ESTIMATES OF FERTILITY AND MORTALITY FOR AKINYELE LOCAL GOVERNMENT AREA, OYO STATE

BY

OLABIYI, RASHEED AJIBOYE

MATRIC NUMBER: 196993

A DISSERTATION IN THE DEPARTMENT OF EPIDEMIOLOGY AND MEDICAL STATISTICS, SUBMITTED TO THE FACULTY OF PUBLIC HEALTH, COLLEGE OF MEDICINE, IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE

DEGREE OF MASTERS OF PUBLIC HEALTH

(MEDICAL DEMOGRAPHY)

UNIVERSITY OF IBADAN, IBADAN

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[illegible], 2018

CERTIFICATION

We certify that this work was carried out under our supervision by Mr OLABIYI, Rasheed Ajiboye of the department of Epidemiology and Medical Statistics, Faculty of Public Health, College of Medicine, University of Ibadan, Ibadan, Nigeria.

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Prof. Olusola Ayeni
(SUPERVISOR)

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Dr Gbadebo B.M
B.SC, M.SC, PH.D (Ife)
(CO – SUPERVISOR)

DEDICATION

This work is dedicated to my family

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ABSTRACT

Background: The large unreported births and deaths and the inefficiencies in the vital registration systems in the Sub – Saharan African countries have been impeding computations of adjusted fertility and mortality indices. To track performance and evaluate the impact of government policies and international interventions on infant, child and maternal health in the local government, estimates of these indicators are needed which form the main objective of this study

Methodology: This is a descriptive cross – sectional study conducted in Akinyele local government area with 874 respondents using a multi – stage sampling technique. Data were collected using a semi – structured questionnaire. Direct methods were used to estimate fertility rates. The Trussell Variant of the Brass indirect technique was employed for child mortality and P/F ratio for fertility. The Sisterhood method was used for maternal mortality. Chi – Square Statistic was used to determine the association between parity level and socio- demographic variables at 5% level of significance.

Results: The mean age of respondents was 33.2 ±8.85years. The chi – Square results showed that there were statistical significant association between fertility (Parity levels) and age (P< .005) educational levels (P< .005) and residence of respondents (P < .005). The mean children ever born was 3.07 and the contraceptive prevalence rate was 48%.The adjusted total fertility rates was estimated at 5.43 children per woman while the General Fertility Rate was 167 births per 1,000 women and the Gross Reproduction Rate was approximately 3 daughters per woman of reproductive age. The smoothed infant mortality rate was 32 infant deaths per 1,000 live births while the child mortality rate was 38 deaths per 1,000 live births. The lifetime risk of maternal death was estimated at 0.0281 (1 in 36) while the maternal mortality ratio was 520 maternal deaths per 100,000 live births.

Conclusion: The adjusted fertility rate for the study area was high while the infant and child mortality rates were extremely low due to sampling and reporting errors. To reduce fertility rates and to have a substantial improvement in infant, child and maternal health in the study area, co-ordinated efforts between national and international agencies are needed to achieve Sustainable Development Goal (SDG) 3 targeted at reducing child and maternal mortality and facilitate family

planning to increase the uptake of modern contraceptives with continued focus on Local Government area as unit of interventions of health programmes.

Keywords: Total Fertility Rates, Child mortality, Family Planning, Maternal mortality, Contraceptive

Word count: 400

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

Fertility, mortality and migration are the principal components of population dynamics of any country. Fertility refers to reproductive behaviour (the number of children born to women) as against the actual ability to reproduce, which is called fecundity(Oyefara, 2013). Mortality on the other hand refers to decrement process by which living members of a population die out. It tends to have a negative impact on the growth and size of the population particularly the components of the population in which mortality occurs. Estimates of fertility rates provide a precise measure of human reproduction and it is based only on the segment of the population that determines human fertility, women aged 15 – 49.

By 2010-2015, the global total fertility rate was about 2.5 children per woman. However, Sub – Saharan Africa countries recorded a total fertility rate of 4.8 children per woman. Nigeria recorded a decrease of 0.2 from 5.7 births per women to 5.5 births per women in the current total fertility Rates (TFR), General fertility rate was 190 births per 1,000 of reproductive age and Crude birth rates was 39 per 1,000 population. In Ghana and Niger the Total fertility rates were 4.0 and 7.6 respectively, (NPC & ICF, 2013). This contrast sharply with declining fertility rates being experienced in other countries of the world. According to the United Nations Population Division, worldwide fertility rates are expected to continue to decline in the decades to come, gradually moving toward replacement level of 2.1 children per woman, which is traditionally viewed as the level required to maintain a stable population in countries with low mortality rates among the young.

To stem the trend of high fertility and high birth rates in the sub – Saharan Africa countries there is need to effectively scale up family planning services provision and its uptake. Besides, effective promotion and management of family planning has the potential of reducing maternal, infant and child mortality. Family planning intervention is capable of averting 32% of all maternal deaths and nearly 10% of child mortality whereas 40% of maternal deaths in Nigeria are due to complications of unsafe abortions necessitated by unintended pregnancies (Adewale, et al(2016). The unmet needs for family planning in Nigeria was 13% while contraceptive prevalence rate has been found to be low at 15% in 2013, compared to other countries such as the US and Pakistan (NPC & ICF, 2013)

Child mortality, in developing countries, remains disturbingly high despite the significant decline in most parts of the developed world. Globally, the annual rate of reduction in under 5 mortality has increased from 1.8 to 3.6 per cent between 2000 – 2015, (UNICEF, 2015). However, according to the maternal and health survey by UNICEF in 2013, Nigeria lost about 2,300 under – five years old making it the second largest contributor to child mortality rate in the world. In Nigeria in 2009 and 2013, infant and child mortality were 69 and 128 per 1,000 live births respectively, (NPC & ICF, 2013).

Maternal mortality, that is, the death of a woman while pregnant or within 42 days postpartum from any cause related to or aggravated by pregnancy or its management, is very high in Sub – Saharan African countries. To measure the health status of a country adult and maternal mortality indicators are required. In the 2013 NDHS reports, maternal deaths account for 32 per cent of all deaths among women age 15-49 years. The maternal mortality rate was 1.05 maternal deaths per 1,000 woman-years of exposure. While the maternal mortality ratio was 576 maternal deaths per 100,000 live births. In a study conducted in Jigawa state in 2017, the estimated maternal mortality ratio in the study area was 1,012 maternal deaths per 100,000 live births and the total lifetime risk of maternal death was 6.6%. (Sharma, et al, 2017)

Adult mortality is the deaths at age 15 and above. It also refers to mortality between exact age 15 and 60 or mortality that occurs in older age of 60 and above. In the life table, it is expressed thus: 45q15, that is, the probability that a person aged 15 dies before age 60 which was reported by the NDHS 2013 to be twelve (12) per cent among women and men and adult mortality rates were 3.5 and 3.3 deaths per 1,000 populations among women and men respectively.

Estimates of fertility and mortality rates cited above were available for the global, national, geo – political zones and state levels but none could be found for the local levels particularly Akinyele Local Government which is the study area. This is a Local government that was created in 1976 and had undergone series of developments and changes in population structures. Vital statistics registration system that could form the major source of information on fertility and mortality levels in the local government are not functioning well. Births were under – reported while deaths were not even reported at all. Therefore, to provide estimates of fertility and mortality levels needed to measure performance and evaluate impact of various national and international interventions targeted at improving the

general health conditions of the people of Akinyele Local Government, there is need to conduct household survey of this nature.

1.2 PROBLEM STATEMENT

The large unreported births and deaths have been impeding calculations, not only of infant mortality, but also of unadjusted births and deaths rates. Although mortality is an inevitable event, its untimely occurrence and varieties, especially maternal and under5 mortality, bring about socio - economic and psychological trauma not only to the members of bereaved family, but to their immediate communities, organizations, the nation and the world in general. Childbirth is a thing of joy and an event that attracts celebration, their sudden and untimely demise leaves behind sorrow and confusion to the victims of such unfortunate occurrence (Oyefara, 2013). In contrast to birth rates, death rates are difficult to establish, for the proportion of deaths registered in the vital statistics office in the study area is too low or non – existent at all. Most new born deaths in particular are frequently not reported or registered because infants are born at home and many occur outside clinical setting.

Globally, Nigeria is ranked second largest among countries contributing to high under 5 mortality. It was reported that over 2,000 under 5s die on daily basis, that is, about 4million annually, from vaccine preventable diseases despite the wider coverage on immunization and Oral rehydration therapy for the treatment of diarrhoeal,(Izugbara, Programme, & Africa, 2015).

The disturbing levels and trend of infants and child mortality in Nigeria and Sub – Saharan African countries which has become a public health challenge could no longer be tolerated. This is because it portends a danger in the future of human race. As a result, as far back as 2008, the Nigerian government launched a project titled - National Health Insurance Scheme (NHIS) and Maternal and Child Health Project, focussing on reducing maternal and child mortality. The major contributory factor to this regional disparity is the problem women have in having access to quality and adequate health care services due to dearth of health workers. Countries with high health professionals' ratios to population (as low as 2.3 per 1,000 population in the Sub – Saharan Africa) have higher infant and child survival rates (Findley et al., 2013).

Just like other demographic parameters, maternal mortality equally remains a global health problem. Globally, in 2013, there were 293,000 estimated maternal deaths with 99 per cent of this occurring from developing countries particularly African countries. Despite the fact that the Millennium Development Goal 5 aimed at reducing maternal deaths by 75% by 2015, much progress towards achieving this goal has not been recorded in Nigeria and other African countries,(Sharma et al., 2017).

Adult mortality is yet another major health problem statistics of which are not readily available due to poor documentation. Also the development of reliable and affordable methods of estimating adult mortality in countries with little or no vital events is a challenge.

1.3 JUSTIFICATION

The levels of fertility and mortality in Akinyele Local government could not be ascertained due to lack of data, or deficiencies in the data, or both - especially with regard to mortality and a study had not been conducted to that effect. Most previous studies provided fertility and mortality rates for continents, regions, countries and states but not for local governments as being attempted by this study. The choice of Akinyele Local Government as the study area was borne out of my familiarity with the nooks and cranny of the area.

To forecast changes in the size of a population, demographers require data on fertility and mortality rates (life expectancy). Socio – economic planning and monitoring, policy makers and planners require reliable information on the number of births, deaths and population. That is, planning for the provision of maternal and child health, education, employment and security services.

Conducting survey of this nature in the study area, apart from strengthening local research capacity, would provide baseline demographic indices on fertility and mortality for tracking progress and impact of most interventions, particularly family planning, aimed at reducing fertility, encourage child spacing, improving maternal health and achieving child survival goal. Therefore, the impact of family planning programme on fertility and child mortality would be determined with the findings from this study most especially for the study area.

In the last decades, various programmes such as malaria control through the distribution of Long Lasting Insecticidal Nets (LLINs), Preventive treatment during pregnancy, birth control, immunization programme for infants and children, Millennium Development Goal

(MDG) 4 – to reduce child mortality and MDG 5 – improve maternal health which is now Sustainable Development Goal 3 – Ensure healthy lives and promote well – being for all at all ages, and the Oyo state Health Insurance Scheme (OYHIS) have received a boost of funding and renewed attention in Akinyele Local Government. To justify the funding and efforts of these international donors and assess these various programmes, computing fertility and mortality indices for the study area is necessary.

This study would provide estimates of fertility and mortality for advocacy purposes and to draw attention to fertility levels and the problem of mortality at the local government level.

1.4 RESEARCH QUESTIONS

1. What is the level of fertility in the study area?

2. Is there any relationship between socio – demographic characteristics of respondents and fertility levels?

3. What are the levels of infant and child mortality in the study area?

4. What is the level of maternal mortality in the study area?

1.5 OBJECTIVES OF THE STUDY

The general objective of this study is to provide indices of fertility and mortality rates for Akinyele Local Government areas of Oyo state.

1.5.1 SPECIFIC OBJECTIVES

1. To compute basic fertility rates (age specific fertility rate, total fertility rate, general fertility rate and gross reproduction rate) among women of reproductive age in the study areas.
2. To examine the relationship between socio – economic characteristics of respondents and fertility.
3. To estimate infant and childhood mortality (using Brass method of indirect estimation).
4. To estimate maternal mortality ratio, based on sisterhood method, in the study areas.

1.6 LIMITATIONS OF THE STUDY

This study was limited only to Akinyele Local Government area of Oyo State and the data used were obtained from a sub –section of the local government therefore, could not be devoid of sampling errors. Some women were reluctant to disclose the number of children ever born while some who had lost their children also felt shy to inform the interviewers about the incidence because of the stigma attached to it.

The introduction of indirect methods of demographic estimation of adult male and female mortality have led to the inclusion of questions on the survival of biological fathers and mothers in censuses and sample surveys to obtain data on orphanhood. Generally, population census collects data for the direct and indirect estimation of demographic paramcters.

The strength of population census lies on the fact that it devoid of any kinds of sampling errors as could be found in the sample surveys.

2.1.2 SAMPLE SURVEYS

Developing countries began the use of retrospective surveys in estimating basic parameters of fertility and mortality shortly after World War II. Between 1960 and 1980, 81 countries conducted at least one major survey, 31 from Africa, 24 from Asia and 24 equally from Latin America. Some countries conducted follow – up surveys (Prospective or Multi – Round surveys) to assess their current levels of fertility, mortality and population growth. One of the strength of household surveys over census is the quality of data generated in the process. This is due to its limited coverage that made it less expensive and flexible. The undercount of infants and young children as in the case of census is equally a limitation of this approach.

To minimize memory lapse and misconception of reference period a follow – up (Multi – round) or prospective survey were conducted by most developing countries for three or more rounds in an interval of 6 months.

2.1.3 CIVIL REGISTRATION SYSTEM

This is a continuous operation that collects information and legally documented births, deaths and other vital events occurring in a country. The creation and development of the civil registration system will be justified by its primary legal functions and not by its secondary statistical functions. This system is more demanding and in a situation where a fully developed civil registration system is not available, population census and household surveys are used to collect data on births and deaths (United Nations, 2004)

2.2 EVOLUTION OF TECHNIQUES DEMOGRAPHIC PARAMETERS

The United Nations Population Fund (UNFPA) under the guidance and supports of the International Union for the Scientific Study of Population (IUSSP) funded a project to harmonized key methods (that are user – friendly) of estimating Population parameters from defective and limited data by demographers all over the world. The idea of training few younger demographers in either the science or craft of using or applying indirect methods of estimation was borne out of the revised agenda adopted by the International Conference for population and development held in Cairo in 1994. This was done to change the pattern of directing fund to reproductive and sexual health rather than technical demography which was a prerequisite for the study of patterns of growth and management of population increase.

The emergence of Demographic and Health Surveys programme where data on full birth histories were being collected with the use of direct techniques in estimating fertility and mortality eroded the importance of tools and techniques used in the past from Census or other survey data (Moultrie et al., 2013).

2.3 FERTILITY TRANSITION AND FAMILY PLANNING PROGRAMME

Fertility rates in Sub-Saharan Africa was 5.1 births per woman in 2005–2010 (United Nations. 2011) and 4.8 between 2010- 2015 more than double the replacement level. Replacement fertility is the level of fertility required to ensure a population continues to replace itself in size. For women to replace themselves, on average, they need to have one female child who survives long enough for a female grandchild to be born, and so on for succeeding generations. This means an average of two children will 'replace' all mothers and fathers, but only if equal number of boys as girls are born and all female children survive to the end of their reproductive age. However, because of mortality and the fact that in most populations around 105 boys are born for every 100 girls, fertility needs to be a little higher than a rate of 2.0 children per woman to achieve replacement.

In the UK, as in all developed countries, a fertility rate of 2.1 is usually taken as roughly approximate to the level of replacement fertility, although the precise level will vary between countries. Fertility rates in most developed countries are below the replacement level of 2.0. For instance as at 2105, TFR in the UK is 1.81, U.S.A (1.84), Canada (1.60), Greece (1.30). According to the World Bank group Data, in 2015, there are some countries with a Total Fertility Rates (TFR) of less than 1.4 children, though above replacement level,

such as Namibia (3.47), South Africa,(2.48), Gabon (3.85), Kenya (3.92), Libya(2.31). At the other end of fertility distribution, some countries with a Total Fertility Rates (TFR) greater than 6 children are yet to experience fertility transition. They are Niger (7.29), D.R Congo (6.20), Mali (6.14), and Chad (6.05). Nigeria, Burkina Faso, Ethiopia, Ghana are in between with 5.59, 5.44, 4.32, 4.04 children per women respectively.

In 2013, the total fertility rate (TFR) was 5.5 births per woman (or 5,500 births per 1,000 women). This implied that women in Nigeria would bear average of 5.5 children if they all experience age – specific fertility rates throughout their reproductive years. TFR by states in Nigeria showed that Bauchi had the highest TFR of 8.4 births per woman, Katsina (8.1) while Oyo state was 6.2, Yobe (6.7), Kogi and Ondo states (3.9) and the lowest TFR was reported for the FCT Abuja (3.8) (National Bureau of Statistics, 2014).

This high fertility combined with falling mortality has led to rapid population growth of 2.5 percent per annum and by the UN projections, the sub-Saharan population would grow from 0.86 billion in 2010 to 1.96 billion in 2050 and 3.36 billion in 2100. Population growth rate in the Sub-Saharan African is considerably high when compared with the rest of the world. This implies that there is high fertility, high birth rates and low contraceptive prevalence.

Fertility transition in Sub-Saharan Africa has been very reluctant or stalling after a brief start (Garenne, 2008). Within all countries, however, remarkable differences in fertility rates occurred in rural and urban areas. This, no doubt, is a reflection of both demand and supply side of contraception. (Lesthaeghe, 2014).

According to conventional demographic theory, high fertility in the early stages of the demographic transition is a function of high desired family size. That is, couples desire to have many children with a view to gain the advantage of helping in family enterprises such as farming and for insurance in old age. Besides, high child mortality leads parents to have additional children to serve as security against loss. Fertility decline occurs once rising levels of urbanization and education, changes in the economy, and declining mortality lead parents to desire a smaller number of births. To implement these desires, parents rely on contraception or abortion, and family planning programs in many countries accelerate their adoption (Lee and Bulatao, 1983)

Fertility preferences represent a key link in the chain of causation between fertility and its socioeconomic determinants. In low-income agricultural societies, parents tend to desire relatively large numbers of children while in a more developed societies with higher

income, women typically want only about two children. The decline in preferences that accompanies development in turn leads to a decline in actual fertility with adoption of birth control -induced abortion and/or contraception,(Bongaarts & Casterline, 2014)

In 1994, the international conference on population and development stressed the benefits of family planning to meet individual reproductive health needs. Family planning services provides myriads of benefits to individual households, community, country and the world at large. At household levels, it allows individual to decide on the number of births and space between each child which has the potential to improve child survival and maternal health. It prevents the occurrence of unwanted pregnancy, thereby reduce injury and deaths associated with child birth, abortions, and sexually transmitted infections (STIs) including HIV/AIDS.

As part of efforts to further promote family planning services in Nigeria, Phase II of the Nigerian Urban Reproductive Health Initiative (NURHI) Project began in October 2015, and is being implemented in three States, Lagos and Kaduna for five years (2015-2020) and three years (2015-2018) in Oyo State. In a study conducted in Ogbomoso, Oyo State, low contraceptive prevalence rate of 25.4% among respondents currently using any method was reported despite the high level of awareness (Adewale et al, 2016).

2.4 INFANT AND CHILD MORTALITY

Although death is inevitable but it apparently becomes a source of concern when death rates particularly among young children is continually increasing. This will eventually have adverse effects on the future economically active population. Considering this fact health experts, decision and policy makers across the globe in an attempt to checkmate the rising trend of child mortality developed a systematic approach to reduce it by two – third among children under the age of five between 1990 and 2015 as contained in the United Nations Millennium Development Goals (MDGs),(Adepoju, 2015)

Globally, reports show that under-5 mortality reduced substantially from 12million in 1990 to 6.9million in 2011. This means that the number of children that died each day reduced by 14,000 in 2011 than in 1990. This was further reduced to 5.8 million in 2015, representing 52% of 1990 under 5 deaths(Lancet, 2016). Between these periods under reference, a 39% reduction in under five mortality had been experienced in the African regions. Eastern and Southern Africa (43%) and Western and Central Africa (33%). To be country specific, Liberia (67.5%), Rwanda (65.4%), Malawi (63.6%), and Madagascar (61.8%).(African

Leadership for Child Survival, 2015). In Bangladesh for instance, a similar reduction of under-5 deaths from 305,000 in 1990 to 105,000 in 2011 was experienced and there was a close relationship between the risks of an infant's death and characteristics of mother. To further reduce the rate of childhood mortality, improve infant survival, and reduce maternal death, public health interventions such as family planning, safe motherhood programme, child immunization are exclusive breast feeding are essential to achieve such objectives,(Abir et al, 2015).

In Uzbekistan, there were relatively little changes in levels and trends of infant and childhood mortality between 1988 and 2002. Infant mortality was 52 deaths per 1000 (1988-1992), 64 per 1,000 live births (1993- 1997) and 62 deaths per 1,000 live births (1998-2002). While Child mortality was estimated at 11 deaths per 1,000 live births and under five mortality at 73 deaths per 1,000 live births (Sullivan & Tureeva, 2002).

However, highest rates of under – five mortality are still in Sub – Saharan African regions where child mortality is 1 in 9 children more than the 16 times the average of developed regions which is 1 in 152 children.

Considering the association between socio – demographic characteristics, bivariate analysis of 2008 Nigeria Demographic and Health Survey showed that all socio – demographic characteristics, except occupation of father, were significantly associated with under-5 mortality and that highest percentage of under -5 was found among the Hausa/Fulani. Tribes with 23% and the lowest (9.2%). The geo political zones differential was put at South West (9.1%), North East (22.1%) and the North West (22.8%). Besides, more deaths occurred among males (17.7%) than females (16.4%) children amongst other characteristics (Adedini et al. 2015). This is an indication that there was a wide disparity in the mortality experience of different ethnic groups in Nigeria. This result was similar to what was reported in the NPC & ICF, 2013 where under -5 mortality among males (151 deaths per 1,000 live births) was greater than that of the females with 137 deaths per 1,000 live births. More so, lower deaths of 90 per 1,000 live births were reported in the South west and the highest record in the North West with 185,000 per 1,000 live births (NPC & ICF, 2013).

Previous studies on regional variations in infant and child mortality in Nigeria confirmed this report, that infant mortality was highest in the North- East and South - East (8.0% each) and was the lowest in the South- West (5.2%) while child mortality was the highest in the

North – West (6.0 %) and lowest in the South – West (1.4%) (Ononokpono & Ibisomi, 2015).

In a study conducted in Kenya in 2014 using the Kenya Demographic and Health Surveys data, results showed that there was a significant reduction in all forms of child mortality (infant, child and under – five) over the 30 years period between 1979 to 2008. Infant Mortality Rate (IMR) decline from 76.5 to 57.9, Child Mortality Rate (CMR) reduce to 21.3 from 31.7 while U5MR fell from 100.7 to 72.9 (Kimani-murage et al., 2014). In Nigeria, there were equally considerable reductions in infant and under 5 mortality from 2003 to 2013. The IMR were 100, 75 and 69 deaths per thousand live births in 2003, 2008 and 2013 respectively. Similarly, under 5 mortality was 201 deaths per 1000 live births in 2003, it reduced to 157 and 128 deaths per 1000 live births in 2008 and 2013 respectively. (Morakinyo & Fagbamigbe, 2017) .

In a similar study conducted on infant and under five mortality rates, although type of housing materials was used as predictor, the smoothed childhood mortality probability estimates increased from 0.0778 among infants to 0.1613 among young adults. This was characteristics of group of women who lived in a house built with low quality materials (Adebowale et al 2017).

In most studies adolescent mothers are expected to have higher levels of childhood mortality among their children compared with older mothers. The result of a survey conducted in Osogbo and Ola- Oluwa Local Governments areas, Osun State, Nigeria, were in line with this assertion. The childhood mortality prevalent rate among children of adolescent mothers was about 18% while the rate was just 3% among older mothers (Oyefara, 2013).

2.5 ADULT MORTALITY IN NIGERIA

Adult Mortality is generally being influenced by three factors; environment, human behaviour and ill health experienced from childhood into adulthood. Among the factors capable of contributing to adult mortality in Nigeria are poverty, ignorance and inadequate resource provision for health facilities. Therefore, the survival of adults mostly lies in the ability of the health system of a country to provide for immediate and long term quality health care to its populace

The ability of individual adult to prevent death by infections and diseases depends on kind of available physical, environmental, social and economic resources such as availability of enough food, level of education, employment status, and access to health care services.(Olanrewaju et al, 2015). The levels and patterns of increase in adult mortality with increasing age depend on occupational profile, fertility pattern and epidemiologic characteristics of a population. Due to increase prevalence of HIV/AIDS in Sub – Saharan Africa, morality among males and females adult is expected to rise.

The estimation of adult mortality either by direct or indirect approach requires information on the survivorship of father and mother. The proportion of respondents whose father or mother is surviving at the time of census or survey determines the levels of adult mortality. A lower proportion surviving is an indication of higher mortality and vice versa. Data obtained from this process are referred to "orphanhood" data. However, possible errors that may be introduced to adult mortality estimates may be through age misreporting. Age exaggeration will definitely result into higher proportion of parents surviving and thereby reduce the estimates of adult mortality. Similarly, accurate reporting of the number of sisters and brothers the respondent ever had, the numbers that have died could form a source of deriving adult mortality estimates. One major demerit of this approach is that respondents may not be aware that one or more of their brothers or sisters died at infancy.(United Nations, 2004).

There is no definitive procedure to establish the completeness and accuracy of retrospective data on data siblings' survivorship. One way to assess the quality of data used to estimate maternal mortality is to evaluate the plausibility and stability of over all adult mortality. It is believed that if estimated rates on adult mortality are defective, rates based on subsets of deaths, particularly maternal deaths are likely to have problems, (Kichamu, 1998)

2.6 MATERNAL MORTALITY

Maternal mortality constitutes another global public health problem. Maternal death refers to death of a woman during pregnancy or within 42 days after birth irrespective of the duration or site of the pregnancy, from any cause related to or aggravated by pregnancy or its management and not by disease or any other incidence. Estimating maternal mortality has not been very easy because getting the required information, such as the number of deaths of women of reproductive age, their pregnancy status at the time of deaths and the medical

cause of such death, for accurate estimation of maternal mortality ratio (MMR) had been difficult. This is evident in a low – income countries where vital statistics is not complete or does not exist. In most cases estimates are based on data generated from hospital which do not reflect the maternal mortality risks in the community since most deaths occur at home and are not reported in the hospital or the vital registration centre. This is part of the challenges being faced by community based study while attempting to measure MMR using direct estimation method (Sharma et al. 2017).

Several methods are available to measure maternal mortality ratio, such as, vital registration system though not in place in the developing countries, even where it exists, in the developed countries, maternal deaths are often under reported or misclassified as non-maternal. Other methods include, review of all deaths to women of reproductive age (called RAMOS), longitudinal studies of pregnant women, and repeated household surveys. The effectiveness of all these methods is a function of accurate reporting of deaths of pregnant women and the cause of death.

Sisterhood method is an indirect measurement technique developed during the late 1980s to measure a variety of demographic parameters and has been adapted for the measurement of maternal mortality to overcome the problem of large sample sizes and thus reduce costs. The method is based on asking respondents four (4) simple questions about how many of their sisters reached adulthood and ever married, how many are alive, how many have died and whether those who died were pregnant around the time of death. This method relies on the assumption that there are relationships between fertility and age specific maternal mortality. As a result, this method should not be used in settings where the total fertility rate (TFR) is less than 3, or where there are recent or marked decline in fertility, or major migration has taken place.

Planners and policy – makers consider the adoption of sisterhood method for the estimation of maternal mortality ratios when no reliable estimates of the level of maternal mortality is available for advocacy and decision making purposes or when the resources available in the short run do not permit the use of alternative approach. And when an estimate is needed as baseline for a more detailed follow-up of maternal deaths identified in recent past. However, this method is not appropriate in measuring progress towards safe motherhood in the short term, evaluating intervention programme impact and comparing trends and levels of estimates of different geographical areas.

Reported cases of highest maternal mortality rates are more in African countries compared to developed nations. For example out of 20 countries in the world with highest maternal mortalities, 17 were in Africa. Unfortunately, Nigeria is among six countries (others are : Ethiopia, Indian, Pakistan, Afghanistan and Democratic Republic of Congo) where more than 50% of maternal deaths occur worldwide. In South Ethiopia, using a Total fertility rate of 6.4, the estimated lifetime risks of maternal death of 0.102 was translated to a MMR of 1667 per 100,000 live births in 2011 (Yaya & Lindtjorn, 2012). However, there was a substantial improvement in maternal health among women of reproductive age in India from 2004 to 2014. Between 2004 – 2007 study period, MMR was 279 per 100,000 live births, it reduced from 196 (2010- 2013) and 184 (2011 – 2014) per 100,000 live births. In Ghana, the MMR were 376, 325 and 319 per hundred thousand live births in 2005, 2010 and 2015 respectively (United Nations, 2015) . Between 1993 and 1998, the estimated level of maternal mortality ratio in rural Gambia was 424 maternal deaths per 100,000 live births (Walraven et al, 2000) .

However, there have been substantial improvements in the maternal mortality rates in Nigeria since 2008. In 2004 maternal mortality rates were 800 per 100,000 women, in 2008 it reduced to 545 per 100,000 women and in 2013 it fell to 350 per 100,000 women (National Bureau of Statistics, 2014). In a study conducted in Jigawa state in the North – western part of Nigeria, out of 1,026 reported maternal deaths 300 (29.2%) were direct obstetric deaths, that is, maternal deaths related to pregnancy, childbirth or within 42 days after termination of pregnancy. Besides, the estimated maternal mortality ratio (MMR) in the study area was 1,012 maternal deaths per 100,000 live births using a Total Fertility Rates (TFR) of 6.7. Then the Lifetime risks of maternal deaths was 6.6% or 1 in 15 (Sharma et al, 2017).

In a study conducted in Ajebo and Alapako-Oni in Obafemi Owode Local Government, Ogun State, Nigeria, the estimated lifetime risks of maternal deaths was 0.0262 (1 in 38) which was translated into a MMR of 448 maternal deaths per 100,000 live births (Adebowale et al, 2016). Further studies carried out in the rural Northern Nigerian States (Jigawa, Yobe, Kaduna and Zamfara) to estimate Maternal Mortality levels for the study areas revealed that the total lifetime risk of maternal deaths was 0.09 (1 in 11) and using the TFR of 7.3 births per woman for all the states, the average MMR was 1,271 maternal deaths per 100,000 live births (Henry et al, 2012). In 2012, studies on predictors of maternal

mortality in institutional deliveries in Nigeria estimated Maternal Mortality Ratio at 927 maternal deaths per 100,000 live births. The estimated MMR for states were 568, 1,315, and 993 maternal deaths per 100,000 live births for the FCT, Katsina, and Lagos States respectively (Fawole et al., 2012).

CHAPTER THREE

METHODOLOGY

3.1 STUDY AREA

Akinyele local government area was created in 1976 with the administrative headquarters located at Moniya. It consists of 12 political wards with about 800 localities. It is one of the eleven local government areas that make up Ibadan metropolis. It is located at the hub of the Oyo Central Senatorial District. The local government share boundaries with Afijio, Lagelu, Ido, and Ibadan North Local governments to the North, East, west and south respectively. It occupies a land area 464,892 square kilometres with a population of 211,811 (Males – 105,594 and females - 106,217) according to 2006 census. Dominated by the Yoruba among other resident tribes, the people are of Christianity, Islamic and traditional religious background.

3.2 STUDY POPULATION

This is the population from which data to obtain estimates of fertility and mortality for the study areas were collected. It consists of women of reproductive age (15– 49) that fell within the selected localities in the six (6) wards out of the twelve wards in Akinyele local government. However, all women below age fifteen and above the age of fifty were excluded from the survey. All men were equally excluded from the study. Due to constraints such as time, finance and other logistics only a subset (sample) of the target population was studied

3.3 SAMPLE SIZE DETERMINATION

The sample size used for this study was calculated using the statistical formula for calculating minimum sample size using the reported under-five mortality of 128 per 1000 (NPC & ICF, 2013).

The minimum sample size was calculated thus:

$$N = \frac{Z\alpha^2 P(1-P)}{d^2} = \frac{1.96^2 \times 0.128 \times 0.872}{0.05^2} = \frac{0.4286}{0.0025}$$

Calculated sample size = 171

Besides, the same procedure could be applied **using the General fertility rates (GFR)** of 190 births per every 1000 women of reproductive age in Nigeria (NPC & ICF, 2013).

$$N = \frac{Z\alpha^2 P(1-p)}{d^2} = \frac{1.96^2 \times 0.19 \times 0.81}{0.05^2} = \frac{0.590976}{0.0025} = 236.39$$

Calculated sample size ≈234.

To increase the levels of precision in the obtainable estimates of fertility and mortality, the sample size was increased to 900 households.

The resolve to make use of General Fertility Rates (GFR) as a yard stick for the determination of sample size was borne out of the fact that it was the only rate that provided the highest minimum sample size of 582. The infant mortality rates of 69 deaths per 1000 live births gave a sample size of 244, while Total Fertility Rates (TFR) 4.5 births per woman gave a minimum sample size of 17 and the minimum sample size computed using the maternal mortality ratio (MMR) of 576 maternal deaths per 100,000 women was equally as low as 22.

3.4 STUDY DESIGN

This is a descriptive cross-sectional study using a multi-stage sampling technique. Retrospective study was carried out to collect data on the children ever born, children surviving and birth histories in the 12 months preceding the survey.

3.5 SAMPLING PROCEDURE

The following stages were followed in the process of selecting eligible respondents who were present and willing to participate in the survey after assuring them of utmost confidentiality of the information provided.

Stage 1: Selection of wards

A systematic random sampling method was used to select 6 wards from the existing 12 wards in the Local government areas. To establish the interval of 2, the first ward was picked by balloting. The six (6) wards eventually selected were ward 2 (Pade), ward 4 (Onidundu), ward 6 (Akinyele) , ward 8, (Ojoo), ward 10 (Alabata) and ward 12, (Iroko). Out of the six (6) wards, only ward 8 is urban while others are rural

Stage 2: ***Selection of localities***

From the available list of localities in each ward, five (5) localities were selected each using systematic random sampling technique to give a total of 30 localities.

Stage 3: ***Selection of respondents***

To ensure fairness, equal number of respondents, which was thirty (30), were interviewed in each locality to make up for 900 respondents in total. Interviewers were asked to select the 30 respondents from identified streets where available and use judgement or convenient method where necessary. However, they were warned not to interview more than one respondent in a household.

3.6 STUDY INSTRUMENT

Data was collected using a semi-structured, pretested questionnaire. This is shown in appendix 1. To test the validity and reliability of the study instrument, a pre- text was carried out with fifty (50) questionnaires in Fiditi, a neighbouring town in Afijio local government area.

3.6.1 Validity of the instrument

During the pre – text exercises, omissions of some questions which may likely affect the validity of the study instrument were detected and were corrected in the main questionnaire used for the study.

3.6.2 Reliability of Instrument

The results to be obtained from these instruments would be consistent and dependable if used in other populations by different researchers

3.7 DESCRIPTION OF THE QUESTIONNAIRE

The questionnaire was structured in such a way that reflected each demographic parameter that was classified. The questionnaire contained five (5) sections with thirty

two (32) questions some of which were adapted from the Demographic and Health Survey (DHS).

3.7.1 SECTION A : *Household Composition*

This section was used to collect data on sex and age of all households' members in the study areas. The data were used to estimate age-sex distribution of the study population.

3.7.2 SECTION B: *Demographic and Socio – economic characteristics of women of reproductive age.*

This section was used to obtain information on respondents' age, marital status, education, income, religion, occupation, residence and others.

3.7.3 SECTION C: *Reproduction (Fertility history and Child mortality).*

This section collected data on the number of children ever born, children surviving and birth in the year preceding the survey. Data collected were used for the indirect demographic estimation of fertility and child mortality in the area.

3.7.4 SECTION D: *Family planning*

This section was used to collect information on the uptake of family planning to determine current contraceptive prevalence in the local government.

3.7.5 SECTION E: *Maternal mortality*

These are the four (4) questions usually asked under the indirect (Sisterhood) method of estimating maternal mortality.

3.7.6 SECTION F: *Adult mortality*

This section provided information on survivorship of parents either father or mother of respondent.

3.8 QUESTIONNAIRE ADMINISTRATION

The services of eight (8) research assistants were employed in the administration of the questionnaires. They were put through some training to have better understanding of the questions, how to approach and get better and voluntary responses from the prospective respondents. Emphases were placed on the need to obtain informed written consent from

all eligible respondents and the use the local language in the process of the interview if necessary. This was why the questionnaires and the written informed consent were translated into Yoruba being the common local language. (See Appendix 3 and 4)

3.9 VARIABLES

The **dependent variables** in this study were fertility rates, infant mortality, childhood mortality and maternal mortality

The **independent Variables** were socio-demographic characteristics of women of reproductive age which include age, marital status, age at first marriage, mother education, husband education, religion, residence, place of work, type of marriage, income, and occupation

3.10 DATA PROCESSING AND ANALYSIS

Before the data entry into the SPSS version 20, administered questionnaires passed through cleaning and editing processes to check for possible errors and inconsistencies in respondents` responses or errors committed by the interviewers in the process of administering the survey instruments. Majority of the questions were pre - coded and those left opened were eventually coded into categorical variables for ease of analysis.

In the process of analysis, the followings were done;

1. Descriptive statistics were used to summarize the background characteristics of respondents into frequencies and percentages while some were equally presented in charts
2. Pearson Chi Square test of association was used to determine the association between fertility(parity level) and socio – demographic variables
3. Estimates of fertility and mortality parameters were computed using direct and indirect techniques for demographic estimations with the aid of MORTPAK and Microsoft Excel worksheet

3.11 METHODS OF ESTIMATING FERTILITY AND MORTALITY

In the estimation of basic demographic parameters, two methods can be used These are direct and indirect methods The direct method used data obtained from continuous registration of vital events, data on full birth histories from survey and summary of fertility measures collected on routine basis in censuses to estimate

recent fertility (Moultrie, Dorrington, & Hill, 2013). While indirect are techniques used for basic demographic estimation from information that is indirectly related to its values. The rationale for indirect method was as a result of in - existence or inefficient vital registration systems and defective data from censuses. The term "indirect" is used to describe any method of estimation based on models or uses conventional data in an unconventional way.

3.11.1 DIRECT ESTIMATION OF BASIC FERTILITY RATES

1. **AGE – SPECIFIC FERTILITY RATES:**

   ASFR was computed from data on number of births in the last twelve (12) months per thousand women of reproductive age (15 – 49) by five year age groups.

2. **TOTAL FERTILITY RATES (TFR):**

   This was calculated by the summation of Age-specific fertility rates (ASFR) in all age groups (15 – 49) multiplied by 5.

   That is $5 \times \sum_{i=1}^{n} ASFR$

3. **GENERAL FERTILITY RATES (GFR) :**

   GFR is the number of live births per 1000 of women of reproductive age.

   $$GFR = {}^{B}/_{35WRA} \times 1000$$

   Where B = the total live births in a year and

   35WRA = the total mid-year population of females of reproductive age 15 – 49

4. **GROSS REPRODUCTIN RATES (GRR):**

   GRR shows the extent to which the generation of daughters replace the preceding generation of females if fertility remains constant at present levels

   GRR = TFR * (Proportion of female births)

   Where Proportion of female births = $Bf / Bm+f$

   Bf = Number of female births and Bm + f = Number of male and female births

3.11.2 INDIRECT METHODS

3.12 FERTILITY ESTIMATION

The adjusted Age specific fertility rates, Total fertility rates, General fertility and gross reproduction rates were estimated using an indirect method developed by Brass. This is the P/F Ratio based on the following data requirements:

(a). the number of children ever born classified by sex and five year age groups of mother..

(b). the number of births in the last twelve(12) months preceding the survey classified by sex and five year age groups of mother.

(c). the number of women (irrespective of marital status) classified by five year age groups.

STEPS IN THE COMPUTATION OF BRASS FERTILITY ESTIMATION.

Below is the summary of **steps** taken to estimate the P/F ratio methods as contained in the Manual X (UNITED NATIONS, 1983?)

1. **Calculation of reported average Parities** .The reported average parity of women in age group 1 is denoted by P(i) and its value was obtained by dividing the total number of children ever born to women in age group i by the total number of women in that age group (irrespective of marital status, fertile or not).
2. **Calculation of a preliminary fertility schedule from information on births in the past years.** The fertility rates of women in age group *i* is denoted by f(i). The value is obtained by dividing the total number of births occurring to women in age group *i* in the year preceding the survey by the total number of women in that age group.
3. **Calculation of cumulative fertility schedule for a period denoted by θ (i).**

   $\theta(i) = 5 \times \left(\sum f(i) \right)$. That is, the value obtained for f(i) above were added for all ages and multiply the results by 5 .
4. **Estimation of average parity equivalent for a period denoted by F(i).** these are estimated by interpolation using the period fertility rates f(i) and the cumulative fertility values θ(i) calculated in steps 2 and 3 above respectively. Below is the interpolation equation

$$F(i) = \theta(i-1) + a(i)f(i) + b(i)f(i+1) + c(i)\,\theta(7)$$

The values of parameters a, b and c are constant and were estimated by using least square regression to a large number of model cases constructed using the Coale – Trussel fertility model.

Table 3.12.1

COEFFICIENT OF INTERPOLATION BETWEEN CUMULATED FERTILITY RATES TO ESTIMATE PARITY EQUIVALENTS

age group	index	a(i)	b(i)	c(i)
15-19	1	2.531	-0.188	0.0024
20-24	2	3.321	-0.754	0.0161
25-29	3	3.265	-0.627	0.0145
30-34	4	3.442	-0.563	0.0029
40-44	6	3.862	-2.481	-0.0001
45-49	7	3.828	0.016	-0.0002

Source UN. 1983. Manual X

5. **Calculation of fertility schedule for conventional 5 – year age group denoted by** f*(i).; This was estimated by weighting the rates referring to unorthodox age group by these equations

$$f^*(i) = (1\text{-}w(i\text{-}1)f(i) + w(i)f(i+1)$$

Note that *f(i) and* f*(*i*) = unadjusted and adjusted asfr respectively.

Weighting factor w (i) was calculated thus:

$$W\ (i) = x\ (i) + y(i)f(i)/\ 0(7) + z\ (i)f(I+1)/\ 0(7)$$

The derivation of coefficients in table 3.12.2 below used in the calculation of weighting factor was the same as that of the above coefficients in table 3.12.1

Table 3.12.2 :

COEFFICIENT FOR CALCULATION OF WEIGHTING FACTORS TO ESTIMATE AGE- SPECIFIC FERTILITY RATES FOR CONVENTIONAL AGE GROUPS FROM AGE SHIFTED BY SIX MONTHS

age group	index	x	y	z
15-19	1	0.031	2.287	0.114
20-24	2	0.068	0.999	-0.233
25-29	3	0.094	1.219	-0.977
30-34	4	0.120	1.139	-1.531
35-39	5	0.162	1.739	-3.592
40-44	6	0.270	3.454	-21.497
45-49	7			

No weighting factor was calculated for i (7) because childbearing is assumed to cease after age 50

6. **Adjustment of period fertility schedule:** The P/F ratios were calculated by dividing the average parity per women P(i) by the average parity equivalent F(i). Under normal circumstances, these ratios should be fairly similar for different values of (i). However, this does not always hold in practice.

In this study, the adjustment factors were calculated using P (2)/F (2), P (3)/F (3) and the average of the three ratios (P2/F2, P3/F3 and P4/F4) , the three methods were used to determine which factor would produce a reasonable estimates of adjusted total fertility rates

3.13 ESTIMATION OF CHILDHOOD MORTALITY (INDIRECT METHOD)

William Brass was the first to develop a procedure for converting proportion dead (Di) of children ever born reported by women in age15 – 49 years into estimates of probability of dying q(x) before attaining certain exact childhood ages. An important assumption made in the development of this method is that the risk of dying is a function only of the age of the child and not the age of the mother or child's birth order

To estimate child mortality rates using data classified by age (from a single survey) the following data were required.

1 The number of children ever born classified by sex and five- year age groups of mother.

2 The number of children surviving (or dead) classified by sex and five year age groups of mother and

3 The number of women (irrespective of marital status) classified by five year age groups.

Steps involved in the computation of Child mortality as contained in the Manual X **(UN, 1983),** were summarized below:

Step 1: Calculation of average parity per women denoted by P(i)

$$P(i) = CEB(i) / FP(i)$$

Where CEB (i) referred to Children ever born by women in age group (i) and FP(i) is the total number of women in age group I irrespective of their marital status. Variable i refers to different age groups, 15-19, 20-24, 25-29 and so on

Step 2.Calculation of proportion of children dead D(i) for each age group of mother

$$D(i) = CD(i) / CEB(i)$$

Where CD(i) is the number of children dead reported by women in age group i

Step 3: Calculation of Multipliers K(i) according to Trussell variant of the original Brass method. Estimation equations are:

$$K(i) = a(i) + b(i) P(1)/P(2) + c(i) P(2)/P(3)$$

Where a, b and c are coefficients for the estimation of child mortality multipliers.(see appendix 2)

Step 4: Calculation of probability of dying q(x) and of surviving l(x):

$$q(x) = K(i) D(i)$$

That is, estimates of the probability of dying **q(x)** are obtained from the different values of exact age x as the product of reported proportion dead **D(i)** and the corresponding multipliers

$$l(x) = 1.0 - q(x)$$

Step 5 : Calculation of reference period t(x):

t(x) is an estimate of the number of years before the surveys date to which the child mortality estimates q(x) obtained in the previous steps refer. It is estimated by this equation:

$$t(x) = a(i) + b(i)\, P(1)/P(2) + c(i)\, P(2)/P(3)$$

The values of these coefficient used in the estimation was selected from the west mortality model.

3.13.1 SMOOTHING OF THE ESTIMATED VALUES OF CHILDHOOD MORTALITY.

"Smoothing" is the term used when irregularities in the observed data or estimates derived from deficient data are being removed or minimized. In other words, the crude estimates from deficient data were refined to improve upon its quality for decision making.

The technique is to relate the observed l(x) to the standard l(x) values as could be seen in the standard life table and then extrapolate the required values (U.N Manual X, 1983). The Brass African standard life table was used for this study. The Brass African standard used logit relational system where the logit values for exact ages can be read from the table. The table is shown in appendix three.

The logit model is $Y(x) = \alpha + \beta\, Ys(x)$.

Where $Y(x) = Y(2), Y(3), Y(5)$ = the graduated estimates of logits l_2, l_3 and l_5

$Y(s)$ = values from the Brass African model life tables

To determine the level that the value of l(x) falls in the life table, interpolations took place between levels 22 and 23 to obtain level 21.9547 through which the values of Y(s) were generated. α = level of mortality

The above equation is reduced to one parameter when $\beta = 1$

The equation becomes, $Y(x) = \alpha + Ys(x)$.

$$\alpha = Y(x) - Ys(x)$$

Y(x) is the average of Y2, Y3 and Y5 , (logits of l_2, l_3 and l_5)

Ys) is the average of Ys(2), Ys(3) and Ys(5)

$$\text{Where } Y(x) = 0.5 * LN\left(\frac{1 - lx}{lx}\right)$$

$$\text{and } Y(s) = 0.5 * LN\left(\frac{1 - ls}{ls}\right)$$

$$\text{refined lx} = 1 \,/\, 1 + e^{Y(x)}$$

3.14 ESTIMATION OF MATERNAL MORTALITY BASED ON SISTERHOOD METHOD

In this study, the Maternal Mortality Ratio (MMR) computed was based on the Sisterhood method developed by Wendy Graham, Williams Brass and Robert Snow first published in 1989. The approach was to estimate lifetime risks of maternal death from proportion of sisters who died from maternal causes and then converted to Maternal Mortality Ratio (MMR). Thus the proportions were adjusted in order to provide correct estimates of LTR using the adjustment factors in appendix 5.

The formula used to calculate Maternal Mortality Ratio (MMR) was

$1 - (1 - LTRMD)^{1/adjTFR}$

This implied that the Lifetime risks of Maternal deaths (LTRMD) was calculated using the sisterhood method with the estimated value of the adjusted TFR under P/F ratios developed by William Brass.

To estimate maternal mortality the following data were required:

1 Number of sisters that have ever married or aged over 15 years denoted by N(i)

2 Number of maternal deaths among those sisters denoted by D(i)

3 Number of respondents classified by five – year age groups

The next stage is to calculate q(50) using $\frac{D(i)}{N(i)A(i)}$

then Q(50) was calculated with the formula : $\frac{\sum_{i}^{n} D(i)}{\sum_{i}^{n} N(i)A(i)}$

And reference period T using $\frac{\sum_{i}^{n} N(i)A(i)T(i)}{\sum_{i}^{n} N(i)A(i)}$

3.15 Ethical Considerations

Ethical approval for the study was obtained from the Oyo State Research Ethical Review committee, Ministry of health. Informed consent was obtained from each participant prior to data collection.

CHAPTER FOUR

RESULTS

4.1 HOUSEHOLDS COMPOSITION OF THE STUDY AREA

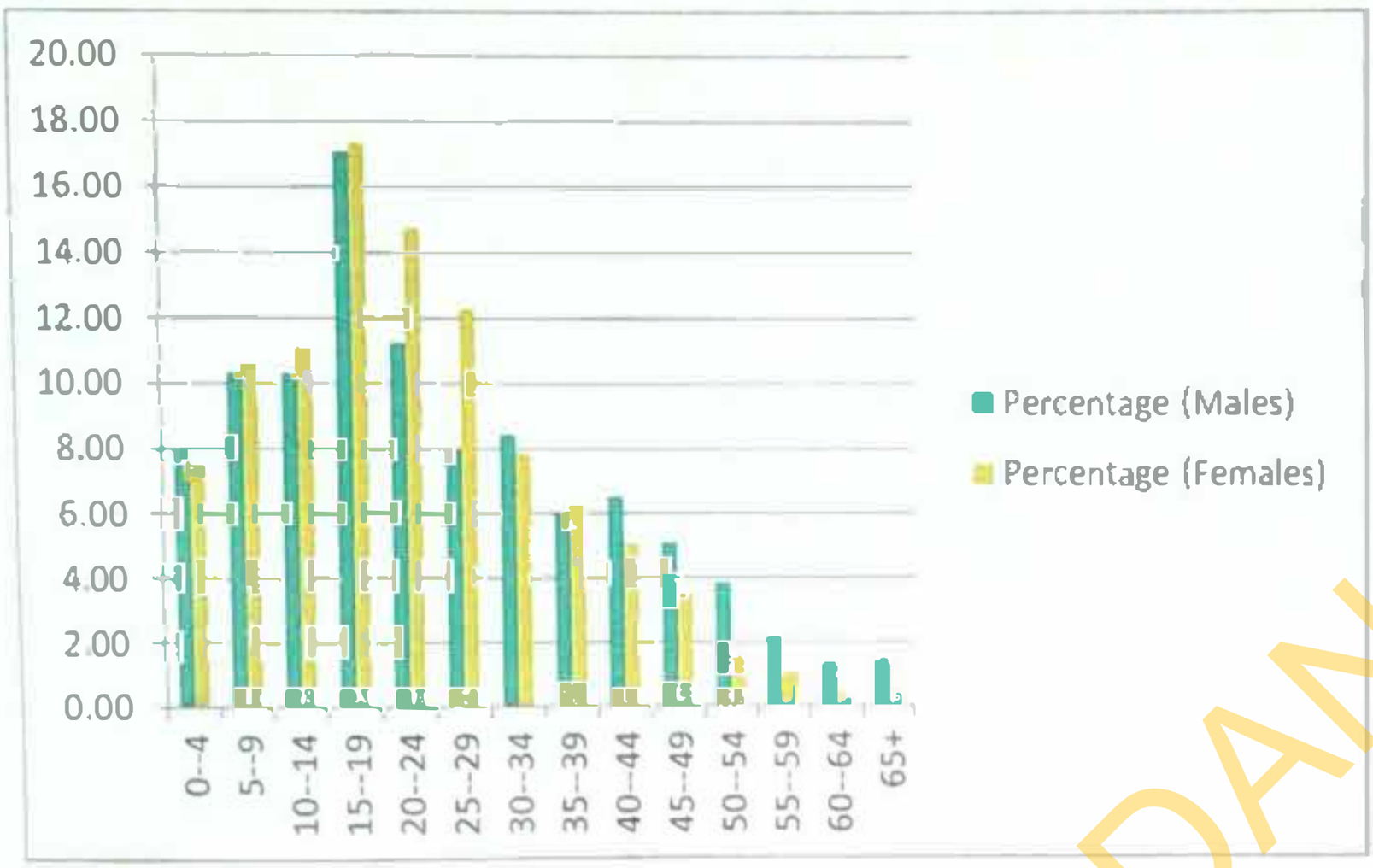
The reported household composition by age and sex is shown in table 4.1.1 below. There were 2,065 females and 1,838 males making a total of 3,903 persons in the sampled households.

Table 4.1.1 AGE – SEX DISTRIBUTIONS OF HOUSEHOLD MEMBERS

AGE GROUP	Male	Percentage	Female	Percentage	TOTAL	SEX RATIO
0–4	147	8.00	156	7.55	303	94.2
5–9	190	10.34	220	10.65	410	86.4
10–14	190	10.34	230	11.14	420	82.6
15–19	314	17.08	359	17.38	673	87.5
20–24	207	11.26	305	14.77	512	67.9
25–29	147	8.00	254	12.34	401	57.9
30–34	155	8.43	162	7.85	317	95.4
35–39	111	6.04	130	6.30	241	85.4
40–44	120	6.53	105	5.08	225	114.3
45–49	94	5.11	73	3.54	167	128.8
50–54	71	3.86	32	1.55	103	221.9
55–59	40	2.18	22	1.07	62	181.8
60–64	25	1.36	8	0.39	33	312.5
65+	27	1.47	9	0.44	36	300.0
Total	1,838		2,065		3,903	89.0

Source: Field study, 2017

Figure 4.1.1: PRESENTATION OF AGE–SEX DISTRIBUTION OF MEMBERS OF HOUSEHOLDS AS REPORTED BY ELIGIBLE RESPONDENTS.



It could be observed from the above chart that there is high concentration of both females and males in age group 15-19 though with higher female population. Besides, there is a descending trend from age group 30-34 to older age 65 and above.

4.2 DESCRIPTIVE STATISTICS OF SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS IN THE STUDY AREA

The descriptive statistics of socio-demographic characteristic of respondents in the study areas were presented below. A total of 900 respondents were included in the study. However, 874 questionnaires were retrieved and analysed. Therefore the response rate was 97.1%.

Table 4.2.1 shows the distribution of respondents according to age groups. It could be observed that age group 25 – 34 years has the highest number of respondents of 346 which represent 39.6% of total respondents of 874. Proportion of respondents age group 15 -24 years was 16% while age group 35 – 44 years was 29.1% and 45 – 49 years was 15.3%. The mean, median and standard deviation of the age distributions are 33.2 years, 32 years and 8.82 respectively.

The table 4.2.1 shows the marital status, age first married and the type of marriage of respondents. As below , it could be observed that larger proportion of respondents were currently married (80.2%) while ever married respondents that is, those that have married before but now widowed, separated or divorce were 3.2%, 2.3% and 2.1% respectively. The percentage of respondent not yet married was 12.2%. Among those ever married respondents majority of them got married in the age range 18 to 24 years (49.8%) while age at first marriage of 44.3% of the married respondents fell within age range of 25 to 34 years. Few women (4.6%) responded they got married at age below 18 years. The mean age at first marriage was 24 years. The proportion of respondents in the polygamous home is 31.3% compared with the percentage of married women in the monogamous home (68.7%). As shown in the table 4.2.1, the proportion of respondents with secondary level of education is 46.3% while those with higher levels of education are 38.2%. The least are respondents with Koranic education only with 1.3% of total respondents. Considering the education of husbands of respondents that are currently married, majority of them (42%) reported that their husbands attained higher levels of education and closely followed by respondents whose husbands 'education stopped at secondary level. Husbands with no education (3.4%) as reported by women are similar to the respondents with no education at all which is 1.5%.

Table 4.2.1 shows that more than half of the respondents (53.9%) were Christians while 387 (44.3%) were Muslims and a few respondents (1.6%) claimed practising Traditional religion. Traders represent 62.0% of total respondents, Artisans were (19.3%), while full house wives and civil servants were 11.7% and 4.7% respectively. When asked about the place of work whether close or far away from home, a larger proportion of women (54.9%) reported their place was far away from their house while 42.4% of respondents reported that their place of work was very close to where they reside.

Table 4.2.1 shows that 61.7% of respondents in the working class earn below fifty thousand which was categorised as low income while 26.7% realised between ₦ 50,000 and ₦ 100,000 (middle level income earners) in a month and as low as 9.0% claimed to be realising above a hundred thousand (₦ 100,000) in a month. The median income level per month was N20,000.

When considering the ethnic composition of the study area, table 4.2.7 shows that Yoruba were 75.7%, while other tribes Hausa, Igbo and others were 12.5%, 8.7% and 3.1% respectively. About 68.2% of women live in the rural setting while 32% live in the Urban setting

Table 4.2.1 shows that 91.4% of the total respondents have heard about family planning while seventy five respondents which represents just 8.6% of total respondents claimed not to have heard about family planning. Table 4.2.1 equally shows that 38.3% of respondents are currently using Injectable while 23.1% are using implant method. About fifty two or 12.4 per cent of total respondents are using pill. The least method currently using is Foam/ Jelly with just 1.2%.

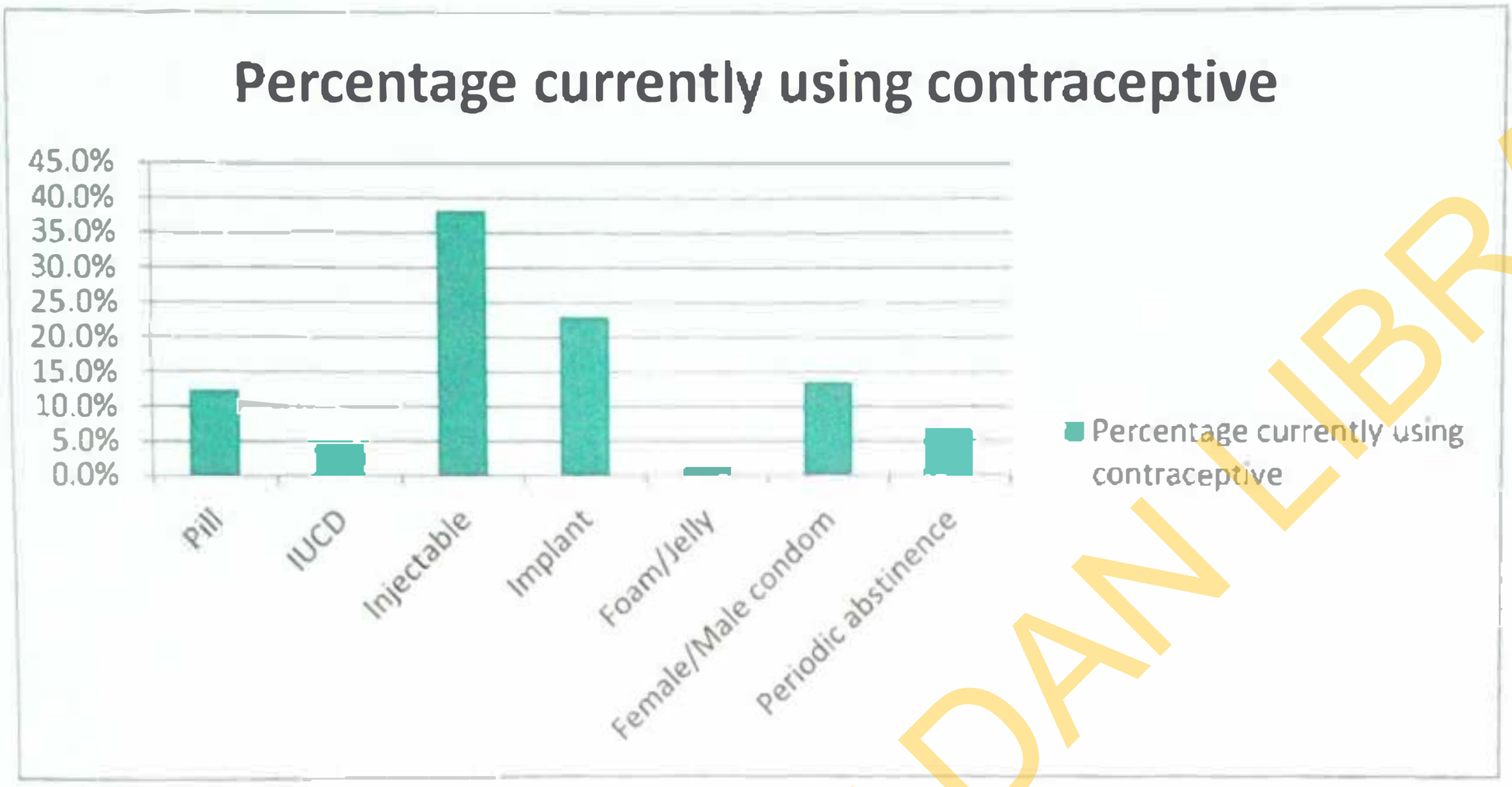
Table 4.2.1 Distribution of respondents by socio-demographic characteristics.

Background Characteristics	N(%)
Age of respondents	
15 – 24	140 (16)
25 – 34	346 (39.6)
35 – 44	254(29.1)
45 – 49	134 (15.3)
Marital Status	
Single	107 (12.2)
Married	701 (80.2)
Widow	28 (3.2)
Separated	20 (2.3)
Divorced	18 (2.1)
Age at first marriage (years)	
<18	35 (4.6)
18 – 24	382 (49.8)
25 – 34	340 (44.3)
35+	10 (1.3)
Type of marriage	
Polygamy	242 (31.3)
Monogamy	532 (68.7)
Educational level of respondents	
None	31 (3.5)
Koranic School only	11 (1.3)
Primary	93 (10.6)
Secondary	405 (46.3)
Higher	334 (38.2)
Husband's Educational level	
None	30 (3.4)
Koranic School only	27 (3.1)
Primary	48 (5.5)
Secondary	305 (34.9)
Higher	367 (42.0)

Background Characteristics	N (%)
Religion	
Islam	387 (44.3)
Christianity	471 (53.9)
Traditional	16 (1.6)
Occupation	
Full housewife	102 (11.7)
Trading	542 (62.0)
Artisan	169 (19.3)
Civil Servant	41 (4.7)
Others	20 (2.3)
Work place of respondents	
Home	371 (42.4)
Away from home	480 (54.9)
Income level of respondents per month	
below N50,0000	539 (61.7)
N50,001 – N100,000	227 (26.0)
above N100,000	79 (9.0)
Respondent's Tribe	
Yoruba	662 (75.7)
Hausa	109 (12.5)
Igbo	76 (8.7)
others	27 (3.1)
Residence	
Rural	596 (68.2)
Urban	284 (31.8)
Family Planning Knowledge	
Yes	799 (91.4)
No	75 (8.6)

Background Characteristics	N (%)
Contraceptive methods currently using	
Pill	52 (12.4)
IUCD	19 (4.5)
Injectibles	161 (38.3)
Implant	97 (23.1
Foam/Jelly	5 (1.2)
Female/Male Condom	57 (13.6)
Periodic abstinence	29 (6.9)
Reasons for non – use of contraceptives	
Not Married	93 (21.1)
I want more children	125 (28.4)
My husband disapprove of it	79 (18.0)
Because of its side effects	60 (13.6)
Because of my religion	49 (11.1)
All of the above	34 (7.7)

Figure 4.2.1: PRESENTATION OF RESPONDENTS BY METHODS CUREENTLY USING CONTRACEPTIVES.



From figure4.2.1, it is obvious that injectable is the most used contraceptives in the study area.

In table 4.2.1 about 28.4% has stopped using a method because they want more children. Ninety three or 21.1% of the respondents are not married while seventy nine (18%) are not using a method currently because they cannot act against the directives of their husbands who disapprove of it. Sixty (13.6%) of the women not currently using a method claimed to have used a method before but were allergic and had bad experience, so they have stopped using any method currently. About forty nine women said they were not currently using a method because of their religion.

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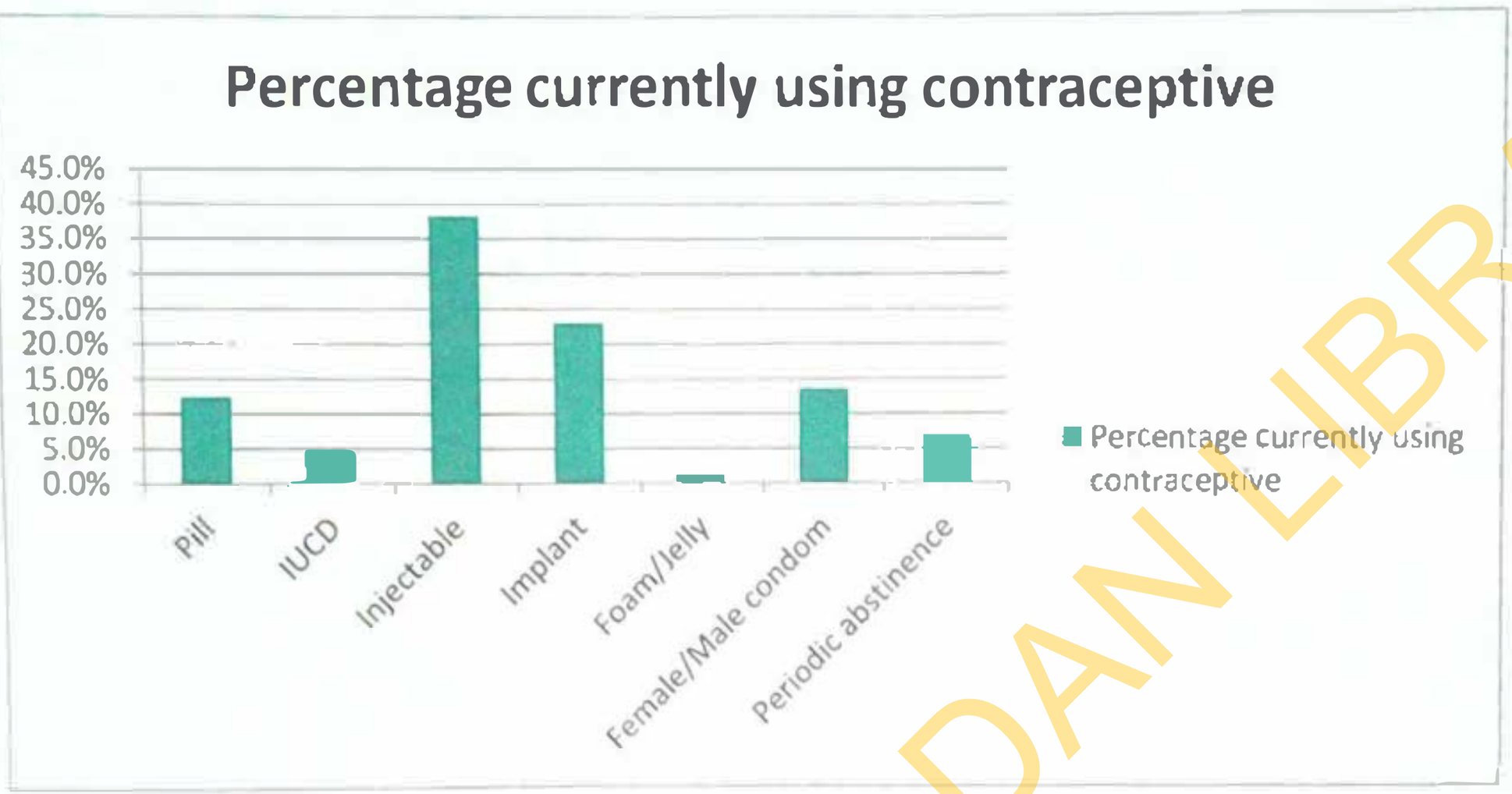

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TABLE 4.2.2: RESPONDENTS' REPRODUCTIVE HISTORY

	Children Ever Born (Parity)
Low Parity (0 - - 4 children)	629 (84.7%)
High Parity (5 children and above)	114 (15.3%)
Total	743 (100%)

Table 4.2.2 shows the low/high parity classification of the women among the ever married respondents. Six hundred and twenty nine women which represent 84.7% have between one (1) and four (4) children categorised as low parity while women with high parity, that is five (5) or more children, is 114 (15.3%).

Among children ever born of all categories, 51.3% are males while 48.7% are females as shown in table 4.2.3. Out of the 2,287 Children ever born, 97.6% are still alive and 2.4% of CEB have died as at the time of the survey.

Table 4.2.3: DISTRIBUTION OF RESPONDENTS BY CHILDREN EVER BORN AND CHILDREN SURVIVING

	Children Ever Born	Children Alive
Male	1,177 (51.5%)	1,148
Female	1,110 (48.5%)	1,083
Total	2,287	2,231

The mean children ever born in the study area was 3.07.

4.3: ASSOCIATION BETWEEN SOCIO-DEMOGRAPHIC VARIABLES AND FERTILITY

CHARACTERISTICS	FERTILITY(PARITY)LEVEL		χ^2 - Value (P. Value)
	LOW (< 5)	HIGH (5+)	
AGE OF RESPONDENTS			
15 – 24	51 (92.7)	4 (7.3)	47.556 (0.000)
25- 34	286 (93.5)	20 (6.5)	
34 – 44	199 (79.9)	50 (20.1)	
45—49	93 (69.9)	40 (30.1)	
AGE AT FIRST MARRIAGE			
<18	28(84.8)	5 (15.2)	0.657
18 – 24	308(83.7)	60 (16.3)	(0.883)
25 – 34	280(85.6)	47 (14.4)	
35+	8(80.0)	2 (20.0)	
TYPE OF MARRIAGE			
Polygamy	188(82.5)	40 (17.5)	1.156
Monogamy	438(85.5)	74 (14.5)	(0.282)
EDUCATIONAL LEVEL			
None	18(60.0)	12 (40.0)	61.767
Koranic School Only	6(60.0)	4 (40.0)	(0.001)
Primary	58(64.4)	32 (35.6)	
Secondary	299(86.4)	47 (13.6)	
Higher	248(92.9)	19 (7.1)	
HUSBAND'S EDUCATIONAL LEVEL			
None	15(53.6)	13 (46.4)	52.143
Koranic School Only	18(72.0)	7 (28.0)	(0.001)
Primary	35(74.5)	12 (25.5)	
Secondary	237(89.1)	59 (19.9)	
Higher	321(93.3)	23 (6.7)	

4.3contd: ASSOCIATION BETWEEN SOCIO-DEMOGRAPHIC VARIABLES AND FERTILITY

CHARACTERISTICS	FERTILITY(PARITY)LEVEL		χ^2 - Value (P. Value)
	LOW (< 5)	HIGH (5+)	
RELIGION			
Islam	292(83.4)	58 (16.6)	2.620
Christianity	326(86.2)	52 (13.8)	(0.270)
Traditional	11(73.3)	4 (26.7)	
OCCUPATION			
Full housewife	84(86.6)	13 (13.4)	12.438
Trading	328(81.8)	73 (18.2)	(0.006)
Artisan	84(81.6)	19 (18.4)	
Civil servant	133(93.7)	9 (6.3)	
PLACE OF WORK			
Home	271(83.5)	52 (16.5)	0.260
Away from home	353(85.3)	61 (14.7)	(0.610)
INCOME LEVEL			
Low income	380(83.3)	76 (16.7)	4.410
Middle income	183(88.8)	23 (11.2)	(0.110)
Higher	57(80.3)	14 (19.7)	
RESIDENCE			
Rural	441(87.3)	64 (12.7)	8.652
Urban	188(79.0)	59 (21.0)	(0.003)

Table 4.3 shows that 7.3% of respondents in age group 15-24 years have high parity level and a higher percentage (6.5%) of respondents in age group 25-34 years have more than four children (high parity). Also respondents in age groups 35 – 44 and 45 – 49 years have high parity level with percentage 20.1% and 30.1% respectively. It could be observed that as respondents advanced in age attainments of high parity equally assumed an increasing trend. Thus shows that there is statistically significant association between age of respondents and parity level as evident by the chi square value (P = 0.000).

As regards age at first marriage, table 4.3 shows that 15.1% of respondents that got married before 18 years of age fell under high parity level while just a little different percentage (16.3%) of respondents that got married within age group 18 – 24 years had high parity. Besides, respondents whose age at first marriage fell between 25 and 35 years of age constitute 14.4% of respondents under high parity level. Whereas 20% of respondents above 35 years of age at the time they got married have high parity level. Indeed the difference between these proportions are marginal which is an indications that the association between age at first marriage and parity level are not statistically significant (P = 0.883).

Figure 4.3.1 PRESENTATION OF RELATIONSHIP BETWEEN AGE AT FIRST MARRIAGE AND CHILDREN EVER BORN (PARITY)

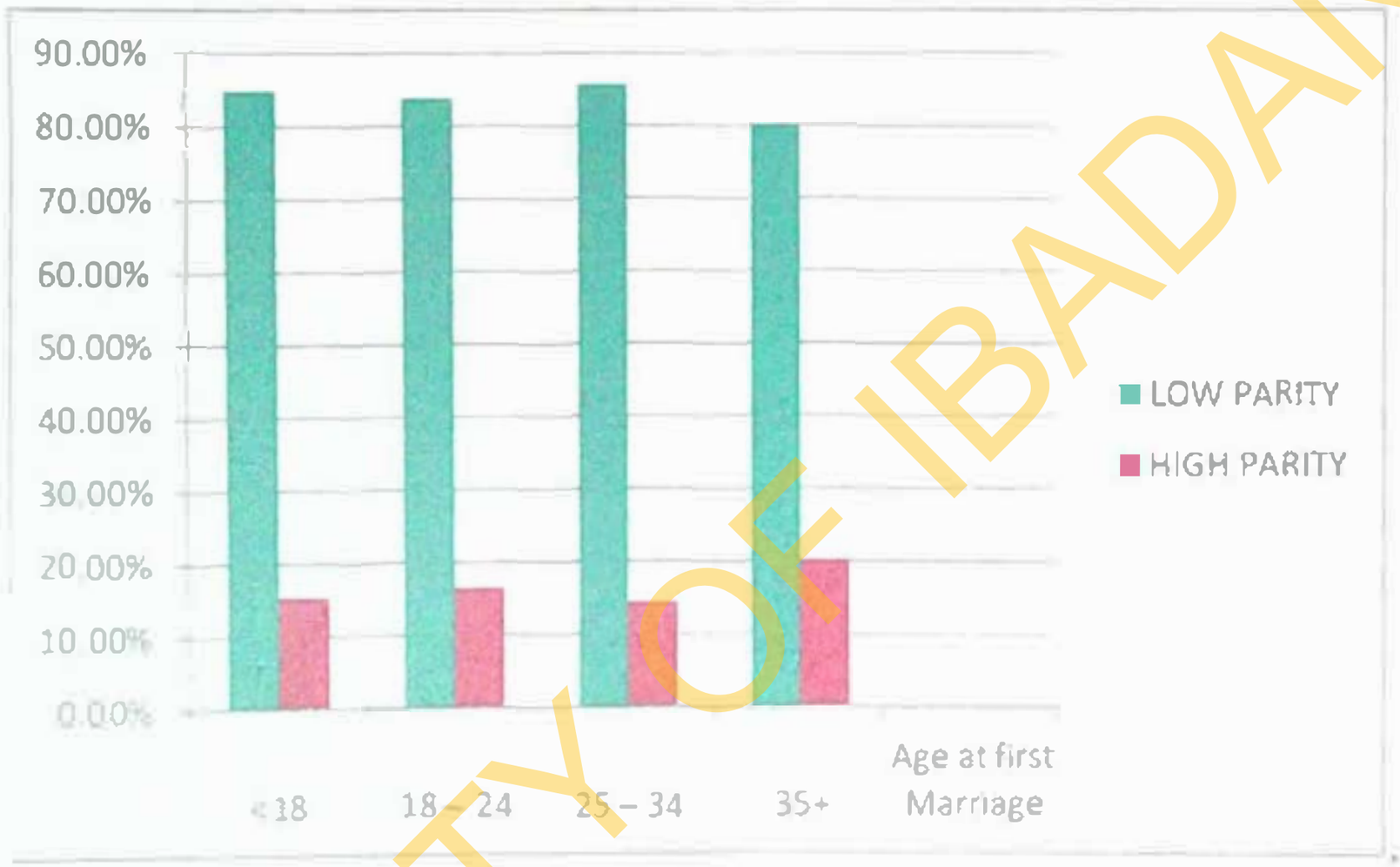

Figure 4.3.1 shows that both low and high parity levels at which all respondents got married were almost at the same percentage levels.

Table 4.3 further shows that 17.5% of respondents in a polygamous home have high parity level while a smaller percentage (14.5%) of respondents in a monogamous home have high parity level. The difference between these two percentages is not statistically significant (P = 0.282).

Considering the educational level of respondents table 4.3 shows that same percentages (40%) each of respondents with no education and those that attended koranic school only have had children that fell under high parity level while 15.6% of respondents with primary education have high parity. Whereas 13.6% and 7.1% of respondents with high parity attended

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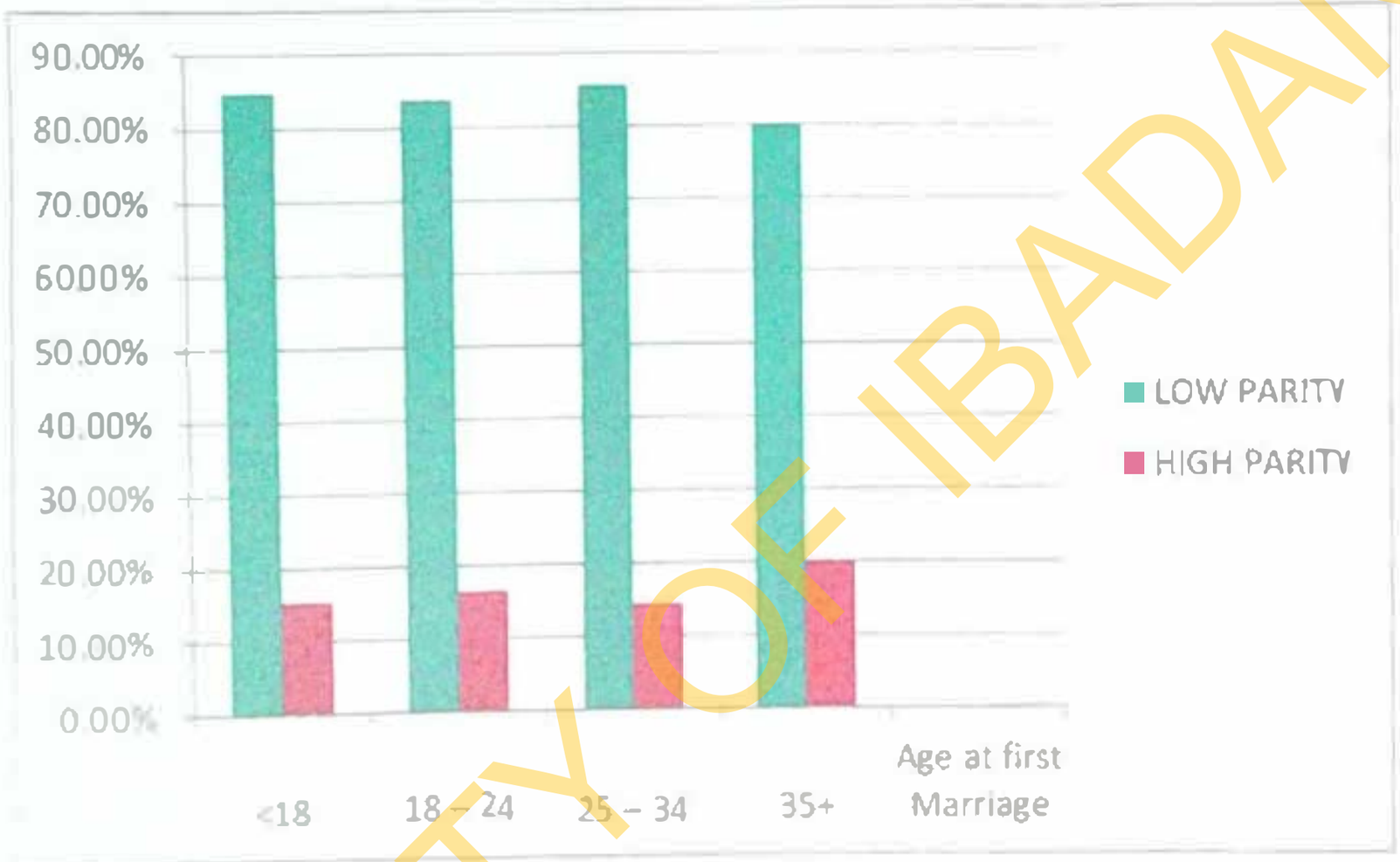

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Considering the educational level of respondents table 4.3 shows that same percentages (40%) each of respondents with no education and those that attended koranic school only have had children that fell under high parity level while 15.6% of respondents with primary education have high parity. Whereas 13.6% and 7.1 % of respondents with high parity attended

secondary and Tertiary educational levels respectively. This is a clear indication that as respondents progressed in their educational attainment there parity level becomes lower.

In table 4.3, educational levels of respondents' husbands presented similar results where 46.6%, 28%, 25.5%, 19.9%, and 6.7% of respondents who have achieved high parity claimed their husband had no formal education, attended koranic school only, primary school, secondary and higher education respectively. It could be seen that as both the respondents and their husbands advances in education their parity levels tend to become lower. This means that there is statistically significant association between educational level and level of parity. (P = 0.001)

As far as religion of respondents is concerned, table 4.3 shows that the percentage of Christians with high parity level was 13.8% while 16.6% of Muslims have high parity level whereas a higher percentage (26.7%) of respondents practicing traditional religion have attained high parity level. All these observed percentages have close margin with no clear direction. This shows that there is no statistically significant association between religion of respondents and their parity levels (P = 0 ..270)

As regards occupation, table 4.3 shows that respondents that have high parity who were full housewife represent 13.4%, while traders with high parity were 18.2%, Artisans 18.4% and Civil servants 6.3%. All these percentages looked alike except that of the civil servant that was much smaller. Generally, this indicated that there is statistically significant association between occupation of respondents and parity levels (P = .006).

Table 4.3 equally shows that 16.5% of respondents who have high parity were those who work at home or their work places were not far from home while 14.7% of respondents who have high parity work very far from where they live. This was somehow similar which shows that there is no statistically significant relationship between place of work and parity levels (P = 0.610)

Table 4.3 shows that 16.7% of respondents whose income fell below N50,000 have had more than four children (high parity) while 11.2% of respondents under middle level income (N50,00 – N1000,00) have high parity and 19.7% of respondents that earn above N100,000 high parity. Going by these proportions , the association between income level and parity lvels are not statistically significant (P = 0.110). As regards residence of respondents, it was found that 12.7% of rural women have high parity while 21.0% of women in the urban areas have more than four children (high Parity level). This shows that there is statistical significant association between residence and parity levels (P = 0.003)

4.4 ESTIMATES OF BASIC FERTILITY RATES (AGE- SPECIFIC FERTILITY RATES, TOTAL FERTILITY RATES, GENERAL FERTI;ITY RATES AND GROSS REPORDUCTION RATES)

4.4.1 DIRECT ESTIMATES.

1. **AGE SPECIFIC FERTILITY RATES (ASFR):** Since fertility varies among women of different ages, it is therefore, imperative to calculate rates for each five year age group (ASFR) using the number of births (in the last 12 months) to women in age groups x, x + n and the total number of women in age group x, x + n multiplied by 1000.

$$ASFR = \frac{nBx}{nWx} \times 1,000$$

Table 4.4.1 ESTIMATION OF ASFR

Age group	Number of Women	No of Birth in the last 12 months	ASFR per 1,000
15 – 19	33	4	121.2
20 – 24	107	25	233.6
25 –29	200	62	310.0
30 –34	146	43	294.5
35 –39	129	26	201.6
40–44	125	28	224.0
45 –49	134	16	119.3
	874	204	**1504.3**

As in table 4.4.1 above, the ASFR assumed a similar trend from age group 20 – 24 to 40 – 44. The largest variations were noticed in the two extreme age groups that were not as high as other age groups.

2. TOTAL FERTILITY RATE (TFR):

To compute TFR, the summation of the ASFR Values in column 4 in the above table 4.4.1 is multiplied by 5 as thus: $5 \times \sum_{1}^{7} ASFR$

TFR = 5 X 1.5043 = **7.5**

As above the Total Fertility Rates (TFR) for age 15 – 49 in the study areas was 7.5 births per woman of child bearing age in the study areas.

3. GENERAL FERTILITY RATES (GFR).

GFR is the number of live births per 1000 of women of reproductive age (15 – 49) years .

$$GFR = \frac{B}{{}_{35}W_{15}} X\ 1,000$$

Where B = the total live births in a year and

${}_{35}W_{15}$ = the total mid-year population of females of reproductive age 15 – 49

$$\frac{204}{874} X 1,000 = 233$$

The computed GFR for the study areas was 233, which means there were 233 births for every 1,000 woman during the last one year preceding the survey.

4. GROSS REPRODUCTION RATE (GRR):

This is the number of daughters a woman would have or bear if she experiences a given set of age – specific fertility rates throughout the reproductive ages with no allowance for mortality over this period.

To calculate:

GRR = TFR * (Proportion of female births)

Where Proportion of female births = $Bf / Bm + f$

Bf = Number of female births and Bm + f = Number of male and female births

Bf = 1,110 while total births was 2,277. The proportion of female births is 1110/2287 = 0.49

GRR = 7.5 * 0.49 = **3.65**

4.4.2: INDIRECT ESTIMATES OF FERTILITY RATES

This method of fertility estimation is basically based on information about children ever born. That is, the number of children born to women of reproductive age which is a measure of their lifetime fertility experience up to the time of this survey. In the adoption of P/F ratio or Brass methods data required as reported in the study areas during the survey were tabulated below in table 4.4.2.

Table 4.4.2 CHILDREN EVER BORN, BIRTH IN THE PAST YEAR, AND NUMBER OF WOMEN CLASSIFIED BY SEX AND FIVE YEAR AGE GROUPS OF MOTHER

Age Group of women	index	Number of women	Children Ever Born			Birth in the past year		
			Male	Female	Total	Male	Female	Total
15 – 19	1	33	10	3	13	3	1	4
20 – 24	2	107	52	68	120	9	16	25
25 – 29	3	200	200	186	386	29	34	62
30 – 34	4	146	187	190	377	17	26	43
35 – 39	5	129	203	197	400	13	13	26
40 - 44	6	125	258	198	456	11	17	28
45 – 4	7	134	267	268	535	8	8	16
Total		**874**	**1177**	**1110**	**2,287**	**89**	**115**	**204**

Table 4.4.2 shows total number of women aged 15 - 49 interviewed was 874 while the total reported Children Ever Born (CEB) was 2,287 (1,177 males and 1,110 females) and the number of children born in the last 12 months preceding the survey was 204 with 89 Males and 115 females.

TABLE 4.4.3 P/F RATIO METHOD OF ESTIMATING FERTILITY (USING THE ADJUSTMENT FACTOR P2/F2)

Age Group of women	Average Parity per women **P(i)**	Period fertility Rates (ASFR) **f(i)**	Cummulative fertility rates **O(i)**	Average Parity equivalent **F(i)**	fertility rates for conventional 5-yr age group **f⁺ (i)**	P/F Ratio **P(i)/F(i)**	Adjusted fertility rates (**f*(i)** using P2/F2 (0.915)
15 – 19	0.3939	0.1212	0.6061	0.2809	0.1432	1.079	0.1310
20 – 24	1.1215	0.2336	1.7743	1.2260	0.2431	0.915	0.2225
25 – 29	1.9300	0.3100	3.3243	2.6718	0.3118	0.722	0.2853
30 – 34	2.5822	0.2945	4.7969	4.2386	0.2866	0.609	0.2623
35 – 39	3.1008	0.2016	5.8046	5.3379	0.1915	0.581	0.1752
40 - 44	3.6480	0.2240	6.3730	6.3730	0.1967	0.572	0.1800
45 - 49	3.9925	0.1194	7.3843	7.3843	0.1315	0.541	0.1203
Total		**1.5043**			**1.5043**		**1.3765**

Table 4.4.3 above, shows the average parity per women, the reported age specific fertility rates, the P/F ratio and the adjusted fertility rates in the study area.

2. ESTIMATION OF TOTAL FERTILITY RATES.

From table 4.4.3 above shows the result of the estimated age specific fertility rates calculated from the current data on births 12 months preceding the survey. The reported TFR calculated at 7.52 (5 x 1.5043) (that is, 5 x ΣASFR.) .Applying the same formula for the adjusted ASFR, x 1.3765 = 6.9 children per woman of reproductive age. This was smaller than the estimates obtained using the direct method of estimation.. Hence, the estimated Total Fertility Rate for the study areas using P2/F2 as adjustment factor was 6.9 children per woman.

TABLE 4.4.4 P/F RATIO METHOD OF ESTIMATING FERTILITY (USING THE MEDIAN OF P2/F2, P3/F3 AND P4/F4 WHICH IS THE ADJUSTMENT FACTOR P3/F3)

Age Group of women	Average Parity per women **P(i)**	Period fertility Rates (ASFR) **f(i)**	Cummulative fertility rates **0(i)**	Average Parity equivalent **F(i)**	fertility rates for conventional 5-yr age group f ' (i)	P/F Ratio **P(i)/F(i)**	Adjusted fertility rates (f*(i) using median P/F P3/F3 (0.722)
15 – 19	0.3939	0.1212	0.6061	0.2809	0.1432	1.079	0.1034
20 – 24	1.1215	0.2336	1.7743	1.2260	0.2431	0.915	0.1755
25 – 29	1.9300	0.3100	3.3243	2.6718	0.3118	0.722	0.2251
30 – 34	2.5822	0.2945	4.7969	4.2386	0.2866	0.609	0.2069
35 – 39	3.1008	0.2016	5.8046	5.3379	0.1915	0.581	0.1383
40 - 44	3.6480	0.2240	6.3730	6.3730	0.1967	0.572	0.1420
45 - 49	3.9925	0.1194	7.3843	7.3843	0.1315	0.541	0.0949
Total		**1.5043**			**1.5043**		**1.0861**

From table 4.4.4 computed TFR would be 5 x 1.0861 = **5.43** children per woman

TABLE 4.4.5 P/F RATIO METHOD OF ESTIMATING FERTILITY (USING THE MEAN OF P2/F2, \P3/F3 and P4/F4)

Age Group of women	Average Parity per women **P(i)**	Period fertility Rates (ASFR) **f(i)**	Cumulative fertility rates 0(i)	Average Parity equivalent **F(i)**	fertility rates for conventional 5-yr age group f^{+} (i)	P/F Ratio **P(i)/F(i)**	Adjusted fertility rates (f*(i) using average P/F (0.749)
15 – 19	0.3939	0.1212	0.6061	0.2809	0.1432	1.079	0.1072
20 – 24	1.1215	0.2336	1.7743	1.2260	0.2431	0.915	0.1820
25 – 29	1.9300	0.3100	3.3243	2.6718	0.3118	0.722	0.2334
30 – 34	2.5822	0.2945	4.7969	4.2386	0.2866	0.609	0.2146
35 – 39	3.1008	0.2016	5.8046	5.3379	0.1915	0.581	0.1434
40 - 44	3.6480	0.2240	6.3730	6.3730	0.1967	0.572	0.1473
45 - 49	3.9925	0.1194	7.3843	7.3843	0.1315	0.541	0.0985
Total		**1.5043**			**1.5043**		**1.1264**

From table 4.4.5, computed TFR would be 5 x 1.1264 = **5.63** children per woman.

Of the three adjustment factors: P2/F2, median P/F and mean P/F, the median P/F is the most centrally located and TFR based on it which is 5.43 is accepted. In any case the resulting value of TFR is close to that based on the mean P/F

Figure 4.4.1 RELATIONSHIP BETWEEN THE PERIOD AND ADJUSTED AGE – SPECIFIC FERTILITY RATES OF THE RESPONDENTS

The curves in figure 4.4.1 follow the regular bell shape though a bit deformed to the right. The ASFR started low, reached peak at age 25 – 29 and then started to decline towards late Reproductive age. The chart equally shows that the period fertility rate is slightly higher than the adjusted fertility rates.

3. ESTIMATION OF GENERAL FERTILITY RATES (GFR):

Age Group of women	index	Number of women	Adjusted Fertility Rates	Estimated Births for age Group
15 – 19	1	33	0.1034	3.41
20 – 24	2	107	0.1755	18.78
25 – 29	3	200	0.2251	45.02
30 – 34	4	146	0.2069	30.22
35 – 39	5	129	0.1383	17.83
40 - 44	6	125	0.1420	17.75
45 - 49	7	134	0.0949	12.72
Total		**874**	**1.0861**	**146**

Using the indirect methods. estimates of General Fertility Rates = $^{146}/_{874} * 1{,}000 \approx 167$

The computed GFR for the study area is 167 births per 1,000 women of reproductive age.

4. ESTIMATION OF GROSS REPRODUCTIONRATES (GRR):

To calculate GRR, using the adjusted TFR of 5.43

The proportion of female births is 1110/2287 = 0.49

GRR = 5.43 * 0.49 = **2.64**

GRR estimated for the study area was approximately 3 daughters per woman

4.5 ESTIMATES OF CHILD MORTALITY (INDIRECT METHOD)

Table 4.5.1 shows the number of children ever born classified by five year age group of mother, the number of children surviving and the proportion dead (Di) calculated for each of the women in the age groups. It could be observed that the proportion of children dead (0. 667) in the first age group 15 – 19 was the highest followed by age group 20- 24 years

(0.0500). the lowest was found in age group 35- 39. This result was not in consonance with the assumption made in the development of this method of child mortality estimation that the risk of dying of a child is a function only of the age of the child and not of other factors such as the age of mother or child's birth order. However, in practice, as could be seen in the table 4.5.1 below that the children of young mothers experience mortality risks well above average (UN, 1983).

TABLE 4.5.1 TOTAL NUMBER OF CHILDREN EVER BORN, CHILDREN SURVIVING AND PROPORTION OF CHILDREN DEAD

Age Group of women	index	Total Number of women	Children ever born (CEB)	Children Surviving	Children Dead	Proportion of Children Dead
15 – 19	1	33	13	11	2	0.1538
20 – 24	2	107	120	114	6	0.0500
25 – 29	3	200	386	374	12	0.0311
30 – 34	4	146	377	364	13	0.0345
35 – 39	5	129	400	394	6	0.0150
40 - 44	6	125	456	450	6	0.0132
45 - 49	7	134	535	524	11	0.0206
Total		874	2,287	2,231	56	

FIGURE 4.5.1 PROPORTION OF CHILDREN DEAD CLASSIFIED BY AGE GROUP OF MOTHER

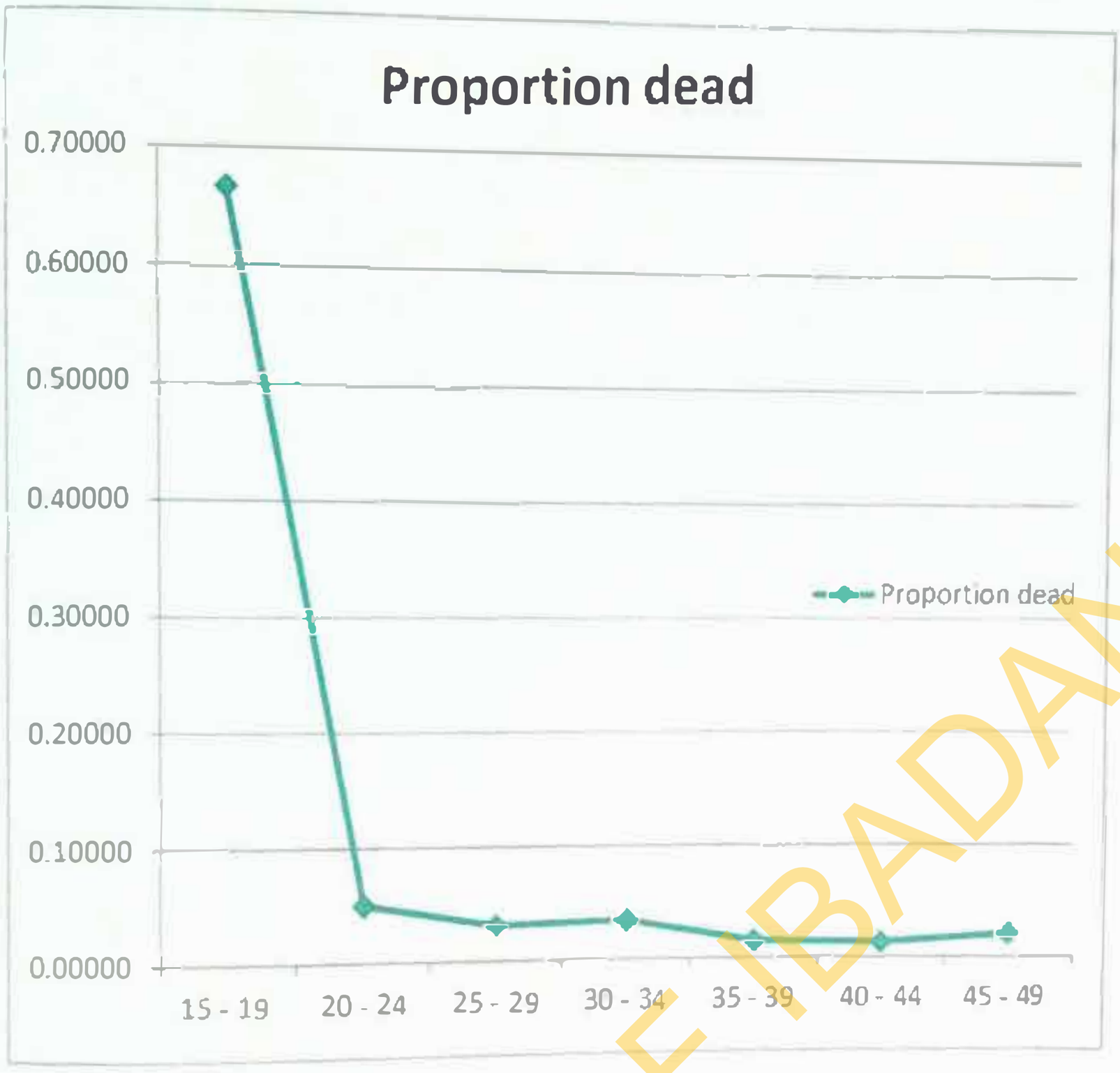

Figure 4.5.1 shows that proportion dead was high in early age group 15 -19 and fell sharply to a lower level from age 20-24 and maintained the trend to age group 45 49 years.

TABLE 4.5.2 ESTIMATES OF PROBABILITIES OF DYING AND PROBABILITIES OF SURVIVING AT EXACT AGE X

Age Group of women	index	Exact age x	Multipliers	Proportion of children dead	Probabilities of dying before exact age x	Probability of Surviving to exact age x
1	2	3	4	5	6 (col 4*5)	7 (1-q(x))
	(i)	(x)	K(i)	D(i)	q(x)	l(x)
15 – 19	1	1	0.6359	0.1538	0.0978	0.9022
20 – 24	2	2	0.9141	0.0500	0.0457	0.9543
25 – 29	3	3	0.9646	0.0311	0.0300	0.9700
30 – 34	4	5	1.0115	0.0345	0.0349	0.9651
35 – 39	5	10	1.0360	0.0150	0.0155	0.9845
40 - 44	6	15	1.0256	0.0132	0.0135	0.9865
45 - 49	7	20	1.0182	0.0206	0.0209	0.9791

Table 4.5.2 shows the estimated levels of child mortality at different exact ages 1, 2, 3, 5, 10, 15 and 20 years. These were estimated using the equation q(x) = K (i) D (i). The value of probability of dying before exact age one. q(1) was 0.0978 while the probability of surviving to age q(1) was 0.9022 . Similarly, the probability of dying before age q (5) was 0.0349 and the probability of surviving to exact age q(5) was 0.9651. Due to irregularity in results, the observed(x) values need be smoothened.

4.6 SMOOTHING CHILDHOOD PROBABILITY OF DYING

To obtain a better probability of dying q(x) series, the values obtained were smoothed using the Brass African standard. The values were smoothed against the logit model.

$Y(x) = \alpha + \beta Ys(x)$.

Where $Y(x) = Y(1), Y(2), Y(3)$ = the graduated estimates of logits l_2, l_3 and l_5

To obtain the value of α when β is assumed to = 1, the equation becomes $Y(x) = \alpha + Ys(x)$.

$\alpha = \bar{Y}x - \bar{Y}x(s)$

Table 4.6.1 : Estimating value of α

Exact age (x)	Y(x)	Ys(x)
2	-1.51941	-1.71408
3	-1.73825	-1.69174
5	-1.66301	-1.66301
	-4.9207	-5.0688
Mean	**-1.6402**	**-1.6896**

$\bar{Y}x = (-1.6402) - \bar{Y}x(s) = -1.6896$

$\alpha = 0.0494$

TABLE 4.6.2: ADJUSTING CHILDHOOD PROBABILITY OF DYING

Age Group of women	Exact age x	Alpha «	logit(lx) Y(x)	logit(ls) Y(s)	Probability of surviving to exact age x l*(x)	Probability of dying at exact age x q*(x)
15 – 19	1	0.0494	-1.11077	-1.75775	0.9682	0.0318
20 – 24	2	0.0494	-1.51941	-1.71408	0.9654	0.0346
25 – 29	3	0.0494	-1.73825	-1.69174	0.9639	0.0361
30 – 34	5	0.0494	-1.66301	-1.66301	0.9619	0.0381
35 – 39	10	0.0494	-2.07434	-1.62011	0.9586	0.0414
40 - 44	15	0.0494	-2.14506	-1.58766	0.9559	0.0441
45 - 49	20	0.0494	-1.92257	-1.53511	0.9513	0.0487

Where $Y(x) = 0.5 * LN\left(\frac{1-lx}{lx}\right)$

and $Y(s) = 0.5 * LN\left(\frac{1-ls}{ls}\right)$

refined $lx = 1 \,/\, 1+e^{2Yx}$

4.7: ESTIMATES OF INFANTS AND CHILD MORTALITY

Table 4.6.2 shows the adjusted values of q(x) and l(x) classified by age group of women.

Therefore, the observed estimate of infant mortality q(1) was adjusted to 0.0318 which means 32 infants deaths per thousand live births and the Child mortality rates q(5) was 0.0381, that is , 38 deaths per thousand live births

4.8 CALCULATION OF REFERENCE PERIOD t(x)

The reference period is the number of years before the survey to which the estimates of childhood mortality refers.

TABLE 4.8.1: REFERENCE PERIOD

Age Group of women Exact age x	index	P(i)	q(x)	t(x)
15 – 19	1	0.3939	0.0318	0.4
20 – 24	2	1.1215	0.0346	1.9
25 – 29	3	1.9300	0.0361	4.5
30 – 34	5	2.5822	0.0381	7.9
35 – 39	10	3.1008	0.0414	11.5
40 - 44	15	3.6480	0.0441	15
45 - 49	20	3.9925	0.0487	18

The equation to calculate t(x) is **t (x) = a(i) + b(i) P(1)/P(2) + c(i) P(2)/P(3)**

The values of the coefficients a(i), b(i), and c(i) were taken from the West mortality pattern.

Table 4.5.5 above shows the values of the computed reference period t(x). it showed the number of years the corresponding q(x) refers. The value of 0.4 in q(1) indicates that infant mortality occurred in May 2017, 0.4 months before the survey that was conducted between August 5 and September 15, 2017. While the reference period for the child mortality was **7.9 years** This was referred to December, 2009

4.9 ESTIMATES OF MATERNAL MORTALITY RATIO

Table 4.9.1: CALCULATION OF LIFETIME RISK OF MATERNAL DEATH

Age Group of women	No of respon dents	N(i)	D(i)	A(i)	N(i).A(i) 9(50)	D(i) / N(i).A(i) (LTR)	T(i)	N(i).A(i).T(i)
15 – 19	33	45	1	0.107	4.82	0.208	5.7	27.45
20 – 24	107	229	4	0.206	47.17	0.085	6.8	320.78
25 – 29	200	395	6	0.343	135.49	0.044	8.1	1097.43
30 – 34	146	352	5	0.503	177.06	0.028	9.7	1717.44
35 – 39	129	292	6	0.664	193.89	0.031	11.7	2268.49
40 - 44	125	324	7	0.802	259.85	0.027	14.3	3715.83
45 - 49	134	355	3	0.900	319.50	0.009	17.5	5591.25
Total	**874**	**1,992**	**32**		**1,137.77**	**0.0281**		**14,738.67**

Table 4.9.1 contains:

1. the number of respondents classified by five – year age group;
2. number of sisters reported to have ever married and have exposed to lifetime risk of maternal death classified by five – year age group of respondents **N(i);**
3. number of maternal deaths from those ever married sisters in age group i **D(i);**
4. Proportion of sisters dead from maternal causes reported by respondents age i **P(i)**
5. Adjustment factor calculated from fixed fertility and mortality models for age i **A(i);**
6. Reference period to which each estimate refers applicable to various populations T (i).

LTR was calculated thus:

$$Q(50) = \frac{\sum D(i)}{\sum N(i).A(i)} = \frac{32}{1,137.77} = 0.0281$$

$$LTR = 0.0281$$

$$MMR = 100,000 * 1-(1-LTR)^{*(\text{adjusted TFR})}$$

adjusted TFR for this study was 5.43 births per woman of reproductive age

$$MMR = 100,000 * 1-(1-0.0281)^{*(5.43)} = \mathbf{520}$$ **maternal death per 100, 000 live births.**

The results in table 4.6.2 shows that maternal mortality began to increase from age group 20 – 24 to age group 40 – 44 years and lower maternal deaths were observed in age groups 15 – 19 and 45 – 49 years. The lifetime risk of maternal deaths (LTR) among age groups shows a

declining trend though with a little distortion in age group 35 – 39 because of the observed marginal increase in the LTR. The general LTR calculated was 0.0281 (1 in 36) and using 5.43 as TFR, the estimated MMR for the study area was **520** maternal deaths per 100,000 live births.

$$T = \frac{\sum N(i).A(i).T(i)}{\sum N(i).A(i).} = \frac{14{,}738.67}{1{,}137.77} = 12.95 \approx 13 years$$

The observed lifetime of maternal deaths (LTRMD) refer to a period of about 13 years before the survey.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1 Discussion

The reported household compositions in the study areas showed that there were more females than males revealed by the overall sex ratio. This structure, though contrary to the sex ratio for the entire Oyo State was a reflection of the population sex structure for Akinyele Local Government. This information was necessary because reliable data about the size, sex, and age of a country's population enable government to plan, develop policies and investment on how to sustain the present and secure the future of its population (UNFPA, 2012)

The study population shared the same characteristics with most States in the South-West, Nigeria by not engaging in early marriage.

Respondents whose husbands married more than one wife were few in numbers. Therefore, the practice of polygamy was not common even among Muslims whose religion permits marrying more than one wife. According to the NPC & ICF, 2013, the practice of polygamy was least common in Oyo State among all the states in the South-West, Nigeria.

Literacy levels in the study areas were on the average because majority of the respondents and their husbands had at least secondary and higher education. Low levels of literacy and education in general, can impede the economic development of a country in the current rapidly changing technology- driven world (CIA, world fact book, 2017)

Findings showed that the major occupation among women in the study areas was trading and working place were far away from home and their proportion of children borne was more than those working at home or very close to their place of residence

The results on income level of respondents showed that majority of women in the study areas earned lower income. This is an indication that poverty level is very high in the study area though poverty thresholds for individual and households differ based on family size, number of children and age

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Considering family planning as a measure of birth control in the study area, it was observed that knowledge of family planning was widespread but use of modern contraceptive was not very encouraging and the reason adduced for non-use or discontinuation was desire to have more children. This is contrary to the study conducted in Ogbomoso where the main reason adduced for non use of contraceptive was its side effects(Adewale et al, 2016) .

The estimated contraceptive prevalence rate was 48% This finding was higher than the estimated CPR for Oyo State (37%) and the same with CPR for Lagos, South West, Nigeria (NPC & ICF, 2013). This result was smaller to 62.7% of couple using contraceptives in Umuahia, South – East, Nigeria. The contraceptive method commonly used was Injectables (38.3%) which is the most popular method in Nigeria as at 2013. (NPC & ICF, 2013) But this was not the case in Umuahia where Pill was the most popular method (28.3%) (Kingsley & Okoronkwo, 2015).

The finding that age of respondents was statistically significant with fertility levels was considered to be normal. This is evident in the findings where the reported number of children ever born or parity level kept increasing as age increases until women reach their completed fertility. Older women have remained and experienced motherhood than the younger ones. This is in line with previous study where it was reported that respondents aged 35 – 39 years are 6.2 times more likely to have more children than those aged 15 – 19 years (Fagbamigbe & Adebowale, 2014). The study showed that child bearing did not begin too early in the study areas. With this, problems associated with teenage pregnancy such as high morbidity and mortality for child and mother would be minimal

However the association between age at first marriage and fertility levels were not statistically significant. It implied that age a woman got married does not determine the number of children to bear during her reproductive years. The small number of children ever born at ages below 18 years was an indication that few teenage girls were exposed to early sexual intercourse. This habit, if continues would reduce teenage pregnancy and abortion resulting from unwanted pregnancy. Child birth at early ages was considered high risk birth As a result, early marriage should be discouraged

It was observed that associations between fertility and educational levels of both respondents and their husbands were statistically significant. That is, the higher the level of education the lower the parity level of a woman in her life time. This result is in consonance with previous study that the odds of high fertility among Nigerian women against low fertility levels are 3.8 times higher among women with primary education compared to those with higher education (Olatoregun et al, 2014) Therefore, women education should be given priority to promote low fertility levels and even lead to delayed marriage.

Findings in this study revealed that having many wives is not a significant factor that determines the number of children born to a household. Although this practice is common among the Muslims because the religious principles allowed it. However, in this study, the proportion of Muslims that practice polygamy was just 39%. This situation equally reflected in the fertility levels among the religious practice which are relatively similar within the two prominent religions. Fewer percentages of respondents from all the religious sects were in high parity category.

In this study, it was found that fewer proportion of women not working at all and those whose place of work are not far from home have high parity. These are set of respondents that are expected to have time to engage more in sexual activities than those working. Surprisingly, higher proportion of traders who were always engaged in economic activities have high parity. This implied that occupation and place of work were not statistically significant with fertility level. This result was in contrast to a report by previous study that Nigerian women with no work are 0.4 times less likely to have a high fertility against low fertility compared to those who are working (Olatoregun, et al, 2014).

It was observed in the study that the association between income level of respondents per month and their fertility level were not statistically significant. Women in low income level (below N50, 000 per month) tend to be in high fertility than women earning between N51,000 and N100,000. That is the higher the income level, the lower the fertility level. It implied that the tendency to have more children were not income driven. Besides, it may be that higher income earners are more educated than the low income earners.

The findings in this study further showed that women in the urban area have higher fertility than rural women. This result was least expected because urban women are expected to have low parity considering their exposures to quality education and health services.

The estimates of fertility computed in this study include the age specific fertility rates (ASFR), total fertility rates (FTR), adjusted fertility rate (P/F ratio), general fertility rates (GFR), and the gross reproduction rates (GRR) using both direct and indirect methods of estimations.

The estimated age specific fertility rates (ASFR) for the study area (from direct and indirect methods) followed a bell shaped pattern. It started low at the lower age groups, reached the peak at the middle age groups and lower rates at the last age groups. However, a slight variation was noticed in the shape at age group 40-44 with ASFR greater than the preceding age groups 35-39. Studies have shown that child bearing at these ages groups should maintain a decreasing trend moving towards completed fertility. The unadjusted reported Total Fertility rate of 7.5 children per woman for the study area was believed to have been over - estimated. After the application of the P/F ratio, the adjusted total fertility rate was computed to be 5.43 children per woman. This estimate of TFR was similar when compared with the NPC & ICF, 2013 reported TFR of 5.5 for Nigeria but slightly higher than 4.6 and 4.5 births per woman reported for South West and Oyo state respectively.

This fertility level need be reduced by creating more awareness on the need to increase uptake of family planning and the use of contraceptives. Because uncontrolled fertility would lead to poverty at both the household and national levels.

The General Fertility Rates (GFR), which is a measure of risk of giving birth, for the study areas was estimated at 233 births per 1,000 women (using direct method) and 167 births per 1,000 women of childbearing age through the indirect method. The two values were greater than the reported GFR by the NPC & ICF, 2013 reports at 190 births per every 1,000 women of reproductive age. This means that 1,000 women of childbearing age in the study area are expected to have 167 children per year. As regards the General Reproduction Rates (GRR), which is the number of daughters to a woman, the estimated value of GRR for the study area using both direct and indirect methods were 3.65 and 2.64 daughters per woman of reproductive age respectively. This implies that number of

daughters a woman in the study area is likely to have given the current age specific rates for the cohorts is on the average 3 daughters at the end of her reproductive age.

Considering the higher number of female youths observed in the household compositions and the computed sex ratio with more females than males in the study areas, a regime of high fertility is likely to persist which had become a public health concern in Nigeria. The estimates of TFR is also greater than the general replacement level of 2.0 coupled with 3 daughters per woman, therefore, the population has the propensity for future growth.

Mortality parameters estimated in this study includes infant, childhood mortality, and maternal mortality.

Estimates of child mortality for this study include infant and under - five mortality rates.

The estimated infant mortality rate (1q0) for the study area after smoothening was 32 infant deaths per 1,000 live births which is quite low. This was far lower than the estimated rate of 69 deaths per 1,000 live births for Nigeria, (NPC & ICF, 2013)..

The smoothed under –five mortality for the study area was 38 deaths per thousand live births. This again was far too low compared with the NPC & ICF, 2013 reports of 128 deaths per thousand live births. Similarly the estimated IMR (0.0318) and CMR (0.0381) for Nigeria were lower than the study conducted on infant and child mortality with probability of dying of 0.0778 among infants to 0.1613 among young adults (Adebowale et al, 2017).

The reason for the observed low IMR and Child mortality might be due to the small sample size in the first instance. Apart from sampling error, omission of infant deaths by responding mothers, aversion to counting number of deaths especially if the occurrence was recent and still fresh at the survey time. The belief among yoruba culture was that incident such as death is an ugly experience particularly if it involves children and parents are not expected to survive their children. As a result, parent would not be happy to recall and even report the death of their children. All these are contributing factors to under-estimation of infants and child deaths in the study area

The calculated number of years to which the estimates of childhood mortality relates were 0.38 years for infant mortality while under five mortality was related to 2.56 years

before the survey.

Maternal mortality which refers to death of a woman during pregnancy, that is, obstetric risks of childbearing, is one of the key indicators for measuring women's overall health conditions and reproductive health programs. The Life Time Risks of Maternal death estimated for the study area was 0.0281 (1 in 36). This was translated to Maternal Mortality Ratio of 520 maternal deaths per 100,000 live births. This estimate was lower to the MMR of 545 deaths per 100,000 live births reported for Nigeria (NPC & ICF, 2013). However, the result was very close to the estimated MMR of 448 deaths per 100,000 in a study conducted in Ajebo and Alapako – Oni in Obafemi Owode Local Government, Ogun State, South West ((Adebowale & Joshua, 2016) and lower than the MMR of 1,012 maternal deaths per 100,000 live births in Jigawa state, Northern Nigeria (Sharma et al, 2017). Compared with MMR in other African countries, the estimated MMR for the study area was higher than the MMR for the Gambia in 1998 (424 maternal deaths per 100,000 live births) (Walfraven et al, 2000) and the MMR for Ghana in 2015 which was 319 maternal deaths per 100,000 live births (United Nations, 2015).

5.2 Conclusion

The inadequacy of vital statistics and the difficulty of collecting accurate and complete data directly in surveys have made the indirect demographic technique an important source of estimating fertility and mortality parameters. This approach was used to estimate adjusted fertility and mortality indices for the study area which would be available to measure performance and evaluate the impact of interventions on health programmes and besides serve as baseline data for further studies. However, these methods are sensitive to age exaggeration, under reporting of children ever born and dead, failure to declare or lack of knowledge of the reason about the death of a pregnant woman and these largely affected the observed estimates of mortality in this study particularly infant and childhood mortality.

5.3 Recommendations

It is worthy of note that fertility and mortality rates are only available for the country as a whole and sometimes for large geopolitical zones but barely for states and extremely rarely for Local Governments. Therefore, this type of survey is important and should be encouraged to provide estimates of fertility and mortality rates particularly at the local levels where most health intervention programmes are done. To measure performance and evaluate impact of such

programmes availability of data is very important.

To stem the trend of high fertility, improve child survival and reduce maternal deaths, effective and efficient systems of managing and promoting family planning should be put in place to increase the uptake of contraception.

Educational levels was found to be statistically significant to fertility levels, therefore, women education is very important and should be taken very serious.

Considering the value of data as veritable tools for making evidenced based decisions, collecting data for the estimation of demographic parameters should be continuous and complete, it is therefore, important to strengthen the existing vital registration systems. To improve the existing vital registration system, more awareness should be created, through the media, town announcers, community and religious leaders, on the need for people to register their births and deaths at the national Population Census Office or any area designated for the purpose in their areas.

The services of the National Health Insurance Scheme (NHIS) being domesticated in the state as Oyo State Health Insurance Scheme (OYHIS) which provides free treatment for under 5 children and adults at a subsidized costs be extended to the public in a bid to reduce child mortality and reduce maternal and young adult mortality.

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APPENDIX I

DEPARTMENT OF EPIDEMIOLOGY AND MEDICAL STATISTICS,

UNIVERSITY OF IBADAN, NIGERIA.

SURVEY ON FERTILITY AND MORTALITY IN AKINYELE LOCAL GOVERNMENT AREAS, OYO STATE

Informed Consent

This questionnaire aims at collecting information on fertility and mortality from women of reproductive age (15 – 49) in Akinyele Local Government areas, Oyo State. Your household was selected for the survey and you are assured that all information collected shall be treated with utmost confidentiality. I hope you will agree to answer the questions because your views are important.

Locality.....House No..... Building No.....

Street Name..... Serial No.....

SECTION A: HOUSEHOLD COMPOSITION

1	How many are you in your household?	.....

2. What are their sex and age

S/N		SEX	AGE
1			
2			
3			
4			
5			
6			
7			

SECTION B – DEMOGRAPHIC AND SOCIO – ECONOMIC CHARACTERISTICS OF OF REPRODUCTIVE AGE

1	What is your age?	.....
2	Marital Status	Single.....1 Married .....2 Widow.....3 Separated....4 Divorced.....5
3	At what age did you first get married?	.....
4	Type of marriage	Polygamy.....1 Monogamy.....2
5	What is your educational level?	None.....1 koranic school only.....2 Primary.....3 Secondary.....4 Higher.....5
6	What is your husband's educational level?	None.....1 koranic school only.....2 Primary.....3 Secondary.....4 Higher.....5
7	What is your Religion?	Islam.....1 Christianity.....2 Traditional.....3
8	What is your occupation?	full housewife..1 Trading.....2 Artisan.....3 Civil Servant.....4
9	What is your Income level per month?	.....
10	Do you usually work at home or away?	home.....1 away from home.....2
11	Residence	urban.....1 rural.....2
12	What is your tribe?	.....
13	What is your **main source** of water for domestic use?	Stream.....1 well....2 street tap.....3 Tanker.....4 Borehole.....5 Rain water.....6
14	What type of toilet facility do you use at home?	flush toilet.....1 Pit toilet.....2 bush/field/River.....3 Bucket.....4 others (specify).....5

SECTION C: REPRODUCTION

15	Have you ever given birth to children?	Yes.....1 No.....2
16	If yes, how many children have you ever born?	.....
17	How many males and females?	Males.....1 Females.....2
18	How many children are still alive	Males.....1 Females.....2
19	Did you give birth to child in the last one year?	Yes.....1 No.....
20	If yes, males or females?	Males.....1 Females.....2

SECTION D: FAMILY PLANNING

21	Have you ever heard of family Planning?	Yes.....1 No.....2
22	If yes, have you ever used a method?	Yes.....1 No.....2
23	Which method(s) have you ever used?	PILL.....1 IUCD.....2 Injectable .....3 Implants,,,,,,,,,,,,,,,,,4 Foam/Jelly .....5 female condom,,,,,,,,,6 Female sterilization.....7 Periodic abstinence.....8
23	Which method(s) are you currently using?	PILL.....1 IUCD.....2 Injectable .....3 Implants,,,,,,,,,,,,,,,,,4 Foam/Jelly.....5 female condom,,,,,,,,,6 Female sterilization.....7 Periodic abstinence.....8
24	If No to question 22, what is the reason for non-use?	not married.....1 I want more children.....2 My husband disapprove of it.....3 Because of its side effects.....4 Because of my religion.....5 all of the above.....6

SECTION E: MATERNAL MORTALITY

25	How many sisters (born to the same mother) have you ever had who were ever-married (including those who now dead)?	.....
26	How many of these ever-married sisters are alive now?	.....
27	How many of these ever-married sisters are dead?	.....
28	How many of these dead sisters died while they were pregnant, or during childbirth, or during the six weeks after the end of pregnancy?	.....

SECTION F: ADULT MORTALITY

29	Is your biological father alive?	Yes.....1 No.....2
30	If Not alive, at what age did he die?	.....
31	Is your biological mother alive?	Yes.....1 No.....2
32	If Not alive, at what age did she die?	.....

Thank You

APPENDIX 2

EKA TI A TI N KO NIPA TOJU AWO ATI ISIRO NINU ISEGUN OYINBO, FASITI ILE IBADAN, NAIJIRIA.

ISE IWADI LORI IBIMO ATI IKU NI IJOBA IBILE AKINYELE, IPINLE OYO.

Iwe ibeere yi wa lati gba oro sile lenu awon obirin ti o si n bimo ti ojo ori won wa laarin odun marindinlogun ati okandinlaadota nipa ibimo ati iku ni ijoba ibile Akinyele, Ipinle Oyo. Ati nu ile re fun ise iwadi yi asi fun yin ni idaniloju wipe gbogbo ror ti a ba gba sile lenu yin ni ao fi owo asiri nla mu. A n reti wipe e o dahun awon ibeere wonyi nitori eero yin se Pataki.

Adugbo..... Nomba ile..... Nomba Ile.....

Oruko opopona..... Nomba idanimo.....

IPIN A: ORO NIPA ILE RE

1	Eyin melo ni ewa ninu ile yin?	.....

2. Se ako niwon tabi abo pelu ojo ori won

S/N		AKO TABI ABO	OJO ORI
1			
2			
3			
4			
5			
6			
7			

IPIN B – ORO NIPA IGBE-AYE ATI ETO ORO-AJE AWON OBIRIN TI O WA AKOKO IBIMO

1	Kini ojo ori re?	.....
2	Eto igbeyawo	Apon.....1 Abileko .....2 Opo..... .....3 Ipinya.....4 Ikosile.....5
3	Kini ojo ori re nigbati o koko se igbeyawo?	.....
4	Iru eto igbeyewo	Alaya pupo.....1 Alaya kan.....2
5	Kini ipele eko kika re?	Mi o ka rara.....1 Ile iwe kurani nikan.....2 Alakobere.....3 Girama.....4 Eko giga.....5
6	Kini ipele eko kika oko re?	Mi o ka rara.....1 Ile iwe kurani nikan.....2 Alakobere.....3 Girama.....4 Eko giga.....5
7	Kini esin re?	Musulumi.....1 Kristeni.....2 Abalaye.....3
8	Kini ise ti o n se?	Iyawo ile ni kikun..1 Owo.....2 Ise-owo.....3 Ise-ijoba.....4
9	Elo ni o ma n wole fun o l'osu?	.....
10	Se ile ni o ti n sise ni abi ibi ti o jina sile?	Ile.....1 Ibi ti o jina sile.....2
11	Ibugbe	Igboro.....1 oko.....2
12	Kini eya re?	.....
13	Nibo gan ni o ti ma n pon omi fun lilo nile?	Odo.....1 Kanga.....2 Kanga d'ero adugbo.....3 Tanka.....4 Kanga alagbeju.....5 Omi ojo.....6
14	Iru ile iyagbe wo ni e n lo ni ile yin?	Igbalode.....1 Salanga.....2 Igbo Odo.....3 Ike.....4 omiran (so nipa re).....5

IPIN D: IBIMO

15	Nje o ti bimo ri?	Beeni.....1 Beeko.....2
16	Bi o ba je beeni, omo melo?	.....
17	Okurin ati Obirin melo?	Okunrin.....1 Obirin.....2
18	Melo ninu awon omo re ni o si wa laye	Okunrin.....1 Obinrin.....2
19	Nje o bimo nibi odun kan seyin?	Beeni.....1 Beeko.....
20	Bi o ba je beeni,se okunrin ni tabi obinrirn?	Okunrin.....1 Obirin.....2

IPIN E: IFETO S'OMO BIBI

21	Nje o ti gbo nipa ifeto s'omo bibi ri?	Beeni.....1 Beeko.....2
22	Bi o ba je beeni, nje o ti lo iru kan ri?	Beeni.....1 Beeko.....2
23	Iru wo ni o ti lo ri?	●GUN.....1 IUCD.....2 Alabere .....3 Ele ti wo fi sinu,,,,,,,,,,,,,,,,,4 Foam Jelly.....5 condomu obirin,,,,,,,,6 Mimu obirin wa li aile bimo.....7 Sisa fun ibalopo nigba die 8
23	Iru wo ni o n lo lowo?	OGUN.....1 IUCD.....2 Alabere .....3 Ele ti wo fi sinu,,,,,,,,,,,,,,,,,4 Foam Jelly.....5 condomu obirin,,,,,,,,6 Mimu obirin wa li aile bimo.....7 Sisa fun ibalopo nigba die.....8
24	Bi ibeere kejilelogun (22) ba je beeko, kini idi ti oo fi lo?	Mi o ti se igbeyawo.....1 Mo fe bi omo sii.....2 Oko mi o fe.....3 Nitori awon okunfa re.....4 Nitori esin mi.....5 Gbogbo nkan ti a ka loke.....6

IPIN E: IKU IBATAN IYA

25	Melo ninu awon aburo tabi egbo re obinrin (ti e je omo iya) ti o ti se igbeyawo ri (pelu awon ti o ti ku bayi)?	.....
26	Melo ninu awon wonyi ni o wa laye bayi?	.....
27	Melo ninu awon wonyi ni o ti ku?	.....
28	Melo ninu awon wonyi ni oku nigbati o loyun, Tabi nigbati o n bimo, tabi laarin ose mefa leyin iloyun?	.....

IPIN F: IKU AGBA

29	Nje baba ti o bi o wa laye?	Beeni.....1 Becko.....2
30	Bi ko ba laye, kini ojo ori nigbati o ku?	.....
31	Nje iya ti o bi o wa laye?	Beeni.....1 Becko.....2
32	Bi ko ba laye, kini ojo ori nigbati o ku?	.....

E se.

APPENDIX 3

INFORMED CONSENT FORM

My name is Olabiyi, Rasheed Ajiboye. I am a student of the Department of Epidemiology and Medical Statistics, University College Hospital, University of Ibadan, Ibadan, I am interviewing women of reproductive age (15 – 49) in order to find out about your fertility history, family planning practice and matemal mortality in Akinyele Local Government area, Oyo State. I will need to ask you some questions on fertility and mortality which you may find it difficult to answer. Please, note that your answers will be kept very confidential.

You will be given a number and your name will not be written on the form so that your name will not be used in connection with any information you gave. The information you and other people give will be used to provide indices of fertility and mortality for Akinyele Local Government area that could be used by the government to measure the performance and evaluate the impact of most interventions to reduce infant and child mortality and improve maternal health.

You are free to refuse to take part in this study. You have a right to withdraw at any giving time if you so wish. I will greatly appreciate your help in responding to the Survey and taking part in the study.

Consent: Now that the study has been well explained to me and i fully understand the content of the process, i will be willing to take part in the programme.

Signature/thumbprint of Participant

Interview date

APPENDIX 4

IWE IFOWOSI ADEHUN

Oruko mi ni Olabiyi, Rasheed Ajiboye. Mo je akeko ni eka ti a ti n ko nipa awo ati onka isegun oyinbo, ni ile ikose isegun Fasiti ile Ibadan, Ibadan. Mo fi oro wa awon obirin ti o si n bimo lowo (odun meedogun si okandinlaadota) lenu wo lati mo nipa itan ibimo re, ise ifeto s'omo bibi ati iku ibatan iya ni ijoba ibile Akinyele, ni ipinle Oyo. Mo na beere awon ibeere die lori ibimo ati iku ti o le soro die fun o lati dahun. Jowo mo fe ki o mo wipe awon idahun re ni ma fi owo asiri mu.

Ma fun o ni nomba idanimo mi o si ni ko oruko re si ori foomu ki enikeni ma ba loo lati fi da o mo. Idahun re ati ti awon elomiran ni yio je atoka fun ijoba ibile Akinyele eleyi ti ijoba le lo lati mo bi nkan se nlo ati lati wa ona lati mu adiku ba iku iya ati lati eto eko alaboyun g'oke agba sii.

O ni anfani lati ma kopa ninu ise iwadi yii. O ni anfani lati dekun kikopa nigbakugba ti o ba wu o. Ma mo riri re bi o ba le dahun awon ibeere wonyi ti o si kopa ninu ise iwadi yi.

Ifowosi: Nisisyi ti won ti salaye ise iwadi yi fun mi daadaa ti mo si ni oye liana re ni kikun, mo setan lati kopa ninu eto yi.

Ifowosi: Iteka olukopa

Deeti: Iforowanilenuwo

APPENDIX 5

COEFFICIENTS FOR ESTIMATION OF CHILD MORTALITY MULTIPLIER

TRUSSELL VARIANT WHEN DATA ARE CLASSIFIED BY AGE OF MOTHER

Mortality model (1)	Age Group (2)	Index i (3)	Mortality Ratio (4)	Coefficients a(i) (5)	b(i) (6)	c(i) (7)
West	15-19	1	Q(1)/D(1)	1.1451	-2.7070	0.7663
	20-24	2	Q(2)/D(2)	1.2563	-0.5381	-0.2637
	25-29	3	Q(3)/D(3)	1.1851	0.0633	-0.4177
	30-34	4	Q(5)/D(4)	1.1720	0.2341	-0.4452
	35-39	5	Q(10)/D(5)	1.1865	0.3080	-0.4452
	40-44	6	Q(15)/D(6)	1.1746	0.3314	-0.4537
	45-49	7	Q(20)/D(7)	1.1639	0.3190	-0.4435

APPENDIX 6

COEFFICIENTS FOR ESTIMATION OF THE REFERENCE PERIOD t(x) TO WHICH THE VALUE q(x) ESTIMATED FROM DATA CLASSIFIED BY AGE OF MOTHER REFER TO

Mortality Model	Age Group	Index i	Parameter Estimate	Coefficients		
				a(i)	b(i)	c(i)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
West	15-19	1	q(1)/D(1)	1.0970	5.5628	-1.9956
	20-24	2	q(2)/D(2)	1.3062	5.5677	0.6962
	25-29	3	q(3)/D(3)	1.5305	2.5528	4.8962
	30-34	4	q(5)/D(4)	1.9991	-2.4261	10.4282
	35-39	5	q(10)/D(5)	2.7632	-8.4065	16.1787
	40-44	6	q(15)/D(6)	4.3468	-13.2436	20.1990
	45-49	7	q(20)/D(7)	7.5242	-14.2013	20.0162

APPENDIX 7

ADJUSTMENT FACTORS AND REFERENCE PERIOD FOR THE ESTIMATION OF LIFETIME RISK OF MATERNAL DEATH

Age Group	Group index	Adjustment factor	Reference Period
years	i	A(i)	T(i)
15 – 19	1	0.107	5.7
20 – 24	2	0.206	6.8
25 – 29	3	0.343	8.1
30 – 34	4	0.503	9.7
35 – 39	5	0.664	11.7
40 - 44	6	0.802	14.3
45 – 49	7	0.900	17.5
50 – 54	8	0.958	21.2
55 - 59	9	0.986	25.6
60+	10	1.000	35.7

APPENDIX 7

ADJUSTMENT FACTORS AND REFERENCE PERIOD FOR THE ESTIMATION OF LIFETIME RISK OF MATERNAL DEATH

Age Group	Group index	Adjustment factor	Reference Period
years	i	A(i)	T(i)
15 – 19	1	0.107	5.7
20 – 24	2	0.206	6.8
25 – 29	3	0.343	8.1
30 – 34	4	0.503	9.7
35 – 39	5	0.664	11.7
40 - 44	6	0.802	14.3
45 – 49	7	0.900	17.5
50 – 54	8	0.958	21.2
55 - 59	9	0.986	25.6
60+	10	1.000	35.7