

THE TRENDS IN UNDER-FIVE INFANTS AND CHILD MORTALITY IN KADUNA STATE, NIGERIA

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ABSTRACT

The rising trend in mortality rates in Kaduna State seem to be firmly established and this would appear as the most striking demographic phenomenon of the last seven years. While, the pattern of mortality increase in Kaduna State bears similarities to the observed pattern in the early stage of the demographic transition, it is occurring now under quite different social, economic, and medical conditions. There have been concerted efforts to reduce the rate of infant and child mortality in Kaduna State, but there have been no significant studies to show whether or not the rate of infant and child mortality is rising or falling. Data from Jema'a, Kaduna South and Zaria Local Government Areas hospitals from 2005 to 2014 were analyzed to assess the trends of infant and child mortality. A semi-structured questionnaire was purposively administered among 386 respondents in the study area. Descriptive statistics was used to summarize the data into frequency, averages and percentages. ANOVA and Logistic regression technique was used to determine the relative contribution of each factor responsible for under-five mortality using SPSS version 20.0 version. The result reveals that majority of the respondents 65.0% are between the ages of 20-34 years, 19.0% are in the age group of 40-49 years, 36.8% are Hausa/Fulani, and 51.0% are Muslims. The trends has been on the decrease, although the decrease is small over the years from 2011, 2012, 2013 and 2014 saw steady declined or no change in the trends of infant and child mortality. Logistic regression revealed that distance from the health facility 0.379, age at first marriage 0.138, age of mother 0.118, marital status 0.064, level of education 0.064 and length of breast feeding 0.054 were found to be correlated with under 5 mortality. On the basis of the findings, the study recommends that programme interventions need to focus on mothers with low socioeconomic status. The adolescent girls should be encouraged to go for educational training in schools in order to lengthen age at first birth and reduce child death at first birth order. Also, health services should be brought nearer to the local communities with a bid to increase accessibility of the mothers to medical facilities thereby reducing under-five mortality.

Key words: Accessibility, Health facilities, Mortality, Trends, Under-five

INTRODUCTION

Infant and child mortality are commonly on top of the agenda of public health and international development agencies. Recently, the issue has received renewed attention as part of the United

Nation's Millennium Development Goals (MDGs) (Mahfouz, Surur, Ajak, and Eldawi, 2009). Approximately, 10.8 million children worldwide die annually, 41% of these deaths occur in sub-Saharan Africa and 34% in South Asia (UNICEF, 2007). Between 1990 and 2008, under-five mortality in Nigeria only falls from 199 to 157 against the 62 MDGs target by 2015. Currently, about 5.9 million babies are born in Nigeria every year, and nearly one million children die before the age of five years. Many deaths occur at home and are unseen and unrecorded in the official statistics (UNICEF, 2007).

In Nigeria today effort toward reducing under-five mortality is still slow with the country ranking 12th in the indicator having a ratio of 143 to 1,000 live births in 2010 and life expectancy at birth for under-five children in Nigeria standing at 51 (UNICEF, 2010). The percentage of under-five children sleeping under Insecticide Treated Nets (ITNs) is still 29% and in the aspect of Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/ AIDs), the report shows that a total number of under-five orphaned by the epidemic stood at 2,500 in 2009. In this regard, the progress being made in Nigeria towards reducing under-five mortality is invariably stagnant as about one in every six children born in Nigeria dying before their fifth birthday. This is a serious challenge to the socio-economic development of the country as such demands for urgent attention. However, infant and child mortality is high and has had a sluggish decline in Kaduna State. It was at a high prevalence rate of 115 deaths per 1,000 live births and 205 deaths per 1000 live births for infant and child mortality respectively in 2003 (Partnership for Transforming Health Systems [PATHS], 2010), 91 deaths per 1,000 live births and 189 deaths per 1,000 live births for infant and child mortality respectively (NPC and Macro, 2009), 88 deaths per 1,000 live births and 179 deaths per 1,000 live births for infant and child mortality respectively in 2010 (PATHS, 2010). This slope sluggishly and is still a far cry from Millennium Development Goal (MDGs) of a reduction in infant and child mortality rate by about two third, between 1990 to 2015.

The high rates of infant and child mortality in Kaduna South Local Government Area has been attributed to the trend in rapid population growth, down turn in the economy and a relatively high level of poverty and apathy, ignorance, a situation of relatively unsafe drinking water, poor nutrition, inadequate sanitation, high level of environmental pollution, limited access to professional medical care, facilities and drugs as well as the low utilization of the few facilities, and high cases of unwanted pregnant among young women, most of whom are unemployed and lack a reasonable educational qualification (PATHS, 2010).

Accurate and reliable information is scarce on under-five mortality differentials in the study area but recently, studies have been made on national surveys on health in examining and trends, socio-economic status of parents and demographic differentials of childhood mortality in the country. In this regard, this study focused on trends of infant and child mortality and factors influencing under-five mortality in Kaduna State. The main objective of this paper is to examine the trend of infant and child mortality rate in the study area from 2005-2014 in Kaduna State and also to examine the factors that determine infant and child mortality rate in the study area.

STUDY AREA

Kaduna State is located between Latitudes 9^o 02'N - 11^o 32' North of the Equator and Longitudes 6^o 15' E - 8^o 50' East of the Green Which Meridian (Figure 1). Kaduna State is bounded to the

north by Katsina, Zamfara and Kano States, to the west by Niger State, to the east by Bauchi State and to the south by Plateau, Nasarawa and the Federal Capital Territory, Abuja. Kaduna State has a total population of 6,113,503 and a landmass area of about 43,898 square kilometers (NPC and ICF Macro, 2009) and with a growth rate of 3.0% per annum. The State serves as a major gate way to important traditional, political and commercial states of Kano, Katsina, and Sokoto (Bako, 2014). The state is divided into three senatorial zones, namely; Kaduna North, Central and South and it comprises twenty three (23) Local Government Areas with 255 political wards (NPC and ICF Macro, 2009).

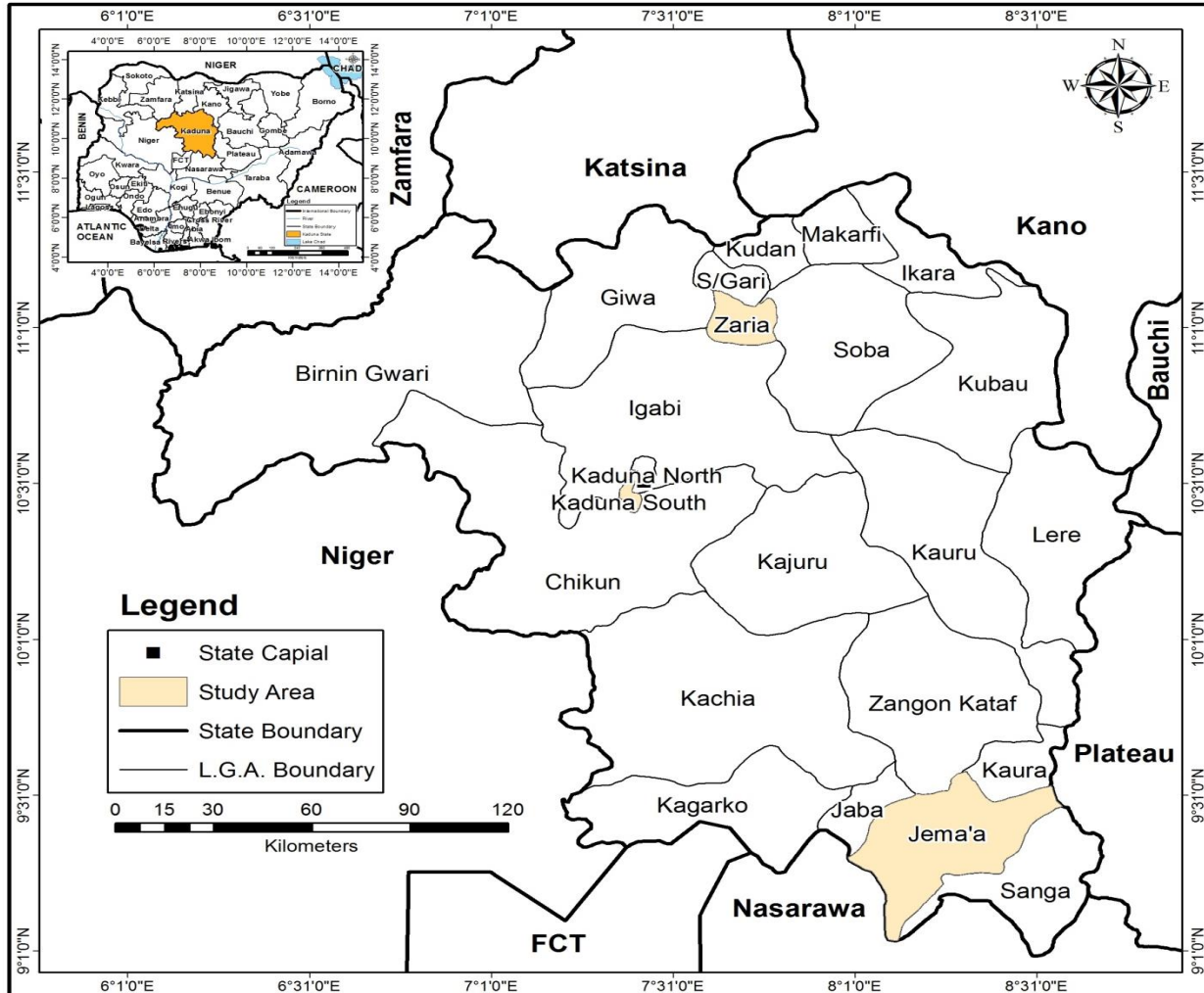


Figure 1: Kaduna State Showing the Study Areas

Source: Adapted and Modified from the Administrative Map of Kaduna State, 2014

Kaduna State contains a striking range of natural environments from the forested guinea savanna, heavy rains in the southern part, to the savanna scrub in the far north (Kaduna State Ministry of Health, 2014). The topography varies from the Kudu Ring Complex Hills in the East, to the wide valley plains of the River Kaduna in the West.

The study area possess a tropical continental climate with marked seasonal variations. The area is influenced by two distinct air masses that have tremendous effect on the climate of the State. Rainfall is very heavy in the southern part of the state and reaches an average of over 500 mm per month between April and September (Bako, 2012). There are many primary health centers (PHC) located in virtually all the Local Government Areas with emphasis on preventive-community health care and environmental and personal hygiene. Kaduna State has 739 Local Government Health Facilities, 29 Secondary Care Facilities, five (5) Tertiary Hospitals, 19 General hospitals, 656 Private Health Facilities and 2500 registered patent medicine shops (Kaduna State Ministry of Health, 2014).

MATERIALS AND METHODS

A reconnaissance survey was carried out for getting acquaintance with the study area. The data for this study were collected as part of a larger study on household demography in Kaduna State. Information was collected from the hospital records, household of young mothers and older women that have experienced the loss of under-five child/children who gave information about infant and child mortality in the study area.

A multi-stage sampling procedure was adopted. First, purposive sampling technique was used to select a local government area from each of the three senatorial districts in the study area, to ensure adequate spatial coverage of the study. Kaduna State has a population of 6,113,503 (NPC and ICF Macro, 2009). It comprises of twenty three (23) Local Government Areas, grouped into three senatorial districts. The selected local government areas include Zaria, Kaduna South and Jema'a. Second, a systematic sampling technique was adopted to select nine wards by arranging them alphabetically and every fourth ward was selected for the study (see Table 1). Third, in each ward, the households with children 5 years and below was identified with the help of a local guide who is resident in the ward and questionnaire administered to the mothers randomly. Yamane (1967) sampling formula was used to determine the sample size with 95% confidence level and 5% sampling error assumption.

$$n = \frac{N}{1 + N(e)^2}$$

Where,

n= Sample size

N= Population size of the selected LGAs

e= Level of significance (0.05)

The study used the above formula to obtain an approximate 400 sample size for the study. However, some 386 samples were considered valid and used for the analysis of data. To determine the proportion of the sample size for each ward, the formula below was adopted. A simple structured questionnaire was administered randomly to 386 young and older women.

Where:

$$\text{Sample size per ward} = \frac{\text{Selected LGAs Population} \times \text{Sample Size}}{\text{Total Selected LGAs Population}}$$

Table 1: Sample Size by Wards

Senatorial District	Selected LGA	Ward	2006 Population Census	Sample Size
Kaduna North	Zaria	Angwan Fatika Angwan Juma Dambo Dutsen Abba* Gyellesu Kauran Limanci Kufena Kwarbai A.* Kwarbai B. Kona Tudun Wada Tukurtukur* Wuciciri	196,090	148
Kaduna Central	Kaduna South	Asso Atuku Angwan Sanusi Badiko* Barnawa Kakuri Gwari Kakuri Hausa Makera* Sabon Gari North Sabon Gari South Television Tudun Nuwapa* Tudun Wada North Tudun Wada South Tudun Wada West	137,478	103
Kaduna South	Jema'a	Barde Gidan Waya Godogodo Jagindi* Kagoma Kafanchan A. Kafanchan B. Koninkon* Maigizo Takau	197,762	149
Total			531,330	400

Source: Compiled by the Author, 2015

* Selected Ward

Logic and ANOVA analysis using the statistical package for social science (SPSS) was used in determining the demographic variables that account for the determinants of infant and child mortality in the study area.

RESULTS AND DISCUSSION

Socioeconomic Characteristics of the Respondents

Table 2 shows the distribution of respondents by age and ethnicity. The result reveals that majority of the respondents (65%) are between the ages of 20-34 years, while 19% are in the age group of 40-49 years.

Table 2: Age and Ethnicity of the Respondents

Age Group	No of Respondents	%
15-19	34	8.8
20-24	78	20.2
25-29	91	23.6
30-34	83	21.5
35-39	27	7.0
40-44	37	9.7
45-49	36	9.3
Total	386	100.0

Ethnicity	No of Respondents	%
Igbo	68	17.6
Yoruba	51	13.2
Hausa/Fulani	142	36.8
Northern Minority	94	24.4
Southern Minority	31	8.0
Total	386	100.0

Source: Field Survey, 2015

This distribution is to be expected as the study targets women that are breast feeding and this age distribution is typical of women in reproductive age group. In all, 36.8% of the respondents are Hausa/Fulani, Northern Minority 24.4% and Igbo with 17.6%. The relatively high percentage of Hausa/Fulani populations is expected because they constitute the majority in the study area followed by the northern minority. About 31% are inhabited by immigrants (Igbo and Yoruba) from other parts of the country (Field Survey, 2015).

The distribution of respondents by religious affiliation shows that majority 51% of the women are Muslims, followed by Christians 45%, while the traditionalist make up 4% (see Fig. 2).

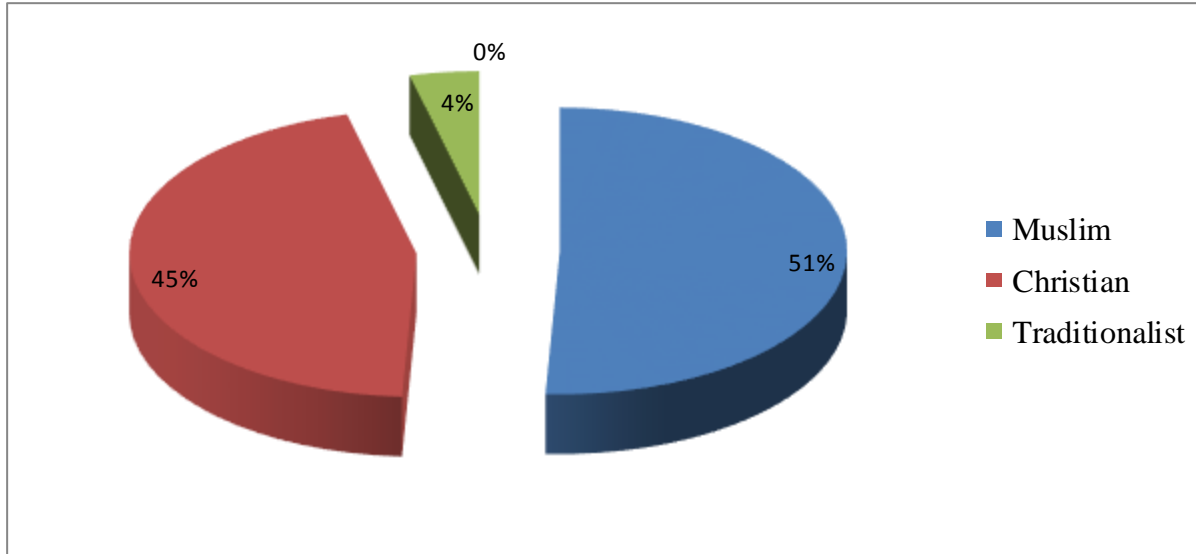


Figure 2: Distribution of Repondents by Religious

Source: Field Survey, 2015

The religious background of respondent influenced the choice and type of food to be taken in the household given to the children, whereby depriving them from eating foods will have probably increase their immune system so as to reduce the rate of diseases in their body as well as reduction in mortality. This is supported by Agada, (2008) in Kawo, Kaduna State, Nigeria.

Trends in Infant and Child Mortality

Death of children under five is a factor that defines the well-being of a population and it is usually taken as one of the development indicators of health and socioeconomic status which indicate the quality of life of a given population, as measured by life expectancy (Bello and Joseph, 2014). That is why reduction in infant and child mortality is a worldwide target and one of the most important key indices adopted by Millennium Development Goals (MDGs) is reducing infant and under-five child mortality rates by two-thirds starting from 1990 – 2015 (Desta, 2011). Health indices are poor in Kaduna State as can be seen in the maternal mortality ratio of 1025/10000 live births, infant mortality and child mortality rates are 114 and 269/ 1000 live births respectively Federal Ministry of Health (FMOH, 2012). The prevalence of Human Immunodeficiency Virus (HIV) and Tuberculosis (TB) are on the increase and non communicable diseases are increasingly becoming public health problems. This, in part is because of low coverage of high impact cost-effective interventions. For example, only 22% of children are fully immunized, less than 20% of women deliver in a health facility and only a fifth have their deliveries supervised by a trained health professional (FMOH, 2012).

United Nations Children’s Education Fund (UNICEF) (2007) has revealed that malnutrition accounts for over 50% of under-five mortality of children and women in Nigeria especially the Northern part of the country said the North-west has 53% malnutrition prevalence according to 2014 Multiple Indicator Cluster Surrey (MICS). Malnutrition is another cause of morbidity and mortality in Nigeria, it accounts for at least 50% of children’s deaths. Poor environmental

hygiene, low access and utilization of quality health care services by women and children are additional factors.

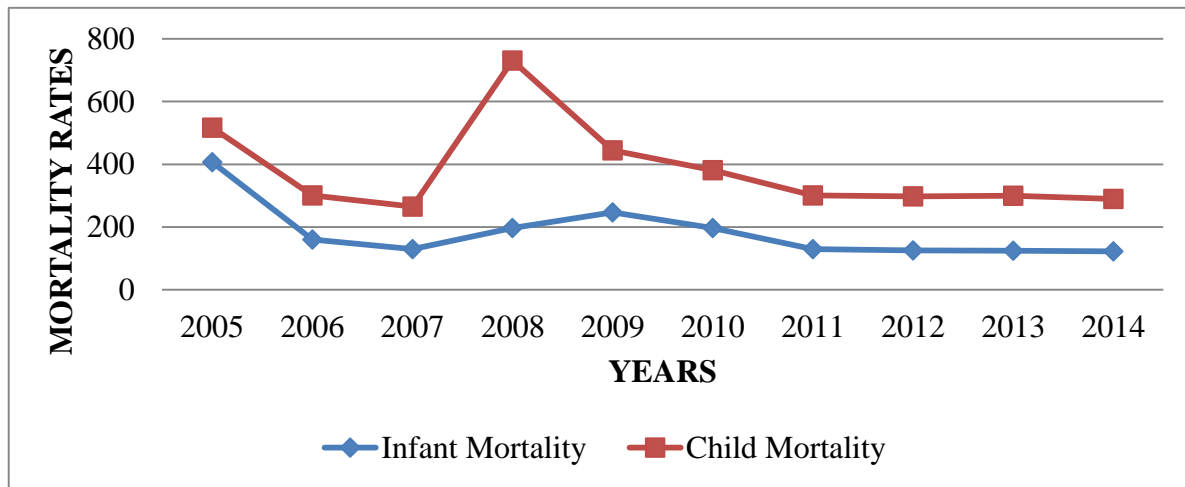


Figure 3: Trends in infant and child Mortality Rates, 2005-2014
Source: Hospital Records, 2005-2014

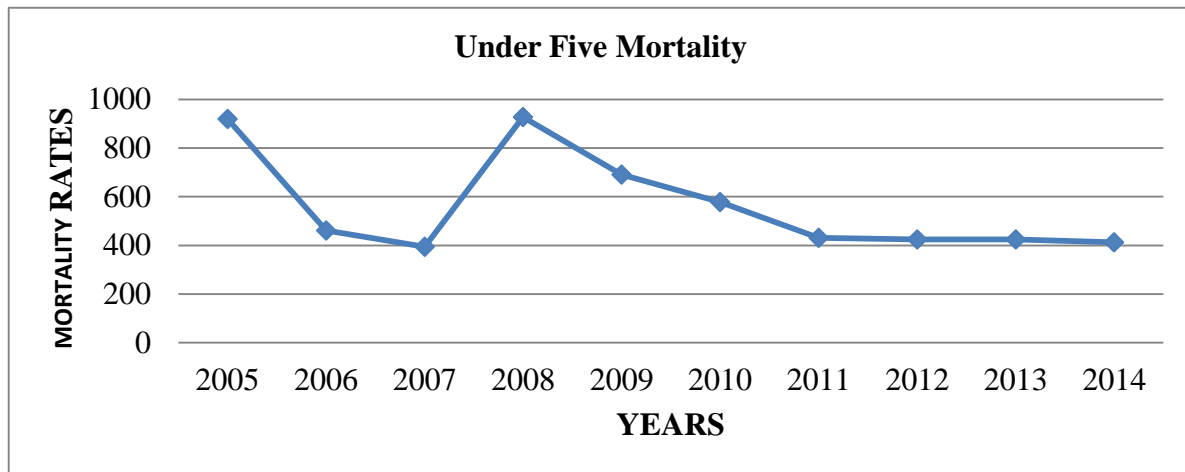


Figure 4: Trends of Under-five Mortality from 2005-2014
Source: Hospital Records 2005-2014

Figure 4 shows the trends of components of under-five mortality that is infant mortality rate (IMR) and child mortality rate (CMR) according to the various hospitals in the study areas for ten years periods from 2004-2014. The state recorded the highest infant and child mortality in 2008 probably due HIV/AIDS prevalence that was high in Kaduna State, with adverse consequences on the weak health care delivery system. Between 1991 and 1999, there was an exponential increase in the sero-prevalence rate of HIV in Kaduna State and after a period of decline after 1999, the rate increased to 7% in 2008, the highest state rate in the NW zone that could probably skyrocket the death of infant and child mortality (FMOH, 2009). Another reason could be as a result of human factor or political reasons where data can be manipulated by the

hospital for selfish interest. Although, during data gathering there was inconsistent, duplicate, missing of record book or record keeping was noticed by the some of the hospitals. Many children were not immunized, exposing them to disabilities or premature death. This is in concomitant with the research of Bryce, Terreri, Victora, Mason, Daelmans and Bhutta, (2015) noted that while some people believed that the polio vaccine was contaminated by anti-fertility substances, others questioned the focus on polio when measles and malaria were considered more harmful. Some also distrusted claims about the safety of Western biomedicine. These concerns relate to questions about the appropriateness of vertical health interventions, where levels of routine immunization are low.

Malnourishment could also be the cause of high infant and child mortality since there is over 57% of children that are malnourished in the state. Female illiteracy adversely affects child survival rates and is also linked to early pregnancy. The lack of primary education and lack of access and distance to health care contribute significantly to child mortality statistics. Women who complete secondary education are more likely to delay pregnancy, receive prenatal and post natal care and have their birth attended to by qualified medical personnel. UNICEF also notes that discrimination and exclusion of access to health and nutrition services due to poverty, geographic and political marginalization are factors in mortality rates as well (Saraki, 2008).

Overall, the under-five mortality indicators declined steadily in the past 10 year's period (2004-2014) and maximum decline was observed in 2011. In 2007 and 2011 most of the hospital did not have under five mortality records due to either fire outbreak, wind disaster or due to change in government. This could be as a result of low immunization awareness by the state and the local government areas. Another reason for the decline could be as a result of increased awareness by the state and local government. Although, the toll of under-five deaths over the past decade is staggering: between 2005 and 2014. The magnitude of decline varied across components of under-five mortality by years. Among the ten (10) years, four (4) years: 2011, 2012, 2013 and 2014 saw steady declined or no change in infant and child mortality. Kaduna State did not key into the National Health Sector Reform Programme of 2003 to 2007, on its own and with the support of development partners notably PATHS, undertook some reforms in recent years in the State to strengthen her health care delivery system (FMOH, 2012). The State implemented the Medium Term Health Plan for the period 2008 -2011 that probably led to the steady decrease in infant and child mortality. However considering the trends in under-five mortality in Kaduna State since 2005, there is no doubt that the trends has been on the decrease, although the decrease is small over the years up to 2014. However, despite the fact that under-five mortality has decreased between 2005 and 2014, the State still witness a reversal in the achievement made so far as the under-five mortality increase from 140 to 201 per1,000 live births between 1999 and 2003 (NPC and ICF Macro, 2003; UNICEF, 2010). Though, recent progress has been made towards reducing under-five mortality from 201 to 157 between 2003 and 2008 according to NDHS 2008 reports and UNICEF 2010 reports.

The infant and child mortality rates are 114 and 269/1000 live births respectively (NPC and IPC Macro, 2003), twice the rates in the southern zones of the country. The high infant and child mortality are from diseases that can be prevented or treated at low cost; they include diarrhea, malaria, malnutrition, measles and acute respiratory tract infections. Infant and child mortality increase in 2008, 2010, 2013 and decreased in 2009, 2011 and 2014 in almost all the hospitals

(See figure 1). This result is similar to the findings of Antai (2011). The above findings are consistent with the conclusions reached by Adedini, Odimegwu, Masiku, Ononokpono and Ibisonu (2013). During the same period, the under-five mortality rate declined from 135 deaths to 96 deaths per 1000 live births (29% decline) and infant mortality rate declined from 91 deaths to 62 deaths per 1000 live births (32% decline).

The data indicates that all the five childhood mortality indicators have been steadily declining over the last decades. The magnitude of decline varies among the component rates that combine to form the under-five mortality. This is also supported by Kaduna State Ministry of Health (2015) which revealed that there was 50% reduction in child mortality from its current level 2010-2013. The high infant and child mortality are from diseases that can be prevented or treated at low cost; they include diarrhea, malaria, malnutrition, measles and acute respiratory tract infections.

Regression Analysis of Infant and Child Mortality

An attempt was made to determine the factors that affect infant and child mortality using multiple regression analysis. This method essentially tends to eliminate the weakest variable, so that only the strongest variables are left. The variables are: distance to health facility, age at first marriage, age of mothers, current marital status, and level of education, length of breast feeding, child sleep under net, type of occupation, type of healthcare centre, cause of death, postnatal attendance, monthly income and age at first birth. The percentage variance of mortality explained by the factors of distance to health facility, age at first marriage, age of mothers, current marital status, level of education, length of breast feeding, child sleep under net, type of occupation, type of healthcare centre, cause of death, postnatal attendance, monthly income and age at first birth using multiple regression method.

Out of the six variables, distance from the health facility had the most significant correlation (0.379), followed by age at first marriage (0.138), the age of mother was also significant (see Table 3). This is expected as most mothers complain about the far distance to the health facilities in the study area. Most health facilities are not located within the reach of the respondents. According to one of the respondent (mother) during the focus group discussion in Zaria local government area affirmed that she spent not less than ₦300 on motor cycle to reach a health care facility that at times she end up trekking or alternatively visit a traditional healer who is close to her locality. The result shows that a matured age of woman before nursing a baby will help to reduce child mortality in the state than the little age ladies that have no prior nursing knowledge.

Table 3: Regression Analysis Under Five Mortality

Variables	Multiple R Square	Adjusted R Square	Change Statistics		
			R Square Change	F Change	Sig. F Change
1	.144	.142	.144	66.805	.000
2	.267	.263	.123	66.859	.000
3	.403	.399	.136	90.286	.000
4	.488	.483	.085	65.697	.000
5	.583	.578	.095	89.355	.000
6	.668	.663	.085	100.392	.000
7	.699	.694	.032	41.250	.000
8	.733	.727	.033	48.954	.000
9	.761	.755	.028	45.813	.000
10	.770	.764	.009	14.966	.000
11	.775	.769	.005	9.366	.002
12	.779	.772	.004	6.595	.011
13	.786	.778	.007	11.736	.001

Source: Field Survey, 2015

Key: 1. Distance from the health care center 2. Age at first marriage 3. Age of the mother 4. Current marital status 5. Level of education 6. Length of breast feeding 7. Child sleep under net 8. Occupation 9. Type of health care center 10. Cause of death 11. Post natal attendance 12. Monthly income and 13. Age at first birth.

From the result maturity of a woman before nursing a child will help to reduce child mortality with about 0.118, current marital status (.064), educational attainment (.064) and breast feeding as part of the factor that reduces under-five mortality. The result shows that exclusive breast feeding reduces child mortality in Kaduna state. From the analysis of the result, it means that improvement in exclusive breastfeeding will help to reduce child mortality with about 0.54. It is noted that religion, ethnicity and antenatal care are not relevant. It is noted that these variables operate indirectly on the infant and child mortality levels through other variables which are directly related to infant and child mortality levels

It is very important to note that other variables such as ever given birth at home, monthly income, source of water, antenatal attendance, postnatal attendance, type of healthcare centre, age at first birth, religion denomination, distance to health facility, introduction of supplementary food, ethnicity, cause of death, child sleep under net, immunization within the last six months, length of breast feeding, toilet facility, spaced children are not relevant. We note that these variables operate indirectly on the infant and child mortality through other variables which are directly related to mortality levels.

CONCLUSION

The primary aim of this paper was not to calculate U5MR for Kaduna State but to see the trend made from 2005, which will serve as a wake-up call assessment towards achieving the 2015 Sustainable Development Goals (SDGs) target. In Kaduna state infant and child mortality ratio (163/1,000 live births) is extremely high representing one of the country's development challenges. the trends in under-five mortality in Kaduna State since 2005, there is no doubt that the trends has been on the decrease, although the decrease is small over the years up to 2014 in which 2011, 2012, 2013 and 2014 saw steady declined or no change in the trends of infant and child mortality.

Six variables were found to be the most contributing factors of infant and child mortality in the study area and they are distance to health facilities, age at first marriage, age of the mother, marital status, educational attainment, and breast feeding. Distance to the health facilities was seen as the most contributing factor to Under-five mortality in the study area. The provision of adequate and accessible health care services is a key factor for under-five survival. Girls should be encouraged to go to school up to at least secondary level. Health services should be brought nearer to the communities so that mothers have access to both during pregnancy and after.

The study recommends that programme interventions need to focus on mothers with low socioeconomic status. The adolescent girls should be encouraged to go for educational training in schools in order to lengthen age at first birth and reduce child death at first birth order. Also, health services should be brought nearer to the local communities with a bid to increase accessibility of the mothers to medical facilities thereby reducing under-five mortality.

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