DETERMINANTS OF PREGNANCY OUTCOMES AMONG ANTENATAL CARE ATTENDEES IN BIRNIN GWARI LOCAL GOVERNMENT AREA OF KADUNA STATE, NIGERIA.

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DECLARATION

I declare that the work in the dissertation entitled "DETERMINANTS OF PREGNANCY OUTCOMES AMONG ANTENATAL CARE ATTENDEES IN BIRNIN GWARI LOCAL GOVERNMENT AREA, KADUNA STATE, NIGERIA" has been performed by me in the Department of Community Medicine under the supervision of Dr Shehu A. U and Dr Sambo M. N. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this dissertation was previously presented for another degree or diploma at any university.

Abbott Samuel Luka _____ _____

Name Signature Date

CERTIFICATION

This thesis entitled, **"DETERMINANTS OF PREGNANCY OUTCOMES AMONG ANTENATAL CARE ATTENDEES IN BIRNIN GWARI LOCAL GOVERNMENT AREA, KADUNA STATE, NIGERIA"** by **Abbott Samuel Luka** meets the regulations governing the award of the degree of Master in Public Health of Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This academic work is dedicated to my parent Mr. and Mrs. Luka K. Abbott who sowed the seed and set my feet in the path of western education.

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I glorify God Almighty for His mercies, divine protection, enablement, and guidance towards the completion of this work.

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SUMMARY

Despite implementation of proven programmes and initiatives by government and nongovernmental organization poor pregnancy outcomes such as low birth weight, perinatal and maternal mortality rates remain a major public health issue in Birnin Gwari Local Government Area. Level of awareness of the risk factors that contributes to these poor pregnancy outcomes among pregnant women in Birnin Gwari LGA has not been documented. This study was conducted to assess the knowledge of pregnant women on risk factors that predispose to poor pregnancy outcomes and to determine the prevalence of these risks factors among pregnant women in Birnin Gwari LGA.

A descriptive cross sectional study was conducted from October 2012 to April 2013 and pregnant women were observed up to delivery. Information on mothers was collected using an interviewer administered semi structured questionnaire. Data was analyzed at univariate and bivariate levels using EPI info 7 and results were presented as means, proportion and Chi square with corresponding 95% confidence intervals and p- value.

Of the 160 women studied 62% had adequate knowledge of factors that influence pregnancy outcomes; knowledge was significantly associated with maternal education, maternal age and parity. The prevalent risk factors are teenage marriage, low socioeconomic status, high maternal parity, late and inadequate attendance to antenatal care, and lack of skilled attendant during delivery. Hospital delivery was significantly associated with mother's level of education, mother's age, being in a monogamous family setting, husband's level of education, but no association was found with maternal parity. Incidence of low birth weight was 11.7% and perinatal mortality rate was 34/1000 births. Low birth weight and perinatal mortality were associated with preterm delivery and extreme maternal age respectively.

Majority of the pregnant ANC attendee have adequate knowledge of the factors that predisposes to poor pregnancy outcomes, the major factors for adverse outcome in this study are teenage marriage with associated teenage pregnancy, high maternal parity, inadequate prenatal care and unsupervised home deliveries. Factor that would lead to good outcomes are good birth spacing, being in a marriage, non use of alcoholic beverages and cigarette smoking. Knowledge of these factors should be disseminated to the households and communities at large in order to influence behavioral modification that will lead to reduction in poor pregnancy outcomes in the LGA.

Keywords: Antenatal care, pregnancy outcomes, Birnin Gwari, Kaduna State.

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List of Acronyms

ANC	Antenatal Care
BMI	Body mass index
CHEW	Community health extension workers
CS	Caesarean section
Hb	Heamoglobin
HIV	Human Immune-deficiency Virus
IPT	Intermittent preventive treatment
IUGR	Intrauterine growth retardation
LBW	Low birth weight
LGA	Local government area
MCH	Maternal and child health
MDG	Millennium Development Goal
MICS	Multiple indicators cluster survey
MMR	Maternal mortality ratio
MUAC	Mid-upper arm circumference
NBS	National Bureau of Statistics
PHC	Primary healthcare centres
PMR	Perinatal mortality rate
PMTCT	Prevention of maternal to child transmission of HIV
TBA	Traditional birth attendants
VDRL	Venereal disease research laboratory
VVF	Vesico-vaginal fistula
WHO	World Health Organization

1 CHAPTER ONE: - INTRODUCTION

1.1 Background information

Pregnancy outcome is the result of conception and ensuing pregnancy, including live births, stillbirths, spontaneous abortion, induced abortion. The outcome may follow natural or artificial insemination or any of the various reproductive techniques such as embryo transfer or fertilization in vitro. The spectrums of events from conception to the birth of a live and healthy infant are complex. Problems that arise during the course of the reproductive process define the adverse outcomes of pregnancy[1]. Major adverse pregnancy outcomes are abortions, low birth weight, birth asphyxia, neonatal mortality including still births, malformation of the baby and death of the mother due to difficult delivery[2]. Factors that influence the outcome of pregnancy are many and could be biological, socio economic, environmental, demographic or cultural. These factors include maternal nutrition, maternal age, birth interval, pre natal care, cigarette smoking, alcohol consumption, drug abuse, unsafe sex leading to unplanned pregnancy and poverty. Additionally, a variety of conditions that are detrimental to the mother's and fetus's health can arise during the course of pregnancy, including pregnancy-induced hypertension, gestational diabetes, placenta previa, and placental abruption. Pre-existing chronic diseases such as hypertension or diabetes are also harmful to pregnancy, often more severe than the pregnancy-induced counterparts. Pregnancy complications can be quite common, the most frequent affecting about 5 percent of all pregnancies[1].

Annually nearly 41% of all under-five deaths are among newborn infants, babies in their first 28 days of life or the neonatal period and three quarters of all newborn death occur in the first week of life[3]. Of the 8.2 million under-five child deaths per year, about 3.3 million occur during the neonatal period. The majority - almost 3 million of these - die within one week and almost 2

million on their first day of life. An additional 3.3 million are stillborn. Virtually all (99%) newborn deaths occur in low- and middle-income countries[4,5]. The survival and health of newborn babies is a critical part of the push towards lower child mortality in MDG (Millennium Development Goal) 4, because a large portion of under-five deaths actually occur during the first month of life. Since many of these deaths are related to care at the time of birth, newborn health goes hand in hand with the health of mothers, Millennium Development Goal 5[6].In Nigeria, the national demographic and health survey 2008 reported a PMR (Perinatal mortality rate) of 39 per 1000 live births, neonatal mortality rate was 40 per 1000 live births, post neonatal deaths was 35 per 1000 live births, and infant mortality rate was 75 per 1000 live births; and that these figures are higher in rural than urban areas[7].

LBW (Low birth weight) is defined as birth weight < 2500g taken shortly after delivery. More than 20 million infants worldwide or 15.5% of all births are born with LBW. The level of LBW in developing countries (16.5%) is more than double the level in developed regions (7%). More than 95% of LBW are born in developing countries[8]. LBW is one of the principal contributors to neonatal morbidity and mortality worldwide, and accounts for up to 70% of neonatal deaths in some countries. IUGR (Intrauterine growth retardation) is the most common form of LBW in the developing world (accounting for more than 60%), whereas most low birth weight infants in developed countries is due to preterm birth. Risk factors for IUGR include untreated urinary tract infections; ascending reproductive tract infections, including syphilis, gonorrhea and chlamydia; low pre-pregnancy maternal weight and height, and low caloric intake and poor weight gain during pregnancy[8–10].

Maternal mortality is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or

aggravated by the pregnancy or its management but not from accidental or incidental causes. Globally, there were an estimated 287 000 maternal deaths in 2010, yielding a MMR (Maternal mortality ratio) of 210 maternal deaths per 100 000 live births among the 181 countries that were studied. Developing countries account for 99% (284 000) of the global maternal deaths, the majority of which are in sub-Saharan Africa (162 000) and Southern Asia (83 000). At the country level, two countries account for one third of global maternal deaths: India at 19% (56 000) of all global maternal deaths, followed by Nigeria at 14% (40 000)[11]. Maternal mortality has continued to be one of the most serious public health challenges in Nigeria. An estimated 50,000 Nigerian women die each year from complications of pregnancy and childbirth, accounting for 10% of global estimates of maternal deaths[12]. The recent estimate of MMR in Nigeria is 545 maternal deaths per 100,000 live births[7]. This figure is above the average for the developing regions (450).

Pregnancy outcomes may undermine family stability at the institutional level while it may also affect the health and manpower needs of societies at the structural level. Both impacts have implications for individuals, families, communities and society at large. The World Bank had observed that maternal and infant mortality depend to a large extent on whether women have access to information, education and communication resources requires to provide themselves and their infants with adequate care. The implication of the above is that the achievement of safe motherhood among women to a great extent depends largely on the interaction of several factors in any given human societies. Apart from the conditions of health centers and the factors that affect their use or non-use, the culture of the people, environment where they live and the socio-economic status of women is also strongly associated with pregnancy outcomes[13].

1.2 Problem statement

A review of records of delivery for the years 2010 and 2011 in Jibril Mai Gwari I Memorial Hospital, Birnn Gwari LGA (Local government area) shows a perinatal mortality rate of 94 and 91 per 1000 live births respectively. Most of these deaths were fresh stillbirths (early neonatal deaths). Similarly the maternal mortality ratio for the same periods were 1721 and 736 respectively. These figures represent a threefold increase compared with the national figures of 39/1000 live birth and 545/ 1000 live births for PMR and MMR respectively[7]. Prevalence rate of low birth weight from records of birth weight of babies delivered between June 2008 and August 2010 was (11.2%).

1.3 Rationale

Over the years, several initiatives and programmes like the midwives service scheme, the free maternal and child health programme, by the federal and Kaduna state government respectively; have been introduced to combat morbidity and mortality among women and children in Nigeria. Despite these efforts, poor maternal and child health indices has continued to be one of the most serious health and development challenges facing the country especially in the rural area. In addition to government efforts, NGO (non-governmental organization) such as Rotary international and recently PATH (Partnership for transforming health) 2 in collaboration with NURTW (National Union of road transport workers) have introduced programmes to support the effort of government to curb the problems. Despite the political will and commitment, as well as zealous efforts by various Governments and NGO to improve maternal and child health, the figures for these indices in Birnin Gwari LGA are worrisome. Nigeria's effort towards achieving the millennium development goals 4 and 5 is being slowed down by high figures of maternal and

child morbidity and mortality in Birnin Gwari LGA and other LGA and states in the north-west geopolitical region.

The main rationale for this study is to obtain information on the knowledge of pregnant women on the factors that influence pregnancy outcomes, against the backdrop of the high perinatal and maternal mortality figures, thus providing basis for effective and evidence-based intervention(s) that will reduce these figures towards attainment of MDGs 4 & 5 by 2015.

The information gather from this study will help the health department, policy makers and health personnel in planning appropriate intervention programs to address the problems of poor pregnancy outcomes in Birnin Gwari local government area.

1.4 Scope

The study assessed the general knowledge of pregnant women on risk factors that influence pregnancy outcome negatively and determined the proportion of women with these risks factors.

1.5 Research questions

1. What is/are the common factors that determine pregnancy outcome among ANC (Antenatal Care) attendees in Birnin Gwari LGA?
2. What is the level of awareness of these factors among ANC attendees in Birnin Gwari LGA?
3. What is/are the determinants of the level of awareness of the factors?

1.6 Objectives

1.6.1 General objective

To determine the factors that affects pregnancy outcome in Birnin Gwari local government area of Kaduna state.

1.6.2 Specific objectives

1. To assess the level of knowledge of pregnant women attending ANC in Birnin Gwari LGA on factors that influence pregnancy outcomes

2. To determine the frequencies of factors that influence pregnancy outcomes among pregnant women attending ANC in Birnin Gwari.

3. To determine pregnancy outcomes among pregnant women attending ANC in Birnin Gwari LGA

4. To determine the relationship between the risks factors and poor pregnancy outcomes.

2 CHAPTER TWO: - LITERATURE REVIEW

2.1 Knowledge of factor influencing pregnancy outcome

Knowledge is awareness of knowing about what, why, when, where and how of anything. Knowledge plays an important role in all spheres of human life and activity. It is a powerful factor which helps man to attain success in life. Knowledge directs our actions and enables us to find the difference between right and wrong, good and bad. Knowledge of the factors that influence pregnancy outcome will to a large extent determine the attitude and practice of women to pregnancy and it outcome. A study in Tanzania showed that, majority of the pregnant women studied were aware of the risk factors that could adversely affect the pregnancy outcomes, however, they did not know the exact mechanisms by which the risk factors acted to cause the adverse effects[14]. Another study in Kenya report that up to 40% of women are not aware of the importance of pre natal care[15]. A survey in Sydney, 61.5% had heard about effects of alcohol on the fetus and 55.3% had heard of Fetal Alcohol Syndrome. Although 92.7% agreed alcohol can affect the unborn child, 16.2% did not agree that the disabilities could be lifelong. Most women agreed that pregnant women should not drink alcohol (80.2%) and 79.2% reported having negative feelings towards pregnant women drinking alcohol. Knowledge of effect of alcohol was associated with higher maternal education[16].

2.2 Factors influencing pregnancy outcomes

2.2.1 Maternal Age

Extreme of maternal age has since been recognized as a potential risk factor for poor pregnancy outcome. Maternal age below 18 years and above 35 years are associated with higher level of LBW, Prematurity, Perinatal and neonatal mortality and even maternal deaths especially in

developing countries where health care services especially in the rural settings are poor and level of poverty high. A study in Ilorin found that anaemia, toxeamia of pregnancy and low birth weight was commoner among teenage mothers than adult mothers; however, hypertension was commoner among adults than adolescents[17]. Another study in Iran found that Preterm labor and placenta previa were significantly higher in less-than 18 years group and that maternal age in the two extremes affected pregnancy outcome[18]. Another study in Canada reports that adolescents were more likely to have a preterm delivery and lower CS (Caesarean section) delivery compared to older women. Older maternal age, higher pre-pregnancy BMI (Body mass index), increased weight gain during pregnancy, and pre-delivery anemia were all independent risk factors for CS. Smoking was the most influential factor in predicting infant birth weight. Adolescents had significantly more low birth weight infants than adults but gestational age rather than young maternal age was the most significant risk factor for low birth weight. After controlling for smoking status, adolescents were 2.5 times more likely than adults to be anemic at 26 to 35 weeks' gestation and pre-delivery[19].

2.2.2 Maternal parity

Parity has been used as a risk marker with nulliparous and grand multiparous women classified as at higher risk of pregnancy complications. Nulliparous women are considered to be at risk of pregnancy-induced hypertension and fetopelvic disproportion leading to operative delivery, whereas the grand multiparous are considered to be at risk for haemorrhage, malpresentation, anaemia, uterine rupture and complications associated with chronic medical problems such as diabetes and hypertension. Grandmultiparity has been described as an independent risk factor for a variety of obstetric complications, especially in developing countries with inadequate health facilities. High parity is still common with dire consequences to the foetus, the family and the

society. Pregnancy after the fifth delivery is viewed with anxiety, especially by Obstetricians in developing countries working with inadequate facilities. The problem of high parity in developing countries is further compounded by a high prevalence of low socio-economic status, poor female literacy, and social deprivation, as well as poor utilization of contraceptive services

A study conducted in southeastern Nigeria reported that Diabetes mellitus; hypertension, heart disease, anaemia, multiple pregnancy, antepartum haemorrhage, foetal malpositionings and malpresentations, cephalopelvic disproportion, congenital malformations and macrosomia were significantly associated with grandmultiparae[20].

2.2.3 Maternal Nutrition

Poor maternal nutrition before and during pregnancy impacts adversely on pregnancy outcome and infant survival, and can result in spontaneous abortion, stillbirth, congenital malformation, IUGR, preterm delivery and perinatal and neonatal death. Malnutrition also increases the risk of maternal infection, which further impacts on perinatal and neonatal morbidity and mortality. Because much of brain growth occurs during late pregnancy and early infancy, maternal malnutrition also can impair early childhood development.

Studies showed that intrauterine malnutrition have more serious consequences for children than postnatal malnutrition. Under-nutrition, as well as over-nutrition during pregnancy, was associated with adverse pregnancy outcomes. The IOM (Institute of medicine) published recommended weight gains by pre-pregnancy BMI. Wasting in pregnant women can be defined as a MUAC (Mid-upper arm circumference) < 22cm. Low pre-pregnancy BMI is considered a risk factor for preterm birth and intra-uterine growth retardation. Pregnant women in developing countries start to attend antenatal clinics late in pregnancy, so that pre-pregnancy BMI may be unknown and antenatal care can be based on pregnancy weight gain only. Women with short

stature 145cm), low body weight 45kg), and/or MUAC < 22cm are considered to be at risk of adverse pregnancy outcomes. Weekly weight gains should range from 0.3kg for overweight women to 0.5kg or more for underweight women from the second trimester[21].

2.2.4 Antenatal care

ANC means, "care before birth" and includes education, counseling, screening to monitor and to promote the well-being of the mother and foetus. ANC is one of the "four pillars" of safe motherhood; the other three are family planning, clean/safe delivery and essential obstetric care. The package was devised to ensure that women should be able to go safely through pregnancy and childbirth and have healthy infants, in other words, to prevent the dreaded outcomes: maternal death, and perinatal and infant death[22]. ANC services indirectly saves the lives of mothers and babies by promoting and establishing good health before childbirth and the early post-natal period[23]. It often presents the first contact opportunities for a pregnant woman to connect with health services, thus offering an entry point for integrated care, promoting healthy home practices, influencing care-seeking behaviours and linking women with pregnancy complications to a referral system; thus impacting positively on maternal and fetal health[23]. The very low maternal/infant morbidity and mortality rates reported for developed countries[24] compared with the extremely high figures in developing countries[24] have been attributed to the higher utilization of modern obstetric services by the former. Currently, 71% of women worldwide utilizes ANC services; and in industrialized countries – 95%, South Asia – 54% and Sub-Saharan Africa – 64%[25]. A study in a rural district in Kenya found high ANC utilization rate[15] comparable to the developed region of the world. A study in Delta state found mothers with higher educational status, spouse's high education level and those who had income-yielding occupations utilized antenatal care services; while housewives, with no other occupation, and

women with a parity of more than 4 children utilized antenatal care services less[26]. Another study in Osogbo, on timing of first ANC visit (booking clinic) found mean gestational age at booking was 20.3±6.2 weeks and prevalence of late entry to antenatal care was 82.6%. Maternal education and age were significant factors influencing late booking[27].

2.2.5 Malaria Infection

Malaria infection leads to severe complications during pregnancy and is an important public health problem in many developing countries. In settings of moderate to high endemicity, malaria may cause up to 30% of preventable LBW in newborns and account for 3% to 5% of neonatal mortality. In settings of low endemicity, malaria is associated with an increased risk of spontaneous abortion and stillbirth. Malaria infection during pregnancy was found to be associated with anaemia in pregnancy in Kano, Nigeria[28]. Anaemia in pregnancy can result in abortions, preterm delivery, low birth weight, still birth and even maternal death, this could be a direct consequence of malaria infection during pregnancy.

The study in Ile-Ife found that mothers who didn't attend ANC had a higher tendency to be younger, unmarried, with lower educational status, lower social class and with higher proportion of multipara. It also found higher incidence of antepartum haemorrhage, anaemia and toxeamia of pregnancy in unbooked mothers. Mothers with no ANC were half as likely as mothers who had ANC to deliver by spontaneous vaginal delivery but were twice as likely to deliver preterm babies and three times more likely to have babies with birth asphyxia. Higher perinatal and maternal mortalities among mothers without ANC was also reported in this study [29].

2.2.6 Inter-pregnancy interval

The inter-pregnancy interval between the birth of one child and conception of the next appears to be one of the factors associated with preterm birth, low birth weight, and intrauterine growth

restriction. The highest risk for these outcomes occur at inter-pregnancy intervals less than six months, the least risk for intervals of 18 to 23 months, and an increasing risk thereafter. Avoidance of short intervals can be achieved through use of contraception, but avoidance of long inter-pregnancy intervals is more problematic since a desired pregnancy may be precluded by sub-fertility, availability of a partner, economic issues, or illness. A retrospective longitudinal analysis of inter-pregnancy intervals in 96 married couples who had never used any form of contraception found that the mean inter-pregnancy interval in the 1218 pregnancies evaluated was 8.5±4.9 months, and was significantly shorter after an abortion or stillbirth than after a delivery[30]. Inter- pregnancy interval was significantly longer in women 40 years old than in women under age 30. Length of breast-feeding would be expected to affect these results, as ovulation is unlikely in the first six months postpartum in women who breast-feed exclusively.

2.2.7 Anaemia in pregnancy

Anaemia in pregnancy is an important public health issue globally. WHO (World Health Organization) estimates that more than half of pregnant women have Hb (Heamoglobin) level indicative of anaemia (11g/dl) the prevalence maybe however as high as 56% to 61% in developing countries[10]. In developing countries, anaemia is an important cause of morbidity and mortality especially in malaria endemic regions. It is a major risk factor for adverse pregnancy outcomes; it has a significant impact on the fetus and the mother. In Africa 20% of maternal death have been attributed to anaemia. A study in Abeokuta reported that 76.5% of women studied were anaemic at one trimester or another with 63% anaemic at booking. It was prevalent among Primigravidas than multigravidas though the difference was not significant. Severity of anaemia was 40.3%, 57.8% and 1.9% for mild, moderate and severe anaemia. All the severely anaemic were primigravidas[31].

3 CHAPTER THREE: - METHODOLOGY

3.1 Background information on study area:

Birnin Gwari local government area is one of the 23 local government areas of Kaduna state in north-west geopolitical zone of Nigeria. It shares boundaries with Niger, Katsina and Zamfara states and Giwa, Chikun and Igabi LGAs of Kaduna state. It is divided into 11 political wards and has a population of 301335 (2012 estimate based on the 2006 national population census). Population of women of childbearing age is 15067. The LGA has 65 health facilities out of which one is a secondary health facility and managed by the state government. It provides specialized health services to the LGA and communities from the neighbouring states and serves as a referral centre to other health facilities in the area. Of the 64 health facilities owned and managed by the LGA 43 are functional with at least one health worker. Four of the functional health facilities are PHC (Primary healthcare centres) and 39 are health clinics. The general hospital, PHC and some of the health clinics offer antenatal clinic services. Inhabitants of the community are Hausa, Kamuku and Gwari; and predominantly farmers. Islam is the main religion in this LGA. Appendix 4

3.2 Study design

A descriptive cross sectional study was conducted

3.3 Study population

Pregnant women attending antenatal clinic in five selected health facilities in Birnin Gwari LGA (Local Government Area)

3.3.1 Eligibility criteria

All pregnant women attending antenatal clinic in selected health facilities within Birnin Gwari LGA who have be resident within the LGA for at least six months prior to the study,

3.3.2 Exclusion criteria

All pregnant women attending ANC but decline consent to participate in the study. Pregnant women who will not be in the LGA at the time of delivery were also excluded from the study. Pregnant women from neighbouring state and LGA to Birnin Gwari LGA were also excluded from the study.

3.4 Sample size determination

Sample size was determined using the prevalence of low birth weight (the major poor pregnancy outcome) from a previous study in Nigeria[9] and was calculated using the formula:

$n = Z^2pq/d^2$ [32]

Where n = minimum sample size;

z= the normal standard deviate usually set at 1.96 which correspond to 95% confidence interval;

p = Observed prevalence of low birth weight (11.5 %)(9);

q = 1 –p (0.885);

d = Degree of accuracy set at (5%).

Thus n= $1.96^2 \times 0.115 \times 0.885 / 0.05^2$

The sample size is therefore 156. Additional sample of 16 (10%) was added to take care of non response. Total sample size is therefore 172.

3.5 Sampling technique

A two stage sampling technique was employed;

1. Purposive sampling was used to select health facility based on location, availability of trained midwives and basic laboratory services.
2. Systematic random sampling was employed at the facility level to select study participants.

Health facilities selected include the general hospital, and the four PHC; (Jibril Mai-Gwari I Memorial Hospital), MCH (Maternal and child health) clinic, PHC Randagi, PHC Kuyello and PHC Dogon Dawa). At each facility, pregnant women were selected using systematic random sampling technique during booking clinics at the health facilities. The formula N/n was used to determine the sampling fraction for selecting study participants where N is total number of women attending booking clinic on the day of sampling and n is the number of women required at that facility. The sampling fraction was used to select study participant until the required sample per facility was reached. Number of pregnant women in each facility was determined base on probability proportionate to size of the population of pregnant women in the selected ward as illustrated below

Number of pregnant women per facility = pregnant women in selected ward/ study population× sample size

The target population = 15067

Study population= 8412 (sum of population of pregnant women in selected wards from the estimated population of the selected wards based on 2006 population census)

Sample size = 172

The distribution of the study sample in each facility is as shown in the table below

Facility/Ward	Population of pregnant women in ward	Number of pregnant women
Jibril Mai Gwari I Memorial Hospital/Magajin Gari II & III	3000	61
MCH clinic/Magajin Gari I	484	10
PHC Kuyello/Kuyello	1420	29
PHC Randagi/Randagi	1218	25
PHC Dogon Dawa/Dogon Dawa	2290	47

3.6 Study instruments

Questionnaires were used to collect data from study participants; it included both close ended questions to facilitate data collection, entry and analysis; as well as open ended questions. Information collected was on socio-economic status, demographic characteristics, knowledge of risk factors, biomedical information, measurements taken during the pregnancy and delivery. Weight and height of the mothers was measured using stadiometer, blood pressure was measured using Litmanns' stethoscope and Accuson's sphygmomanometer; HIV (Human Immune-deficiency Virus) screening was performed using rapid Core™ One step HIV 1+2 test kit (ISO 9001, ISO 13484 Certified), Syphilis screening was performed using VDRL and Wondfo rapid test kit and malaria with CareStart™ malaria HRP2 test kit (ACCESSBIO).

3.7 Data collection method

3.7.1 Administration of questionnaire

Data was collected through interviewer administered questionnaire using semi structured pre-tested questionnaires by trained midwives who understand and speak Hausa fluently. Questionnaire was in five sections; the first three sections were administered at first contact during booking clinic, section four was filled during antenatal visits while section five was filled during labour and delivery.

3.7.2 Measurement of variables

Weight of the pregnant women was measured to the nearest 0.1kg using appropriate weighing instrument at booking visit and during each ANC visit. Their heights were measured to the nearest 0.1cm once at booking. Blood pressure was measured on the left mid upper arm at booking visit and during each ANC visits, using stethoscope and sphygmomanometer to the nearest 0.1mmHg. We also determined Heamoglobin concentration, urinalysis to detect glucose and protein, and screened for HIV and Syphilis using appropriate test. Informed consent was obtained before screening for HIV. Pretest and post test counseling was administered by trained midwives.

3.8 Data management

3.8.1 Statistical analyses

Data was entered into excel spread sheet, cleaned, compiled and analyzed using Epi-info version 7. Results were presented as proportions, means and rates to describe the knowledge of pregnant

women on various risk factors and the poor pregnancy outcomes. Chi square test was used to analyze the influence of certain maternal characteristics and their level of knowledge and also risk factors and pregnancy outcomes. Response to the knowledge questions was scored; correct response scored 1 mark and incorrect response scored no mark. Correct responses were summed up for each respondent and the mean score determined. Respondent were graded as having adequate knowledge if the score marks equal to or above the mean score while those with total marks below the mean score were grouped as having inadequate knowledge.

3.9 Ethical consideration

Ethical clearance for the use of human subjects was obtained from the ethical review board of Ahmadu Bello University Zaria, and Kaduna state ministry of health. Permission was obtained from the Health department Birnin Gwari LGA. Informed consent was sought for and obtained from study participants; the purpose of the study and the perceived benefits and risks if any was clearly explained to the pregnant women and were informed of the freedom to discontinue from the study at any point they so desire.

3.10 Limitations

Where a mother delivers outside the facility of study, events around labour and delivery cannot be ascertained. Pregnant women not attending antenatal care excluded from the study, this might affect the actual level of knowledge and estimate of risk factors. Not all women in the study were screened for malaria, syphilis and packed cell volume determination because they could not afford to pay the prescribed fee; this might affect the true estimates measured in this study.

4 CHAPTER FOUR: - RESULTS

4.1 Maternal characteristics

Table 1 Socio demographic characteristics of respondents

Characteristics	Frequency	Proportion
Age group		
11 – 15	12	7.5
16 – 20	45	28.1
21 – 25	46	28.8
26 – 30	31	19.4
31 – 35	10	6.3
36+ years	16	10
Tribe		
Hausa	109	68.6
Kamuku	28	17.5
Fulani	11	7
Others	11	7
Educational level		
None	35	22.3
Arabic	56	35.7
Primary	29	18.5
Secondary	29	18.5
Tertiary	8	5.1
Occupation		
Housewife	109	69.4
Employed	38	24.2
Self employed	3	1.9
Student	3	1.9
Farming	4	2.6
Religion		
Muslim	152	95
Christian	8	5

A total of 160 pregnant women aged 14 – 46 years (mean 24.9 ± 7.4) were studied. Table 1 shows the demographic characteristics of the subjects. The modal age groups were 16-20 and 21 -25 years 28.1% and 28.8% respectively, approximately 8% of the subjects were in the age group 10 – 15 years, while 10 % were above 35 years. Majority of the subjects 159 (99.4%) were married only one (0.6%) of the respondent was single (divorced). Eighty five (54.1%) were from a polygamous family setting; more than half of the study pregnant women (58.3%) had no formal education and majority of the pregnant women 109 (69.4%) are housewives.

Table 2 Socio - economic status of spouses of respondents

Characteristics	Frequency	Percent
Husband education level		
None	22	14.3
Arabic	39	25.3
Primary	15	9.7
Secondary	50	32.5
Tertiary	28	18.2
Husband's occupation		
Employed	27	15.5
Self employed	68	43.3
Farming	58	36.9
Unemployed	3	1.9

4.2 Knowledge of pregnant women regarding the risk factors

The factors were grouped into Socio-economic, demographic and nutritional factors, medical and infection factors, obstetrics factors and the poor pregnancy outcomes. Respondents' responses are as shown in tables 3 – 7 below.

Table 3 Responses on socio economic, demographic and nutritional risk factors for poor pregnancy outcomes

Risk factor	Yes (%)	No (%)	Don't know (%)
Maternal Age <15, >35years	94 (59.9)	18 (11.5)	45 (28.6)
Low socio economic status	112 (70.9)	9 (5.7)	37 (23.4)
Alcohol use in pregnancy	96 (60.8)	6 (3.8)	56 (35.4)
Cigarette smoking	96 (60.8)	6 (3.8)	56 (35.4)
Maternal height < 150cm	78 (50)	13 (8.3)	65 (41.7)
Maternal weight < 45kg	76 (48.4)	16 (10.2)	76 (48.4)
Poor nutrition in pregnancy	125 (78.6)	7 (4.4)	27 (17)

Table 3 show responses of the studied women on maternal demography; most women (59.9%) are aware of the risk associated with extreme of maternal age (< 15, > 35), while 58.6% - sum of proportion of respondents who said 'No' and 'don't know' are not aware that low maternal body weight could affect pregnancy outcome poorly.

Table 4 Responses on medical conditions and infection risk factors for poor pregnancy outcomes

Risk factor	Yes (%)	No (%)	Don't know (%)
Hypertension	121 (76.1)	8 (5)	30 (18.9)
Diabetes	102 (64.2)	5 (3.1)	52(32.7)
Sickle Cell Disease	108 (67.9)	5 (3.2)	46 (28.9)
Anaemia	122 (77.2)	5 (3.2)	31 (19.6)
Malaria	97 (64.2)	7 (4.4)	48 (31.8)
Urinary tract Infections	90 (58)	6 (3.9)	59 (38.1)
HIV/AIDs	104 (65.8)	7 (4.4)	30 (18.9)
Sexually transmitted diseases	81 (52.3)	7 (4.5)	67 (43.2)

Table 4 shows level of awareness on medical condition that could lead to poor outcome of pregnancy. Thirty six percent and 42 % of the studied women did not know that malaria infection and urinary tract infection during pregnancy respectively could lead to poor pregnancy outcomes.

Table 5 Responses on obstetrics risk factors for poor pregnancy outcomes

Risk Factor	Yes (%)	No (%)	Don't know (%)
First pregnancy	79 (50.3)	16 (10.2)	62 (39.5)
5 or more Pregnancy	70 (44.3)	19 (12)	69 (43.7)
Short inter pregnancy interval	104 (65.8)	8 (5.1)	46 (29.1)
Lack of Antenatal care	119 (75.3)	5 (3.2)	34 (21.5)

A large proportion of the women 50% and 56% do not know that first pregnancy and pregnancies above five respectively are associated with increased risk for poor outcome, however most of the women (75%) are aware that lack of antenatal care can result in poor outcome for the mother and the baby. Table 5

Table 6 Responses on poor pregnancy outcomes

Poor pregnancy outcome	Yes (%)	No (%)	Don't know (%)
Low birth weight	96 (60.4)	21 (13.2)	44 (23.4)
Stillbirth	120 (75.9)	12 (7.6)	26 (16.5)
Neonatal death	107 (68.6)	10 (6.4)	39 (25)
Congenital Defects	108 (68.4)	8 (5.1)	42 (26.6)
Maternal Death	122 (77.2)	8 (5.1)	28 (17.7)

Table 6 showed knowledge of poor pregnancy outcomes among studied women; approximately 23% did not know that maternal death is a poor pregnancy outcome.

Table 7 Risk factors discussed by study participants

Risk factor	Frequency	%
HIV infection	12	7.5
Malaria infection	9	5.6
Low socio economic status	8	5
Poor nutrition	5	3.1
Maternal medical condition*	12	7.5
Lack of ANC	13	8.1
Social habit**	3	2
Strenuous exercise	3	2

*Maternal medical condition= Diabetes, sickle cell disease, Anaemia, Hypertension

** Social habits = cigarette smoking, use of alcohol during pregnancy

Majority of the subjects could not explain how at least one of these risks factor leads to poor pregnancy outcome. Sixty five (39%) of the pregnant women explained how these risk factors could lead to poor pregnancy outcome. One respondent talked about 4 risk factors, 6 respondents explained 2 of the risk factors while 57 talked about one risk factor each. Twelve of the women talked about the possibility of transmission of the HIV from an infected pregnant woman to her baby. Nine women talked about malaria infection could result in anaemia which could lead to foetal or maternal death. For those who do not attend ANC there will be no way of knowing if they have any condition that could lead to poor pregnancy outcomes. Table 7 show the risk factors the pregnant women explained.

4.2.1 Scoring and grading of knowledge

Scores were assigned to the responses in order to grade the knowledge of the pregnant women on risk factors of poor pregnancy outcomes. 'Yes' response scored 1 mark, while 'No' and 'Don't Know' response scored no mark. The correct responses for each respondent were summed up and the mean score for all respondents was calculated to be 15.7 ± 8.5.

Respondents were grouped into two groups based on their final score. Those with scores below the mean score were considered as having inadequate knowledge while those with scores equal or above mean score were said to have adequate knowledge of risks factors for poor pregnancy outcomes. Sixty three percent of respondents had adequate knowledge of risk factors for poor pregnancy outcomes.

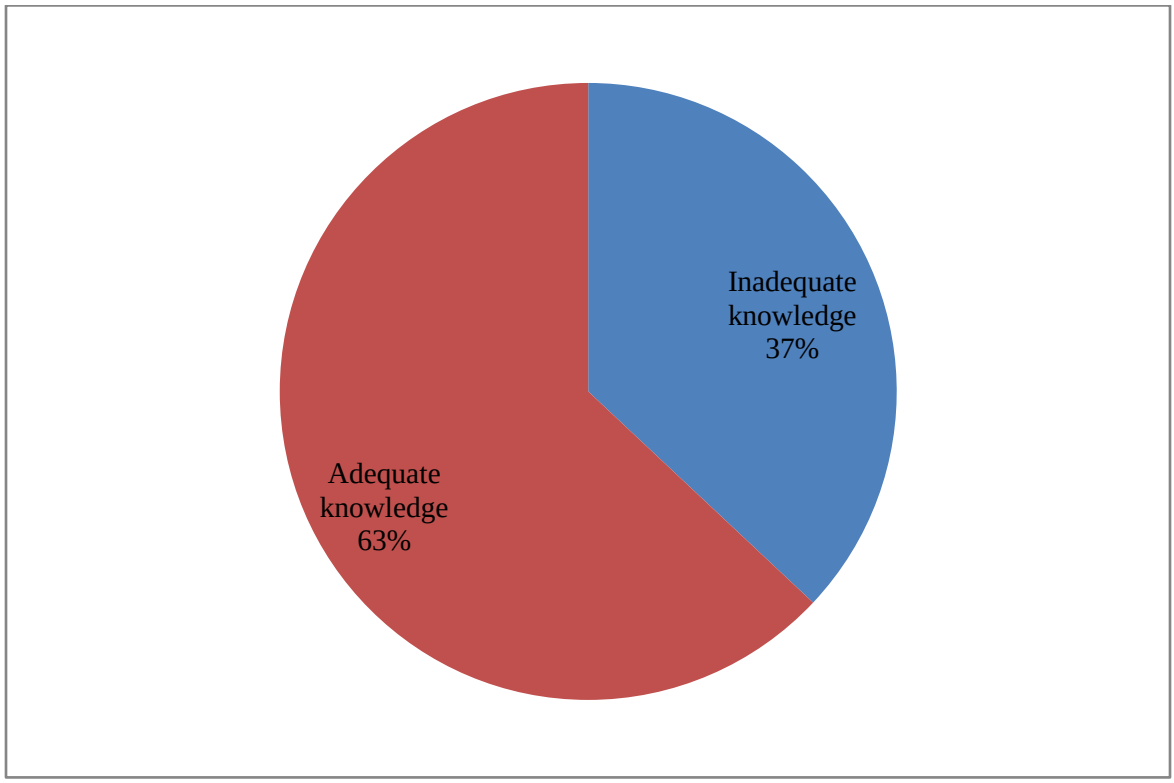


Figure 1 Distribution of respondents' level of knowledge of factors influencing pregnancy outcomes

Table 8 Relationship between maternal characteristics and knowledge of risk factors

Variables	Adequate Knowledge	Inadequate Knowledge	χ^2	P- Value
Parity				
1	15	25		
2 – 4	46	17		
>4	39	17	14.91	0.0006
Mother's age				
10 – 17	5	15		
18 – 35	81	42		
>35	14	2	16.92	0.0002
Mother Education				
None	32	24		
Arabic	18	17		
Primary	18	11		
Secondary	23	6		
Post Secondary	8	0	10.86	0.028

Table 8 shows the relationship between some maternal characteristics and level of knowledge of risk factors that could affect pregnancy adversely. Increasing maternal age, education and parity are independently statistically associated with adequate level of knowledge of risk factors.

4.3 Frequency of risk factors among the pregnant women

Table 9 Prevalence of risk factors among respondents

Characteristic		Frequency	Percent	95% CI lower, upper
Booking gestational age	1st trimester	6	4	1.46, 8.40
(n = 152)	2nd trimester	74	58	49.63, 65.85
	3rd trimester	55	38	30.41, 46.38
Inter pregnancy Interval (n = 97)	<18	22	22.7	14.8, 32.3
	18-24	28	28.9	20.1, 39.0
	>24	47	48.5	38.2, 58.8
Age of mother at marriage (n = 153)	<18	95	61.7	53.5, 69.4
	18 – 25	57	37	29.4, 45.2
	>25	2	1.3	0.16, 4.61
Maternal age	<18	20	12.5	7.81, 18.6
(n = 160)	18 – 35	124	77.5	70.2, 83.7
	>35	16	10	5.8, 15.7
HIV status	Reactive	3	1.9	0.4, 5.4
(n = 160)	Non reactive	157	98.1	94.6, 99.6
Haemoglobin conc.	< 11	26	28	19.1, 38.2
(n = 93)	> 11	67	72	61.8, 80.9
VDRL*	Positive	3	5.4	1.1, 14.9
(n = 56)	Negative	53	94.6	85.1, 98.9
Malaria Parasite	Positive	20	28.6	18.4, 40.6
(n = 70)	Negative	50	71.4	59.4, 81.6

*VDRL (Venereal disease research laboratory).

Table 9 summarizes the frequency of risk factors among studied subjects. Majority of the subjects 95 (62.1%) got married as teenagers. The median age at marriage was 16 (range 13-26 years). Most of the pregnant women (96%) began their antenatal care late. The median booking

gestation age was 24 weeks (range 12- 34 weeks); only 4 % of the studied women began the antenatal care in the first trimester. Median number of ANC visits among studied women was 2.5 (range 1 – 8). Majority of the women 47.5% had only one ANC visit. Twenty two (22.7%) of studied women had inter pregnancy interval below 18 months. The median inter pregnancy interval was 24.5 months (range 4-60 months). Only 8 (5.1%) of the subjects had medical conditions such as diabetes, hypertension and sickle cell disease. Six (3.8%) of the women were hypertensive. None of the studied women smoke cigarette or drink alcohol. Out of the 160 pregnant women, 15 (9.4%) had spouses who smoke cigarette. Three (20%, n=15) of these spouses smoke in indoor. The mean maternal height was 156.2 ± 7 centimetres. Majority of the women (77.2%) were above the 150 centimetres in height. The median Hb concentration for the studied women was 11.4 g/dl (range 6 – 14.3g/dl). Most of the studied women (72% n = 93) had Hb levels above 11 g/dl, 28% (n = 93) had Hb below 11 g/dl indicating anaemia in pregnancy.

Majority of the pregnant women (98.1%, n =160) had blood pressure below 140/90 mmHg (systolic/diastolic). The mean booking blood pressure was 107/68 ± 11mmHg. Only six of 160 studied women (3.8%) had elevated blood pressure above 140/90mmHg. None of the women was diabetic. A few of the women had glucose in their urine but blood glucose test was within normal limit.

Most of the pregnant women were given free insecticides treated mosquito nets and Sulfadoxine pyrimethamine was administered to most of the pregnant women at least once during their ANC as IPT (Intermittent preventive treatment) for malaria. Women who developed malaria were given a full course of treatment. Iron tables were also given to all pregnant women free to build up their iron level and prevent anaemia in pregnancy.

4.3.1 Previous pregnancy outcomes

Twenty six percent of study women had no previous birth (primigravidas). The proportion of women of parity 5 or more constitutes 35% of study women while those with 2nd to 4th pregnancy constitute 39% of the study women. The median parity was 3 (range 0 -14). Excluding women who had no previous birth, 38% had an abortion in a previous pregnancy while 18% had a still birth.

4.4 Pregnancy outcomes

Of the 160 women observed information on place of delivery and outcome of pregnancy was obtained for 147 women about 92 % of the total women in this study.

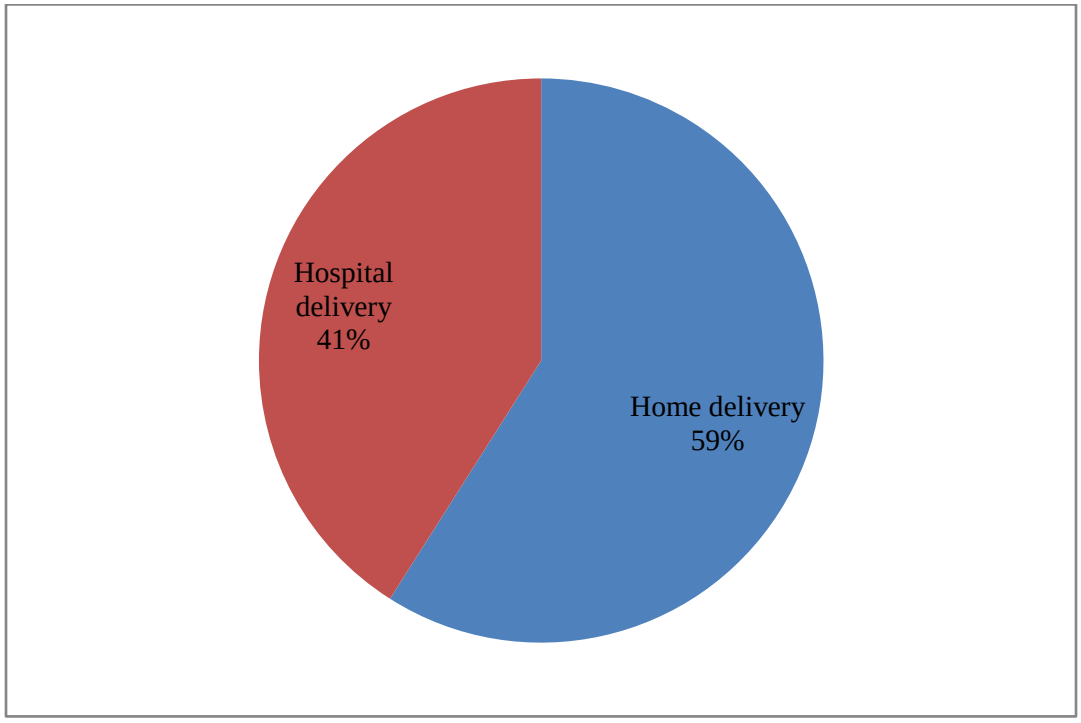


Figure 2 Place of delivery of respondents

Among the 147 women who gave birth, 58.5% had home delivery, while 41.5% delivered in the health facility Figure 2

Table 10 Pregnancy outcomes among study women

Variable		Frequency	Percent
Delivery GA	< 37 weeks	10	15
(n = 67)	> 37 weeks	57	85
Singleton/multiple	Singleton	144	98
	Multiple	3	2
Sex of baby	Male	82	55.7
(n =150)	Female	68	45.3
Birth weight	< 2500g	7	11.6
(n = 60)	2500 – 3999g	54	86.7
	4000g and above	1	1.7
Outcome of pregnancy	Alive	144	95.1
(n = 150)	Stillbirth	3	2.0
	Early neonatal death	2	1.4
	Abortion	1	0.7

Average gestation age at delivery was 37 ± 2 weeks. The median birth weight of babies delivered in the health facilities was 3000g (range 1800 – 4000g). Mean birth weight for female babies was 2968 ± 428g while that for male babies was 2994 ± 458g. Table 10. Majority of the women had a normal spontaneous vaginal delivery, only one woman had caesarean section due to obstruction.

Table 11 Relationship between risk factors, low birth weight and peri-natal mortality

Variable	Low birth weight	Normal birth weight	χ^2	P – Value
GA < 37 weeks	4	5		
GA > 37 weeks	2	47	13.36	0.002
Maternal Age				
< 18, > 35 years	3	15		
18 – 35 years	4	38	0.62	0.23
Maternal Age	Peri-natal death	Alive		
< 18, > 35 years	3	26		
18 – 35 years	3	115	3.62	0.03
HIV status				
Positive	1	2		
Negative	5	139	6.65	0.005

Table 11 shows the relationship between pregnancy outcomes and risk factors for poor pregnancy outcomes. The incidence of low birth weight among babies delivered in the health facilities for whom birth weight were measured was 11.6% (n = 67). Low birth weight was significantly associated with Preterm delivery. There was one abortion, 3 fresh stillbirths and 2 early neonatal deaths. PMR was 5/ 140 x 1000 = 35.7/ 1000 live births. No maternal death was recorded. Perinatal mortality was significantly associated with extreme of maternal age and HIV positive status.

Table 12 Relationship between maternal characteristics and place of delivery

Variable	Hospital	Home	χ^2	P – value
Parity				
1	17	17		
2 – 4	21	42		
5+	23	27	3.16	0.206
Mothers age				
< 18	9	7		
18 – 35	41	77		
> 35	11	2	13.61	0.001
Mothers Education				
None	5	25		
Arabic	23	28		
Primary	9	19		
Secondary	16	12		
Tertiary	7	1	18.71	0.001
Husbands education				
None	3	15		
Arabic	13	19		
Primary	4	11		
Secondary	18	31		
Tertiary	19	9	14.45	0.006
Family setting				
Monogamous	37	32		
Polygamous	23	54	8.48	0.002
Time to reach HF				
<. 30 minutes	50	62		
30 – 60 minutes	10	21	1.53	0.11

Table 12 shows relationship between maternal socio demographic characteristics and place of delivery. Increasing maternal age, maternal education, spouse education level and being in a monogamous family setting were associated with delivery at the health facility.

4.5 Knowledge, attitude and practice of modern contraception methods among subjects

Table 13 Knowledge of contraception and contraceptive practice among respondents

Variable	Frequency	Percent	95% CI, lower, upper
Knowledge of contraception			
Yes	114	73.1	65.4, 79.9
No	42	26.9	201., 34.6
Contraception utilization			
Used Before	20	17.7	11.1, 26.0
Currently using	12	10.6	5.6, 17.8
Never used	81	71.7	62.4, 79.8

One hundred and fourteen (73.1%) of the subjects knew about modern contraception, 28% of these have used a method of modern contraception. Among those who have practice contraception, approximately 11 % were using contraception before the index pregnancy. In addition 16% of the study women were using the natural method of contraception like lactation amaenorrhoea, withdrawal and the calendar method Table 14.

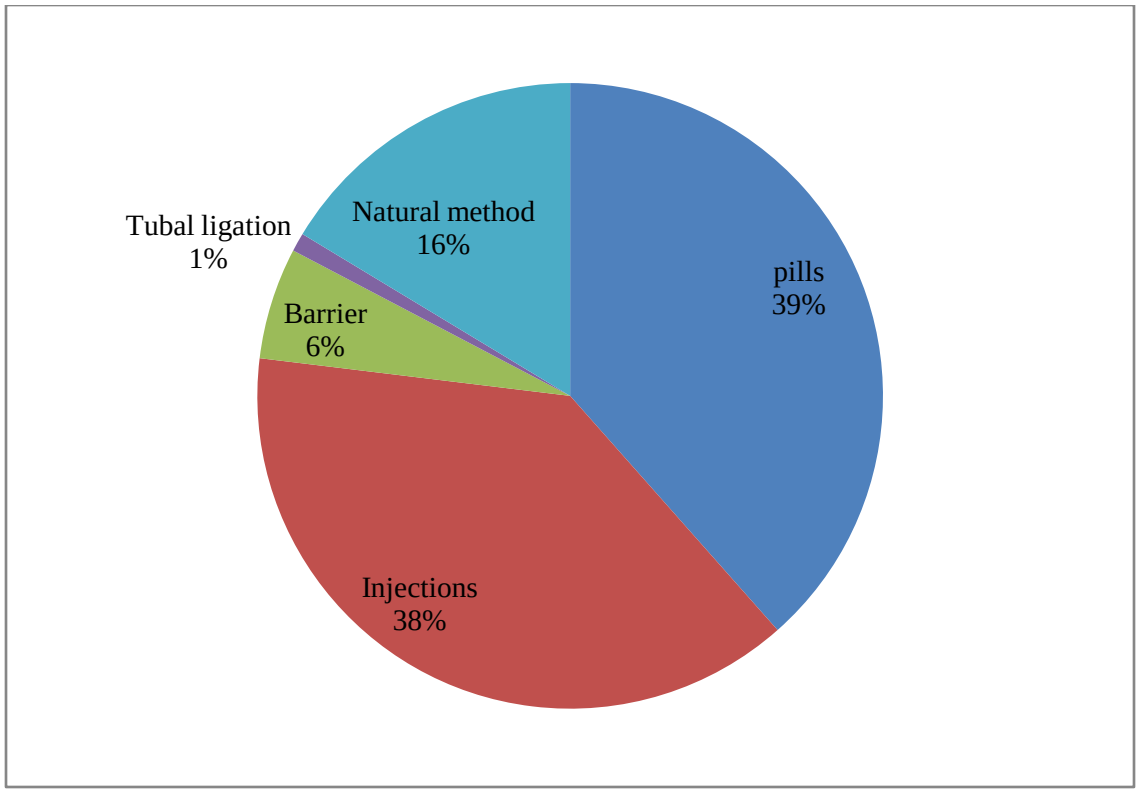


Figure 3 Respondents knowledge of contraception methods

The oral pills 39% and injections 38% are the commonest methods of contraception known among the respondents. Figure 3

4.5.1 Reasons for non utilization of modern contraception

Some of the reasons for not using contraception among the studied women who have never used modern contraception are shown in figure 4.

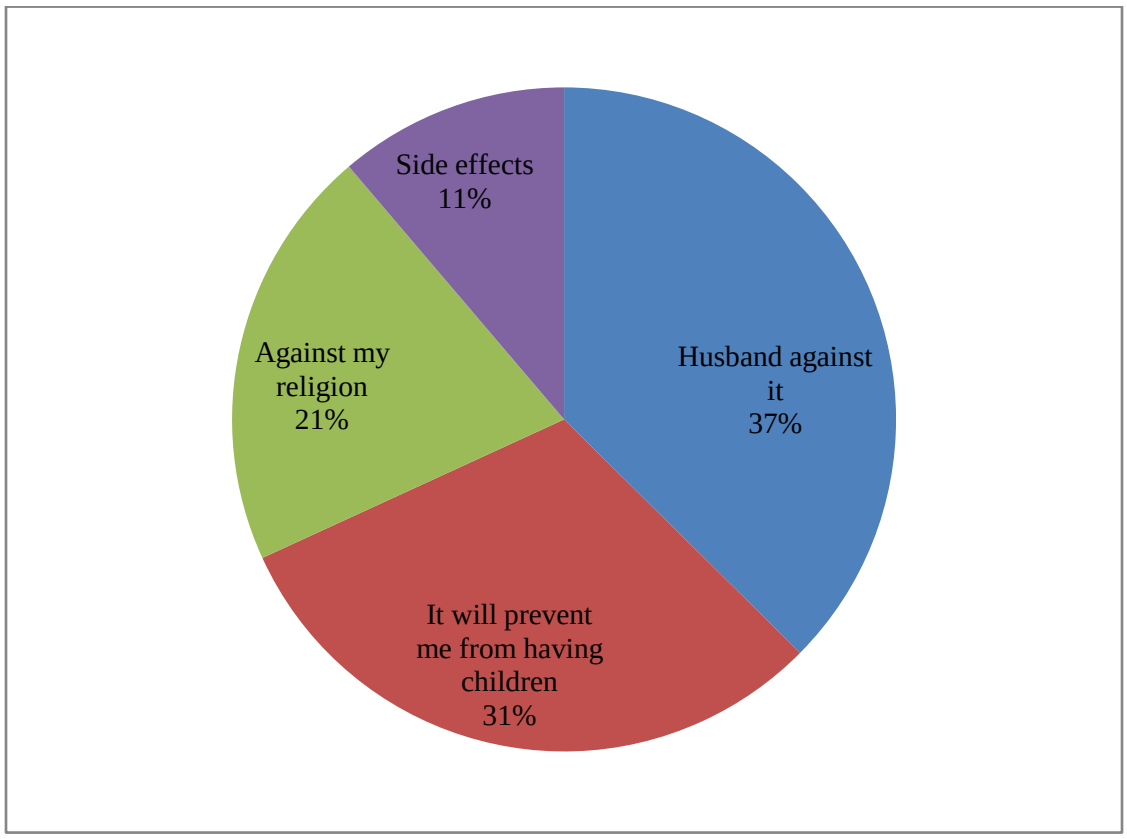


Figure 4 Reasons for not utilizing modern contraception

Thirty seven percent (37%, n = 54) said their spouses are against the use of modern contraception while 30.4% said that it will prevent them from having children. Figure 4

4.6 Accessibility to antenatal care and delivery services

Table 14 Accessibility of ANC and delivery centres

Variable	Frequency	Percent	95 % CI, lower, upper
Means of transport			
Walk	28	18	12.3, 24.9
Motorcycle	81	51.9	43.8, 60.0
Car	47	30.1	23.1, 38.0
Time taken reach to clinic			
Less than 30 minutes	114	74.5	66.8, 81.2
1 hour	33	21.6	15.3, 28.9
Above 1 hr	6	3.92	1.5, 8.3
Cost of transport			
< N 100	94	72.2	63.0, 79.1
N 100 – 200	25	19.3	12.9, 27.1
> N 200	11	8.5	4.3, 14.6
Waiting time at clinic			
1 hour	24	15.8	10.4, 22.6
1 – 2 hours	89	58.6	50.3, 66.5
3 – 4 hours	31	20.4	14.2, 27.7
>4 hours	8	5.2	2.3, 10.1

Majority of the subjects 114 (74.5%) live within less than 30 minutes from the health facility offering antenatal and delivery services, and it cost less than N100 ($0.6) to transport to and fro the health facilities for 71.5% of the studied subjects, Table15.

5 CHAPTER FIVE: - DISCUSSION

The mean knowledge score on risk factors for poor pregnancy outcomes among studied women was 15.7 ± 8.5. (Total score = 25) Majority of the study women (62.5%) had a score equal to or above the mean score indicating adequate knowledge of risks factors that could adversely affect pregnancy outcomes lower than what was reported in a study in Tanzania[14]. However only 39% of entire women could attempt to explained how at least one of the risk factors could lead to poor outcomes. Similar finding was reported in a study in Tanzania[14]. About 5.6% of the women said malaria infection could lead to aneamia which could lead to foetal or maternal death; 7.5% said those who are HIV positive could transmit the virus to their baby especially if they did not attend antenatal care and are not on antiretroviral treatment. The importance of attending ANC in order to identify mothers with some risks factors like high blood pressure, anaemia in pregnancy, and other dangers signs during pregnancy for prompt treatment to avert these poor outcomes was mentioned by only 8% of the women studied. Other risk factors identified include Low socio economic factor which is believed to be the most important risk factor among all since those who are of low socio economic status cannot afford to pay for ANC services and proper nutrition and care of the mother during pregnancy. Young maternal age can result in difficult deliveries and VVF (Vesico-vaginal fistula). Some maternal characteristics such as mothers educational level (χ^2 = 10.86, P = 0.028), mothers age (χ^2 =16.92, P = 0.0002) and Parity (χ^2 = 14.91, P = 0.0006) were statistically associated with the women's level of knowledge of the risk factors. However no association was found between father's educational level and mother's level of knowledge of these risk factors.

Higher poor pregnancy outcomes such as maternal and neonatal/perinatal mortality have been observed among mothers who deliver at extreme of age (< 15 and >35 years) as they are more likely to have complications during pregnancy and delivery that affects them and their babies compared to women of ages between 18 and 35 years. A study in India reports that adolescent pregnancy contributes to 19% of total fertility and records the highest maternal mortality and an important determinant to poor pregnancy outcomes, with low birth weight being the major adverse outcome for the infant and an important determinant of child mortality[33].

The proportion of teenage mothers in this study was 12. 5%. this is higher than 6.8% reported from the studies in Niger delta[34], 2.8% in Ibadan[35] and 10% in Ile Ife Osun state[36], lower than 19% reported in a study in India[37] but similar to the global prevalence of teenage pregnancies [38]. About 7.5% of these teenagers are below 15years.

Marriage at an early age often means children giving birth to children. Furthermore, women who marry at very young age are more likely, to have their first child earlier and give birth to more children overall, contributing to higher fertility rates. Most of the women (62 %) in this study got married before the age of 18. This finding is higher than 46% reported in the NDHS 2008[7] and 40% reported in the MICS (Multiple indicators cluster survey) 2007

The MICS 2007 indicates that 15% of women are married before the age of 15; nearly 40% are married before the age of 18.5 years. These findings corroborate the figures from the 2008 NDHS, which showed that nearly half (46%) of women aged 20–49 had been married by the age of 18, and 58% by the age of 20[7].

This study found the proportion of women with at least primary school education 42.1% compared with 60.4% among males. This figure is lower than 57% and 75% for female and male level of literacy reported by the NBS (National Bureau of Statistics)[39] and 54% reported by

NDHS 2008 but higher than the figure (21%) reported for the north west geopolitical region[7]. The mother's level of education was also found to be associated with her knowledge and understanding of risk factors for poor pregnancy outcomes, and having hospital delivery, similar to the report in another study[35]. A woman's education is one of the most important predictor of poor pregnancy outcomes[7] The higher a woman's level of education, the more likely it is that she will marry later, use contraception, utilize health services, recognize danger signs in the newborn and play a greater role in reproductive health decision-making. Furthermore, female education has an impact on survival both as a direct determinant of behaviour and indirectly as it affects cultural attitudes and gender issues.

In this study only 4% of the women started ANC during the first trimester of pregnancy, lower than the finding (17.4%) in the study in Ibadan[27] and (21%) in Ile Ife Osun state[36]. Proportion of women who booked in the second and third trimesters was 96% which is higher than the finding 82.6% in Ibadan Nigeria[27] 79% in Ile Ife [36] and 53% reported in a study in Northern Nigeria. The mean booking gestation age in our study was 24.7 ± 5.3 weeks similar to what was reported in Sokoto (23.5 ± 6 weeks) [40], but higher than the finding in Ibadan 20.3 ± 6.2weeks[27], this may be due to traditional practice of late booking in this environment due to the belief that pregnancy is not a diseased condition and only the sick people need visit the hospital, thus reason for indifference to early booking. Majority (45%) of the women in our study had only one ANC visit, only 17% had four or more visit with a median number of visit of 2.5 (range 1 – 8). The study in Ile Ife reported a higher proportion (76%) of women with four or more visit[36]. The importance of early and adequate visits to antenatal care is not clearly understood by women which may be due to the wrong perception they have about antenatal care as a consequence of low level of education. Studies have shown association between early booking and adequate

antenatal care visits with women who have higher education[35]. Furthermore, most women in this study attend ANC late and make just a single visit, so should in case they have difficulty delivering at home or develop complications and present to the hospital they would not be classified as not having attended ANC and not be treated as such. Pregnant women are expected to attend at least four antenatal visits throughout pregnancy during which they should receive evidence-based examinations and screenings; a package referred to as focused ANC. Attending ANC at the early stages of pregnancy is important as this will ensure that women who need early interventions benefit from it.

The content of ANC is an essential component of the quality of services. Focused ANC hinges on the principle that every pregnancy is at risk of complications and should be monitored. In this study all the studied women had their weight measured, blood pressure taken and were counseled and screened for HIV. Fifty four percent (54%), 35% and 44% of the women had blood sample taken to detect haemoglobin level, syphilis and malaria parasite screening respectively. This finding is higher than the finding in Kenya[15] but lower than what was reported in the national survey[7] According to NDHS 2008, 87% of Nigerian mothers who attend ANC have their weight measured, 85% have a blood pressure taken and 74% have a blood sample taken. Three-quarters have a urine sample taken, 54% receive iron tablets, and 61% are informed of signs of pregnancy complications[7]. Blood testing is often incomplete, as it only detects levels of haemoglobin and does not routinely include tests for syphilis screening. The lower proportion of women who had blood screening in our study is largely due to the fact that the respondents cannot afford to pay the fee charged for these laboratory services due to low socio economic status. Therefore a large number could go through pregnancy with any of these risks factors undetected and may result in poor outcome affecting the mother or baby.

Only 70 (44%) of the total studied women were screened for malaria parasite, 28% of this had malaria parasiteamia, lower than the prevalence of malaria parasiteamia reported studies in Kano 39% and Lagos state 60% [28,41]. The low prevalence in our study could be due to the low number of women screened. Those who had clinical malaria were treated with a full course of anti malaria. Majority of the women had at least a single dose of sulphadoxine pyrimethamine as IPT. All the pregnant women in this study were counseled and screened for HIV, and the prevalence was 1.9%, similar to the prevalence in Katsina, lower than the prevalence in Lagos but higher than the finding in Kebbi state[42]. All HIV positive women in this study were enrolled in the PMTCT (Prevention of maternal to child transmission of HIV) with triple antiretroviral regimen. Pregnant women with HIV are at an increased risk of intrapartum and postpartum complications. This study found a significant association between HIV and neonatal (Perinatal) mortality, other studies have reported similar findings[43].

Among the 56 (35%) of studied women screened for syphilis 5.6% were positive for syphilis using the Rapid test kit, however these screening test results were not subjected to a confirmatory test such so might appear higher than what other studies have reported[44–46]. Another possible explanation to the high prevalence in this study could be the number of women screened, because it is small compared to number in other reported studies[44–46].

In this study the proportion of home deliveries was 58.5% lower than what has been reported in the NDHS 2008, but higher than (31.5%) reported in study at a teaching hospital in Sokoto, Nigeria[47]. The lower rate in our study compared to the NDHS 2008 could be because this study was conducted among those who attended ANC. The proportion of home deliveries could have been higher if all pregnant women (those attending ANC and those not attending) were studied together. The 2008 NDHS reports that approximately two thirds of all births take place at home

while the remaining third take place in a health facility. The same survey shows that the rate of home deliveries has increased in all the zones of the country, with the North West recording a rate as high as 90% versus 89% in 2003; while home births in the South East increased from 13% in 2003 to 21% in 2008[7,48]. Women who are giving birth to their first baby are more likely than other women to deliver in a health facility; the proportion of facility deliveries decreases sharply as birth order increases. Further, women with more than secondary education are nine times more likely to deliver in a health facility (90%) compared with women with no education (10%)[7].

Findings of survey on safe motherhood in two northern states provide some insight into why home births are so prevalent[49]. Women list several reasons for not delivering in a healthcare facility, including that their husband/family say it is unnecessary (34%). Women also listed having no time to go, the facility being too far or too expensive as reasons for giving birth at home[49]. In our study we found high mother's education status (χ^2 =18.71 P =0.001), high education level of spouse (χ^2 =14.45, P =0.006), being in a monogamous family setup, (χ^2 = 8.48, P = 0.002) and high maternal age (χ^2 = 13.61, P = 0.001) to be significantly associated with hospital delivery. Maternal parity and distance to the health facility had no significant association with hospital delivery (χ^2 = 3.16, P = 0.206) and (χ^2 = 1.53, P = 0.11). A study in Sokoto also reported similar finding between mother's educational level and hospital delivery but unlike our finding higher maternal parity and previous home delivery was associated with home delivery[47], the high level of home deliveries in our study might have economic and cultural basis; culturally it is considered a thing of pride and a demonstration of the strength of a woman in this environment to have a home delivery and more so unsupervised. Economically especially in a polygamous setting, the pregnant woman would not want to be seen as the one incurring medical

expenses for her husband already small income, especially if other woman have had a successful home delivery. The perception that only pregnant women with problems deliver in the hospital could be another reasons. Some of the women come at near term or even at term and once the ANC care provider informs them that there are no problems and the baby is presenting the way it should; cephalic, that assurance that they are in good condition becomes a license or permission to have home delivery. The attitude of some health care providers could also be a reason adduce to home deliveries in this environment; out of stress on the health care provider resulting from overwhelming responsibility at work, the assuring and tender care that normally should be given to the pregnant woman in labour is replaced with screams and sometimes threat to the laboring woman, hence the preference sometimes to home deliveries rather than delivery in the health care facility.

The term 'skilled attendant' refers to caregivers with midwifery skills, including doctors, nurses and midwives (this definition excludes TBA (Traditional birth attendants)). The level of assistance that a woman receives during childbirth is a strong determinant of the overall outcome for her and her newborn. The presence of a skilled attendant during birth is therefore imperative.

About 58 women representing 44% of deliveries in our study was conducted by trained midwives and CHEW (Community health extension workers) and can therefore be said to have had skilled attendant. This finding is higher than the findings of 13% in a study in Afghanistan[50], 35% and 39% from the 2003 and 2008 NDHS respectively[7,48] but similar to the report (44%) of the MICS 2007.

Low birth weight incidence in this study based on the available birth weight from hospital delivery was 11.6% (95% CI= 4.8, 22.7) it was lower than the 12.7% incidence reported in a study in Jos, Plateau state[51] but similar to the incidence reported in Tanzania 11.7%[14]. Maternal

characteristics influence pregnancy outcomes. Extreme of maternal age has long been associated with increased risk for poor pregnancy outcomes. The proportion of mothers within these ages in this study was 22.5% (12.5% and 10% for below 18 years and above 35 years respectively) although this study did not find an association between low birth weight and extreme of maternal age (χ^2 = 0.62, P = 0.23) other studies conducted in Ilorin Nigeria and Iran [17,18] have reported significant association. The finding in our study might be due to the low number of birth weight recorded as most of the study participants delivered at home and the birth weight of their babies could not be measured. Low birth weight was significantly associated with Preterm delivery i.e. delivery gestational age before 37 weeks (χ^2 = 13.36, P= 0.002). Several studies have reported similar findings.

There were two early neonatal deaths (within 24 hrs) and three stillbirth delivery. The perinatal mortality rate was 34/1000 live births in this study, higher than the estimate for the African region and the finding in Vietnam[52,53]. This finding could be attributed to the slightly increase hospital delivery and availability of skilled attendants at birth through the midwives service scheme. However this decline should not be taken as a general decline in perinatal mortality in the area because of the high number of unbooked unsupervised home deliveries. This study finds association between extreme of maternal age and perinatal mortality. (χ^2 = 3.62 P = 0.03) similar findings have been reported in other studies[37]. The neonatal mortality rate in this studies was 14/1000 live births higher than the report in Vietnam[53]

6 CHAPTER SIX - CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Most women (62%) attending antenatal care have adequate knowledge of factors that influence pregnancy outcomes, the level of knowledge is related to the mother's level of education, increasing age and parity. The prevalent factors that could adversely affect pregnancy outcome in the area are early marriage with associated teenage pregnancy and delivery, low socioeconomic status, high maternal parity, inadequate antenatal care and unsupervised home deliveries while those that could lead to good outcomes are good social practices such no consumption of alcohol or cigarette smoking, good birth spacing, being married, and low prevalence of medical conditions such as hypertension, diabetes and HIV. The prevalence of low birth weight was 11.7%, the perinatal mortality rate was 34/ 1000 total births and neonatal mortality rate was 14/ 1000 live births. Low birth weight was associated with preterm delivery while perinatal and neonatal mortality was associated with extreme of maternal age and HIV positive status respectively.

6.2 Recommendation

1. Knowledge about risk factors for poor pregnancy outcomes should be widely disseminated to pregnant women, their families and the community at large by the LGA with support from the state government. Behavior-change communication strategies would facilitate any new way of providing antenatal care maternity services or demand-side subsidies by increasing awareness and demand for safe care during delivery. Radio and television messages can provide channels for mass communications and have the better chance of reaching the most remote people. It may provide an avenue to ensure that pregnant women have skilled attendant at delivery and also access to support and services for all routine as well as emergency care during pregnancy, delivery and post partum.
2. Educational programs should be put in place by the local and state government to ensure the girl child is enrolled and retained in school to at least completion of senior secondary school.
3. Interpersonal skills and communication strategies capacity building for the health workers could facilitate improvement in the quality of care to the pregnant woman especially during labour, and could improve the proportion of hospital delivery.
4. Women empowerment through gainful employment, vocational training and provision of a micro credit facility to reduce their dependence on their spouses.
5. Increased political will and commitment through a health insurance policy at the state and local government levels similar to the NHIS, to make healthcare services available and accessible to all irrespective of economic or social status.

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Appendix 1

Appendix 1: participants information/Consent form (English version)

Title: Determinants of poor pregnancy outcomes among pregnant women attending antenatal clinic in Birnin Gwari LGA.

Principal Investigator: Dr. Abbott Samuel Luka, MPH student of community health department, Faculty of Medicine Ahmadu Bello University Zaria.

Supervisors: Dr A U Shehu and Dr M N Sambo of the department of community medicine, faculty of Medicine Ahmadu Bello University Zaria.

Purpose of research: The purpose of this study is to help Kaduna state and Birnin Gwari local government particularly understand the risks factors affecting poor pregnancy outcomes and make recommendations for planning and implementing appropriate interventions to curb the high maternal and perinatal/neonatal deaths.

Procedure of the research: We will investigate the knowledge and attitudes of pregnant women on the risk factors that adversely affect pregnancy outcomes. We will interview pregnant women in selected health facility in five wards of the LGA and follow them up to delivery and early peuperium. There are five sections to our questionnaire; we will administer sections 1, 2 and 3 at booking visit section 4 during subsequent visits and section 5 at delivery. We will also assess antenatal care services rendered during the period of pregnancy. We are requesting that you participate in a study that will span through you pregnancy period and early peuperium. During the interview, our researchers will ask questions on the knowledge and attitudes relating to risks factors that adversely affect poor pregnancy outcome in your community.

Expected duration of research and of your participation: In total, we expect you to be in the study from the time of your enrolment until delivery. The study itself will go on for the next 6 month as we plan to follow up each participant to delivery.

Risks: We do not anticipate or expect any physical risks to you because of participation in this research study. We are asking non-sensitive questions about risk factors that adversely affects pregnancy outcomes in the context of the socio-demographic, knowledge and attitude, anthropometric and biomedical information. There is an unlikely risk of potential breach of

confidentiality but we will do all we can to minimize this risk. First, our researches are well trained to avoid such confidentiality breaches; second, we will not collect your names, so your responses cannot be traced back to you. In analyzing our data, we will track information only with codes and will store data collection tools securely.

Costs of participation: Your participation in this research will not cost you anything beyond the time you spend attending antenatal care kabour and delivery.

Benefits of the study: This proposed study will reveal the risk factors for poor pregnancy outcome and their prevalence in your community. What we learn from this study will help Kaduna state and Birnin Gwari local governments plan and implement better strategies that will help reduce maternal and perinatal/neonatal mortality. Another use of the study findings will be to inform other organization on how best to support maternal and child health programs in Birnin Gwari LGA.

Confidentiality: All information collected in this study will be treated with utmost confidentiality. We will track information with assigned code numbers and no name will be recorded. This cannot be linked to you in anyway and your name or any identifier will not be used in any publication or reports from this study. As part of our responsibility to conduct this research properly, officials from institutional review board, Ahmadu Bello Zaria and Kaduna state Ministry of Health may have access to these records.

Voluntariness: Participation is absolutely by choice and there will be no consequence for you if you decide not to participate in the study. If you are receiving care at a facility, your care will not be affected in anyway by your decision or refusal to participate in this study.

Alternatives to participation: There is no alternative procedure for non-participants. People who consent to participate will be asked questions and follow up until delivery and peuperium.

Inducement: There will be no payment or compensation for participating in this research study.

Withdrawal from study: You can choose to withdraw from the study at any time without any consequence to you. Please note that some of the information that has been obtained about you before you chose to withdraw may still be modified or used in reports and publications. However

the researchers promise to work hard to comply with your wishes as much as is practicable. Should you decide to not continue, please just inform the researchers.

After the study: During and after the study, interim and final results will be made available through the health facilities in your community. Printed summaries of results will be made available at each participating health facility.

Conflict of interest: The researchers have no commercial interest in this study. We are not aware of any other information that may cause the researchers to do their work with fear or favor.

Statement of person obtaining informed consent:

I have fully explained this research to _____ and have given sufficient information, including information about risks and benefits, to make an informed decision.

DATE: _____ SIGNATURE: _____

NAME: _____

xviii. Statement of person giving consent:

I have read the description of the research or have had it translated into a language I understand. I have also talked it over with the interviewer to my satisfaction. I understand that my participation is voluntary. I know enough about the purpose, methods, risks and benefits of the research study to judge that I want to take part in it. I understand that I may freely stop being part of this study at any time. I have received a copy of this consent form to keep for myself.

DATE: _____ SIGNATURE: _____

NAME: _____

WITNESS' SIGNATURE (if applicable): _____

WITNESS' NAME (if applicable): _____

xix. Contact information: If you have any questions, need clarifications or have any complaints regarding this study, please contact the Principal Investigator at the address below:

Dr Abbott Samuel Luka

Department of Community Medicine,

Faculty of Medicine,

Ahmadu Bello University Zaria.

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Dr. A U Shehu

Department of Community Medicine,

Faculty of Medicine,

Ahmadu Bello University Zaria.

Cell Phone number: 0803 701 9753

PLEASE KEEP A COPY OF THE SIGNED INFORMED CONSENT

Appendix 2

participant information (Hausa version)

Sashen Kula da Lafiyar Al'umma, Jami'ar Ahmadu Bello, Zaria

Bincike abubuwan da ke jawo matsalloli lokacin juna biyu, ko wajen nakuda da hawuwa, da kuma locacin jego tsakanin akasarin mata da ke da juna biyu sunna zuwa awo a asibiti cikin karamar hukumar Birnin Gwari ta Jihar Kaduna.

Zuwa Ga Masu amsa Tambaya na cikin Bincike,

Ina yin wannan bincike ne don gano abubuwan da ke sanadiyar matsalloli ga mace mai juna biyu ko dan dad aka haifa a karamar hukumar Birnin Gwari, jihar Kaduna.

Kina da dammar ki shiga ko kar ki shiga wannan bincike, amma zamu yi matukar farinciki idan ki ka shiga cikin wannan bincike saboda bada hadin kan ki zai taimaka wajen fahintar matsaloli da samar da bayanai masu muhimmanci wadanda zasu taimaka kwarai wajen samar da tsari wanda zai taimaka wajen shawo kan matsalolin da ake samu a karamar Hukumar Birnin Gwari, jihar Kaduna.

Idan kin amince, zan yi miki wasu 'yan tambayoyi yanzu wanda za su iya kaiwa tsawon mintota talatin, bayan haka za mu chi gaba da lura da abubuwan dasu ka gudana har locakin da ki ka haifu da kuma locakin jego

Idan kin aminta ba da tilastawa ba za ki ba da bayanai ga rangadin binciken da muke yi domin neman bayani a gareki

Eh na amince ☐ **Aa ban amince ba** ☐

Idan ki amince:

Suna……

Ka sa hannu ko ka dangwala babban dan yatsa na dama anan/kwanan wata ……

Shaida:

Suna……

Sa hannu da kwanan wata…….

Appendix 3

Data tool

Questionnaire number_____ Contact phone number_____

Section A: Socio-demographic characteristics

1. Mother's age (years)_____ Birth date ____/___/_____
2. Marital status single [ ] Married [ ] divorced [ ]
3. Month and year of marriage _____/____/_____
4. Family setting Monogamous [ ] Polygamous [ ]
5. Religion Islam [ ] Christian [ ] others [ ]
6. Tribe Hausa [ ] Fulani [ ] Gwari [ ] Kamuku [ ] others [ ]
7. Mother's education level None [ ] Primary [ ] secondary [ ] tertiary [ ] Islamic [ ]
8. Mother's occupation House wife [ ] gainfully employed [ ] self-employed [ ] business [ ]
9. If employed how much do you earn per month less than N5000 [ ] N5000-10000 [ ] above N10 000 [ ]
10. Husbands Education status None [ ] primary [ ] Secondary [ ] tertiary [ ] Islamic [ ]
11. Husband's occupation employed for wage [ ] Farmer [ ] Business [ ] not gainfully employed
12. How much do you earn per month less than N5000 [ ] N5000-10000 [ ] above N10 000 [ ]
13. Does your husband smoke cigarette Yes [ ] No [ ]

14. If yes, does he smoke cigarette in the house? Yes [ ] No [ ]

15. Do you smoke cigarette Yes [ ] No [ ]

16. Do you drink alcoholic beverages Yes [ ] No [ ]

If yes amount per day

Section B Obstetrics/medical History

17. Total number of pregnancies including miscarriages (Parity)_____

18. Have you had any miscarriages (spontaneous abortion)? Yes [ ] No [ ]

If yes, how many times _____

19. How old was the pregnancy when you had the miscarriage? _____

20. Have you had any delivery of a death baby or a child that died in the first month of life? Yes [ ] No [ ] (Pls specify)

21. How old is your last child (months)_____ (if first pregnancy skip this question)

22. Do you have a personal medical history of;

High blood pressure	No	Yes	Heart disease	No	Yes
Breathing or respiratory problems	No	Yes	Seizure or Epilepsy	No	Yes
Diabetes or gestational diabetes	No	Yes	Kidney disease	No	Yes
Sickle cell disease	No	Yes			

Section C: Knowledge of risk factors and poor pregnancy outcomes

23. Poor pregnancy outcomes include

A baby whose weight is low at birth Yes [ ] No [ ] I don't know [ ]

Baby born death Yes [ ] No [ ] I don't know [ ]

Baby that died in the first month of life Yes [ ] No [ ] I don't know [ ]

Baby born with some defects Yes [ ] No [ ] I don't know [ ]

Death of a women while she is pregnant, during labour and delivery or within forty days after giving birth Yes [ ] No [ ] I don't know [ ]

24. (Risk factors) things that can lead to poor pregnancy outcomes include

A woman who is too young (< 15yrs) or old (> 35yrs) Yes [ ] No [ ] I don't know [ ]

A woman who is not tall Yes [ ] No [ ] I don't know [ ]

A woman who has low body weight before she becomes pregnant Yes [ ] No [ ] I don't know [ ]

A woman who does not eat good food during pregnancy Yes [ ] No [ ] I don't know [ ]

Poor spacing of pregnancy Yes [ ] No [ ] I don't know [ ]

A woman carrying her first pregnancy Yes [ ] No [ ] I don't know [ ]

A woman who has had five or more pregnancy Yes [ ] No [ ] I don't know [ ]

Pregnant woman who has

High blood pressure Yes [ ] No [ ] I don't know [ ]

Diabetes Yes [ ] No [ ] I don't know [ ]

Sickle cell disease Yes [ ] No [ ] I don't know [ ]

Heart disease Yes [ ] No [ ] I don't know [ ]

Kidney diseases Yes [ ] No [ ] I don't know [ ]

Malaria in pregnancy

Urinary Tract Infection Yes [ ] No [ ] I don't know [ ]

Pelvic Inflammatory Disease Yes [ ] No [ ] I don't know [ ]

HIV/AIDS Yes [ ] No [ ] I don't know [ ]

Low blood level during pregnancy Yes [ ] No [ ] I don't know [ ]

A woman who smokes cigarette while pregnant Yes [ ] No [ ] I don't know [ ]

A woman who drinks alcohol while pregnant Yes [ ] No [ ] I don't know [ ]

Low socio-economic status Yes [ ] No [ ] I don't know [ ]

A woman who did not attend antenatal care Yes [ ] No [ ] I don't know [ ]

25. Explain briefly how any of these risk factors lead to poor pregnancy outcome.

_____

_____

_____

_____

26. Where did you get information on pregnancy risk factors from?

Friends [ ] Health workers [ ] mass media [ ] Husband [ ] parents [ ] in-laws [ ] others [ ]

27. Have you heard about contraception (family planning)? Yes [ ] No [ ]

28. What method(s) of contraception do you know Natural method [ ] Barrier method (male and female condom) [ ] Oral Pills [ ] Injection [ ] Norplant [ ]

29. Where did you get information on contraception (family planning)? Radio/Television [ ] Husband [ ] Health workers [ ] Parents [ ] friend [ ]

30. Do you approve of contraception (family planning)? Yes I approve [ ] No I Do not approve [ ] Undecided [ ]

31. Before you got pregnant where you using any form of contraception? I was Using [ ] I have used before [ ] I have never used family planning [ ]

32. Where you satisfied with the method you used? Yes [ ] No [ ]

33. If no why where you not satisfied? Not easy to use [ ] causes discomfort [ ] side effect [ ] it failed me [ ]

34. What are your reasons for not using family planning? It is against my religion [ ] costly [ ] my husband is against it [ ] it will prevent me from having children [ ] it side effects [ ]

35. What are the advantages of using family planning? Limiting family size [ ] child spacing [ ] prevention of unwanted pregnancy [ ] prevention of diseases [ ]

36. Do you know exclusive breastfeeding Yes [ ] No [ ]

37. Do you practice exclusive breastfeeding Yes [ ] No [ ]

38. How old was your last child (months) when you introduce him/her to the family meal _____

39. Do you approve of exclusive breastfeeding? Yes [ ] No [ ]

40. What are the benefits of breastfeeding? It is cheap [ ] readily available [ ] it protect the child from diseases [ ] it supply nutrient to the child [ ] create bond between mother and child [ ]

41. How do you transport yourself to this health facility for ANC? Walk [ ] motorcycle [ ] motor car [ ] others _____ (specify pls)

42. How much do you spend on transportation to this facility [ ] < N100 [ ] 100- 200 [ ] above N200

43. How long does it take you to come to this health facility < 30mins [ ] 30mins- 1 hr [ ] > 1hr [ ]

44. How long do you wait before you are attended to when you come for ANC <1 hr [ ] 1- 2 hrs [ ] 3-4 hrs [ ] above 4hrs [ ]

45. Do you pay for ANC/delivery services Yes [ ] No [ ]

46. Are you satisfy with the services you receive here Yes [ ] No [ ]

Section D: Index Pregnancy ANC information

47. Date of first antenatal visit_____

48. Gestation age in weeks_____

49. Expected date of delivery_____

50. Have you had any problem with this pregnancy? Yes [ ] No [ ]

51. If yes briefly state the problem

_____

_____

52. Have you had any illness in this pregnancy? Yes [ ] No [ ]

53. If yes describe illness

_____

_____

Measurements

54. Maternal height (cm)_____

55. Mid upper arm circumference (MUAC) (cm)_____

56. Antenatal visits

Date	Weight	Blood pressure	Hb concentration

57. Number of ANC visits_____

ANC services

58. Information on dangers signs and symptoms in pregnancy Yes [ ] No [ ]

59. Diet and nutrition Yes [ ] No [ ]

60. Exercise during pregnancy Yes [ ] No [ ]

61. Planning and preparing for delivery Yes [ ] No [ ]

62. Breastfeeding Yes [ ] No [ ]

63. Infant immunization Yes [ ] No [ ]

64. Family planning Yes [ ] No [ ]

65. Intermittent preventive treatment for malaria Yes [ ] No [ ]

66. Tetanus toxoid Yes [ ] No [ ]

67. Folic acid/iron tablets Yes [ ] No [ ]

68. Laboratory screening

VDRL Positive [ ] Negative [ ]

HIV positive [ ] Negative [ ]

Malaria parasite + [ ] ++ [ ] +++ [ ]

Urinalysis Glucose [ ] Protein [ ]

Section E: labour and delivery

69. Place of delivery Health facility [ ] Home [ ]

70. Delivery conducted by health worker [ ] TBA [ ] Unsupervised [ ]

71. Gestation age at delivery _____

72. Onset of labour spontaneous [ ] induced [ ]

73. Presentation Cephalic [ ] breech [ ]

74. Mode of delivery SVD [ ] Caesarean section [ ] Assisted Vaginal delivery [ ]

75. Complications in labour, delivery and early post partum Yes [ ] No [ ]

76. If yes, specify

APH [ ] Perineal tear [ ] Obstructed labour [ ] Eclampsia [ ] Ruptured uterus [ ] Retained placenta [ ] PPH [ ]

77. Maternal outcome after delivery Alive [ ] Death [ ]

78. Fetal outcome after delivery Alive [ ] stillbirth [ ]

79. If stillbirth, Fresh Stillbirth [ ] Macerated Stillbirth [ ]

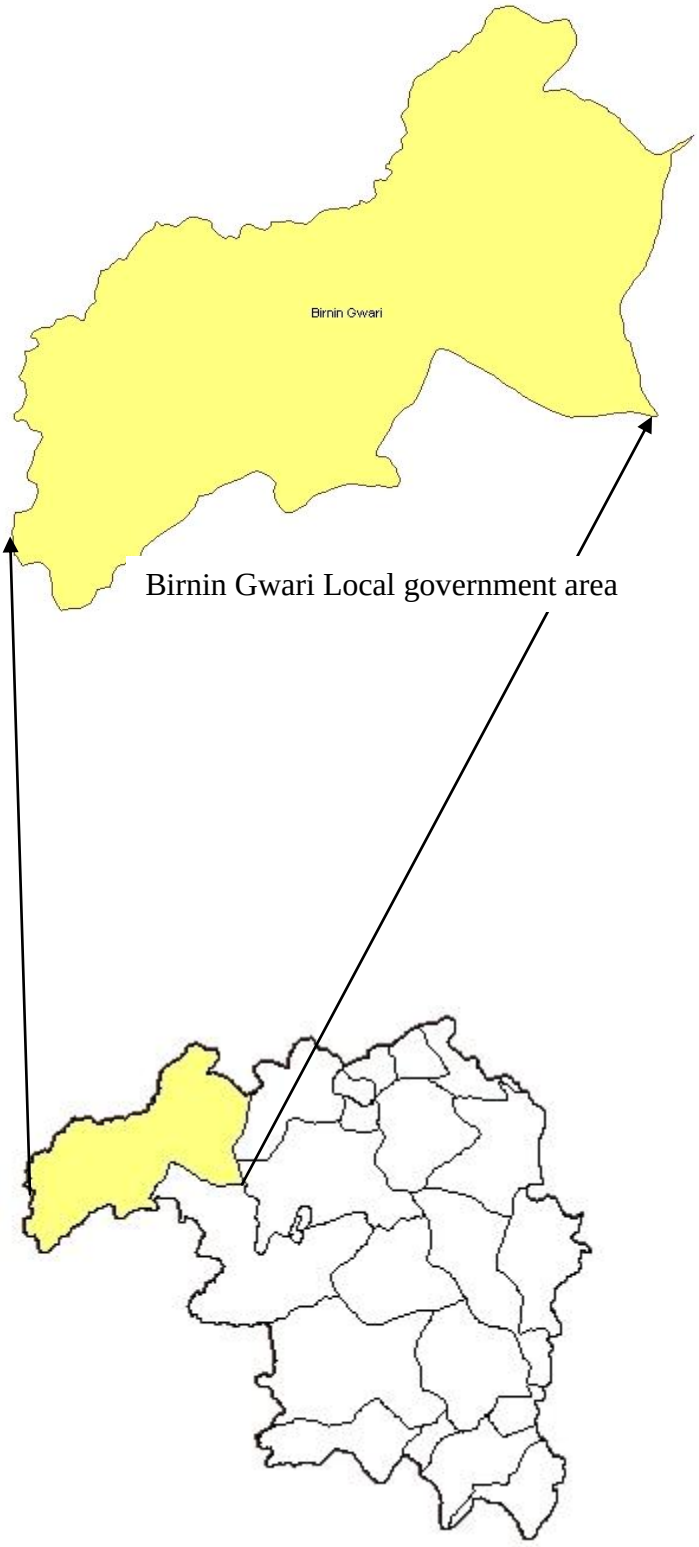
80. APGAR score 0-3 [ ] 4-7 [ ] 8-10 [ ]

81. Sex of baby Male [ ] Female [ ]

82. Weight of baby in Kg_____

Post natal visit Yes [ ] No [ ]

Appendix 4 Map of study area Birnin Gwari Kaduna state.



Map of Kaduna state showing location Birnin Gwari

Appendix 5 Ethical Approval for the research



Ahmadu Bello University Teaching Hospital

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Chief Medical Director: **DR. LAWAL KHALID**, *MBBS, FMCS, FWACS, FRCS(ED) mni*
Chairman, Medical Advisory Committee: **DR. ABDULLAHI MOHAMMED**, *MBBS, FWACP FICS*
Director of Administration: **BARR. ISHAK BELLO**, *LL.B, BL, LL.M, PGDM, AHAN, FCAI*

Our Ref: ABUTH/HREC/TRG/36 20th Feb, 2013-02-20

Dr. Abott Samuel Luka,
Department of Community Medicine,
A.B.U. Zaria.

Dear Abott,

ETHICAL CLEARANCE.

Your application for ethical clearance on the research proposal titled: - "**Determinants of Poor Pregnancy Outcome among Antenatal Care Attendees In Birnin-Gwari Local Government Area Kaduna State**" refers.

This is to convey ethical approval for you to commence the study. The ABUTH Scientific and Health Research Committee require an annual update from the Principal Investigator.

Thank you.

Yours faithfully,

PROF. J.U OKPAPI
CHAIRMAN, ABUTH HREC