demographic	Model 3 Socio-economic	Model 4 Health care utilization
Migration status				
Rural non-migrant	1	1	1	1
Rural-Rural	1.37(1.18-1.58)*	1.37(1.18-1.60)*	1.36(1.13-1.60)*	1.27(1.03-1.57)*
Rural-Urban	1.07(0.75-1.54)	1.33(0.94-1.87)	1.44(0.98-2.10)	1.28(0.84-1.94)
Urban non-migrant	0.87(0.63-1.19)	0.99(0.73-1.35)	1.04(0.75-1.43)	1.19(0.80-1.78)
Urban-Urban	0.71(0.57-0.88)*	1.05(0.84-1.33)	1.30(0.98-1.71)	1.08(0.73-1.59)
Urban-Rural	1.07(0.88-1.30)	1.49(1.22-1.83)*	1.59(1.27-2.00)*	1.54(1.10-2.05)*
Birth Order				
First birth		1	1	1
2-4 birth order		1.02(0.87-1.19)	1.03(0.86-1.24)	0.91(0.69-1.21)
>=5 birth order		1.35(1.10-1.65)*	1.26(1.01-1.59)*	1.07(0.76-1.49)
Sex of child				
Male		1	1	1
Female		0.88(0.80-0.96)	0.88(0.79-0.97)*	0.88(0.76-1.49)
Mother's age				
15-19		1	1	1
20-24		0.76(0.61-0.94)*	0.74(0.59-0.94)*	0.96(0.71-1.29)
25-29		0.68(0.54-0.86)*	0.70(0.54-0.91)*	0.83(0.58-1.18)
30-34		0.62(0.48-0.80)*	0.64(0.48-0.85)*	0.71(0.50-1.03)
35-39		0.58(0.45-0.76)*	0.62(0.47-0.82)*	0.74(0.52-1.05)
40-44		0.59(0.44-0.81)*	0.63(0.44-0.88)*	0.64(0.42-0.96)*
45-49		0.55(0.38-0.80)*	0.55(0.36-0.84)*	0.63(0.39-1.01)
Type of family				
Monogamy		1	1	1
Polygamy		1.17(1.05-1.30) *	1.12(0.99-1.26)	1.08(0.93-1.26)
Region of residence				
North Central		1	1	1

North East		4.24(3.39-5.30)*	3.66(2.77-4.83)*	4.43(3.17-6.19)*
North West		2.48(1.98-3.11)*	3.21(1.67-2.92)*	2.59(1.85-3.63)*
South East		0.96(0.70-1.32)	0.94(0.65-1.36)	1.23(0.73-2.08)
South South		0.59(0.42-0.82)*	0.55(0.34-0.87)*	1.04(0.53-2.04)
South West		1.18(0.89-1.57)	1.19(0.85-1.68)	1.51(0.93-2.45)
Size of child at birth				
Large		1	1	1
Average		0.89(0.79-1.01)	0.91(0.79-1.03)	1.03(0.87-1.21)
Small		1.18(1.02-1.36)*	1.16(0.99-1.35)	1.24(1.01-1.51)*
Highest educational level				
No education			1	1
Primary			1.13(0.95-1.34)	1.17(0.96-1.43)
Secondary			0.97(0.77-1.21)	0.78(0.57-1.07)
Higher			1.19(0.75-1.88)	0.99(0.48-2.03)
Occupation				
Not working			1	1
Agricultural workers			0.92(0.73-1.16)	0.90(0.69-1.17)
Clerical staffs			1.15(0.99-1.34)	1.25(1.03-1.51)*
Professionals			0.72(0.38-1.36)	1.25(0.59-2.65)
Wealth index				
Poor			1	1
Middle			0.83(0.69-0.99)*	0.84(0.66-1.08)
Rich			0.85(0.65-1.10)	1.02(0.73-1.44)
Water source				
Improved			1	1
Non-improved			1.15(0.99-1.32)	1.16(0.98-1.38)
Cooking fuel				
Biomass fuel			1	1
Non-biomass			0.76(0.57-1.02)	0.52(0.32-0.85)*
Floor type				
Finished			1	1
Rudimentary/Natural			1.03(0.86-1.22)	0.96(0.79-1.18)
Place of delivery				
Home				1
Health facility				0.68(0.52-0.88)*
Prenatal care by doctor				
No				1
Yes				0.99(0.74-1.31)
Ever had vaccination				
No				1
Yes				1.21(1.03-1.42)*

*P<0.05

From model 1 in table 13 below, higher odds of fever was observed among rural-rural migrants' children (OR= 1.32, C.I= 1.16-1.49), whereas urban non-migrants and urban-urban migrants' children are less likely to present with fever.

In model 2, demographic variables were fitted along with migration status. The relationship between rural-rural migrants' children and occurrence of fever was slightly raised (OR= 1.33, C.I= 1.17-1.50), and the negative differential between urban non-migrants and under- five fever was increased, but the differential of urban-urban was no longer significant. Meanwhile, a positive relationship between urban-rural and occurrence of fever was observed (OR= 1.38, C.I= 1.17-1.63). In addition, female children were less likely to have fever than male (OR= 0.92, C.I= 0.85-0.99).

In model 3, after the addition of socio-economic variables, the association between rural migrants (i.e. rural-rural and urban-rural) and urban non-migrants were slightly increased. However, children whose mothers are of professional/technical/management occupation had the highest risk of fever than those whose mothers are not working (OR= 1.48, C.I=1.12-1.96).

Addition of health care utilization variables in model 4 resulted in significant increase in the difference between rural-rural migrants (OR=1.42, C.I= 1.23-1.63) and urban-rural migrants' (OR= 1.47, C.I= 1.20-1.79) in the likelihood of the occurrence of fever among under-five. Other factors positively associated were 5 and above birth order, polygamy family and having had vaccination.

Table 13: Logistic regression models of the relative Odd Ratio of fever among under-five children.

	Model 1 Migration status	Model 2 Demographic	Model 3 Socio-economic	Model 4 Health care utilization
Migration status				
Rural non-migrant	1	1	1	1
Rural-Rural	1.32(1.16-1.49)*	1.33(1.17-1.50)*	1.35(1.19-1.52)*	1.42(1.23-1.63)*
Rural-Urban	1.09(0.84-1.42)	0.99(0.76-1.28)	1.01(0.76-1.34)	1.07(0.79-1.45)
Urban non-migrant	0.71(0.55-0.91)*	0.76(0.60-0.96)*	0.78(0.61-0.99)*	0.78(0.58-1.05)
Urban-Urban	0.80(0.67-0.96)*	0.99(0.82-1.18)	1.00(0.80-1.25)	1.07(0.83-1.38)
Urban-Rural	1.17(0.99-1.39)	1.38(1.17-1.63)*	1.39(1.17-1.65)*	1.47(1.20-1.79)*
Birth Order				
First birth		1	1	1
2-4 birth order		0.90(0.80-1.02)	0.92(0.82-1.03)	0.96(0.83-1.11)
>=5 birth order		1.12(0.96-1.30)	1.14(0.98-1.33)	1.22(1.01-1.47)
Sex of child				
Male		1	1	1
Female		0.92(0.85-0.99)*	0.92(0.85-0.99)*	0.97(0.89-1.05)

In model 2, demographic variables were fitted along with migration status. The relationship between rural-rural migrants' children and occurrence of fever was slightly raised (OR= 1.33, C.I= 1.17-1.50), and the negative differential between urban non-migrants and under- five fever was increased, but the differential of urban-urban was no longer significant. Meanwhile, a positive relationship between urban-rural and occurrence of fever was observed (OR= 1.38, C.I= 1.17-1.63). In addition, female children were less likely to have fever than male (OR= 0.92, C.I= 0.85-0.99).

In model 3, after the addition of socio-economic variables, the association between rural migrants (i.e. rural-rural and urban-rural) and urban non-migrants were slightly increased. However, children whose mothers are of professional/technical/management occupation had the highest risk of fever than those whose mothers are not working (OR= 1.48, C.I=1.12-1.96).

Addition of health care utilization variables in model 4 resulted in significant increase in the difference between rural-rural migrants (OR=1.42, C.I= 1.23-1.63) and urban-rural migrants' (OR= 1.47, C.I= 1.20-1.79) in the likelihood of the occurrence of fever among under-five. Other factors positively associated were 5 and above birth order, polygamy family and having had vaccination.

Table 13: Logistic regression models of the relative Odd Ratio of fever among under-five children.

	Model 1 Migration status	Model 2 Demographic	Model 3 Socio-economic	Model 4 Health care utilization
Migration status				
Rural non-migrant	1	1	1	1
Rural-Rural	1.32(1.16-1.49)*	1.33(1.17-1.50)*	1.35(1.19-1.52)*	1.42(1.23-1.63)*
Rural-Urban	1.09(0.84-1.42)	0.99(0.76-1.28)	1.01(0.76-1.34)	1.07(0.79-1.45)
Urban non-migrant	0.71(0.55-0.91)*	0.76(0.60-0.96)*	0.78(0.61-0.99)*	0.78(0.58-1.05)
Urban-Urban	0.80(0.67-0.96)*	0.99(0.82-1.18)	1.00(0.80-1.25)	1.07(0.83-1.38)
Urban-Rural	1.17(0.99-1.39)	1.38(1.17-1.63)*	1.39(1.17-1.65)*	1.47(1.20-1.79)*
Birth Order				
First birth		1	1	1
2-4 birth order		0.90(0.80-1.02)	0.92(0.82-1.03)	0.96(0.83-1.11)
>=5 birth order		1.12(0.96-1.30)	1.14(0.98-1.33)	1.22(1.01-1.47)
Sex of child				
Male		1	1	1
Female		0.92(0.85-0.99)*	0.92(0.85-0.99)*	0.97(0.89-1.05)

Mother's age				
15-19		1	1	1
20-24		0.95(0.78-1.15)	0.92(0.75-1.13)	0.85(0.68-1.06)
25-29		0.90(0.74-1.10)	0.85(0.70-1.05)	0.79(0.63-1.00)
30-34		0.86(0.69-1.06)	0.80(0.65-1.00)	0.73(0.56-0.94)*
35-39		0.85(0.68-1.07)	0.80(0.63-1.01)	0.71(0.54-0.94)*
40-44		0.87(0.67-1.13)	0.82(0.63-1.08)	0.73(0.54-0.99)*
45-49		0.87(0.65-1.16)	0.82(0.61-1.10)	0.72(0.51-1.01)
Marital status				
Currently married				
Not currently married		1	1	1
		1.13(0.94-1.37)	1.21(1.00-1.45)	1.27(1.03-1.55)
Region of residence				
North Central		1	1	1
North East		2.59(2.13-3.16)*	2.64(2.14-3.20)*	2.58(2.07-3.23)*
North West		1.71(1.41-2.06)*	1.71(1.39-2.09)*	1.75(1.40-2.19)*
South East		2.95(2.40-3.62)*	2.97(2.40-3.66)*	2.56(2.01-3.26)*
South South		2.38(1.92-2.95)*	2.34(1.87-2.93)*	2.13(1.66-2.73)*
South West		0.87(0.70-1.09)	0.83(0.66-1.04)	0.74(0.57-0.97)*
Occupation				
Not working			1	1
Agricultural workers			1.07(0.91-1.26)	1.08(0.90-1.31)
Clerical staffs			1.28(1.15-1.43)*	1.36(1.20-1.55)*
Professionals			1.48(1.12-1.96)*	1.55(1.08-2.21)*
Wealth index				
Poor			1	1
Middle			0.92(0.79-1.07)	0.96(0.81-1.14)
Rich			0.84(0.69-1.02)	0.84(0.68-1.04)
Toilet facility				
Improved			1	1
Non-improved			1.07(0.95-1.20)	1.05(0.93-1.20)
Cooking fuel				
Biomass fuel			1	1
Non-biomass			1.13(0.92-1.39)	1.14(0.90-1.45)*
Floor type				
Finished			1	1
Rudimentary/Natural			0.93(0.80-1.08)	0.97(0.82-1.15)
Place of delivery				
Home				1
Health facility				0.90(0.77-1.05)
Ever had vaccination				
No				1
Yes				1.38(1.21-1.57)*

*P<0.05

From table 14 below, fitting only migration status as the only explanatory variable in model 1 to assess the effect of migration status on the occurrence of cough among under-five resulted in higher risk of occurrence of cough for all migrants group.

Mother's age				
15-19		1	1	1
20-24		0.95(0.78-1.15)	0.92(0.75-1.13)	0.85(0.68-1.06)
25-29		0.90(0.74-1.10)	0.85(0.70-1.05)	0.79(0.63-1.00)
30-34		0.86(0.69-1.06)	0.80(0.65-1.00)	0.73(0.56-0.94)*
35-39		0.85(0.68-1.07)	0.80(0.63-1.01)	0.71(0.54-0.94)*
40-44		0.87(0.67-1.13)	0.82(0.63-1.08)	0.73(0.54-0.99)*
45-49		0.87(0.65-1.16)	0.82(0.61-1.10)	0.72(0.51-1.01)
Marital status				
Currently married		1	1	1
Not currently married		1.13(0.94-1.37)	1.21(1.00-1.45)	1.27(1.03-1.55)
Region of residence				
North Central		1	1	1
North East		2.59(2.13-3.16)*	2.64(2.14-3.20)*	2.58(2.07-3.23)*
North West		1.71(1.41-2.06)*	1.71(1.39-2.09)*	1.75(1.40-2.19)*
South East		2.95(2.40-3.62)*	2.97(2.40-3.66)*	2.56(2.01-3.26)*
South South		2.38(1.92-2.95)*	2.34(1.87-2.93)*	2.13(1.66-2.73)*
South West		0.87(0.70-1.09)	0.83(0.66-1.04)	0.74(0.57-0.97)*
Occupation				
Not working			1	1
Agricultural workers			1.07(0.91-1.26)	1.08(0.90-1.31)
Clerical staffs			1.28(1.15-1.43)*	1.36(1.20-1.55)*
Professionals			1.48(1.12-1.96)*	1.55(1.08-2.21)*
Wealth index				
Poor			1	1
Middle			0.92(0.79-1.07)	0.96(0.81-1.14)
Rich			0.84(0.69-1.02)	0.84(0.68-1.04)
Toilet facility				
Improved			1	1
Non-improved			1.07(0.95-1.20)	1.05(0.93-1.20)
Cooking fuel				
Biomass fuel			1	1
Non-biomass			1.13(0.92-1.39)	1.14(0.90-1.45)*
Floor type				
Finished			1	1
Rudimentary/Natural			0.93(0.80-1.08)	0.97(0.82-1.15)
Place of delivery				
Home				1
Health facility				0.90(0.77-1.05)
Ever had vaccination				
No				1
Yes				1.38(1.21-1.57)*

*P<0.05

From table 14 below, fitting only migration status as the only explanatory variable in model 1 to assess the effect of migration status on the occurrence of cough among under-five resulted in higher risk of occurrence of cough for all migrants group.

In model 2, demographic characteristics were adjusted for. This attenuated the association childhood morbidity indicated by fever only for rural-rural, urban-urban and urban-rural migrants' children. in addition, children from north west were less likely to have cough by 37% (OR= 0.73, C.I= 0.58-0.90), while those from northeast , southeast and southsouth had higher risk of cough compared with those from north central.

In model 3, addition of socio-economic variables resulted in increased association between rural-rural and urban-rural migrants children in the likelihood of occurrence of cough. However, it decreased the relationship between urban-urban migrants and occurrence of cough previously observed in model 2. In addition, children whose mothers are agricultural workers are more likely to have cough than those whose mothers are not working (OR=1.33, C.I=1.08-1.63).

Variables that measured health care utilization were added in model 4. This resulted in a significant increase in the positive differential previously observed between rural-rural, urban-urban and urban-rural migrants' children and likelihood of cough among under-five. Like previous models, urban-rural migrants' children had the highest risk of cough compared with rural non-migrants'. Other variables positively associated with the occurrence of cough among under-five include polygamy family.

Table 14: Logistic regression models of the relative Odd Ratio of cough among under-five children.

	Model 1 Migration status	Model 2 Demographic	Model 3 Socio-economic	Model 4 Health care utilization
Migration status				
Rural non-migrant	1	1	1	1
Rural-Rural	1.23(1.07-1.42)*	1.21(1.05-1.40)*	1.24(1.03-1.48)*	1.42(1.18-1.71)*
Rural-Urban	1.47(1.13-1.91)*	1.11(0.85-1.46)	1.12(0.82-1.53)	1.17(0.83-1.65)
Urban non-migrant	0.94(0.71-1.24)	0.95(0.71-1.26)	0.96(0.70-1.31)	1.01(0.72-1.40)
Urban-Urban	1.42(1.18-1.72)*	1.38(1.12-1.71)*	1.33(1.02-1.73)*	1.38(1.05-1.81)*
Urban-Rural	1.62(1.34-1.96)*	1.57(1.28-1.91)*	1.59(1.25-2.02)*	1.77(1.38-2.28)*
Birth Order				
First birth		1	1	1
2-4 birth order		0.60(0.18-1.98)	0.57(0.14-2.27)	5.51(0)
>=5 birth order		0.67(0.20-2.25)	0.66(0.16-2.69)	5.87(0)
Birth interval				
>=24 months		1	1	1
<24 months		1.06(0.94-1.19)	1.05(0.92-1.21)	1.20(1.00-1.44)
First births		0.68(0.21-2.25)	0.67(0.17-2.67)	5.94(0)

Mother's age				
15-19		1	1	1
20-24		0.99(0.79-1.24)	0.97(0.75-1.25)	0.92(0.67-1.26)
25-29		0.95(0.75-1.21)	0.90(0.68-1.20)	0.90(0.65-1.24)
30-34		0.87(0.67-1.12)	0.84(0.63-1.13)	0.76(0.53-1.09)
35-39		0.78(0.59-1.03)	0.73(0.53-1.02)	0.81(0.55-1.19)
40-44		0.85(0.63-1.14)	0.82(0.58-1.16)	0.71(0.46-1.09)
45-49		0.73(0.49-1.09)	0.71(0.45-1.13)	0.66(0.39-1.10)
Marital status				
Currently married		1	1	1
Not currently married		0.75(0.52-1.08)	0.69(0.43-1.09)	1.04(0.59-1.82)
Family				
Monogamy		1	1	1
Polygamy		1.02(0.91-1.15)	1.09(0.96-1.25)	1.17(1.01-1.36)*
Region of residence				
North Central		1	1	1
North East		2.16(1.76-2.66)*	2.43(1.86-3.18)*	2.70(2.10-3.48)*
North West		0.73(0.58-0.90)*	0.81(0.60-1.05)	0.89(0.68-1.16)
South East		2.52(1.98-3.22)*	2.35(1.77-3.12)*	2.59(1.87-3.59)*
South South		2.87(2.23-3.69)*	3.14(2.31-4.27)*	2.91(2.12-4.01)*
South West		1.08(0.84-1.40)	1.08(0.81-1.45)	1.05(0.75-1.48)
Highest educational level				
No education			1	1
Primary			1.08(0.91-1.27)	1.07(0.87-1.30)
Secondary			1.13(0.92-1.40)	0.89(0.69-1.16)
Higher			1.08(0.76-1.54)	0.61(0.37-1.01)
Occupation				
Not working			1	1
Agricultural workers			1.33(1.08-1.63)*	1.39(1.12-1.74)*
Clerical staffs			1.02(0.88-1.18)	1.17(0.99-1.37)
Professionals			0.89(0.63-1.26)	1.26(0.74-2.15)
Wealth index				
Poor			1	1
Middle			1.00(0.79-1.27)	1.11(0.88-1.41)
Rich			1.04(0.78-1.37)	1.35(1.00-1.82)
Water source				
Improved			1	1
Non-improved			0.87(0.74-1.03)	0.92(0.78-1.08)
Cooking fuel				
Biomass fuel			1	1
Non-biomass			1.10(0.88-1.37)	1.12(0.85-1.47)
Floor type				
Finished			1	1
Rudimentary/Natural			0.97(0.78-1.21)	1.00(0.81-1.24)
Place of delivery				
Home				1
Health facility				0.89(0.72-1.10)
Prenatal care by doctor				
No				1
Yes				1.11(0.90-1.37)
Ever had vaccination				1

No Yes				1.28(1.90-1.49)*

*P<0.05

No Yes				1.28(1.90-1.49)*

*P<0.05

No Yes				1.28(1.90-1.49)*

*P<0.05

CHAPTER FIVE

DISCUSSION

`The study demonstrates that the most common form of internal migration in Nigeria is rural-rural migration (33.4%). This is unexpected as previous researches as documented rural-urban migration as one of the most significant migration pattern (Nwokocha 2007, Antai 2010). The possible explanation could be that the high cost of living in urban centers and urban area disadvantages have made individuals prefer to move from a rural to another rural setting that may probably be bigger or better than the previous rural residence.

In this study, the most common morbidity among under-five children was fever, followed by cough and then diarrhea. Overall, 16% of under-five children were reported to have had fever, 13% had cough while 10% had diarrhea in the two weeks prior to the survey, which is in line with the national figures from NDHS 2008 report. Fever is a symptom of malaria. The leading role of malaria as a major cause of under-five morbidity, childhood hospitalization and mortality has been well documented (Okolo 2012, NDHS 2008, Sule 2003, Omokhon et. al. 2003).

This study provides evidence of variation in childhood morbidity according to migration status. Children of rural-rural migrants had the highest prevalence for such morbidity, followed by urban-rural migrants' children. The plausible explanation for this could be the fact that rural dwellers live under disadvantaged conditions that are characterized by inadequate health services, inadequate social amenities, deteriorating housing, and poor environmental and sanitary conditions, as well as poor economic opportunities. Rural populations generally record a higher incidence of unhygienic practices than those of urban areas (Smith et. al. 2008, Pampalon et. al 2006, Mitura & Bollman 2003).

It is evident from this study that the process of migration had a significant effect on childhood morbidity especially among rural-rural and urban-rural migrants. The likely explanation for higher risk of childhood morbidity for rural migrants (rural-rural and urban-rural) is unavailability or poor access to good health services in the rural areas. Apart from the fact that rural-rural migrants are negatively selected, break in mothers' network and community attachment (disruption of the migration process) could be responsible for the higher risk of childhood morbidity. The possible explanation for urban-rural migrants in the likelihood of childhood morbidity could be linked to disruption process of migration and characteristics associated with rural places. Access to health care is more difficult for rural residents. Location and characteristics of rural places indirectly compound problems originating from more fundamental, structural or social causes (Smith et. al. 2008, Frase et. al.2005, Humphreys 2005).

Demographic characteristics slightly attenuated the risk of childhood morbidity for rural-rural migrants' children compared to rural non-migrants, which indicates that effect of migration on childhood morbidity is independent of demographic characteristics for rural-rural migrants' stream, but has a significant effect for urban-rural migrants' children since the risk of such morbidity was increased for children of urban-rural migrants. Migration explains only part of the variation in the likelihood of childhood morbidity. Several other explanatory factors also help in explaining the resulting childhood morbidity differentials in this study. Among the demographic characteristics, maternal age showed a negative relationship with the risk of childhood morbidity in the present study. This is in consonance with other studies (Kandala et. al. 2008, Magadi et. al. 2000). There is increased maturity, awareness and social network of older mothers (Antai 2010). Also, children from the North East region have a relatively higher risk of childhood morbidity. This finding is consistent with other reports (Kandala 2008, Kandala et. al 2007). The climatic

change and Sahelian drought which increased pressure on the available resources over the last decades, may be partially responsible (Anon 2005, Kandala 2008). In addition, size of child at birth has a clear, consistent and significant relationship with childhood morbidity. Children with average birth size are less likely to have childhood morbidity by 14% compared with those of small birth size. Childhood morbidity has been associated with child size at birth. This finding suggests that demographic characteristics of migrants could be an important determinant of childhood morbidity.

Addition of socio-economic characteristics in model 3 increased the risk of childhood morbidity among rural-rural and urban-rural migrants' children. This implies that socio-economic characteristics suppressed the effect of migration status on childhood morbidity and that the differences in the likelihood of such morbidity are partly explained by the disparities between socio-economic characteristics. For instance, children from the rich wealth quintile were less likely to have childhood morbidity than those from the poor quintile. Children of clerical staffs were at higher risk of childhood morbidity. The reasons for this may be that office workers usually have little time for their children due to the time-demanding nature of such occupation. Mothers' educational level, and household environmental variables (water source, type of cooking fuel, floor type) were significantly associated with childhood morbidity in simple logistic regression, but surprisingly, the associations disappeared in multivariate analysis. The reasons for this are not well understood as the roles of these variables on childhood morbidity have been well documented (Antai et. al. 2010, Fayehun 2010, Olaogun et. al. 2006). However similar finding from Kandala et. al. 2008 revealed that education of the mother's partner (often the father of the young child who was studied) was found more likely, than the education of the mother, to reduce the risk of cough in the young child.

The health care utilization of the mother (place of delivery and ever had vaccination) also had significant effect on childhood morbidity. It was however unexpected to observe a consistent positive association between immunization status and childhood morbidity in both simple logistic regression and multivariate analysis. In model 5, Children who have had vaccination were more likely to have childhood morbidity by 14%. This is surprising and in contrast to many reports. Immunization has been well documented to avert countless episodes of illness and disability annually (UNICEF 2012, Semba et al. 2007, Whitney et. al.2014).

However, when years lived in place of residence that depict disruption/adaptation theory of migration status was added to the model, there was the problem of multi-colinearity as some streams of migration status (rural non-migrant and urban non-migrant) were removed from the model and the remaining migration streams became insignificant.

Limitations:

The cross-sectional design of this study does not give the overall information about the scenerio before and after migration. Socio-economic status of each study household is subject to misclassification and may not produce results similar to those obtained from direct measurement.

Strengths:

The strengths of this study are worthy of mention. The use of multivariate analysis modelling to test the theoretical perspective of migration on the risk of childhood morbidity. DHS surveys are nationally-representative and therefore allow for generalization of results across the country.

Recommendation:

As a result of this study, it is recommended that policy makers in Nigeria should carry out an intense effort to transform the rural areas holistically, by making available sufficient

socio-economic and infrastructural amenities for the rural dwellers. Also, more effort should be made to obtain detailed information that can depict individual's migration status during the subsequent National, Demographic and Health Survey.

CONCLUSION

This study clearly demonstrate that under-five children of rural-rural migrants and urban-rural migrants in Nigeria are significantly at higher risk of childhood morbidity than their non-migrant counterparts. Mother's age, region of residence, birth size, wealth index are important determinants of childhood morbidity. This emphasizes the need for advanced age at marriage (above 20), increased female education, and a general improvement of the socio-economic situation of people in rural community.

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