AVAILABLITY, ACCESSIBILITY AND UTILIZATION OF EMERGENCY OBSTETRIC CARE SERVICES: A COMPARATIVE STUDY OF TWO LOCAL GOVERNMENT AREAS IN KADUNA STATE, NIGERIA

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BEING A DESERTATION PRESENTED TO THE DEPARTMENT OF COMMUNITY MEDICINE,FACULTY OF MEDICINE, IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF PUBLIC HEALTH (MPH) DEGREE OF THE AHMADU BELLO UNIVERSITY, ZARIA

OCTOBER, 2011

DECLARATION

I hereby declare that the work presented in this project for the award of Master Degree in Public Health has not been presented either partly or wholly for any degree elsewhere.

The work is entirely the result of my research conducted under the supervision of Dr C.L Ejembi. The works of other researchers have been acknowledged accordingly in the section entitled references.

_____	_____
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CERTIFICATION

This thesis entitled **"AVAILABILITY, ACCESSIBILITY AND UTILIZATION OF EMERGENCY OBSTETRIC CARE SERVICES: A COMPARATIVE STUDY OF TWO LOCAL GOVERNMENT AREAS IN KADUNA STATE NIGERIA"** by **BAKARE, Adeola Bintu Fatimah** meets the regulations governing the award of the degree of Master in Public Health of Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

I hereby dedicate this work to my wonderful husband, Abdulsemiu Olawale Bakare for his love, untiring efforts and support throughout the programme. And to our wonderful son, Muheebudeen who brought joy and laughter into our lives.

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LIST OF ACRONYMS

AIDS	-	Acquired Immune Deficiency Syndrome
AMI	-	Absolute Maternal Indications
ANC	-	Antenatal Care
APH	-	Antepartum Haemorrhage
BEmOC	-	Basic Emergency Obstetric Care
BHG	-	Bo Government Hospital
BOCIF	-	Basic Obstetric Care Facility
CEmOC	-	Comprehensive Emergency Obstetric Care
CFR	-	Case Fatality Rate
CHEWs	-	Community Health Extension Worker
CPD	-	Cephalo- Pelvic Disproportions
DALY	-	Disability- Adjusted Life Years
ELSS	-	Extended Life Saving Skill
EmOC	-	Emergency Obstetric Care
EOC	-	Essential Obstetric Care
FMOH	-	Federal Ministry of Health
HIV	-	Human Immune Deficiency Syndrome
IAG	-	Inter Agency Group
ICD	-	International Classification of Diseases
ICE	-	Information Communication & Education
IMR	-	Infant Mortality Rate
LSS	-	Life Saving Skill
LGA	-	Local Government area
MCH	-	Maternal and Child Health

MDG	-	Millennium Development Goals
MHS	-	Maternal Health Services
MLSS	-	Modified Life Saving Skills
MMR	-	Maternal Mortality Ratio
MOI	-	Major Obstetric Interventions
NDHS	-	National Health Demographic Survey
NEmOC	-	Not Emergency Obstetric Care
PHC	-	Primary Health Care
PHU	-	Primary Health Unit
PMM	-	Prevention of Maternal Mortality
PMR	-	Proportional Mortality Rate
PPH	-	Post partum Haemorrhage
SBA	-	Skilled Birth Attendant
SMI	-	Safe Motherhood Initiative
U5MR	-	Under-Five Mortality Rate
UN	-	United Nations
UNDP	-	United Nations Development Programme
UNFPA	-	United Nations Fund for Population Activities
UNICEF	-	United Nations International Children's Fund
UON	-	Unmet Obstetric Need
WHO	-	World Health Organization

SUMMARY

The use of process indicators to assess availability, accessibility and utilization of emergency obstetric care services as a proxy for impact of standards for maternal health services was carried out in health care facilities in two local government areas in Kaduna state; it is an indirect measure of maternal mortality. Two local government areas were studied and compared with each other, each local government area studied are in different senatorial zones: Kaduna North local government area is urban while Ikara local government area is rural. The aims and objectives of the study was to determine and compare the availability and distribution of emergency obstetric care services; to determine and compare the resource availability for emergency obstetric care services provision; to determine and compare the quality of existing basic emergency obstetric care and comprehensive emergency obstetric care services; to assess and compare the pattern of utilization of basic emergency obstetric care and comprehensive emergency obstetric care services in both local government areas. Recommendations were provided based on the findings from the study. It was a cross sectional study and it involved quantitative method of data collection using questionnaires. Total sampling was done for both local government areas. Only facilities (public, private and mission) that offer maternal health services and those that gave their consent to partake in the study were included. . A total of 87 health care facilities were assessed in both local government areas; 49 health care facilities in Kaduna North local government area and 38 health care facilities in Ikara local government area. A set of tools proposed by WHO: *Guidelines for Monitoring the Availability and Use of Obstetric Services* with little modification as proposed by Federal Ministry Of Health, Nigeria was used for appraisal of health facilities performance and adapted for the study. The appraisal tool looked at six key areas: availability of emergency obstetric care; accessibility of emergency obstetric care; proportion of birth that takes place in health facilities; met needs for emergency obstetric services; proportion of births by caesarian section; Case fatality rate. Emergency

obstetric care facilities were classified into basic emergency obstetric care facilities and comprehensive emergency obstetric facilities. Each local government area was assessed separately and compared with the other. Data were compared using the $\chi 2$. $P<0.05$ was considered statistically significant. Using the WHO guidelines on emergency obstetric care services; it was observed that there were 2 basic emergency obstetric care and 21 comprehensive emergency obstetric care facilities in Kaduna North local government area (as against 3 basic emergency obstetric care and 1 comprehensive emergency obstetric care facilities per 364,575 populations) while in Ikara local government area, there were 2 basic emergency obstetric care and 2 comprehensive emergency obstetric care facilities (as against 2 basic emergency obstetric care and 1 comprehensive emergency obstetric care facilities per 194,723 populations). Using the guidelines set by Nigerian Federal Ministry of Health, in Kaduna North local government area, there were 1 basic emergency obstetric care and 10 comprehensive emergency obstetric care facilities while there was no emergency obstetric care facility in Ikara local government area. The proportion of births in Emergency obstetric care facilities was found to be 55 % and 4.6% for Kaduna North and Ikara local government areas respectively (recommended 15%). The met need for emergency obstetric care was found to be 40.9% and 5.6% for Kaduna North and Ikara local government area respectively (recommended; 100%), while the proportion of births by C-Section were 6.0% and 1.1% for Kaduna North and Ikara local government area respectively (recommended; 5%). And the case fatality rates for public referral facilities were 7.6% and 5.7% for secondary and tertiary health facilities respectively in Kaduna North local government area while that of secondary facility in Ikara local government area was 23.4% (recommended; 1%). With the exception of meeting the required numbers for basic emergency obstetric care facilities and proportion of birth that took place in emergency obstetric care facilities, Kaduna North local government area had better results when compared to Ikara local government area in terms of met needs; proportion of birth by caesarian section and Case

fatality rate. In the light of the above findings, it is recommended that mapping of health facilities in terms of emergency obstetric care services provision should be carried out so as to upgrade some of the PHC facilities to basic emergency obstetric care facilities. There is a need to improve the staff strength so as to ensure 24 hours coverage of skilled birth attendants at the facilities and to establish blood bank in all local government areas in the states to ensure access to blood transfusion. There is a need for community sensitization so as to improve utilization of the available emergency obstetric care services.

CHAPTER ONE

1.1 INTRODUCTION

At the turn of this century, 189 countries endorsed the Millennium Declaration and signed up to meeting its eight goals. The fifth of these Millennium Development Goals, MDG 5, is to "improve maternal health", whose target is to reduce by three-quarters between 1990 and 2015, maternal mortality ratio.[1] Maternal death was, chosen as the outcome with which to judge progress towards this goal, thus bringing renewed attention to what is a 21st century problem essentially only for the poor, and one virtually eliminated for people with the means and status to access health care. Such a marker of global inequity is shocking and is an indication of wider development issues targeted in some of the other MDGs, especially on poverty, education, and gender. The Millennium Declaration is, however, the first time that maternal mortality has featured so prominently in the high ranks of a global pronouncement, providing an opportunity to galvanize action and so help ensure that the risk of maternal death is minimized for all women.[2]

According to the Tenth International Classification of Diseases [ICD-10], a maternal death is defined as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes[3,4] and also according to ICD-9 and ICD-10, maternal deaths should be divided into two groups: direct obstetric deaths resulting from obstetric complications of the pregnant state (pregnancy, labour and the Puerperium); and indirect obstetric deaths resulting from previous existing disease or disease that developed during pregnancy and which was aggravated by the physiologic effects of pregnancy.[4] Indirect obstetric deaths account for about 25% of all maternal deaths in developing countries and are those that are preventable and treatable e.g. tuberculosis, anaemia in pregnancy

etc[5] but this percentage is increasing because of the impact of HIV and AIDS. Direct obstetric deaths account for about 75% of all maternal deaths in developing countries.[2] In other words; there are three times as many direct obstetric deaths as there are indirect obstetric deaths. There are five major medical causes of direct obstetric death, listed in order of importance: haemorrhage, complications of unsafe abortion, pregnancy-induced hypertension (eclampsia), obstructed labour and infection.[5]

Fifteen percent of pregnant women will develop obstetric complications as mentioned above which cannot be predicted despite good antenatal care services.[5] It has been noted that most maternal deaths seem to occur between the 3rd trimester and the 1st week after the end of pregnancy[2]. About 60 percent of the maternal deaths occur during childbirth and the immediate postpartum period, with 50 percent of these deaths (direct obstetric) occurring within the first 24 hours of delivery[6] and thus providing strong support for prioritization of strategies that focus on professional intrapartum care. Because maternal mortality has many causes, it is well known that most deaths can be prevented if adequate timely emergency obstetric care (EmOC) is provided.

An Emergency obstetric care (EmOC) is defined as a set of life saving services that must be available in health facilities to respond to emergencies that arise during pregnancy, delivery or postpartum.[7] The Safe Motherhood Programme in 1987, emphasized the importance of access to EmOC to manage the common causes of obstetric death: hemorrhage, obstructed labour, complications due to unsafe abortion, eclampsia, and infection.[8,9] If women are to receive prompt adequate treatment for complications that arise during these period, then facilities for providing emergency obstetric care (EmOC) must be available, accessible and equitably distributed; be used by women; and be used by women who really need them. All of these issues can be subsumed under the heading of *coverage*. Adequate coverage does not suggest that all births should take place in health facilities. It does mean that all pregnant women need access to

functioning EmOC facilities, in case they need them. Once coverage is established, then questions of *performance* must be addressed. After all, many women die in hospitals. Some of them die because they were not admitted until their condition was critical. Many others, however, die because they did not receive timely treatment or because the treatment they received was inadequate.[3]

To address this issue, a set of process indicators was formally issued by UNICEF, WHO, UNFPA in 1997[3]; which are useful in determining the availability, utilization and quality of service. These indicators are: availability of EmOC, proportion of births in EmOC facilities, met needs in EmOC facility, Caesarean deliveries as a proportion of all births, and case fatality rate. WHO estimates that about 15% of women that are pregnant are likely to develop complication that require access to Emergency Obstetric Care (EmOC) as these complications cannot be predicted despite good antenatal care services.[3] All pregnant women with complications (the minimum recommendation is 100 %) should have access to and be treated in health facility providing EmOC. In order to save women's lives, it is crucial that they have access to such life saving procedure as Caesarean section. UN process indicator recommended at least 5% of birth be undertaken by Caesarean section and not more than 15%. Case fatality rate – this indication is a measure of the quality of services provided by health facilities; it estimates the number of women who come to the facility with complication from which they die. The recommended maximum is 1%.[3]

The WHO recommended that there should be four Basic Emergency Obstetric Care facilities (BEmOC) and one Comprehensive Emergency Obstetric Care (CEmOC) facilities per 500,000.[3] It is necessary to identify a shortlist of 'signal functions' with which to measure the care provided for obstetric complications in a given setting. A Basic Emergency Obstetric care facility is defined as any facility offering the following services: parenteral antibiotic, parenteral

oxytocics, parenteral anticonvulsants, manual removal of placenta, removal of retained products of conception and assisted vaginal delivery. A Comprehensive Emergency Obstetric care facility is defined as any facility offering the above plus Caesarean section and blood transfusion.[3,5]

The Federal Ministry of Health of Nigeria, as part of National standard for facilities under a recent maternal mortality reduction initiative (the "Basic Obstetric Care Facility Initiative"[BOCIF] which is now becoming a part of the new and more comprehensive " Women and Child Friendly Hospital Initiative"), included two extra criteria to that of signal functions; 24hr-service operation in facilities and availability of a minimum of 4 midwives in each facility" (To ensure 24 hrs coverage of skilled attendance) [10].

For effective EmOC services, there has to be adequate human resources, other resources (drugs, equipments) and infrastructure (blood in the blood bank, functioning theatre, potable water supply, toilet facilities, regular source of power supply) put in place.

Determinants of maternal mortality in Nigeria using the conceptual frame work (developed by Maine and McCarthy) on maternal mortality were analysed as consisting of two groups of factors: root determinants and intermediate determinants.[11] While the root determinants are socio-cultural and socio-economic factors that work through the intermediate determinants to affect a woman's reproductive activities and outcomes, the intermediate determinants include health and reproductive behaviour of the woman, access to health services, and quality and performance of the health system. The analysis also recognizes a two-way relationship between poverty and reproductive ill-health, with specific attention on maternal mortality[11].

The problem of maternal mortality in Nigeria is worst in the North West and North East zones of the country which recorded the highest figure of 1,549/100,000 and 1025/100,000 respectively. The North West zone has almost ten times the maternal mortality of the south-western zone (165/100,000).[12] The Northern zones also experience comparatively worse dearth of health

resources; illiteracy and poverty, all which work in synergy to limit access to utilization of maternal health services.[11]

Concerned about this situation, in 2007, the Northern Governors First Health Summit was held with the theme "Alarming Death Rates in Northern Nigerian: The Time for Change is Now". The aim of this Summit was to articulate an enduring response that will address without delay, problems of inadequate finances; health resources inadequacies; deficiencies of health services; health management, coordination and evaluation defects. Consequent upon these, the State Chief Executives resolved to improve financing of the health care; the (human) resources devoted to health care; health services, and the sourcing; management and use of medical equipment and consumables; staff attitudes and performances; review the mechanism of staff supervision; monitoring and evaluation at all levels of health care; and health management and coordination[13]. The present Kaduna State Government has indicated significant interest in reducing MMR and Under Five Mortality Rate by offering free antenatal care services, delivery services, manual vacuum aspiration services, and free obstetric surgical intervention.[14]

Despite these free services, do health care facilities in Kaduna North local government area and Ikara local government area comply with minimum UN recommendation for availability, use and quality of Basic and Comprehensive Emergency Obstetric Care as measured by UN indicators?

1.2 OPERATIONAL DEFINATIONS OF DIRECT CAUSES OF MATERNAL DEATH

Antepartum haemorrhage: Any bleeding before labour and during labour: placenta previa, abruptio placenta.

Postpartum haemorrhage: Bleeding that occurs at immediate delivery and within six weeks of delivery; requires treatment (provision of intravenous fluids and/or blood transfusion); Retained placenta; Severe bleeding from lacerations (vaginal or cervical).

Prolonged/Obstructed labour: This is dystocia (abnormal labour) and will include: prolonged, established, first stage of labour (>12 hours); prolonged second stage of labour (>1 hour) CPD (Cephalo-pelvic disproportion), transverse lie, brow/face presentation.

Postpartum sepsis: A woman has a fever (temperature 38 degrees Centigrade or more) occurring more than 24 hours after delivery (with at least two readings because labour alone can cause some fever).Other signs and symptoms that can be present: lower abdominal pain, purulent, offensive vaginal discharge (lochia), tender uterus.

Complications of abortion: Hemorrhage due to abortion, which requires resuscitation with IV fluids and/or blood transfusion. Sepsis due to abortion (this includes perforation and pelvic abscess).

Severe Pre-eclampsia: Diastolic blood pressure >110 mmHg and proteinuria >3+ after 20 weeks gestation. Various signs and symptoms: headache, hyperflexia, blurred vision, oliguria, epigastric pain, pulmonary oedema.

Eclampsia: Convulsions. Diastolic blood pressure 90mmHg or more after20 weeks gestation. Proteinuria 2+ or more. Various signs and symptoms: coma and other signs and symptoms of severe pre-eclampsia.

Ectopic pregnancy: Internal bleeding from a pregnancy outside the uterus. History of pregnancy, lower abdominal pain and shock possible from internal bleeding. *Ruptured uterus*: Uterine rupture with a history of

prolonged/obstructed labour when uterine contractions suddenly stopped. Painful abdomen

1.3 PROBLEM STATEMENT

Every ten minutes, one woman dies on account of complications of pregnancy or childbirth in Nigeria, giving a total of 53,000 per year. For every maternal death, at least thirty women are estimated to suffer short or long term disabilities. [15] A wide geographical variation obtains with maternal mortality in Nigeria, with the north having a far higher maternal mortality compared to the south. The North-west zone which recorded the highest figure of 1,549/100,000 has almost ten times the maternal mortality of the south-western zone (165/100,000). The rural area, where most of Nigerians live, has a higher maternal mortality ratio (828 deaths per 100,000 live births) compared to the urban areas (351 maternal deaths per 100,000 live births), [12] with an estimated high obstetric risk of 1 in every 6 women in 2003.[16]

Twenty years following the launching of the Safe Motherhood Initiative (SMI), the maternal mortality levels in Nigeria are still high though on slow decline. Nigeria being a signatory to the Millennium Development Goal, MDG 5 is to reduce maternal mortality rate by 75 % by the year 2015. Nigeria has 5 years left to achieve this goal, and at the current trend of MMR in Nigeria the goal may not be achievable (The estimated 0.1 per cent annual rate of reduction in sub-Saharan Africa, instead of 5.5 % per year between 1990 and 2015).[17] Fifteen percent of births are expected to take place in health care facilities and 15% of pregnant women are expected to develop obstetric complications despite good maternal health services.[3] Current interventions have not been able to take care of the 15% of pregnant women who developed obstetric complications due to inadequacies of emergency obstetric care services.[10]

Pregnant women make up 5% of the total population in Kaduna State, the maternal mortality rate is 980/100000, Kaduna State being in North West zone in Nigeria.[14] The underlying causes of high MMR are the under utilization of existing health facilities which are of poor quality and not accessible to communities because of social, physical and financial barriers. Management structures and systems are weak and or often duplicated and or uncoordinated. Generally, communities lack confidence in the existing public health services during emergencies.[14]

1.4 JUSTIFICATION

Maternal mortality is an important indicator of the health and human rights status of women, their access to health care and the adequacy of the health care system and its ability to respond to their needs.

All pregnant women are at risk of obstetric complications.[3,5] In a society where women prefer delivery at home, 58% of pregnant women in Nigeria received antenatal care at least once from a trained provider, while only 35% delivered in health facilities.[18] Most life threatening complications occur during labour and delivery and these cannot be all predicted.[3] Prenatal screening does not identify all of the women who will develop complications. Women not identified as a high risk can and do develop obstetric complications. The goal of reducing maternal mortality by 75% cannot be achieved if utilization and access to emergency obstetric care is not available for obstetric complications, in spite of laudable programme, resources (both from government and donor agencies) committed into activities that is meant to reduce maternal mortality, which has remained persistently high. The challenge is now to shift focus and concentrate on improving efficient delivery of care for emergency obstetric complications, as little studies have been done on performance of the health care system i.e. using the indicator process to monitor maternal mortality, which is cost effective when compared to using Impact Indicator (using Maternal mortality rate and ratio).

The study will be useful to program planners in both local government areas and the state government as a whole. It will serve as a baseline study in assessing health care facilities, a means of assessing how effective are the processes put in place for free maternal health care services. It will also be the first time private health care facilities are being assessed for their performances, thus encouraging Public Private Partnership in effort to reduce maternal mortality. It may also serve as a benchmark for interventional study for both Local and State Government because Kaduna North LGA and Ikara LGA are urban and rural local government respectively.

1.5 AIMS AND OBJECTIVES

AIM

To assess the availability, accessibility and utilization of emergency obstetric care services in Kaduna North local government area and Ikara local government area

OBJECTIVES

1. To determine and compare the availability and distribution of emergency of obstetric care services in Kaduna North and Ikara LGAs.
2. To determine and compare resource availability for emergency obstetric care services provision in the two local government areas.
3. To determine and compare the quality of existing basic and comprehensive emergency obstetric care services in both local government areas.
4. To assess and compare the pattern of utilization of basic and comprehensive emergency obstetric care services in both local government areas.

CHAPTER TWO

LITERATURE REVIEW

2.1 MAGNITUDE OF MATERNAL MORTALITY

Of the estimated total of 536 000 maternal deaths worldwide in 2005, developing countries accounted for 99% (533 000) of these deaths. Slightly more than half of the maternal deaths (270 000) occurred in the sub-Saharan Africa region alone, followed by South Asia (188 000). Thus, sub-Saharan Africa and South Asia accounted for 86% of global maternal deaths.[17] By the broad MDG regions, MMR in 2005 was highest in developing regions (at 450 maternal deaths per 100 000 live births), in stark contrast to developed regions (at 9) and countries of the Commonwealth of Independent States (at 51).[19] The adult lifetime risk of maternal death (the probability that a 15-year-old female will die eventually from a maternal cause) is highest in Africa (at 1 in 26), followed by Oceania (1 in 62) and Asia (1 in 120), while the developed regions had the smallest lifetime risk (1 in 7300).

Available statistics indicate that Nigeria has one of the highest rates of maternal mortality in the developing world .The country's maternal mortality ratio is estimated at 800 maternal deaths per 100 000 live births in 2000, and the neonatal mortality rate was 48 deaths per 1,000 live birth. [12] Nigeria with about 2% of the world's population contributes about 10% of the global burden of maternal mortality. It has been estimated that 1:18 mothers in Nigeria faces a lifetime risk of dying from pregnancy related causes compared to 1:2,400 in Europe.[10,12,20] India and Nigeria rank number one and two in number of maternal deaths in childbirth, and together contribute nearly one-third of the global total.[21] Every ten minutes, one woman dies on account of complications of pregnancy or childbirth in Nigeria, giving a total of 53,000 per year.[15]

A wide geographical variation obtains with maternal mortality in Nigeria, with the north having a far higher maternal mortality compared to the south. The North-west zone which recorded the highest figure of 1,549/100,000 has almost ten times the maternal mortality of the south-western zone (165/100,000).[12] The rural area, where most of Nigerians live, has a higher maternal mortality ratio (828 deaths per 100,000 live births) compared to the urban areas (351 maternal deaths per 100,000 live births).[12] For every maternal death, at least thirty women are estimated to suffer short or long term disabilities. An estimated 800,000 women suffer vesico-vaginal fistula from prolonged labour and complicated deliveries. It is estimated that Nigeria has the largest burden of vesico-vaginal fistula in the developing world, accounting for 40% of global estimates.[12,15]

Major causes of maternal deaths are: haemorrhage 23%, sepsis 11%, eclampsia 11%, obstructed labour11%, anaemia 11%, malaria 11%, unsafe abortion 11%, other causes (HIV, congestive cardiac failure e.t.c) 5%.[11]

In a study carried out in Jos University Teaching Hospital, Jos Nigeria it was discovered that the direct causes of deaths were haemorrhage (34.6%), sepsis (28.3%), eclampsia (23.6%) and unsafe abortion (9.6%). The most common indirect causes of death were hepatitis (18.6%); anaesthetic death (14.6%); anaemia in pregnancy (14.6%); meningitis (12.0%); HIV/AIDS (10.6%) and acute renal failure (8.0%).[22]

2.2 IMPACT OF MATERNAL MORTALITY

Maternal mortality is an important indicator of the health, status and human rights of women, their access to health care and the adequacy of the health care system and its ability to respond to their needs. Disparities in maternal mortality rates may also serve as important indicators of health inequality on local, national, and international levels. Maternal and child health are intricately tied to economic and social development as shown by the report of the Commission

on Macroeconomics and Health which links improved health to poverty reduction and economic development in poor societies.[2]

Maternal death and disability are the leading cause of healthy life years lost for developing country women of reproductive age, accounting for more than 28 million disability-adjusted life years (DALYs) lost and at least 18 percent of the burden of disease in these women.[24] For each woman who dies, an estimated 100 women survive childbearing but suffer from serious disease, disability, or physical damage caused by pregnancy-related complications. Long-term consequences of pregnancy-related complications include uterine prolapse, pelvic inflammatory disease, fistula, incontinence, infertility, and pain during sexual intercourse.[24]

A mother's death carries profound consequences not only for her family, especially her surviving children, but also for her community and country. In some developing countries, if the mother dies, the risk of death for her children under age 5 is doubled or tripled. In addition, because a woman dies during her most productive years, her death has a strong social and economic impact on her family and the community loses a productive worker and a primary care giver.[24,25]

2.3 MEASURES OF MATERNAL MORTALITY

A maternal death is not just a discrete event but rather the culmination of a process. Therefore, the identification and recording of maternal deaths is far from a simple task, and monitoring efforts to reduce maternal mortality cannot rely solely on counting changes in deaths. Monitoring must include information on the processes or pathways that culminate in a maternal death.

There are indicators of efforts to reduce maternal mortality: *indicators of impact* (i.e., of changes in deaths) and *indicators of process* (i.e., of changes in those activities or circumstances that are known to contribute to maternal death).

2.3.1 Indicators of impact

The impact of a programme to reduce maternal deaths is determined by measuring changes in the level of maternal mortality. There are a number of ways to describe this level, some of which are discussed below.

Maternal mortality ratio (deaths per 100,000 live births)

This statistic has traditionally been called the maternal mortality 'rate'. Technically, it is not a rate but a ratio. The maternal mortality ratio (maternal deaths per 100,000 live births) measures the risk of maternal death among pregnant or recently pregnant women. The maternal mortality ratio represents a measure of the risk of death once a woman has become pregnant. As a ratio, it is not a true risk, as it involves two different populations, pregnant women and live newborns. The ratio can be influenced by the prevalence of stillbirths as well as the prevalence of induced abortions.

Maternal mortality rate (deaths per 100,000 women aged 15–49 per year)

This is the true maternal mortality rate. Although less often cited than the ratio, it is important because it measures the impact of maternal deaths on the population of women as whole, not just on pregnant women. This statistic is affected by two forces:

1. The risk of death among pregnant women; and
2. The proportion of women who become pregnant each year.

Lifetime risk

A woman's risk of maternal death accumulates over her reproductive lifetime. Every time she becomes pregnant, she runs the risk again.[3,19]

2.3.2 Indicators of process

There is, however, another way to measure progress in the reduction of maternal mortality, and that is by using process indicators. It is important to note that process indicators are not poor substitutes for impact indicators. Process indicators, in fact, provide a great deal of extremely useful information that impact indicators do not.[3,26]

Process indicators measure levels and changes in processes that are believed to influence the event of interest. These indicators focus on the availability and use of services for treatment of life-threatening obstetric complications.

The process indicators proposed here were designed to answer a series of questions about the availability, utilization and quality of care for women with obstetric complications:

- Are there enough facilities providing EmOC?
- Are they well distributed?
- Are enough women using these facilities?
- Are the right women (those with obstetric complications) using these facilities?
- Are sufficient quantities of critical services being provided?
- Is the quality of the services adequate?[26]

In order to assess whether any of the values obtained for these indicators are sufficient, UNICEF, WHO and UNFPA have set certain 'acceptable levels', these levels are necessarily approximate. The basic assumption in developing these acceptable levels is that at least 15 percent of all pregnant women will develop serious obstetric complications. Therefore, it can be assumed that the minimum proportion of pregnant women who require medical care in order to avoid death or disability is 15 percent.[3,6,26]

TABLE 2.1: Indicators and Minimum Acceptable Levels[3]

Indicators	**Minimum acceptable level**
Amount of emergency obstetric care (EmOC): Basic EmOC facilities Comprehensive EmOC facilities	For every 500,000 population, there should be: At least 4 Basic EmOC facilities. At least 1 Comprehensive EmOC facility.
Geographical distribution of EmOC facilities	Minimum level for amount of EmOC services is met in sub-national areas.
Proportion of all births in Basic and Comprehensive EmOC facilities.	At least 15% of all births in the population take place in either Basic or Comprehensive EmOC facilities.
Met need for EmOC: Proportion of women estimated to have complications who are treated in EOC facilities	At least 100% of women estimated to have obstetric complications are treated in EmOC facilities.
Caesarean sections as a percentage of all births, as a proportion of all births in the population.	Caesarean sections account for not less than 5% nor more than 15%.
Case fatality rate 1%.	The case fatality rate among women with obstetric complications in EmOC facilities is less than 1 %

The use of process indicators has the following advantages:

Programme relevance: Process indicators have a number of distinct advantages over impact indicators. Most importantly, process indicators provide information on the actions that need to be taken to improve the situation.

Affordability: Process indicators are generally less expensive to measure than impact indicators. This is especially true when they are composed of data collected in a few locations (e.g. health facilities), rather than data collected in population surveys. Because process indicators are less expensive, they can be measured more frequently.

Responsiveness: Process indicators can reflect changes immediately, which permit feedback to programme activities in a short period, not years later.[26]

If women are to receive prompt adequate treatment for complications, then facilities for providing essential obstetric care must be available. Enabling women to reach the hospital in time to save their lives is a major focus of efforts to reduce maternal mortality. Once complications in pregnancy becomes apparent, the mother's course which may lead to her death and death of her infant is determined by the barriers which may prevent women in labour from receiving care that might save her life.[27]

2.4 RATIONALE FOR INCREASED FOCUS ON EMERGENCY OBSTETRIC CARE

Why focus on obstetric services?

When using any kind of process indicator, it is important that the processes measured are really linked to the desired outcome, e.g. the reduction of maternal deaths. During the past few years, there has been an increasing clarity about which is the most effective ways to prevent maternal deaths. In theory, there are three main pathways to reduce maternal deaths:

1. Reducing the number of pregnancies and births;
2. Reducing obstetric complications; and
3. Preventing deaths among women who have developed serious obstetric complications.[26]

A woman is not at risk of a maternal death unless she becomes pregnant. Therefore, anything that reduces her chances of becoming pregnant will reduce her chances of maternal death. However, once she becomes pregnant, any woman can develop a complication during pregnancy, labour and the post-partum period. Some complications can be prevented by appropriate management of pregnancy, labour and delivery (for example, regular monitoring of blood pressure, urinalysis, clean delivery practices, active management of third stage). And some groups of women can be identified as being at higher risk, for example women who have experienced a previous complication. However, in the majority of cases it is not possible to predict who will develop obstetric complications.[28] In fact; most complications occur among

low-risk women. Since any woman can suddenly develop a serious problem during pregnancy, delivery or the post-partum period, maternal deaths cannot be substantially reduced unless all pregnant women have access to treatment of life threatening complications, or 'emergency obstetric care' (EmOC). For this reason, the process indicators discussed above focus on the third pathway – that is, reducing deaths among women who develop obstetric complications.[26]

For example, at a health center in Kasongo, Zaire, a prenatal care program was implemented where pregnant women were screened for their risk of developing obstetric complications. Those coming in with a bad obstetric history (history of stillbirths, medical intervention during delivery) were identified as "high-risk" for developing obstructed labour. The Kasongo data showed that only 29 percent of women who actually did develop obstructed labour were from the "high risk" group. More than two-thirds of the women who developed this complication were not predicted by the screening program[29]. This thus shows that women who are likely to develop obstetric complications may not be predicted by good regular ANC services.

2.5 EMERGENCY OBSTETRIC CARE ASSESSMENT

Indicator No. 1: Number of EmOC Facilities

How many facilities are required to treat obstetric complications? That depends on the size and capabilities of these facilities and population they are meant to serve. As the table shows, the minimum acceptable level for this indicator is one Comprehensive and four Basic EmOC facilities per 500,000 populations.[3,26]

In this indicator, two levels of EmOC facilities are identified and counted: Basic and Comprehensive EmOC facilities. For the purposes of this study the above 8 signal functions plus the 2 added by the Nigerian Federal Ministry of Health will be used. These are: Basic EmOC services; administration of parenteral antibiotics, parenteral oxytocic drugs and parenteral anticonvulsant drugs, manual removal of placenta, removal of retained products, and assisted

vaginal delivery, plus 24hrs service operation in facilities and availability of a minimum of 4 midwives in each facility" (To ensure 24 hrs coverage of skilled attendance).[10]

Comprehensive EmOC services: all Basic EmOC services, plus surgery (caesarean section) and blood transfusion. The major difference between Basic and Comprehensive EmOC is the capacity to give blood and perform surgery (i.e. caesarean section).[3]

In a study carried out in Tanzania to assess the availability of EmOC it was found out that out of 129 facilities surveyed, the number of EmOC facilities qualifying for EmOC status was five out of 111 possible BEmOC (5%) and 14 out of 18 possible CEmOC (78%). The number of BEmOC units per 500 000 was 1.6 for all the districts. The number of CEmOC units per 500 000 was 4.6.[30]

For every 500,000 population, the four districts in West Bengal, India have 408 health facilities combined had only 1.6 basic and 0.6 comprehensive EmOC facilities against the minimum acceptable level of 4 and 1 respectively.[31]

In a national study conducted by the Nigerian Federal Ministry of Health in 12 states with 2 states from each geopolitical zone, it was discovered that; The proportion of facilities that met the EOC criteria is as follows: 4.2 % for public facilities (1.2 % for BEOC and 3.9 % for CEOC) and 32.8% for private facilities (5.3 % for BEOC and 27.5 % for CEOC). Overall, only 18.5 % of facilities met EmOC criteria. A critical shortage of skilled attendants obtained with respect to 24-hour coverage in the public sector primary care facilities was noted. Only half of primary health care facilities were operating three shifts (24 hours service) and less than a tenth (6.1 %) of them had a minimum of 4 midwives to enable them provide 24 hours coverage with skilled attendants. The proportion of personnel so far trained in life saving skills in public health care facilities, which is crucial to meeting emergency obstetric condition, is quite low: 10.2 % of non-specialist physicians, 9.9 % of midwives and 4.5 % of CHEWs.[10]

Indicator No. 2: Geographic Distribution of EmOC Facilities

If a sufficient number of EmOC facilities exist, then the next step is to determine whether they are adequately distributed. One telling indicator is the average travel time to an EmOC facility.

While this is an informative indicator, the data required are difficult to obtain. Therefore, the minimum acceptable level for Indicator No. 2 is the same as that for Indicator No. 1.[3,26]

Table 2.2: Estimated Average Time from Outset of Complication to Death[6]

Complications	Hours	Days
Haemorrhage		
Postpartum	2	
Antepartum	12	
Eclampsia		2
Obstructed labour		3
Infection		6

In a study carried out in Tanzania, involving 6 districts the distribution of BEOC facilities per 500,000 populations shows an urban/rural variation ranging from 3.6 per 500,000 to zero per 500,000. None of the districts supplied the minimum accepted by the UN Guidelines. Correspondingly, the distribution of CEOC facilities per 500,000 shows a variation ranging from above 10 per 500,000 in an urban district to zero per 500,000 in a rural district. When disregarding the EmOC facility status, it was observed that there is less variation in facility coverage between urban and rural districts. The average facility distribution for the six districts was 42 per 500,000.[30]

Indicator No. 3: Percentage of Births in EmOC Facilities

It is estimated that at least 15 per cent of women develop obstetric complications, than one can assume that at the very least 15 per cent of all births should take place in EmOC facilities. If

fewer than 15 per cent of all births are taking place in an EmOC facility, it indicates that some women who need these services are not receiving care.[6,32]

In a study carried out in West Bengal, India, it was discovered that overall, 26.2% of estimated annual births took place in the EmOC facilities (ranged from 16.2% to 45.8% in 4 districts) against the required minimum of 15%.[31]

In the same study carried out by the FMOH, Nigeria it was discovered that only 13.9 % of the estimated annual births for the 12 states took place in health facilities, with 53.6% of those in-facility deliveries taking place in private health facilities[10].Of the percentage of estimated births that took place in EmOC facilities: 10.4% occurred in Lagos, 2.8% occurred in Katsina, 5.3% occurred in Cross River and 2.2% occurred in Sokoto.[10]

Indicator No. 4: Met Need for EmOC

If 15 per cent of all births are taking place in EmOC facilities it does not mean that the women with obstetric complications are receiving appropriate care. It might be that most of the births in EOC facilities are normal deliveries. Therefore, there is a need for more refined measure of the utilization of EmOC services – that is, the proportion of all women with obstetric complications that are being treated in a facility.[26] This has been termed the 'met need' for obstetric care. Note that this indicator can be calculated either as met need or unmet need *[Unmet obstetric need (UON)]*. The UON indicator defines major obstetric interventions (MOI) in relation to absolute maternal indications (AMI), which can only be performed in hospitals to include: C/S, laparatomy, hysterectomy, internal version and craniotomy. Absolute maternal indications are severe APH, severe PPH, major Cephalo-pelvic disproportions (CPD), transverse position and brow presentation.[33]

In any case, the target would be to achieve 100 per cent coverage for women in need of obstetric care. While the met need for EmOC may be used as a gauge of the level of EmOC activity in an area, it does not describe what needs to be done.[3,26]

In a study carried out in Nepal involving 5 districts; 4 of the districts had <5% met needs and 14.9% of needs were met in the fifth district,[34] while a study on unmet need for EmOC in Tanga region, Tanzania showed that the percentage of major obstetric interventions carried out in response to an absolute maternal indication was only 71%; most major obstetric interventions (97%) were caesarean sections. The most frequent indication was cephalo-pelvic-disproportion (51%). The proportion of major obstetric interventions for absolute maternal indications performed amongst women living in urban areas was 1.8% of all deliveries, while in rural areas it was only 0.7%.[35]

In the United States, 92.2% of expected births take place in EmOC facilities (the other deliveries primarily take place in freestanding birthing centers, at home or in doctors' offices). Met need in the United States is 98.9%, meaning that virtually all the women expected to develop direct obstetric complications in pregnancy, delivery or the postpartum period are being treated. The most frequent obstetric complication treated in facilities was prolonged or obstructed labour (41%) followed by hemorrhage (34%).[7]

Indicator No. 5 C-section as a percentage of all births

Another indicator of whether EmOC facilities are, in fact, providing life- saving obstetric services is the number of caesarean sections as a proportion of all births. Of all the procedures used to treat the major obstetric complications, caesarean section is the easiest to study.[26] In the UNICEF/WHO/UNFPA Guidelines, the lower limit is set at five per cent of all births in the population, which is a relatively conservative lower limit, especially as no attempt is made in this indicator to distinguish between caesarean sections that are done for fetal as opposed to maternal

indications. For the upper limit, 15 per cent was used. It is slightly higher than the level in most developed countries.[3]

In a study carried out in North West Frontier Province in Pakistan on availability and utilization of EmOC services, out of the 7 districts studied; 6 had less than 1% of Caesarean deliveries as proportion of all births while the last district had 1.2% of all deliveries as C-section. While in USA, Slightly more than 21% of expected births are by caesarean section, which is outside the recommended range of 5—15% of expected births.[7]

While data on caesarean sections need to be interpreted with caution, they do have the advantage of being available where information on complications treated is not. In some situations, it will be necessary to use the proportion of births that are delivered by caesarean section as a proxy for met need for EmOC, while countries begin to gather information on complications. Certainly, if the national or regional data show that less than 5 per cent of births are by caesarean section, this means that some women with life-threatening complications are not receiving the necessary care.[3,26]

Indicator No. 6: Case fatality rate

The previous indicators have focused on measuring the coverage and utilization of EmOC facilities. The sixth indicator is a rough measure of the quality of services provided. Case-fatality is the number of deaths among women admitted to a facility with a major obstetric complication.[3]

The available data indicate that there is a wide gulf between CFRs in developed and developing countries. Based on the available data, a minimum acceptable level of 1 per cent has been set for case-fatality rates for all major obstetric complications combined.

According to WHO estimates for the year 2000, the United States has an MMR of 17 maternal deaths per 100,000 live births, only 0.06% of women with direct obstetric complications died in facilities. This is well below the maximum acceptable case fatality rate of 1% as per UN Guidelines. The most frequent cause of death was complications predominantly in the puerperium (28%), which is followed by pre-eclampsia and eclampsia (21%).[7]

In the study carried out by FMOH, proportional mortality rate was lowest for haemorrhage (8.8% for referral facilities,5.9% for EmOC facilities); worst for ruptured uterus (24.9% for referral facilities, 18.7% for EmOC facilities) and postpartum sepsis (22.5% for referral facilities,14.3% for EmOC facilities).[10]

However, the case-fatality rate is a relatively crude measure of performance which is calculated for Comprehensive EmOC facilities only, because CFRs from Basic EmOC facilities are difficult to interpret. This is because women with serious complications may be referred from Basic to Comprehensive EmOC facilities, which would make the CFR in the Basic EmOC facility artificially low.

2.6 BARRIERS TO TIMELY AND APPROPRIATE EMERGENCY OBSTETRIC CARE MODELS OF MATERNAL MORTALITY

In order to discuss reasons why women don't have access to timely and appropriate emergency obstetric care, two models of maternal mortality are discussed below. These models are:

- 3-Delay Model
- Analytical Model

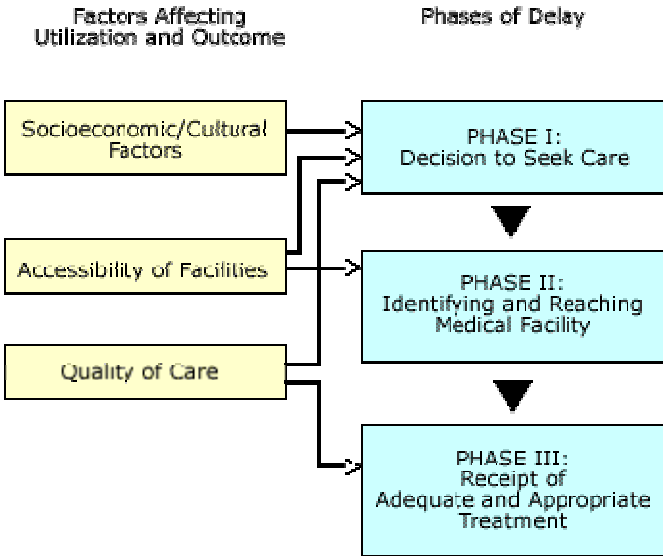
2.6.1 3-Delay model

The "3 Delay Model" developed by the Prevention of Maternal Mortality (PMM), Network identifies the points at which delay to EmOC can occur:

- Delay in deciding to seek care;

- Delay in reaching a first referral level facility; and
- Delay in actually receiving care after arriving at the facility.[28]

Figure 2.1: The three delays model of maternal mortality[36]



Delay in receiving care at the health facility

Often, people know when and where to go for medical care but they do not go because they are aware that the facility has no drugs, the staff are usually not present, or patients are treated disrespectfully.

Attitude of staff as a barrier to utilization of health facilities**:** In focused group discussion carried out in University of Calabar Teaching Hospital Calabar, Nigeria, it was discovered that the attitude of staff of the hospital served as a barrier to the utilization of the obstetric services by the community.[37]

Difficulty *obtaining blood for transfusion* is a major obstacle in the management of obstetric emergencies. For example, a study in rural Tanzania concluded that the difficulty in obtaining blood was responsible for 35 percent of maternal deaths.[38] In a study at the University of Nigeria Teaching Hospital Enugu, Nigeria, the survival rate for patients with ruptured uterus who were

unable to have a blood transfusion was 57 percent compared to a survival rate of 76 percent for patients who received blood transfusion. Most of the health care facilities studied either did not have blood banks or had blood banks that were inadequately stocked.[39]

Lack of appropriately trained staff was also a major problem identified in a community-based study of maternal mortality undertaken in Zimbabwe during a two-year period from 1989 to 1990. Avoidable curative-care factors were responsible for 87 percent of maternal deaths in the rural study area and for 70 percent of maternal deaths in the urban study area.[40] The study identified inadequate treatment by incompetent staff, specifically inadequate resuscitation of women suffering from hemorrhage and septic shock, insufficient antibiotic therapy and inadequate skills in surgery and anesthesia as avoidable factors for maternal mortality.[40]

Focus group discussions were held in Niamey with women users of maternal health services, with student midwives and experienced midwives. Sources of complaints between providers and patients appeared to be numerous. However, they were centered on two themes, delivery techniques and cultural requirements, which correspond to two types of constraints: technical constraints and social representations and practices of the population. Both women and midwives are tied up by the same social rules (e.g. linguistic taboos, respect and shame) but technical constraints force midwives to violate those rules, making the application of their technical skills very difficult. Thus, the mutual relationship between users and providers is source of dissatisfaction, which often degenerates into an open confrontation.[41]

Delay in reaching facilities with EmOC capabilities

Once a decision has been made that a complication needs medical intervention, availability of transportation and easy accessibility to a facility with EmOC capabilities become factors of paramount importance. Women's need for emergency obstetric services may put them at immediate life threatening risk in remote locations, but distance from health centers and hospitals is also likely to reduce their ability to access a range of preventive and curative services with potential longer-term impacts. Its being discovered that the reason why the maternal mortality fell in the United States this century was because of the advent of antibiotics and blood transfusion more than anything else. There is simply no scientific evidence to prove the falling mortality was because birth was moved into the hospital. The evidence does show that as long as there is a system in place to transport women in labour to a facility within 30 minutes where there are antibiotics, blood transfusion and caesarean section capacity, there should be very little maternal mortality.[42] The Zimbabwe maternal mortality study reported unavailability of transportation contributed to 28 percent of deaths in the rural study area and 3 percent of those in the urban study area. The study also reported that among the deaths in the rural area, seven were women who had been staying in a specially designed shelter (similar to a maternity waiting home) as advised, but died because of the need for transport to a higher referral level.[43]

In a preliminary study on Facilitating emergency obstetric care through transportation and communication, Bo, Sierra Leone: Focus group discussions revealed poor roads, few vehicles, and high transportation costs as major causes of delay in deciding to seek and in reaching emergency obstetric care. Following intervention through the installation of a radio system linking the hospital, primary health units (PHUs) and the referral vehicle, the number of women with major obstetric complications arriving at Bo Government Hospital (BHG) from the project area increased from 0.9 to 2.6 per month, while case fatality rate dropped from 20% to 10%. In the post-intervention period, approximately half of women with complications from the project

area utilizing BHG came by project vehicle. The mean time from the vehicle being called by the PHU to the patient's arrival at BGH was 3.1 hour.[44]

In a study which explores the role of access versus traditional beliefs in the decision to seek obstetric care from health professionals, eighteen purposively sampled homogenous groups in Kassena-Nankana District of northern Ghana participated in focus-group discussions. Accessibility factors (cost, distance, transport, availability of health facilities, and nurses' attitudes) were major barriers, whereas traditional beliefs were reported as less significant.[45]

In a study of maternal mortality in a rural area of Gambia, where maternal mortality rates are among the highest in the country, specific cases such as poor roads and inability to access transport from home to health centre or from health centre to hospital were implicated in subsequent death of the patients.[43]

One study conducted in rural north-western Nigeria identified vehicle and fuel shortages, combined with a lack of willingness on the part of drivers to transport women for affordable fares, contribute to delays in transport to appropriate health care in cases of obstetric complications.[46]

Delay in seeking care under emergency conditions

Pregnancy and childbirth are imbued with strong cultural meaning, and hence cultural factors may be more important determinants of uptake of maternity care than of other forms of care. Poorer women may prefer traditional birth attendants or family members, particularly if childbirth is seen as a non-illness event where modern medicine has little to contribute.[47] A woman's decision to seek health care is shaped by several factors, including the influence of her spouse or other family members, social norms, her education, her status in society, the severity of her illness, the distance she lives from the health facility, the financial and opportunity costs of seeking care, and her previous experiences with the health system and perceived quality of care.

In a community survey carried out in rural Western Kenya, on the use of ANC services and delivery services it was found that eighty percent of women delivered outside a health facility; among these, traditional birth attendants assisted 42 percent, laypersons assisted 36 percent, while 22 percent received no assistance. Factors significantly associated with giving birth outside a health facility included: being aged over thirty, low socio-economic status, having less than eight years of education, and being over an hour walking distance away.[48]

Women's status in the immediate and extended family generally underlies and shapes the decision to seek care. Many studies show that women cannot and do not decide on their own to seek care; the decision belongs to a spouse or senior members of the family. In a survey in six Senegalese regions, 52 percent of the respondents said the decision would be made by the husband and 44 percent said another family member would make the decision.[28]

In an anthropological fieldwork in the Bangladesh village of Miapur among Bengali Muslims and Hindus, on the beliefs, rituals, prescriptions and rituals of birth, the 200 family group studied was largely illiterate farmers with some employed in a sugar mill or railroad. Childbirth is considered a natural event with social and religious ramifications, not a medical event. Women

work hard up to delivery, and give birth at home or outside, stoically and without embarrassing preparations. About 1/3 deliver unassisted, and the rest either accept help from relatives (considered dais) or may call practicing dais. Women do recognize complications of labour, except for hemorrhage which they believe is purifying, and of diseases such as tetanus, but are not likely to ascribe western causes or call for medical help for them.[49]

In a study conducted among the Yoruba of South-West Nigeria (Osun State) to examine the role of men in emergency obstetric care, as men determine whether and when their spouses visit health clinics in most cultures. There was high level of awareness of emergency obstetric conditions by men, particularly in relation to pregnancy signs and labour pains (53.2%). Respondents reported that men play useful roles during their partner's obstetric conditions (89.2%). Women take decisions on health-seeking behaviour during emergency obstetric conditions in the absence of the male partner. Education is found to be the major determinant of this change in male knowledge and behaviour.[50]

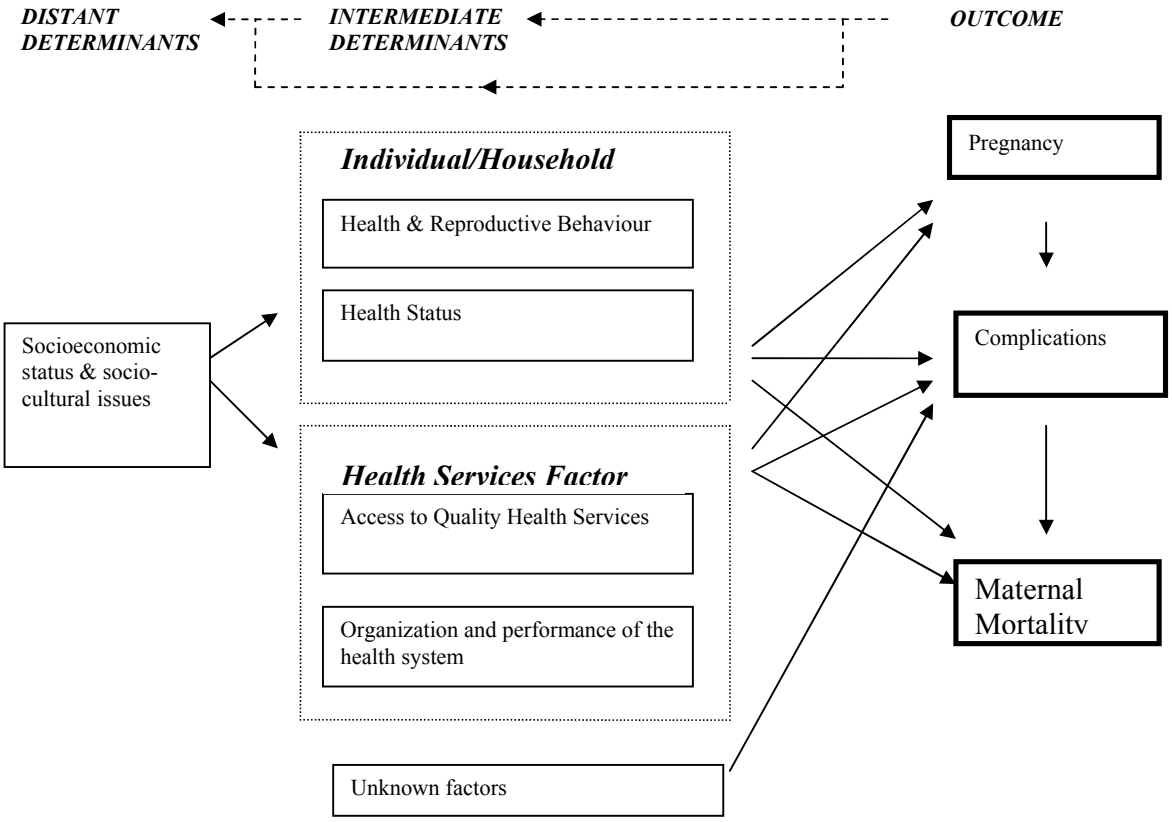
Yet in another study carried out in South Western Nigeria, it was discovered that androcentric behaviour is a major determinant of pregnancy outcome, since men have almost absolute control over the choice of health care facilities used during pregnancy, the condition under which delivery takes place, dieting during pregnancy, and the types of action taken in emergency obstetric conditions. And the study found that most men lacked knowledge of what constitutes emergency obstetric conditions, appropriate actions to be taken, and a shallow knowledge of pregnancy, fertility and family planning.[51]

2.6.2 ANALYTICAL MODEL

This model devised by Maine and McCarthy attempts to give a framework to encompass all the major factors that affect maternal mortality. It separates these factors into *distant factors* (socioeconomic status) which act through *intermediate (or proximate)* factors (health and

reproductive behaviour, health status, access to health status, unknown factors) in turn influencing *outcomes* (pregnancy, complications, maternal mortality). The framework follows other models which are based on the premise that the social and economic determinants of mortality (here maternal mortality) necessarily operate through a common set of biological mechanisms and proximate determinants to exert an impact on mortality.[11,32]

Figure 2.2: Framework for analyzing the determinants of maternal mortality[11,32,52]



OUTCOME

Pregnancy is a prerequisite of maternal death. Therefore, factors that influence the incidence of pregnancy will also influence levels of maternal mortality. Once a woman is pregnant, complications may develop which need to be prevented or effectively treated in order to reduce maternal mortality. If complications are not successfully treated, then maternal death may be the final outcome.[32,52]

INTERMEDIATE FACTORS

The intermediate factors identified by the model are:

Health and reproductive behaviour

Health behaviour: This is taken to mean actions that people do or do not take for the sake of their health, such as attending pre-natal care, or seeking help when complications ensue.

Reproductive behaviour: They include age, pregnancy order and birth spacing as well as wantedness of pregnancy.[11]

Age: The age of a pregnant woman affects her chances of dying a maternal death. This is due to a range of biological and social factors. For instance, young women may be at increased risk of obstructed labour, if their pelvic are not mature. Older women may have accumulated health problems like hypertension and diabetes which cause obstetric problems.[32]

The greatest risk of MMR was among young teenagers (<15 years) and older women (> 40 years). Parity-specific maternal mortality ratio was highest in the grand multiparous women.[22]

A study in Egypt showed that every 1 year increase in age increased the risk of prolapse by 7%.[53] Young unmarried pregnant women may likely resort to illegal abortion due to social factors.[12]

Pregnancy order (parity): Women having their first pregnancy are more likely to die a maternal death than women having their second or third. With the fourth child the risk rises again.[32]

Birth spacing*:* Recent evidence from Latin America shows that women who experience birth intervals of less than 15 months have 2.54 times increased risk of maternal death. They also experience an increased risk of third-trimester bleeding, premature rupture of the membranes, and anemia compared with women who experience 27–32 months between births.[54]

Wantedness of pregnancy*:* Women with unwanted pregnancies may be more likely to seek illicit abortion, or less likely to seek health care, thereby increasing their risk of a maternal death.[32]

Health status

The health status of a woman may affect the likelihood that she will develop complications during pregnancy and also her ability to survive these complications. Health status is itself affected by a range of factors, both distant and intermediate. Anaemia is a health status factor which is influenced by other factors, for example it may be the result of a lack of money to buy food, or its persistence may be the result of a lack of access to health services which can correct anaemia[32]. Women with severe anemia are particularly at risk and have a 3.5 times greater chance of dying than women without anaemia.[55]

Viewing women's health across the life cycle, it is clear that the health status of pregnant women is affected by their experience earlier in life. Particularly significant is the nutrition of girl children. For example, where girl children are undernourished, sometimes due to gender bias in food allocation, their growth may be stunted leading to the likelihood of complications in pregnancy.[56] Women who are stunted from malnutrition during childhood are at greater risk of needing an assisted delivery than taller women.[57]

HIV/AIDS is another health status factor which may be increasingly important in influencing the incidence of maternal mortality. Pregnant women with HIV are more prone to the complications of pregnancy.[58]

Women whose immune systems are already under attack through full blown AIDS may be less likely to survive the complications of pregnancy. Some drugs for the treatment of AIDS may be inappropriate for pregnant women. HIV infected blood is a major problem for women receiving

blood transfusions as treatment for pregnancy complications. Women with known HIV/AIDS may be more inclined to seek illicit abortions.[58]

HEALTH SERVICE FACTOR

Access to health services

Access to health services is a complicated concept covering many different issues, including whether adequate facilities exist (e.g. adequate supplies and personnel, good quality of care), and also if people can reach the services given (e.g. cost, distance, information).[32,52]

Access to information

If women are to make effective use of the medical resources available, they need to know when to seek help. This knowledge is often lacking.

The proportion of women that have no access to any mass media in the urban areas was about three times that of men (18.7 % compared to 6.3% in urban areas and 52.5 % compared to 22.6 % in the rural areas) in a study conducted in Nigeria.[11]

In rural Senegal, some important indications of obstetric problems were not recognized as danger signals. For example, some women reported that fever, dizziness and pallor are part of a normal pregnancy.[32,52]

Quality of Care

One component of high-quality care is the presence of qualified personnel. The proportion of deliveries assisted by a skilled birth attendant (SBA) has become an indicator for measuring maternal mortality reduction, including the 75% reduction called for by the fifth Millennium Development Goal (MDG-5). WHO defines an SBA as someone "trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period, and in the identification, management and referral of complications in women and newborns".[59] Since treatment of the complications that cause most maternal deaths require

skilled medical intervention, shortages of physicians, nurses and trained midwives in developing countries – particularly in rural areas – contribute to maternal deaths. In Asia and sub-Saharan Africa, only one skilled attendant is available for every 300,000 people, resulting in a ratio of one skilled attendant for every 15,000 births.[36]

NDHS 2008 reported that only 58% of pregnant women received antenatal care at least once from a trained provider, while 35% delivered in health facilities. The proportion of pregnant women that had skilled attendant at delivery was 39%.[18]

A study in East Africa discovered that, only an estimated one in 10 women who needed an emergency caesarean section obtained one.[32]

Accessibility

In Malawi, 90% of women in a study wanted to deliver in a health-care facility, but only 25% of them did, those who did not citing distance and time as major obstacles.[60]

A study from Pakistan shows that, in a large referral hospital in Karachi, 118 mothers who had been brought dead to the hospital lived within an 8 km range of the hospital. Social and cultural factors (of patients and first-line providers) played the most significant role in preventing timely referral to the hospital.[61]

Affordability

A low level of public expenditure for health services and, particularly, maternal health services is a major problem for many developing countries. Pressure to achieve financial services often translates into increasing a household's financial burden through user fees, out-of-pocket payments, and other cost-recovery mechanisms. Families that are already too poor to pay for normal childbirth procedures are overwhelmed and suffer catastrophic financial consequences as they try to support the costs of emergency medical care.[62]

In the teaching hospital in Zaria, northern Nigeria, patients and their families used to buy essential supplies (such as drugs, gloves and sutures) before treatment could begin. This was one reason why the waiting time from admission to surgery for obstructed labour has increased in recent years – from 3.5 hours in 1983 to 6.9 hours 1989.[32] After the interventional study of the Prevention of Maternal Mortality Network 1995, the mean admission to treatment time interval reduced by 57 % to 1.6hrs and an EmOC pack system was instituted, this contains surgical consumables for major obstetric complications. Patients either pay before surgery or (in emergencies) after, in which case an emergency voucher is utilized.[63]

In Uganda, a study showed that the costs for medical supplies were significantly higher than the actual user fees (15,000 shillings compared to 3,000 shillings) and that, if the pregnant woman and her family cannot cover these hidden costs, she is likely to receive poor quality care during her delivery.[36]

UNKNOWN FACTORS

Unknown factors are included as a category in the model to cover the fact that a proportion of obstetric complications cannot be accounted for by any of the known risk factors. Also it is not always clear why one patient may live and another dies following complications even when their conditions and treatments were similar.[32,36,48,52]

DISTANT FACTORS

Socio economic status

In this model, socioeconomic status affects a woman's chances of dying a maternal death by working through the intermediate factors. Mortality is almost always higher among the poor and disadvantaged than among the wealthy, and this is also true of maternal mortality.[11,32,52] Gender has a powerful influence on reproductive decision-making and behavior. In many developing countries men are the primary decision-makers about sexual activity, fertility, and contraceptive

use. Men are often called "gatekeepers" because of the many powerful roles they play in society—as husbands, fathers, uncles, religious leaders, doctors, policy-makers, and local and national leaders. In their different roles men can control access to health information and services, finances, transportation, and other resources.[64] A study of more than 3,000 urban Nigerian couples found that, while men do not dominate decision-making, they still wield more power than women do. Men and women were asked who decides such matters as family size, when to have sex, and how long periods of sexual abstinence should last. Close to 60% of men said that they decide, and 40% to 50% of women agreed that men decide (119).[65] The higher the mother's educational status, the more likely she is to receive ANC services from a health professional; 31 percent of mothers with no education received ANC services from a health professional, compared with 97 percent of mothers with more than a secondary education.[18]

Studies in Bolivia showed that differences between the poor and the rich in the proportion of clients using health services are large for all services, but they are the greatest for the use of modern contraception and skilled attendance at delivery: the rich-poor ratio is 6.4 for contraceptive prevalence and 4.9 for skilled attendance at delivery. Relatively less inequity occurs for immunization (rich-poor ratio: 1.4) and antenatal care (rich-poor ratio: 2.5). Although averages for the use of safe motherhood health services (antenatal care and skilled attendance at delivery) are above 50%, they mark the low levels of health-care utilization by the poorest people.[36]

The proportion of births for which professional antenatal care was received and the proportion of births attended by a professional for the five wealth groups and ranked by each country's mean, among the richest quintile, use of antenatal care and professional delivery care reaches levels of 80% or higher, irrespective of the average level in the country, with a few exceptions (Bangladesh, Chad, Nepal, Pakistan, Yemen). Use of these services is much lower among poorer

women. Wealth and maternity care are linked across the entire wealth hierarchy within countries, with each progressively poorer group having progressively lower use. Importantly, poor–rich inequalities in professional delivery care are much larger than those in antenatal care. Whereas professional delivery care among the poor is below 30% in many countries, antenatal care is at least 30% in most countries.[66]

2.6.3 LIMITATIONS OF THE MODELS

3 Delay Model

The 3 delay model as proposed by the Prevention of Maternal Mortality Network actually simplifies the understanding of the barriers a pregnant woman goes through before accessing emergency obstetric services. The delay to seek care recognizes the various barriers a woman goes through before deciding to seek health care services. While the distance is an interplay between the decision to receiving care and actual receiving of the care. It is an easy way of understanding where maternal death occurs; at home, on the way to seeking help to save her life and at the health care facility.

It allows for focused intervention at each level of delay, for example, delay to seek care can be prevented by Information Communication and Education (ICE), advocacy visit to Gate keepers within the community, empowerment of women within the community. 2nd delay intervention may constitute the involvement of Road Transport Workers, improvement of road networks, proper sighting of health care facilities, community birth preparedness plan, use of telecommunications, use of Riders where the road terrain is poor. 3rd delay intervention may be to improve manpower, infrastructures, scale up on technical capacity.

Despite the above, the model has the following drawbacks: It is over simplified in its explanation of barriers to receiving EmOC. Role and status of women in the community is not well emphasized, currently a 4th delay is being proposed: *Failure or delay in recognition of warning*

signs of obstetric complication.[6] Dynamics of the 2nd delay goes beyond just the distance to the health care facilities. Sighting of health care facilities is affected by good road networks. Good road network improves the transport system which in turn increases the transport of goods and services, increase in community infrastructures (such as schools, potable water, good waste disposal system), reduction in women house hold chores, improvement of average house-hold income and nutritional status of women, increased access of female to education. These will encourage health workers to move to rural community thereby increasing access to skilled birth attendants.

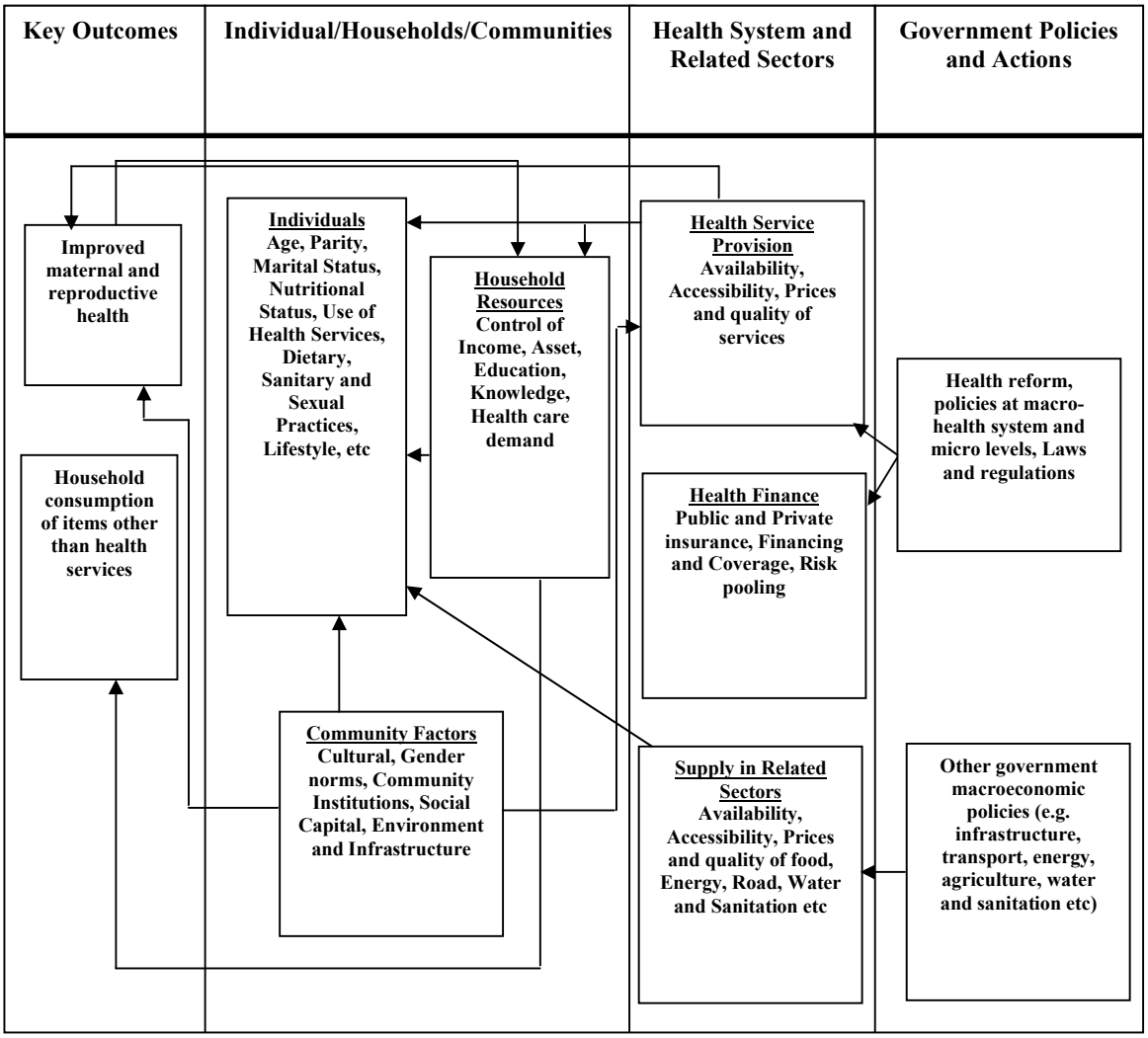
The supply side of health care is not well highlighted in the 3rd delay. It is affected by macro/micro policies, laws and regulations, political commitment to improvement of health care financing, stable political environment, all these affects access to health care services.

Analytical Model

Maine and McCarthy used this model to examine a range of safe motherhood programme options, illustrating with a hypothesized chain of effects for each strategy, what works to reduce maternal deaths. However they leave the distant factor of socioeconomic status quite vague in the model. The model maps out the relationships between factors as linear and suggests that socioeconomic factors act through intermediate factors. However, distant and intermediate factors can operate together, rather than the purely uni-directional causality of distant to intermediate that the model suggests. Distant factors may not be so distant, and labeling socioeconomic status as such may mean that its importance is ignored. Further problem is that by looking at the effects of different strategies, Maine and McCarthy use the model with a starting point of the supply side factors in health service provision, leaving the demand side factors secondary or unexplored. Women are thus positioned by this framework as passive objects, who are either the recipients of services or victims of external factors.[52]

Gender analysis suggests that it is equally important to consider the demand-side factors relating to the utilization of health services. The links between socioeconomic status, health behaviour and access to health services need to be better understood. How do women's positions in households and communities relate to their abilities to seek adequate health care for themselves, thereby preventing maternal death?[52]

Table 2.3: Determinants of reproductive health-sector outcomes[36]



2.7 INTERVENTIONS TO REDUCE MATERNAL MORTALITY

The Safe Motherhood Initiative

In 1987 the World Bank, in collaboration with WHO and UNFPA, sponsored a conference on safe motherhood in Nairobi, Kenya to help raise global awareness about the impact of maternal mortality and morbidity. The conference launched the Safe Motherhood Initiative (SMI), which issued an international call on action to reduce maternal mortality and morbidity by one half by the year 2000. It also led to the formation of an Inter-Agency Group (IAG) for Safe Motherhood, which has since been joined by UNICEF, UNDP, IPPF, and the Population Council.[24]

The SMI's target has subsequently been adopted by most developing countries. Under the Safe Motherhood Initiative, countries have developed programs to reduce maternal mortality and morbidity. The strategies adopted to make motherhood safe vary among countries and include: Providing family planning services, providing post abortion care, promoting antenatal care, ensuring skilled assistance during childbirth , improving essential obstetric care, and addressing the reproductive health needs of adolescents.[24] National Safe Motherhood conference was launched in Nigeria in 1990. SMI programme in Nigeria includes: delay in child bearing, prevention of unwanted pregnancy, addressing unsafe abortion, ensuring skilled birth attendants at delivery, improving access to maternal health services, improving the quality of maternal health services and women's empowerment and prevention of harmful traditional practices.[67]

Women and Children Friendly Health Services

In order to reduce maternal and child morbidity and mortality, a regional initiative, Vision 2O10 was launched in Bamako, Mali that promotes the following strategies: improving infrastructure and availability of resources; improving technical skills and capacity building; ensuring available and affordable drugs; assuring quality care and user friendliness; ensuring community participation and ownership. This was initiated under the environment of lack of user-friendliness and deficient quality of care which did not help the access and effectiveness of these activities. This was mainly caused by: inconvenient opening hours; non-availability of drugs, vaccines and supplies; obsolete or missing equipment; unfriendly health providers and poor skills of health provider; erratic and inadequate supply of water and electricity and inadequate number of skilled staff.[68]

Integrated Maternal, Newborn and Child Health

It is a national strategy to achieve MDG 4 & 5. A holistic approach to reorganization and reorientation of the Health System to ensure delivery of evidence-based, essential set of

interventions which will provide continuum of care for women, newborn and childhood achieving high coverage of the target groups using integrated Maternal, Newborn and Child Health services.[23]

2.8 WHY IS THERE PERSISTENT HIGH MATERNAL MORTALITY RATE IN NIGERIA?

Safe motherhood initiation was launched in 1987, fully 2 decades the main primary goal was to reduce the number of maternal deaths by half by year 2000. Yet, new estimate of maternal mortality indicates that globally in 2005, some 536,000 women died from complications of Pregnancy and Labour, 7,000 less than earlier estimates (1990) had suggested.

The fifth MDG aims to improve maternal health and targets reducing MMR by 75% between 1990 and 2015 – that is, it seeks to achieve an expected 5.5% annual decline in MMR from 1990.[17] However, maternal mortality (as measured by MMR) has decreased at the global level at an average of less than 1% annually between 1990 and 2005. Moreover, on the regional basis, none of the MDG regions achieved 5.5% between 1990 and 2005, although Eastern Asia came close to that goal with a 4.2% annual decline.[19] To make the achievement of the fifth MDG a reality, MMR will have to decrease at a much faster rate – especially in sub-Saharan Africa, where the annual decline has so far been about 0.1%.[17] The realization of this goal will require increased attention to improved health care for women, including prevention of unplanned pregnancies and unsafe abortions and provision of high-quality pregnancy and delivery care, including emergency obstetric care.[69]Data on the second indicator identified for monitoring progress towards achievement of maternal mortality reduction – that is, the proportion of births attended by skilled health personnel (doctor, midwife, or nurse) – indicate that the receipt of such care is limited where maternal deaths also constitute a major problem.[19] In Africa, less than 50% of births are attended by a skilled health worker, according to most recent available data – despite an increase from 43% to 57% between 1990 and 2005 in all developing regions, as

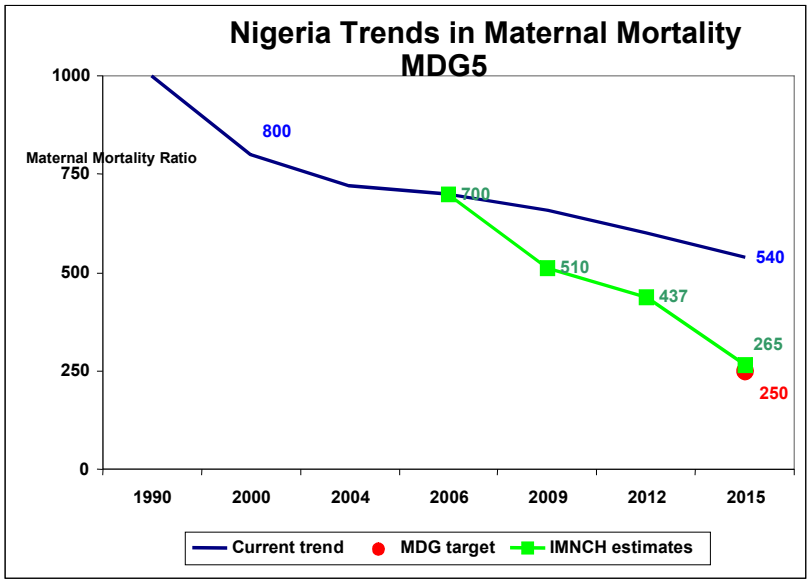
indicated by the 2007 Millennium Development Goals Report.[70] These figures are far lower than the global target for this indicator, which was set at a special session of the United Nations in 1999. This global target aims to assure that at least 90% of births worldwide be attended by skilled health personnel by 2015.[19]

The figures for both indicators identified for measuring maternal mortality suggest that much needs to be done to accelerate progress towards the achievement of MDG5.

Until recent, the focus of safe motherhood programs in Nigeria had been majorly on delivery of maternal services other than emergency obstetric care.

Achieving the MDG 5 is very paramount to reducing maternal mortality, but currently the high MMR has been attributed to the following challenges faced in Nigeria; Political, Economic, Social and Cultural. These challenges are inimical to achieving MDG 5 by 2015.

Figure 2.3: Reaching MDG5 in Nigeria?



The leadership and governance crisis

This has left the constitution silent on roles and responsibilities of levels of government on health; Lack of coordination between the different levels; Political commitment more, where it is likely to yield greater dividends; Government policies hardly translated to action and issues of corruption. There is periodic discontinuation of policy and programme direction, due to change of governments. High dependence on donor driven programmes and the current slight of focus to HIV / AIDS to the exclusion of other maternal and child health assisted programmes.[12,71]

Financial challenges

WHO recommends 5% of budget to health, and Abuja Plan of Action, Health Financing: Strategy for African Region reiterated in Maputo Declaration on Health Financing in Africa Region is 15 %, MCH is $34/capita. Far from actualizing this, the proportion of public expenditure on health as % GDP is 1.7% in 2007. Out of pocket account for 70% of health expenditure; this limits access and which shows there is low political commitment translating to low budget allocation.[71]

Human Resources for Health challenges

Nigeria has substantial human resources for health, but distribution is skewed towards urban and southern population. There is wide patronage of the private sector which is poorly regulated - some staff are not well trained. Even where services are free in public sector, challenges of negative attitude of health workers and weak strategic human resource management are being faced.[12]

Health Services delivery: Infrastructural and service delivery challenges

Vehicle through which community's health status is improved. Health service delivery is characterized by low performance; dearth of basic resources; inequitable resource distribution; decaying infrastructure; gaps in mix, quality and distribution of health workers. Only 18.5 % of

facilities provide EOC; fragmentation and verticalization of services; unavailability of standard operative procedure and treatment protocols, except for few control programs; lack of definition of essential services and non implementation of maternal and child health programme; weak referral system; poor involvement of private sector; poor monitoring and evaluation, supervision and poor coverage with interventions.[71]

Social and cultural challenges

There is economic recession in Nigeria; More than 70% are poor living on less than $2/day;Low level of female education especially in northern and rural parts of Nigeria; Cultural practices inimical to health (male dominance, cultural preference for home deliveries in some parts, cultural treatment modalities etc). All these limit demand and access to health care services.[71]

CHAPTER THREE

METHODOLOGY

3.1 Background Information

3.1.1 Background to Kaduna State

Kaduna State is in the North West geographical zone of Nigeria. It is the twelfth largest state in Nigeria accounting for 5% (46,000 sq km) of Nigeria's total land mass. It is culturally diverse with ethnic and religious groups.

The state has an estimated population of 6.12 million (2006 census[70]) with a population density of 125 people per sq km and an annual rate of increase of around 3%, (The population in 1991 was estimated at 3.9 million) Kaduna is the third most populous state in Nigeria. Nearly 2 million people live in the two towns of Kaduna and Zaria.

The Capital is Kaduna Town and the state has 3 senatorial zones, 23 Local Government Areas with 255 political wards. Provision of services tends to be based on LGA structure. This has implications for the provision of facilities and services in the state.

Women and Health Equity

In Kaduna State, many women are not empowered enough to express their health needs and issues. The major barrier for women to achieve good health and well-being is inequality between men and women. Women have different and unequal access to and use of basic health resources for the prevention and treatment of a range of diseases and for the protection, promotion and maintenance of their health. The lack of effective obstetric services, particularly for emergencies is of particular concern.[14]

Health Needs and Health Services

Kaduna state has unacceptable high mortality rates and burden of diseases profile. In 2003 infant mortality rates (IMR) was 115 per 1000 lives birth; under-fives mortality (U5MR) was 205 per 1000 live births and maternal mortality ratio (MMR) was 980 deaths per 100,000 live births. More alarming is the fact that these figures represent a worsening trend over the previous five years. Corresponding figures for 1999 and 2004 were 911 and 950 respectively.[14]Each local government in Kaduna state has a general hospital and each ward has at least one PHC facility, the state has a specialist hospital and a federal teaching hospital.[13]

A wide range of services are provided under Maternal Health programme though very few facilities actually provide the full range. MCH services listed below are to be provided free under the policy in state government owned health facilities. The package constitutes the basic care to ensure safe delivery for every mother using the services.

Free Maternal Care Package; Antenatal care, treatment of anaemia, treatment of malaria, education on essential maternal and child care skill, basic laboratory investigations, normal delivery care, laboratory test, drugs, emergency obstetric care, consumables ; including blood bag.

3.1.2 Brief History of Kaduna North Local Government Area

The Local Government Area is situated within the Sahel savannah region of the country with an annual rainfall of 50 centimeters with land mass of 4,5567sq kilometers.

The main ethnic groups in the area are Hausa, Gbagyi (Gwari) and Fulani, although other inhabitants include Kadara, Jaba, Bajju, Kagoma, Kagoro, Atyab, Kamanton, Ikulu, Moroa, Numana, Gwandara, Kaningkon, Fantsam Mada, Ayu and Nimzan, which are major ethnic groups of the state. Others are Igbo, Yoruba, Idoma, Tiv, Lantang, Kanuri, Jukun, Igala, Nupe, Dakarkare, Benin, Efik and all other tribes that exist in Nigeria.

The major occupations of the Local Government Area are:

Commercial undertakings, Civil service, Farming, Agricultural products of the Local Government Area include maize, rice, beans, fish, vegetables, fruits, dairy products and animal rearing.

Population per 2006 census[72] - 364575

Male - 177500

Female - 187075

Maternal Health Programme

Kaduna North LGA had a total of 74 health facilities; 15 public health facilities, 1 missionary, 3 military, 2 police and 53 private health facilities. Fifty seven of these facilities offer maternal health services. All the PHC facilities offer the free maternal and child health services. Situated in the local government area is the state's ministry of health and the National blood transfusion services.[73]

3.1.3 Brief History of Ikara Local Government Area

Ikara LGA is situated in the North-Eastern part of Kaduna State and one of the 23 LGAs in the state. It shares boundaries with Makarfi LGA to the north –west, Kubau LGA to the west and Kano State to the east.

Population per 2006 census[72] - 194,723

Male - 99,125

Female - 95,598

There are seven administrative and traditional districts with district heads and 10 health wards, 82 communities and 715 settlements comprising of 10 political wards. The majority of the populace are Muslims, and farming is the major occupation with the predominant tribe/ethnic groups been Hausa and Fulani. There is a good road network leading to most districts/ ward

headquarters but with some difficult terrain leading to some communities/ settlements most especially in peasants and nomadic settlements.

Maternal health services

Ikara LGA had a total of 55 health care facilities; 37 PHC and health clinics, 1 secondary health facility and 17 private facilities. Thirty nine health facilities offered MHS; the secondary health facility and 5 out of the 21 PHC facilities offering MCH services offer free maternal and child health services.[74]

3.2 MATERIALS AND METHODS

3.2.1 Type of study

It is a cross sectional descriptive study.

3.2.2 Sample size

All facilities offering maternal services.

3.2.3 Sampling method

List of urban settlements in Kaduna State which served as the sample frame, one urban settlement was randomly selected using simple random sampling.

Simple random sampling was also used to select the rural settlement from a list of rural settlement .which served as sample frame.

3.2.4 Study population

To provide an estimate in line with the stipulations of the international guidelines by UNICEF/ WHO/ UNFPA, the study covered all health facilities belonging to either the public (primary, secondary and tertiary) or private sector in the Kaduna North LGA and Ikara LGA. The study included all health facilities which provide any form of maternal health services (MHS): antenatal, deliveries or postnatal services. Exclusion criteria include patent medicine vendors,

traditional health care outlets. Kaduna North LGA is cosmopolitan, located in the central senatorial zone, while Ikara LGA is rural, located in the northern senatorial zone.

3.2.4 Instrument and method of data collection

A set of tools proposed by Guidelines for Monitoring the Availability and Use of Obstetric Services with little modification as proposed by FMOH, Nigeria[10] was used for appraisal of health facility performance and adapted for the study. The appraisal tool looked at six key areas:

- Availability of EmOC
- Accessibility of EmOC
- Proportion of birth that takes place in EmOC facilities
- Met needs for EmOC
- Proportion of birth that is by caesarian section
- Case fatality rate

It is divided into the following sections:

Form 1: Used to obtain a listing of available health facilities in the Kaduna North and Ikara local government areas and the services they provided, with main focus on maternal health services.

Form 2: Health facility based data collection instrument. Questionnaires were administered to health workers which focused on collecting detailed information on availability, utilization and performance of EmOC services and consisted of three sections:

Section A: **Facility review** – This focused on available MHS, personnel and infrastructure, which formed the basis for deciding whether a facility met the internationally set standard with respect to basic and comprehensive emergency obstetrics care.

Section B: This provides summary of health service data on obstetric complications, maternal deaths, number of deliveries for each facility.

Section C: Checklist of available instruments and drugs essential to EmOC.

Quantitative method of data collections was carried out in all the public and private health facilities providing maternal health services. In order to construct the process indicators, 3 kinds of data are needed: Population data, data on birth rates and health facility data. Health facility data were collected through a two-stage process. The first stage was to provide relevant information on the available health facilities in each local government area. The second stage focused on collecting information regarding available services, staff, equipment and supplies relevant to EmOC.

Available hospital records between 1st of January 2009 and 31st of December 2009 and a checklist were used for summary of health service data.

3.2.5 Data quality control

A week-long training for the research assistants was conducted before the commencement of data collection; six research assistants were recruited for the data collections, three medical officers and three community health extension workers. The criteria for selection was based on the research assistants having worked in the local government of interest, had knowledge of the terrain and were all health workers. The questionnaires were pre-tested to assess the research assistants' appreciation and understanding of the questions, the suitability of the questionnaires addressing the study objectives, followed by demonstration of instruments to be assessed and health facility register on delivery, admission and operation. Data from facilities were collected in stages, starting with Kaduna North LGA then Ikara LGA. Data collection period was between February 2010 and April 2010. Field supervision was conducted by the researcher during the

data collection and all questionnaires were reviewed for completeness and correctness of recording.

Data validation was done at the end of each day by the researcher and the research assistants.

3.2.6 Data Analysis

At the inception of study the status of health care facilities were roughly assessed for the facilities' ***possible status*** based on the following criteria:

1. Conduction of ANC services only,
2. ANC and vaginal delivery alone,
3. ANC with both vaginal deliveries and operative deliveries.

Facilities offering (1) were classified as not emergency obstetric care (NEmOC) facilities; facilities offering (2) were classified as Basic emergency obstetric care (BEmOC) facilities while facilities offering (3) were classified as Comprehensive emergency obstetric care (CEmOC) facilities. These rough assessments were done to understand how facilities were viewed in terms of their adequacy in the management of emergency obstetrics cases.

Facilities' *actual status* was assessed on the basis of performance of signal functions as specified in the guidelines. The facilities were classified into whether they met standards prescribed for Basic Emergency Obstetrics Care (BEmOC) or Comprehensive Emergency Obstetric Care (CEmOC) and those that did not met the standard were classified as Not Emergency Obstetric Care (NEmOC) facilities. However, whereas the international guidelines had focused on the performance of such services within the last 3 months to the data collection exercise, the definition used in this study, based on the previous study carried out by FMOH of Nigeria[10], was the "routine performance (i.e. the facility has the capability of performing the required signal function when the need arises)" of signal functions. This modification is likely to provide a more complete picture of available EmOC facilities, bearing in mind that certain functions may not

have been performed in the last three months prior to study based on the geographical location, demographic factors and service utilization pattern. Thus, the modification is likely to minimize "false negatives".

On the other hand, in order to ensure that facilities be classified as meeting EmOC standard were truly so at the time of the study, information on availability of key relevant functional equipment for the performance of the signal functions (particularly vacuum and/or forceps for assisted vaginal delivery) and health personnel were also used to determine the true capacity of the facilities to perform the signal functions at the point in time. This approach thus enables us to minimize "false positives".

The working definition of the various obstetric complications was based on definitions derived from WHO and International Federation of Gynecology and Obstetrics Save the Mothers Projects.[75] Collecting hospital data on obstetric complication was from the available records such as delivery registers, theatre records and hospital admission records. Where data are not available, a correction factor of 1.25 multiplied by the number of abnormal deliveries was used to calculate the number of women with obstetric complications.[3]

Data was analysed using the Epiinfo. Some relevant population data necessary for calculating specific indices such as population size and crude birth rate were obtained from National Population Commission[72] and National Health Demographic Survey[76] respectively.

Test of statistical significant for qualitative data was done using X^2 test with p –value set at 5% α – level.

The data are presented in tables and charts.

Each indicator was derived as follows;

Indicator 1: Availability of EmOC facilities

For every 500000 population there should be at least 4 BEmOC and 1 CEmOC facilities.

To calculate the number of BEmOC and CEmOC required to meet WHO minimum standard for the study population (indicator 1):

In Kaduna North LGA,

The population of Kaduna North LGA as at the last census, 2006 was 364,575.[72] The number of BEmOC and CEmOC facilities required to meet the UN minimum standard for the population is:

364,575/500,000 = 0.73

Minimum acceptable level of BEmOC facilities x 0.73

4 x 0.73 = 2.92 (approx 3 BEmOC facilities)

Minimum acceptable level of CEmOC x 0.73

1 x 0.73 = 0.73(approx 1 CEmOC facility)

3 BEmOC and 1 CEmOC facilities per 364575 populations was required to meet UN standard for both availability and coverage of EmOC in Kaduna North LGA.

In Ikara LGA,

The number of BEmOC and CEmOC facilities required to meet the guidelines' minimum standard for the population (194723) is:

194723/500000 = 0.39

Minimum acceptable level of BEmOC x 0.39

4 x 0.39 = 1.56 (approx 2 BEmOC facilities)

Minimum acceptable level of CEmOC x 0.39

1 x 0.39 = 0.39 (approx 1 CEmOC facility)

Therefore 2 BEmOC and 1 CEmOC facilities per 194723 populations was required to meet the guidelines' standard for both availability and coverage of EmOC in Ikara LGA.

Consistency in the availability of EmOC services according to the FMOH is determined by 24 hours of service in the health care facilities and the presence of at least 4 midwives. These plus the above signal functions make up the Nigerian guidelines for EmOC services.

Indicator 2*: *Geographical distribution of EmOC facilities

Values for indicator I is approximated for indicator 2

Indicator 3*: *Proportion of all births in emergency obstetric facilities

At least 15 % of all births in the population should take place in EmOC facilities

In Kaduna North LGA,

The estimated births for the population in Kaduna North were:

Projected *population* for the year x Crude birth rate[76]

364575 x 41.9/1000 = 15,276.

Proportion of births in EmOC facilities (%):

$$\frac{\text{Number of births in EmOC facilities}}{15276} \times 100$$

In Ikara LGA,

The estimated births for the population in Ikara LGA were:

Projected population for the year x Crude birth rate

194723 x 41.9 / 1000 = 8,159

Proportion of births in EmOC facilities (%):

$$\frac{\text{Number of births in EmOC facilities}}{8159} \times 100$$

Indicator 4: Met need for EmOC services

At least 15 % of pregnant women are expected to develop obstetric complication and 100 % of these women estimated to have obstetric complications should be treated in EmOC facilities.

In Kaduna North LGA,

Number of women expected to develop obstetric complications:

15/100x15276 = 2291.4

Met need for EmOC facilities in Kaduna North LGA (%):

$$\frac{\text{Number of women treated with obstetric complication in EmOC facilities}}{2291} \times 100$$

In Ikara LGA,

Number of women expected to develop obstetric complications:

15/100 x 8159 = 1224 (approx)

Met need for EmOC facilities (%):

$$\frac{\text{Number of women treated with obstetric complication in EmOC facilities}}{1224} \times 100$$

Indicator 5: C –Section as a percentage of all births

C-section should account for 5 % -15 % of all births

In Kaduna North LG;

$$\frac{\text{Number of c-section through out the year}}{\text{Estimated birth for year}} \times 100$$

Number of c-section through out the year /15276 x 100

In Ikara LGA,

Proportion of c-section in Ikara LGA (%):

$$\frac{\text{Number of c-section through out the year}}{8159} \times 100$$

Indicator 6; Case fatality rate:

The case fatality rate among women with obstetric complications in EmOC facilities should be less than 1 %.

$$\frac{\text{Number of maternal deaths}}{\text{Number of women treated with obstetric complications}} \times 100$$

Proportional mortality rate (PMR):

$$\frac{\text{Number of women who died of a particular health condition}}{\text{Number of direct cause of maternal deaths}} \times 100$$

Maternal mortality ratio (MMR):

$$\frac{\text{Number of maternal deaths}}{\text{Number of live births}} \times 100{,}000$$

3.2.7 Ethical issue

Ethical approval was collected from Kaduna State Ministry of Health Ethical Committee. Permission was obtained from the Kaduna North LGA, Ikara LGA, operators of private hospitals and mission hospitals. Only hospitals where consents were given to carry out the study were included. The respondents were reassured that all the information given would be kept confidential and used solely for the study

3.2.8 Limitations of the study

Very few studies on EmOC services using the process indicators had been done both at national and international level, therefore limiting the number of references made to previous works. Data on coverage of EmOC facilities (Indicator 2) are difficult to obtain, the minimum acceptable level for Indicator 2 is the same as Indicator 1. Not all the indicators were adequately evaluated due to poor records keeping in the health facilities such indicators include, Met needs for EmOC facilities. The study did not assess the use of partograph in health care facilities as a means of proper monitoring of labour. Case fatality rate was calculated for only referral facilities that are public health care facilities.

CHAPTER FOUR

RESULTS

4.1 AVAILABILITY OF MATERNAL HEALTH SERVICES

In Kaduna North LGA, a total of 74 health care facilities operated in the local government; of which 15 were public health care facilities, 53 private health care facilities, 1 mission hospital, 3 military hospitals and 2 police hospitals. In Ikara LGA, there were a total of 58 health care facilities: 38 public and 20 are private health care facilities. A total of 132 health care facilities operated within both LGAs.

Table 4.1: Distribution of all health services by ownership in Kaduna North and Ikara LGAs

LGA	Health Facility Type					Total
	Private Freq. (%)	Mission Freq. (%)	Military Freq. (%)	Police Freq. (%)	Public Freq. (%)	
Kaduna North	53(71.6)	1(1.4)	3(4.1)	2(2.7)	15(20.3)	74
Ikara	20(34.5)	0(0.0)	0(0.0)	0(0.0)	38(65.5)	58
Total	73	1	3	2	53	132

A total of 57 (77%) out of 74 health care facilities and 39 (67%) out of 58 health care facilities offer maternal health services (MHS) in Kaduna North LGA and Ikara LGA respectively.

Table 4.2: **Distribution of all maternal health services by ownership in Kaduna North and Ikara LGAs**

LGA	Private Frequency (%)	Public Frequency (%)	Mission Frequency (%)	Military Frequency (%)	Total
Kaduna North	41(71.9)	13(22.8)	1(1.8)	2(3.5)	57
Ikara	17(43.6)	22(56.4)	0(0.0)	0(0.0)	39
Total	58	35	1	2	96

In Kaduna North LGA, thirteen out of the 15 public health care facilities and 41 out of the 53 private health care facilities, 1 mission and 2 military health care facilities offered MHS services. In Ikara LGA, twenty two out of the 38 public health care facilities offer MHS services: 14 health clinics, 7 PHC and 1 general hospital while 17 out of the private care facilities offer MHS.

A total of 49 health care facilities out of 57 offering MHS were assessed in Kaduna North LGA; thirty five private health care facilities, 1 mission hospital and 13 public health care facilities (11 PHC, 1 general hospital and 1 specialist hospital). In Ikara LGA a total of 38 out of 39 health care facilities offering MHS were assessed: 22 public health care facilities including the general hospital and 16 privately owned health care facilities.

Both LGAs were noted to have had more facilities offering maternal health services than non maternal health services but Kaduna North LGA had more private health care facilities offering maternal health services than Ikara LGA. There was conspicuous absence of military and missionary health care facilities in Ikara LGA.

A total of 87 facilities were assessed in both LGA; 59.8 % (52) of the facilities were private health care facilities and 40.2% (35) were public health care facilities. Amongst the private health care facilities in both LGAs, there were no primary health care facilities in Kaduna North LGA when compared to Ikara LGA and there was absence of tertiary health care facility in Ikara LGA. Amongst public health care facilities, Ikara LGA had more PHC but no tertiary health care facility.

Table 4.3: Distribution of assessed health care facilities providing maternal health services by ownership and level of care in Kaduna North and Ikara LGAs

LGA	Private health care facilities				Public health care facilities				Total
	1^0	2^0	3^0	Subtotal	1^0	2^0	3^0	Subtotal	
Kaduna North	0	26	10	36	11	1	1	13	49
Ikara	7	9	0	16	21	1	0	22	38
Total	7	35	10	52	32	2	1	35	87

4.2 AVAILABILITY OF EmOC SERVICES

Table 4.4: Distribution of facilities by ownership based on their assumed EmOC status in Kaduna North and Ikara LGAs

LGA	NEmOC	BEmOC		CEmOC		Total
	Public Freq.(%)	Private Freq.(%)	Public Freq.(%)	Private Freq.(%)	Public Freq.(%)	
Kaduna North	4(8.2)	2(4.0)	7(14.3)	34(69.4)	2(4.0)	49
Ikara	6(15.8)	7(18.4)	15(39.5)	9(23.7)	1(2.6)	38
Total	10	9	22	43	3	87

The facilities were roughly assessed (as explained above) based on the services provided by them; 8.2% (4) of the health care facilities were found to be NEmOC facilities, 18.4% (9) were BEmOC facilities while 73.5 % (36) were CEmOC facilities in Kaduna LGA. In Ikara LGA, 15.8 % (6) of the health care facilities were found to be NEmOC facilities, 57.9 % (22) were BEmOC facilities while 26.3 % (10) were CEmOC facilities.

A higher percentage of facilities in both LGA were noted to have had assumed EmOC status, with a higher percentage of CEmOC facilities in Kaduna North LGA than Ikara LGA. All the private health care facilities in both LGAs had assumed status of EmOC facilities when compared to the public health care facilities which had 8.2% and 15.8% of the total facilities assessed as NEmOC facilities in Kaduna North and Ikara LGAs respectively.

Table 4.5: Distribution of signal functions in public health care facilities in Kaduna North and Ikara LGAs

Signal functions	Kaduna North LGA			Ikara LGA	
	1^0	2^0	3^0	1^0	2^0
	n= 11 Freq (%)	n=1 Freq (%)	n=1 Freq (%)	n= 21 Freq (%)	n=1 Freq (%)
I.V Antibiotics	5(45.5)	1	1	14(66.7)	1
I.V Anticonvulsants	3(27.3)	1	1	15(71.4)	1
IV Oxytocics	4(36.4)	1	1	15(71.4)	1
Manual removal of placenta	7(63.6)	1	1	15(71.4)	1
Removal of retained products of conception	0(0.0)	1	1	17(81)	1
Assisted vaginal delivery	0(0.0)	1	1	2(9.5)	0
24 hours of service	4(36.4)	1	1	3(14.3)	1
4 Midwives	3(27.3)	1	1	2(9.5)	1
Blood transfusion	0(0.0)	1	1	0(0.0)	1
C-Section	0(0.0)	0	1	0(0.0)	1

Distribution of signal functions according to the WHO guidelines and addition of 24 hours coverage of services and the presence of at least 4 midwives (according to the Nigerian guidelines) are as noted above. In PHC facilities in Kaduna North LGA, 45.5% of the facilities gave IV antibiotics, 27.3% IV anticonvulsants 36.4% IV oxytocics, 63.6% carried out manual removal of placenta, 36.4% operated 24 hours services and 27.3% had at least 4 midwives. In PHC facilities in Ikara LGA, 66.7 % of the facilities gave IV antibiotics, 71.4% IV anticonvulsants and IV oxytocics each, 81% carried out manual

removal of placenta, 9.5% performed assisted vaginal delivery, 14.3% operated 24 hours services and 9.5% had at least 4 midwives.

A higher percentage of the PHC facilities in Ikara LGA were noted to carry out the following signal functions: intravenous antibiotics, anticonvulsants and oxytocics than Kaduna North LGA. Manual removal of placenta was comparable in both LGA. Conspicuously absent in PHC facilities in Kaduna North LGA was the non performance of manual vacuum aspiration for removal of retained product of conception and assisted vaginal delivery. Both had low percentages of 24 hours service coverage and the presence of at least 4 midwives. The performance of signal functions in secondary health care facilities in both LGA were comparable except for the non performance of C-section in Kaduna North LGA and assisted vaginal delivery in Ikara LGA. All the signal functions were performed in the tertiary health care facility in Kaduna North LGA.

Table 4.6: Distribution of signal functions in private health care facilities in Kaduna North and Ikara LGAs

Signal function	Kaduna North LGA	Ikara LGA
	n=36 Freq.(%)	n=16 Freq.(%)
I.V Antibiotics	36(100)	16(100)
I.V Anticonvulsants	36(100)	16(100)
IV Oxytocics	36(100)	16(100)
Manual removal of placenta	36(100)	16(100)
Removal of retained products of conception	33(91.7)	11(68.8)
Assisted vaginal delivery	21(58.3)	2(12.5)
24 hours of service	36(100)	16(100)
4 Midwives	10(27.8)	0(0.0)
Blood transfusion	35(97.2)	9(56.3)
C-Section	34(94.4)	9(56.3)

In Kaduna North LGA, all the private health care facilities offered IV antibiotics, anticonvulsants, oxytocics and manual removal of placenta and 24 hours services. While, 91.7% carried out removal of retained products of conception, 58.3% carried out assisted vaginal delivery, 27.8% had at least 4 midwives, 97.2% carried out blood transfusion and 94.4% offered C- section. In Ikara LGA, , all the private health care facilities offered IV antibiotics, anticonvulsants, oxytocics and manual removal of placenta and 24 hours services. While, 68.8% carried out removal of retained products of conception, 12.5% assisted vaginal delivery, 56.3% offered blood transfusion and C- section but none had at least 4 midwives.

Both LGAs were comparable in giving IV antibiotics, IV anticonvulsants, IV oxytocics and the offering of 24 hours services, both had all the facilities offering the above mentioned services. Private health care facilities in Kaduna North LGA however, offered more of the remaining signal functions when compared to Ikara LGA. Overall, the private health care facilities offered more of the signal functions when compared with public health care facilities.

Table 4.7: Proportion of public PHC facilities that met Nigerian guidelines on BEmOC services in Kaduna North and Ikara LGAs

LGA	No of PHC facilities with BEmOC		No of PHC facilities with 24hrs service		No of PHC facilities with @ least 4 midwives	
Kaduna North	**Frequency**	**%**	**Frequency**	**%**	**Frequency**	**%**
(n=11)	0.0	0.0	4.0	36.4	3.0	27.3
Ikara (n=21)	2.0	9.5	3.0	14.3	2.0	9.5

None of the PHC facilities in the Kaduna North LGA met with UN guidelines for BEmOC. Only 36.4% (4) facilities had 24 hours coverage and 27.3 % (3) of the facilities had at least 4 midwives. None of them met with Nigerian criteria for EmOC, in Kaduna North both the secondary and tertiary health care facilities met with the Nigerian standard of EmOC. In Ikara LGA, 9.5 % (2) of facilities met with UN guidelines for BEmOC, 14.3% (3) of the facilities offered 24 hours coverage and 9.5 % (2) had at least 4 midwives. None of the facilities in Ikara LGA that were BEmOC met with the Nigerian criteria for BEmOC services. The secondary health care facility in Ikara did not meet with the Nigerian standard for EmOC.

Table 4.8: Distribution of facilities by ownership based on their actual status using WHO guidelines on EmOC services in Kaduna North LGA and Ikara LGA

LGA	Private health care facilities				Public health care facilities			
	NEmOC Freq. (%)	BEmOC Freq. (%)	CEmOC Freq. (%)	Total	NEmOC Freq. (%)	BEmOC Freq. (%)	CEmOC Freq. (%)	Total
Kaduna North	15(41.7)	1(2.8)	20(55.5)	36	11(84.6)	1(7.7)	1(7.7)	13
Ikara	14(87.5)	0(0.0)	2(12.5)	16	20(80.9)	2(9.1)	0(0.0)	22
Total	29	1	22	52	31	3	1	35

Assessing public health care facilities using the WHO guidelines, in Kaduna North LGA, 7.7% (1) were BEmOC and 7.7% (1) CEmOC. While in Ikara LGA, 9.1 % (2) of the facilities were BEmOC, There were no CEmOC facilities in Ikara LGA.

Private health care facilities in Kaduna North LGA were found to have 2.8 % (1) BEmOC and 55.5 % (20) as CEmOC. In Ikara LGA, 12.5 % were CEmOC. There was no BEmOC.

Comparing both public and private health care facilities in Kaduna North LGA, 15.4% (2) of public health care facilities were EmOC facilities while 58.3 % (21) of private health care facilities were EmOC facilities. While in Ikara LGA, 12.5 % (2) of the public health care facilities were EmOC facilities while 9.1% (2) private health care facilities were EmOC facilities.

Table 4.9: Distribution of facilities based on their actual status using the signal functions

(WHO guidelines) in Kaduna North and Ikara LGAs

	Kaduna North Freq.(%)	Ikara Freq.(%)	Total
EmOC (Present)	23(46.9)	4(10.5)	27
EmOC(Absent)	26(53.1)	34(89.5)	60
Total	49	38	87

Chi-Square Analysis:

Chi-squares (all with 1 degree of freedom]: $\chi 2$= 13.258181 (p= 0.000271)

Overall comparism between the two LGAs on the distribution of facilities based on their actual EmOC status according to the WHO guidelines revealed that Kaduna North LGA had more facilities offering EmOC services than Ikara LGA. There was a statistical significant difference (p -value of 0.000271) between Kaduna North and Ikara LGA

Table 4.10: Distribution of facilities by ownership based on their actual status using the signal functions (Nigerian guidelines) in Kaduna North and Ikara LGAs

LGA	Private health care facilities				Public health care facilities			
	NEmOC Freq. (%)	BEmOC Freq. (%)	CEmOC Freq. (%)	TOTAL	NEmOC Freq. (%)	BEmOC Freq. (%)	CEmOC Freq. (%)	Total
Kaduna North	27(75)	0(0.0)	9(25)	36	11(84.6)	1(7.7)	1(7.7)	13
Ikara	16(100)	0(0.0)	0(0.0)	16	22(100)	0(0.0)	0(0.0)	22
Total	43	0	9	52	33	1	1	35

Assessing public health care facilities using the Nigerian Guidelines, in Kaduna North LGA, 7.7% (1) were BEmOC and 7.7% (1) CEmOC. While in Ikara LGA, none of the facilities met the Nigerian standard for EmOC services.

Private health care facilities in Kaduna North LGA were found to have 25 % (9) of the health care facilities as CEmOC while in Ikara LGA; none of the facilities were EmOC facilities.

Comparing both public and private health care facilities in Kaduna North LGA, 15.4% (2) of public health care facilities were EmOC facilities while 25% (9) of private health care facilities were EmOC facilities. While in Ikara LGA, none of the public health care facilities and private health care facilities was EmOC facilities.

Table 4.11: Distribution of facilities based on their actual status using the signal functions (Nigerian guidelines) in Kaduna North LGA and Ikara LGAs

	Kaduna North Freq. (%)	Ikara Freq. (%)	Total
EmOC (Present)	11(22.4)	0(0.0)	11
EmOC(Absent)	38(77.6)	38(100.0)	76
Total	49	38	87

Chi-Square Analysis:

Chi-squares (all with 1 degree of freedom]: $\chi 2 = 14.569904$ ($p = 0.000135$)

Overall comparism between the two LGAs on the distribution of facilities based on their actual status according to the Nigerian Guidelines, which added 24 hours service and each facilities having at least 4 midwives to the signal functions; revealed that only Kaduna North LGA offered EmOC services when compared with Ikara LGA. There was a statistical significant difference (p -value of 0.000135) between Kaduna North and Ikara LGA.

4.3: COVERAGE OF EmOC SERVICES

Table 4.12: Coverage of EmOC services in both Kaduna North and Ikara LGAs using both the WHO and the Nigerian Guidelines on EmOC services

LGA	POPULATION	FACILITY TYPE	OBSERVED		RECOMMENDED (WHO)
			W.H.O	NIGERIAN	
KADUNA NORTH	364,575	BEmOC	2	1	3
		CEmOC	21	10	1
IKARA	194,723	BEmOC	2	0	2
		CEmOC	2	0	1

The coverage of EmOC services in Kaduna North LGA was 2 for BEmOC and 21 for CEmOC as against the recommended of 3 and 1 for BEmOC and CEmOC services respectively. While that of Ikara LGA, there were 2 BEmOC and 2 CEmOC health care facilities as against the recommended of 2 and 1 for BEmOC and CEmOC services respectively, using the WHO guidelines for EmOC services. Using the Nigerian guidelines for EmOC services, the number of facilities reduced to 1 BEmOC, 10 CEmOC in Kaduna North LGA and none in Ikara LGA.

4.4: AVAILABILITY OF RESOURCES FOR EMOC SERVICES

Resources such as human, infrastructure, equipments and drugs are key to the availability of EmOC services. The true assessment of signal functions was carried out when available resources were examined.

Table 4.13: Distribution of human resources by ownership and level of care in Kaduna

North LGA

Human resources	Health care facility type			
	Public			Private
	PHC n=11 Freq (%)	2^0 n=1 Freq (%)	3^0 n=1 Freq (%)	n=36 Freq (%)
Obstetrician	0(0.0)	0	1	22 (61.1)
Non specialist physician	0(0.0)	1	1	35 (97.2)
Nurse midwives	11 (100)	1	1	33 (91.7)
Midwives	4 (36.4)	0	0	12 (33.3)
Single qualified nurses	4 (36.4)	0	0	30 (83.3)
Theatre staff	0(0.0)	1	1	30 (83.3)
Laboratory staff	10 (10.9)	1	1	34 (94.4)
CHEW/CHOs	11(100)	0	0	18 (50.0)
Auxiliary nurses	0(0.0)	0	0	22 (61.1)

Table 4.14: Distribution of human resources by ownership and level of care in Ikara LGA

Human resources	Facility type		
	Public health facilities		Private health facilities n=16 Frequency (%)
	PHC n=21 Frequency (%)	2^0 n=1	
Obstetrician	0(0.0)	0	0(0.0)
Non specialist physician	1 (4.8)	1	9 (56.3)
Nurse midwives	3 (14.3)	1	6 (37.5)
Midwives	2 (9.5)	1	4 (25)
Single qualified nurses	1 (4.8)	1	11 (68.8)
Theatre staff	0(0.0)	1	1 (6.3)
Laboratory staff	1 (4.8)	1	1 (6.3)
CHEW/ CHOs	19 (90.5)	0	15 (93.8)
Auxiliary nurses	0(0.0)	0	12 (75)

Table 4.15: Proportion of health worker trained in life saving skills in public health care

facilities in Kaduna North and Ikara LGAs

LGA	MLSS			LSS			ELSS		
	Total	**Freq**	**%**	**Total**	**Freq**	**%**	**Total**	**Freq**	**%**
Kaduna north	62	8	12.9	56	10	17.9	10	2	20.0
Ikara	29	3	10.4	18	6	33.3	5	2	40.0

Staff who are directly connected to delivery of EmOC services were assessed; staff posted to labour room, laboratory staff, theatre staff and the attending physicians. In the PHC in Kaduna North LGA, 11 of the facilities had nurse-midwives, 4 had midwives, 5 had single qualified nurses, 10 had laboratory staff, and 11 had community health extension workers. In secondary health care facility, it had non-specialist physicians, nurse- midwives, theatre staff, and laboratory staff, while the tertiary healthcare facility has the above (as in the secondary health facility) plus attending obstetrician. Out of the 36 facilities assessed in private health care facility, 61.1% (22) had attending obstetrician, 97.2% (35) had non-specialist physicians, 91.7 % (33) had nurse midwives, 12% (11) had midwives, 83.3% (30) had single qualified nurses, 83.3% (30) had theatre staff, 94.4% (34) had laboratory staff, 50% (18) had CHEWs and 61.1% (22) had auxiliary nurses in their services. .Assessing proportion of staff in public health care facilities trained in life

saving skills; 12.9% (8) of the CHEWs had gone for MLSS, 17.9% (10) of the nurses have gone for LSS while 20% (2) of the non-specialist physicians were trained in ELSS.

In PHC facilities in Ikara LGA, 4.8% (1) had non-specialist physicians, 14.3% (3) of the facilities had nurse-midwives, 9.5% (2) had midwives, 4.8% (1) had single qualified nurses, 4.8% (1) had laboratory staff and 90.5% (19) had community health extension workers. In secondary health care facility, it had non-specialist physicians, nurse-midwives, theatre staff, and laboratory staff. Out of the 16 facilities assessed in private health care facility, none had attending obstetrician, 56.3% (9) had visiting non-specialist physicians, 37.5% (6) had nurse midwives, 25% (4) had midwives, 68.8% (11) had single qualified nurses, 6.3% (1) had theatre staff, 6.3% (1) had laboratory staff, 93.8% (15) had CHEWs and 75% (12) had auxiliary nurses in their services. Assessing proportion of staff in public health care facilities trained in life saving skills; 10.4% (3) of the CHEWs had gone for MLSS training, 33.3% (6) of the nurses have gone for LSS training while 40% (2) of the non-specialist physicians were trained in ELSS.

Overall, it was observed that there were more health workers (skilled birth attendants) in Kaduna North LGA than Ikara LGA, but Ikara LGA had more public health workers trained in LSS than Kaduna North LGA.

Table 4.16: Distribution of available infrastructure in public health care facilities in Kaduna North LGA

Infrastructure		PHC n =11			2^0 n=1		3^0 n=1
		AF	ANF	NA	AF	NA	AF
		Frequency (%)	Frequency (%)	Frequency (%)			
Source of power supply							
	Public	7 (63.6)	1(9.1)	3 (27.3)	1	0	1
	Generator	0(0.0)	3(27.3)	8(72.7)	1	0	1
	Solar	0(0.0)	0(0.0)	11	0	1	1
Laboratory services		5 (45.5)	1(9.0)	6(45.5)	1	0	1
Operating theatre		0(0.0)	0(0.0)	11	1	0	1
Blood bank		0(0.0)	0(0.0)	11	0	1	1
Ambulance		0(0.0)	0(0.0)	11	1	0	1
Source of water supply							
	Borehole	1(9.1)	1(9.0)	9(81.9)	1	0	1
	Well	7(63.6)	0(0.0)	4(36.4)	0	1	0
	Tap	6(54.5)	2(18.2)	3(27.3)	0	1	1
Toilet facility		11	0(0.0)	0(0.0)	1	0	1

KEY: AF - AVAILABLE AND FUNCTIONING;
ANF - AVAILABLE NOT FUNCTIONING;
NA - NOT AVAILABLE

Table 4.17: Distribution of available infrastructure in public health care facilities in Ikara LGA

Infrastructure	PHC n=21			Secondary n=1	
	AF	ANF	NA	AF	NA
	Frequency (%)	Frequency (%)	Frequency (%)		
Source of power supply					
Public	4 (19.0)	0(0.0)	17 (81.0)	1	0
Generator	1 (4.8.)	0(0.0)	20 (95.2)	1	0
Solar	1 (4.8)	1(4.8)	19 (90.5)	0	1
Laboratory services	1 (4.8)	1(4.8)	19 (90.5)	1	0
Operating theatre	0(0.0)	0(0.0)	21(100)	1	0
Blood bank	0(0.0)	0(0.0)	21(100)		0
Ambulance	1 (4.8)	0(0.0)	20 (95.2)	1	0
Source of water supply					
Borehole	7 (33.3)	0(0.0)	14 (66.7)	1	0
Well	6 (28.6)	0(0.0)	15 (71.4)	0	1
Tap	2 (9.5)	0(0.0)	19 (90.5)	0	1
Toilet facility	11 (52.4)	5 (23.8)	5 (23.8)	1	0

KEY: AF - AVAILABLE AND FUNCTIONING;
ANF - AVAILABLE NOT FUNCTIONING;
NA - NOT AVAILABLE

PHC in Kaduna North LGA were assessed for the available infrastructure. 63.6 % (7) had power source from the national grid, 9.1% (1) is connected but not functioning 27.3% (3) of them had generating sets which is not functioning, 72.7% (8) had no generating set. None had solar panels for energy generation. 45.5% (5) had functional lab, 9.0% (1) had lab which is not functional, and 45.5 % (5) had no laboratory services. None had ambulance services. Source of water supply were found to be tap 54.5% (6), well 63.6 % (7), and borehole 9.1% (1).

The secondary health care facility had both public and generator as source of power supply only, had an ambulance service, laboratory service, but no blood bank. The source of water supply is borehole and it has toilet facility available and functioning. In addition to those present in secondary health care facility the tertiary also has a functioning blood bank and solar source of energy supply.

In Ikara LGA, PHC were assessed for the available infrastructure, 19.1% (4) had power source from the national grid, 81% (17) were not connected, 4.8% (1) had generating set, 4.8% (1) had solar panels for energy generation, 4.8% (1) had solar panels which were not functioning, 4.8 % (1) had functional laboratory, 4.8% (1) had lab which was not functional, and 90.5% (19) had no laboratory services. 4.8% (1) had ambulance service. Source of water supply were found to be borehole 33.3% (7), well 28.6 % (6), and tap 9.5% (2). 52.4% (11) had functional toilets, 23.8% (5) had toilets that were not functional. The secondary health care facility had both public and generator as source of power supply, had an ambulance service, laboratory service, but no blood bank. The source of water supply was tap and borehole and it has toilet facility available and functioning.

Overall, Kaduna North LGA had more infrastructures in the public health care facilities than Ikara LGA.

Table 4.18: Distribution of available infrastructure in private health care facilities in Kaduna North LGA

Infrastructure	AF		ANF		NA	
	Freq	%	Freq	%	Freq	%
Source of power supply						
Public	36	100	0	0.0	0	0.0
Generator	35	97.2	1	2.8	0	0.0
Solar	1	2.8	0	0.0	35	97.2
Laboratory services	34	94.4	0	0.0	2	5.6
Operating theatre	34	94.4	0	0.0	2	5.6
Blood bank	0	0.0	0	0.0	36	100
Ambulance	9	25	4	11.1	23	63.9
Source of water supply						
Borehole	9	25	0	0.0	27	75
Well	6	16.7	0	0.0	30	83.3
Tap	34	94.4	0	0.0	2	5.6
Toilet facility	36	100	0	0.0	0	0.0
No. of facilities	36					

Table 4.19: Distribution of available infrastructure in private health facilities in Ikara

LGA

Infrastructure	AF		ANF		NA	
	Freq	%	Freq	%	Freq	%
Source of power supply						
Public	15	93.8	0	0.0	1	6.3
Generator	7	43.8	0	0.0	9	56.3
Solar	0	0.0	0	0.0	16	100
Laboratory services	2	12.5	0	0.0	14	87.5
Operating theatre	8	50	1	6.3	7	43.8
Blood bank	0	0.0	0	0.0	16	100
Ambulance	0	0.0	0	0.0	16	100
Source of water supply						
Borehole	3	18.8	0	0.0	13	81.3
Well	15	93.8	0	0.0	1	6.3
Tap	1	6.3	0	0.0	15	93.8
Toilet facility	16	100	0	0.0	0	0.0
No. of facilities	16					

All the private health care facilities surveyed in Kaduna North LGA are connected to public source of power supply and 97.2 % (35) have alternative supply of power supply (generator) and 2.8% (1) has solar energy. The following services were also available: 94.4 % (34) had both operating theatre and laboratory services, 25% (9) had ambulance services and 11.1% (4) has ambulances which are not functioning. Source of water supply: borehole 25 % (9), well 16.7 % (6), tap 94.4 % (34). All had functioning toilet facilities but none of them had blood bank.

In Ikara LGA 93.8 % (15) were connected to public source of power supply and 43.8 % (7) have alternative supply of power supply (generator) and none had solar energy. The following services were also available: 50 % (8) had operating theatre, 12.5 % (2) laboratory services. None had ambulance services and blood bank. Source of water supply: borehole 18.8 % (3), well 93.8 % (15), tap 6.3 % (1). All had functioning toilet facilities.

Private health care facilities in Kaduna North LGA had more infrastructures than Ikara LGA.

Table 4.20: Distribution of available equipments in public PHC facilities in Kaduna North and Ikara LGAs

S/No	Equipment type	Kaduna North n=11		Ikara n= 21	
		Freq	%	Freq	%
1	Sphygmomanometer	9	81.9	21	100
2	Urinary catheters	4	36.4	8	38.1
3	Surgical gloves	6	54.5	19	90.5
4	Adult airway	0	0.0	1	4.8
5	Angle poise lamp	0	0.0	1	4.8
6	Episiotomy scissors	4	36.4	7	33.3
7	Artery forceps	4	36.4	18	85.7
8	Sponge-holding forceps	2	18.1	9	42.9
9	Vaginal speculum (Cuscos)	4	36.4	4	19.1
10	Needle holder	2	18.1	8	38.1
11	Plastic vacuum extractor/forceps	0	0.0	2	9.5
12	Suction machine	0	0.0	2	9.5
13	Ambu resuscitator (adult)	0	0.0	2	9.5
14	Torch lights	1	9.1	6	28.6
15	Sutures	4	36.4	18	85.7
16	Evidence of high level disinfection (Jik etc)	7	63.3	20	95.2
17	MVA kit	0	0.0	17	81
18	Stethoscope	11	100	21	100
19	Kidney dish	6	54.5	9	42.9

In PHC facilities in Kaduna North LGA the following instruments were available: 81.9% (9) had sphygmomanometer, all had stethoscope, 36.4% (4) had urinary catheter, 54.5% (6) had surgical gloves, 36.4% (4) had episiotomy scissors and artery forceps, 18.1 % (2) had sponge holding forceps,36.4 % (4) had vaginal speculum, 18.1% (2) had needle holder, 9.1% (1) had torch lights, 36.9% (4) had sutures, 63.6% (7) had evidence of high level disinfection, and 54.5% (6) had kidney dish. None had vacuum extractor / forceps, suction machine, ambu resuscitator, adult air way, MVA kit and angle poise lamp. Both secondary and tertiary health care facilities had all the check listed instruments available

and functioning. In Ikara LGA**,** the PHC had the following instrument:- all had sphygmomanometer and stethoscope, 38.1% (8) had urinary catheter, 90.5% (19) had surgical gloves, 4.8 % (1) had angle poise lamp and none adult airway, 33.3% (7) had episiotomy scissors, 85.7% (18) had artery forceps, 42.9% (9) had sponge holding forceps, 19.1% (4) had vaginal speculum, 38.1% (8) had needle holder, 9.5% (2) had vacuum extractor/ forceps**,** suction machine and ambu resuscitator, 28.6% (6) had torch lights, 85.7% (18) had sutures, 95.2% (20) had evidence of high level disinfection, 42.9% (9) had MVA kit and 81% (17) had kidney dish. The secondary health care facility has all the above except for the following: adult air way, angle poise lamp and vacuum extractor/forceps.

Comparing the PHC in the two LGAs, Ikara LGA had more equipment available in the health care facilities than Kaduna North LGA. Conspicuously absent in Kaduna North were plastic vacuum extractors/ forceps and MVA kits.

Table 4.21: Distribution of available equipments in private health care facilities in Kaduna North and Ikara LGAs

S/No	Equipment type	Kaduna North n=36		Ikara n=16	
		Freq	%	Freq	%
1	Sphygmomanometer	36	100	16	100
2	Urinary Catheters	36	100	16	100
3	Surgical Latex Gloves	36	100	16	100
4	Adult Airway	33	91.7	0	0.0
5	Angle poise lamp	26	72.2	3	18.8
6	Episiotomy scissors	36	100	12	75
7	Artery forceps	36	100	16	100
8	Sponge-holding forceps	36	100	14	87.5
9	Vaginal speculum (Cuscos)	36	100	13	81.3
10	Needle holder	36	100	15	93.6
11	Plastic vacuum extractor/ forceps	21	58.3	2	12.5
12	Suction machine	36	100	1	6.3
13	Ambu resuscitator (adult)	29	80.6	2	12.5
14	Torch lights	36	100	16	100
15	Sutures	36	100	16	100
16	Evidence of high level disinfection (Jik etc)	35	97.2	15	93.8
17	MVA kit	33	91.7	11	68.8
18	Stethoscope	36	100	16	100
19	Kidney dish	36	100	14	87.5

In the private health care facilities assessed in Kaduna North LGA, all had the following instruments: sphygmomanometer, stethoscope, urinary catheter, surgical gloves, episiotomy scissors, artery forceps, and sponge holding forceps, vaginal speculum, needle holder, suction machine, torch lights, sutures and kidney dish. While the following are in varying amount: 91.7% (33) adult air way, 72.2% (26) angle poise lamp, 58.3% (21) vacuum extractor/ forceps, 80.6% (29) ambu resuscitator, 97.2% (35) evidence of high level disinfection and 91.7% (33)MVA kit.

In the private health care facilities assessed in Ikara LGA, all had the following instruments: sphygmomanometer, stethoscope, urinary catheter, surgical gloves, torch lights, sutures and artery forceps, while the following are in varying amount: 75% (12) episiotomy scissors, 87.5% (14) sponge holding forceps, 81.3% (13) vaginal speculum,

93.6% (15) needle holder, 6.3% (1) suction machine, 87.5% (14) kidney dish. 18.8% (3) angle poise lamp, 12.5% (2) vacuum extractor/ forceps, 12.5% (2) ambu resuscitator, 93.8% (15) evidence of high level disinfection and 68.8% (11) MVA kit.

Overall, private health care facilities in Kaduna North were better equipped than Ikara LGA.

Table 4.22: Distribution of available key drugs used in EmOC in PHC facilities in Kaduna North and Ikara LGAs

Key drugs	Kaduna north n=11		Ikara n=21	
	Freq	%	Freq	%
Oxytocics				
Ergometrine	4	36.4	21	100
Oxytocin	3	27.3	21	100
Misoprostol	0	0.0	1	4.8
Anti convulsant				
Valium	3	27.3	15	71.4
Paraldehyde	1	9.1	15	71.4
$MgSO_4$	0	0.0	0	0.0
IV antibiotics	5	45.5	20	95.2
Local anaesthesia	4	36.4	21	100
General anaesthesia	0	0.0	0	0.0
O_2	0	0.0	0	0.0
Corticosteroids	2	18.2	9	42.9
Analgesics	5	45.5	21	100
IVF	5	45.5	19	90.5

Drugs which are essential to EmOC delivery were assessed. In Kaduna North LGA, the following drugs were available in varying amounts in the PHC facilities. Oxytocics: 36.4% (4) and 27.3% (3) facilities had ergometrine and oxytocin respectively. Anticonvulsants: 27.3% (3) had valium, 9.1% (1) had paraldehyde, and none of them had magnesium sulphate, oxygen and misoprostol. Other drugs: 45.5% (5) had IV antibiotics, analgesics and intravenous fluids; 36.4% (4) had local anaesthesia and 18.2% (2) had corticosteroids. All the drugs assessed were available in both secondary and tertiary health care facilities.

In Ikara LGA, all the PHC had ergometrine, oxytocin, local anaesthesia and analgesics. The following were in varying amounts: 4.8% (1) had misoprostol, 71.4% (15) had both valium and paraldehyde, 95.2% (20) had IV antibiotics, 42.9% (9) had corticosteroids and

90.5% (19) of the facilities had intravenous fluids. Oxygen, magnesium sulphate and misoprostol were not available. The secondary facility had all the above drugs.

Comparing the PHC facilities in the two LGAs, Ikara LGA had more drugs in their facilities than Kaduna North LGA.

Table 4.23: Distribution of available key drugs used in EmOC in Private health care facilities in Kaduna North and Ikara LGAs

Key drugs	Kaduna North n=36		Ikara n=16	
	Freq	%	Freq	%
Oxytocics				
Ergometrine	36	100	16	100
Oxytocin	36	100	16	100
Misoprostol	18	50	0	0.0
Anti consultants				
Valium	36	100	16	100
Paraldehyde	33	91.7	15	93.8
$MgSO_4$	7	19.4	10	62.5
IV antibiotics	36	100	15	93.8
Local anaesthesia	36	100	14	87.5
General anaesthesia	34	94.4	9	56.3
O_2	33	91.7	0	0.0
Corticosteroids	36	100	10	62.5
Analgesics	36	100	16	100
IVF	36	100	16	100

In Kaduna North LGA, the following drugs were present in all the facilities: ergometrine, oxytocin, valium, IV antibiotics, local anaesthesia, corticosteroids, analgesics and intravenous fluids.. The following were in varying amounts: 50 % (18) had misoprostol, 91.7 % (33) had paraldehyde, 19.4 % (7) had magnesium sulphate, 94.4 % % (34) had general anaesthesia and 91.7 % (33) had oxygen.

In Ikara LGA, the following drugs were present in all the facilities: ergometrine, oxytocin, valium, analgesics and intravenous fluids. The following were in varying

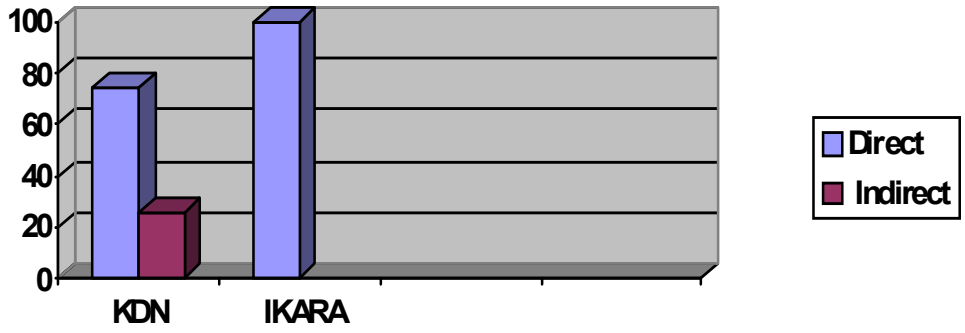
amounts: 93.8 % (15) had paraldehyde and IV antibiotics, 62.5 % (10) had magnesium sulphate, 56.3 % (9) had general anaesthesia and 62.5 % (10) had corticosteroids. None of them had misoprostol in their facilities.

Overall, private health care facilities in Kaduna North LGA had more drugs than Ikara LGA.

4.5 UTILIZATION, QUALITY AND PERFORMANCE OF AVAILABLE MATERNAL HEALTH CARE FACILITIES

It is an assessment of whether the available services are being utilized by pregnant women, whether women who actually need them are using the facilities and also a measure of quality of services available.

Figure 4.1: Pattern of maternal deaths in Kaduna North and Ikara LGAs



A total of 50 maternal deaths occurred in the health care facilities under the year of review (January 2009- December 2009) in Kaduna North LGA. Thirty-seven (74 %) were as a result of direct cause of maternal death and 13 (26 %) were as a result of indirect cause of maternal death. In Ikara LGA, a total of 22 maternal deaths occurred at the same time. All were as a result of direct cause of maternal death.

Table 4.24: Pattern of maternal deaths by facility type in Kaduna North LGA

Type of maternal death	Public health care facilities	Private health care facilities	Total
Direct cause of maternal death	33	4	37
Indirect cause of maternal death	13	0	13
Total	46	4	50

Of the total 50 maternal deaths that occurred in Kaduna North LGA, 46 occurred in public health care facilities and 4 in private health care facilities. Public heath care facilities account for 89.2% (33) of the direct cause of maternal death while 10.8% (4) occurred in private health care facilities.

Table 4.25: Pattern of maternal deaths by facility type in Ikara LGA

Type of maternal death	Public health care facilities	Private health care facilities	Total
Direct cause of maternal death	19	3	22
Indirect cause of maternal death	0	0	0
Total	19	3	22

Of the total 22 maternal deaths that occurred in Ikara LGA, 19 occurred in public health facilities and 3 in private health care facilities. All were recorded as direct cause of

maternal death. Public heath care facilities account for 86.4% (19) of the direct cause of maternal death while 13.6% (3) occurred in private health care facilities.

Table 4.26: Pattern of direct causes of maternal death by facility type in Kaduna North and Ikara LGAs

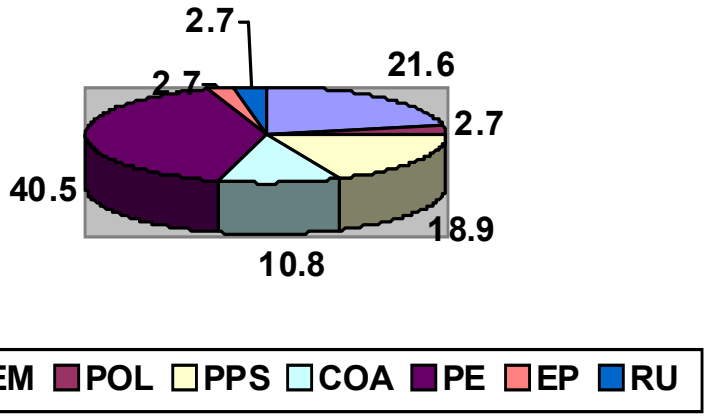
Direct causes of maternal death	Kaduna North		Ikara	
	Public	Private	Public	Private
	Frequency (%)	Frequency	Frequency (%)	Frequency
Pre-eclampsia	11(33.3)	4	8(42.1)	3
Haemorrhage	8(24.2)	0	8(42.1)	0
Postpartum sepsis	7(21.2)	0	0	0
Complications of abortion	4(12.1)	0	0	0
Obstructed labour	1(3.0)	0	0	0
Ectopic pregnancy	1(3.0)	0	0	0
Ruptured uterus	1(3.0)	0	3(15.8)	0
Total	33	4	19	3

In Kaduna North LGA, individual causes of the direct obstetric cause of maternal death in public health care facilities were: 33.3% (11) were due to pre eclampsia, 24.2% (8) as result of haemorrhage, 21.2% (7) postpartum sepsis, 12.1% (4) complications of abortion and 3.0% (1) were caused by prolonged obstructed labour, ectopic pregnancy and

ruptured uterus each. While the private health facilities recorded 4 maternal deaths as a result of pre-eclampsia.

In Ikara LGA, individual causes of the direct obstetric cause of maternal death in public health facilities were: 42.1% (8) were due to pre eclampsia, 42.1% (8) as result of haemorrhage and 15.8% (3) by ruptured uterus.

Figure 4.2: Pattern of direct causes of maternal death in Kaduna North LGA



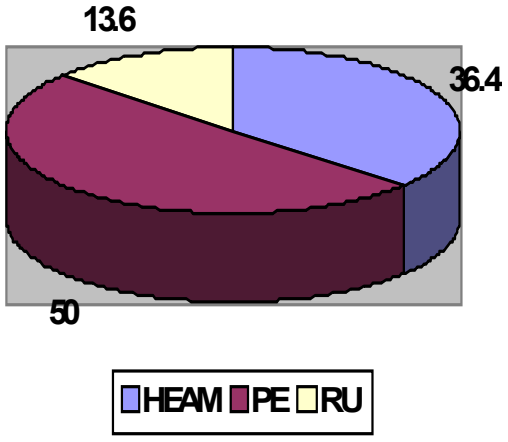
KEY: HAEM- Haemorrhage; POL- Prolonged obstructed labour; PPS- Postpartum sepsis; COA- Complications of abortion; PE- Pre-eclampsia; EP- Ectopic pregnancy; RU- Ruptured uterus

Individual causes of the direct obstetric cause of maternal death in both public and private health care facilities combined were: 40.5 % (15) were due to pre eclampsia, 21.6 % (8) as result of haemorrhage, 18.9 % (7) postpartum sepsis, 10.8 % (4) complications of

abortion and 2.7 % (1) were caused by prolonged obstructed labour, ectopic pregnancy and ruptured uterus each.

In Ikara LGA, a total of 22 maternal deaths occurred: 18 occurred in the secondary health care facility (all were as a result of direct obstetrics maternal cause of death), 3 occurred in the private health care facilities; all also as a result of direct obstetric maternal cause of death. One maternal death was recorded in the PHC. There was no record of indirect obstetric cause of maternal death. Individual causes of the total death in both public and private health care facilities were: pre-eclampsia 50 % (11), haemorrhage 36.4 % (8) and ruptured uterus 13.6 % (3).

Figure 4.3: Pattern of direct causes of maternal death in Ikara LGA



KEY: HAEM- Haemorrhage; PE- Pre-eclampsia; RU- Ruptured uterus

Comparing both LGAs, pre-eclampsia/ eclampsia and haemorrhage were observed to be the highest amongst the direct causes of maternal death.

The maternal mortality ratio was 465 per 100,000 live births and 705 per 100,000 live births in Kaduna North and Ikara LGA respectively. Both LGAs had a very high MMR, with Ikara LGA having a higher MMR than Kaduna North LGA.

Table 4.27: Case fatality rate in public health care facilities (secondary and tertiary) in

Kaduna North and Ikara LGAs

LGA	Secondary facilities			Tertiary facilities		
	Frequency of complication	Frequency of maternal death	CFR	Frequency of complication	Frequency of complication	CFR
Kaduna North	53	4	7.6	505	29	5.7
Ikara	77	18	23.4	0	0	0

In Kaduna North LGA, the CFR was 7.6% and 5.7 % in secondary and tertiary health care facilities respectively. While in Ikara LGA, the CFR was 23.4 % for the secondary health facility. The CFR was found to be higher than the recommended value of less than1 % in both LGAs.

Table 4.28: Analysis of case fatality rate in secondary (public) health care facilities in

Kaduna North and Ikara LGAs

	KDN Freq (%)	IKARA Freq (%)	Total Freq (%)
ALIVE	49 (92.5)	59 (76.6)	108 (83.1)
NOT ALIVE	4 (7.5)	18 (23.4)	22 (16.9)
Total	53	77	130

Chi-Square Analysis: Chi-squares (all with 1 degree of freedom]: $\chi 2 = 5.594939$ ($p = 0.018012$)

The CFR in secondary health care facilities was observed to be higher in Ikara LGA than Kaduna North LGA. This was statistically significant, with a p-value of 0.018012.

Table 4.29: Analysis of referral system in the public and private health care facilities in

Kaduna North and Ikara LGA

LGA	Facility Type	Availability of forms	Availability of functional 2 -way referrals	Availability of communications facilities to support referral	Availability of functional ambulance
		Freq (%)	Freq (%)	Freq (%)	Freq (%)
Kaduna North	**PHC n= 11**	3(27.3)	0	0	0
	Secondary n= 1	1	0	0	1
	Private n= 36	0	0	1(2.8)	9(25.0)
Ikara	**PHC n=21**	1(4.8)	1(4.8)	5(23.8)	1(4.8)
	Secondary	1	0	0	0

	n=1				
	Private n=16	4(25.0)	0	5(31.3)	0

In Kaduna North LGA, out of the 11 PHC facilities assessed, 27.3% (3) had suitable referral forms, none had a functional 2 way referrals; any mode of communication with the referral centers and a functional ambulance to support the referral system. In Ikara LGA, out of 21 PHC assessed, 4.8% had referral forms available, 4.8% had suitable referral forms, 4.8% had a functional 2 way referrals, 23.8% mode of communication with the referral centers and 4.8% had a functional ambulance to support the referral system. The secondary health care facility in Kaduna North LGA had no referral forms available; functional 2 way referral forms; no communication to support the referrals but had a functional ambulance. While Ikara LGA, referral forms were available, but had no functional 2 way referral, no communication facilities and functional ambulance to support referrals. Private health care facilities in the Kaduna North LGA had no functional referral system but in Ikara LGA, 25% (4) of 16 health care facilities assessed had referral forms available, 31.3% (5) had communication facilities to support the referral systems, but none had functional 2 way referral system and ambulance services to support referral.The absence of a functional two-way referral system was observed in both LGAs.

Table 4.30: Proportion of births in EmOC facilities and all facilities surveyed in Kaduna North and Ikara LGAs

LGA	Facility Type	No of Deliveries	Expected No of Deliveries	Proportion of Births	Recommended
Kaduna North	EmOC	8406	15276	55.0 %	15 %
	All facilities surveyed	10745	15276	70.3 %	
Ikara	EmOC	373	8159	4.6 %	15 %
	All facilities surveyed	3119	8159	38.2 %	

In Kaduna North LGA, 55 % (8406) of the expected no of deliveries (15276) for the LGA occurred in EmOC facilities while 70.3 % (10745) occurred in all the facilities surveyed as against the recommended 15 % for EmOC facilities. In Ikara LGA, 4.6 % (373) of the expected no of deliveries (8159) for the LGA occurred in EmOC facilities while 38.2% (3119) occurred in all the facilities surveyed as against the recommended 15 % for EmOC facilities.

Table 4.31: Proportion of births in EmOC facilities in Kaduna North and Ikara

	Kaduna North Freq (%)	**Ikara Freq (%)**	**Total Freq (%)**
EmOC Deliveries	8406(55.0)	373(4.6)	8779(37.5)
Non–EmOC Deliveries	6870(45.0)	7786(95.4)	14656(62.5)
Total	15276	8159	23435

LGAs

Chi-Square Analysis: Chi-squares (all with 1 degree of freedom]: $\chi 2$= 5779.28 (p= 0.500000)

Comparing the two LGAs, it was observed that more deliveries occurred in EmOC facilities in Kaduna North LGA than Ikara LGA and there was no statistical significant difference at p-value of 0.5 between the two LGAs.

Table 4.32: Distribution of complications by facility type in Kaduna North and Ikara

LGAs

LGA	**No of complications treated**		**Total**
	EmOC facilities	**Other facilities**	
Kaduna North Freq (%)	936(88.6)	121(11.4)	1057
Ikara Freq (%)	68(28.5)	171(71.5)	239
Total	1004	292	1296

A total of 1057 women were treated with obstetric complications in Kaduna North LGA, 936 were treated in EmOC facilities while 121 were treated in other facilities. In Ikara LGA, a total of 239 women were treated with obstetric complications with 68 treated in EmOC facilities while 171 were treated in other facilities. Of the total deliveries recorded in the health care facilities, 9.84 % and 7.66 % of the births ended up with complications in Kaduna North and Ikara LGA respectively.

Table 4.33: Distribution of met need for EmOC services in Kaduna North and Ikara LGAs

LGA	Facility Type	Frequency of Complications	Frequency of Expected Complication	Met Need	Recommended
Kaduna North	EmOC	936	2291	40.9	100
Ikara	EmOC	68	1224	5.6	100

The met need for EmOC services was observed to be 40.9 % in Kaduna North LGA, 936 women with obstetric complications were treated in EmOC facilities as against 2291 of the expected complications. While 5.6 % was the observed met need in Ikara LGA, 68 women were treated for obstetric complications as against 1224 of the expected complications. Both were observed to be low when compared with the recommended which is 100 %.

Table 4.34: Distribution of met need for EmOC services by facility type in Kaduna North and Ikara LGAs

	Kaduna North Freq (%)	Ikara Freq (%)	Total Freq (%)

Treatment in EmOC facilities	936(40.9)	68(5.6)	1004(28.6)
Treatment in other facilities	1355(59.1)	1156(94.4)	2511(71.4)
Total	2291	1224	3515

Chi-Square Analysis: Chi-squares (all with 1 degree of freedom]: $\chi 2 = 77.094794$ ($p = 0.0000001$)

Recommended Met Need: 100%

The calculated met need for EmOC services was observed to be higher in Kaduna North LGA than Ikara LGA. This was found to statistically significant with p – value of 0.0000001

Table 4.35: Pattern of obstetric complications in all health care facilities in Kaduna North and Ikara LGAs

Complications	**Kaduna North**		**Ikara**		**Total**
	Frequency	**%**	**Frequency**	**%**	
Haemorrhage					
APH	80	10.6	32	18.3	112
PPH	211	27.9	22	12.6	233
Obstructed labour	241	31.8	46	26.3	287
Pre-eclampsia	94	12.4	47	26.9	141
Ectopic pregnancy	50	6.6	4	2.3	54
Postpartum sepsis	27	3.6	4	2.3	31
Complications of abortion	27	3.6	14	8	41
Ruptured uterus	27	3.6	6	3.4	33
Total	757	100	175	100	932

The obstetric complications assessed were the ones responsible for major maternal death. The seven obstetric complications assessed were: haemorrhage (ante partum and postpartum), prolonged obstructed labour, postpartum sepsis, complications of abortion, pre eclampsia/ eclampsia, ectopic pregnancy and ruptured uterus.

Under the year of review (Jan 2009- Dec 2009), 757 and 175 recorded complications were managed in Kaduna North and Ikara LGA respectively.

In Kaduna North LGA, Haemorrhage, 38.4 % (291) was highest with 10.6 % (80) of cases as APH and 27.9% (211) cases as PPH; 12.4 % (94) were pre eclampsia/ eclampsia, 6.6 % (50) were ectopic pregnancy 31.8 % (241) of the cases were prolonged obstructed labour. Postpartum sepsis, complications of abortion and ruptured uterus were 3.6 % (27) each.

In Ikara LGA, haemorrhage was 30.9 % (54) with 18.3 % (32) APH and 12.6 % (22) cases as PPH; 26.3% (46) of the cases were prolonged obstructed labour, 2.3 % (4) were postpartum sepsis, 8 % (14) were complications of abortion, 26.9 % (47) were pre eclampsia/ eclampsia, 2.3 % (4) were ectopic pregnancy and 3.4 % (6) were ruptured uterus.

Haemorrhage was observed to be the leading cause of obstetric complications; obstructed labour and eclampsia were in the top three of direct causes of maternal complications in both LGAs,

Table 4.36: Proportion of births through C-Section by facility type in Kaduna North and Ikara LGAs

LGA	Private facilities		Public facilities		All facilities	
	No of deliveries	No of C/S	No of deliveries	No of C/S	No of deliveries	No of C/S
Kaduna North	3904	547 (14.0%)	6841	363 (5.3%)	10745	910(8.5%)
Ikara	1492	72 (4.8%)	1627	21 (1.3%)	3119	93(3.0%)

In Kaduna North LGA, 14.0 % of deliveries were by C- Section in private health care facilities, 5.3 % of deliveries were by C- Section in public health care facilities and 8.5 % of the total deliveries were by C-section. With 60.1 % (547) of the total C-section occurring in private health care facilities, 38.9 % (363) occurring in public health care facilities In Ikara LGA, births by C- Section were 4.8 % and 1.3 % in private and public health care facilities respectively and 3.0 % (93) of the total number of deliveries were by C- Section. With 77.4 % (72) of the total C-section occurring in private health care facilities, 22.6 % (21) occurring in public health care facilities.

The number of C-section was observed to be higher in Kaduna North LGA when compared with Ikara LGA and most of the C-section occurred in private health care facilities in both LGAs.

Table 4.37: Proportion of births through C-section in Kaduna North and Ikara LGAs

LGA	All facilities surveyed	Expected no of deliveries	No of C- section	Proportion	Recommended
Kaduna North	49	15,276	910	6.0 %	5 – 15 %
Ikara	38	8,159	93	1.1 %	5 – 15%

The WHO guidelines on EmOC services states that 5 -15 % of the estimated births should be by C-section. The observed proportion of births by C-section was found to be 6.0 % and 1.1 % in Kaduna North and Ikara LGA respectively. Proportion of births by C-section was observed to be within the recommended value in Kaduna North LGA, whilst that of Ikara LGA was below the recommended value.

Table 4.38: Analysis of proportion of births through C-Section in Kaduna North and Ikara LGA

LGA	No of C-section	Proportion	No of Non-C-section delivery	Proportion	Total no of deliveries
Kaduna North	910	6.0 %	9835	94.0%	10745
Ikara	93	1.1 %	3026	98.9%	3119
Total	1003		12861		13864

X^2=108.5 df =1, p-value=0.0001 Recommended proportion of C-Section: 5 – 15%

The proportion of births by C-section was observed to be higher in Kaduna North LGA than Ikara LGA. This was statistically significant, with a p-value of 0.0001.

CHAPTER FIVE

DISCUSSION

Maternal mortality rate is an indicator of the status and rights of women in any country. Nigeria having a high MMR shows that access to appropriate MHS is still far below expectation. The use of process indicators as an indirect measure of MMR highlights the gaps in the available MHS.

From the study, it was observed that both LGAs had a considerable amount of facilities offering MHS; 77% and 67% of health care facilities in Kaduna North and Ikara LGA respectively offer MHS and a high percentage of these facilities were private health care facilities. Though with the high percentage of health care services offering MHS, the statuses of these facilities were roughly assessed based on the services rendered by each facility and it was observed that 91.7% and 84.2% of facilities in Kaduna North and Ikara LGAs respectively had assumed status of EmOC facilities. Thus, implying that when emergency obstetric condition arises most of the available facilities should be able to manage such as at when due.

Using the WHO guidelines on the availability of EmOC services, it was observed that in Kaduna North LGA, there were only 2 BEmOC and 21 CEmOC facilities as against the recommended 3 BEmOC and 1 CEmOC facilities per 364,575 populations in the LGA. While in Ikara LGA, there were 2 BEmOC and 2 CEmOC facilities as against 2 BEmOC and 1 CEmOC facilities per the 194,723 populations in the LGA. Kaduna North LGA had more than the required CEmOC facilities and inadequate number of BEmOC facilities, while Ikara LGA had adequate number of BEmOC and CEmOC facilities. These findings were similar to the study done in the North West Frontier Province in Pakistan (NWFP)

where only 6 (or 10% of recommended) health facilities provided the recommended basic EmOC services. No single district had the recommended minimum basic EmOC facilities. Similarly, in NWFP only 6 health facilities (40% of the recommendation) provided comprehensive EmOC.[27]

Using the Nigerian guidelines for EmOC services, which added 24 hours services and the presence of at least 4 midwives to ensure that the availability of EmOC services and access to skilled birth attendants; the study showed that the number of EmOC facilities dropped from 2 to1 for BEmOC facilities and from 21 to 10 for CEmOC facilities in Kaduna North LGA; while in Ikara LGA, none of the facilities qualified as an EmOC facility. Studying the PHC facilities in both LGAs, it was observed that none of the PHC facilities met the Nigerian guidelines for BEmOC services. This is as a result of absence of 24 hours service coverage with at least 4 midwives in those facilities to ensure adequate access to EmOC services, 36.4% (4) and 14.3% (3) of the PHC facilities in Kaduna North and Ikara LGA respectively offered 24 hours services and 27.3% (3) and 9.5% (2) of the PHC facilities in Kaduna North and Ikara LGA respectively had at least 4 midwives. These findings were similar to that carried out by the Federal Ministry of Health in Nigeria, which revealed that only 1 PHC facility in Lagos state out of all the PHC facilities in the twelve states studied met with the BEmOC standard.[10] The absence of BEmOC facilities amongst PHC facilities in both LGAs, indicate that access to skilled birth attendants and adequate 24 hours coverage of facilities was not possible and these will affect the utilization of services, thereby increasing morbidity and mortality, thus defeating the purpose of Free Maternal and Child Health services. A Zimbabwean study identified inadequate resuscitation of women suffering from haemorrhage and septic shock, insufficient antibiotic therapy as an identifiable cause of maternal death in a rural area.[40]

The secondary health care facilities in both LGA did not meet the required WHO standard for the expected status of CEmOC facilities (as they were designed to be referral centers). This was due to the fact that the secondary health care facility in Kaduna North LGA only carried out 1 C-section during the period of review. This was adduced to the fact that the facility had limited number of bed space, (the facility had only 9 bed spaces for both obstetrics and gynaecological cases). All cases that require C – section were referred to the tertiary facility even though the facility had a functioning theatre. In case of the Ikara LGA, the facility didn't offer assisted vaginal delivery; the equipment was available but not functional and unavailability of C- section procedure over 24 hours. Therefore the secondary health care facility in Kaduna North LGA was classified as BEmOC facility while that of Ikara LGA was not an EmOC facility. The inability of these facilities to meet with the Nigerian guidelines for EmOC services indicates the presence of the third delay in maternal mortality (delay in receiving care at the referral health facility), thus putting pressure on the available resources in the tertiary health care facility. Private facilities accounted for the high number of CEmOC facilities in Kaduna North LGA using the Nigerian guidelines for EmOC services.

The above findings has a wider implications for programme planners and policy makers, at state and local government levels, as Kaduna State Government with other Northern State Governors in 2007, became a signatory to the policy of Free Maternal and Child Health Services; in order to reduce MMR in the state. There is a daunting task of reducing MMR through services offered by the present public health facilities as most EmOC facilities in the state are owned by the private health care providers and this has a cost implication to obtaining such services, therefore limiting access to adequate EmOC services.

Resources for EmOC services were assessed in both LGAs. Staff that are directly connected to delivery of EmOC services were assessed: staff posted to labour room, laboratory staff, theatre staff and the attending physicians. The proportion of births attended to by skilled birth attendants have been specified by the millennium goals as an indicator for reducing maternal mortality and thereby improving the health of women. Studying the available human resources in Kaduna North LGA, all the PHC facilities had nurse-midwives, only 27.3 % of the facilities met with the criteria of four midwives per facility. All had community health extension workers and almost all had laboratory staff. The secondary and tertiary health care facilities had appropriate staff but though not in adequate numbers. The tertiary facility has only one attending consultant obstetrician which incidentally happens to be for the whole state.

This is in contrast to the private heath care facilities where a large percentage, 61.1% of the facilities had attending obstetrician (either as part time or full time) and 97.2% had non-specialist physicians. The presence of qualified midwives (either as single or double qualified) was also found to be high, 91.7 %, but only 25% of these facilities met the criteria of at least presence of four midwives per facility. Auxiliary nursing staff was found only in the private health care facilities with 61.1 % of them having such in their employment.

In Ikara LGA, the presence of skilled birth attendants was very low compared to PHC in Kaduna North LGA, only 14.3% of the 21 facilities had nurse midwives. Most of the facilities are run by CHEWs i.e. 90.5% of the facilities have CHEWs. The presence of community midwives was noted in one of the facilities and also one of the PHC had presence of non-specialist physicians. This is as a result of the presence of millennium village project in one of the wards. The secondary health care facility had similar staffing

to that of Kaduna North LGA but could not give 24 hours emergency operative procedure due to inadequate manpower in the theatre. Also in contrast to Kaduna North LGA, all the private health care facilities are owned either by nurses or CHEWs. None had attending obstetrician, 56.3% had non-specialist physicians as part time, low percentage (6.3%) of theatre staff and laboratory staff as compared with Kaduna North LGA (83.3 % & 94.4 % respectively), 25 % had nurse midwives but none met with criteria for skilled birth attendants. Auxiliary nursing staff were noted in large percentage i.e. 75% of the facilities. These findings on distribution of human resources is similar to the findings of the study on human resources for EmOC in Northern Tanzania where most qualified staff were concentrated in a few centralized locations, while those remaining were inequitably and inefficiently distributed in rural areas and lower-level services. Rural districts have restricted access to government-run health care, because these facilities are understaffed. There is a statistical correlation between availability of qualified human resources and use of services, but the availability of qualified human resources does not automatically translate into higher availability of qualified emergency obstetric care services.[79]

Assessing the proportion of staff trained in life saving courses designed only for different cadres of health workers in public health facilities, the life saving skills (LSS) training is for nurses, while the expanded LSS initiative (ELSSI) is for non-specialist physicians and modified LSS (MLSS) is for CHEWs. Only staff that were directly connected to the delivery of EmOC services were assessed though some other staff with such training, posted to different sections such as ANC, gynaecological wards e.t.c. were not included. In Kaduna North LGA, 12.9 % of CHEWS, 17.9% of nurse midwives, 20% of doctors have gone for training as compared to 10.4% of CHEWs, 33.3% of nurses and 40% of doctors had also gone for the training. It was noted that none of the doctors in the secondary health care facility in Ikara LGA and tertiary facility in Kaduna North LGA

had gone for the training. Similar findings were observed in the study carried out by FMOH; on low numbers of health workers trained in life saving courses.[10]

The presence of infrastructures to support EmOC services were noted in varying amounts for the two LGAs. Notably absent in Ikara LGA was a blood bank, when compared to Kaduna North LGA; which had a National Blood Transfusion Service and a blood bank in the tertiary health care facility.. Sourcing for blood at the times of emergency in both public and private health care facilities is a major problem in Ikara LGA, patient relatives are made to donate on the spot when the need arises. Thus, contributing to higher proportional mortality rate for haemorrhage and ruptured uterus in Ikara LGA when compared to Kaduna North LGA as observed in the study.

In a study at the University of Nigeria Teaching Hospital Enugu, Nigeria, the survival rate for patients with ruptured uterus who were unable to have a blood transfusion was 57 percent compared to a survival rate of 76 percent for patients who received blood transfusion. Most of the health care facilities studied either did not have blood banks or had blood banks that were inadequately stocked.[39]

On the availability of key equipments and drugs in the management of emergency obstetric conditions, both LGAs had varying amounts of both. It was observed that Ikara LGA had more drugs and equipments than Kaduna North LGA. This could be attributed to proximity of available alternate source of drugs and the proximity of referral services in Kaduna North LGA. Conspicuously absent in PHC facilities in Kaduna North LGA are manual vacuum aspiration kits and vacuum extractors/forceps, these indicated that a relevant aspect of the signal function: removal of retained products of conception and assisted vaginal delivery were not being carried out in the PHC facilities in Kaduna North LGA. There are staff competently trained by the local government to carry out this

procedure (MVA), the implication of this is that available limited resources had been wasted in training staff in PHC and the resources in secondary and tertiary facilities were being overstretched to carry out this services which could have other wise been handled at the PHC level. Also noted in the PHC facilities in Kaduna North LGA were the presence of parenteral drugs (anticonvulsants, antibiotics, local anaesthetic drugs) which though present, were not being utilized by the staff of the facilities. Thus bringing out the gaps the in the role of PHC facilities in delivering EmOC services.

The case fatality rate is an indirect measure of quality of services. The CFR is affected by the available resources (human, infrastructure, drugs and equipment supply). The WHO guidelines recommend that the maximum acceptable level for the case fatality rate is 1%. Case fatality rates are best calculated and interpreted at the facility level.

In Kaduna North LGA, a total of 50 maternal death occurred in the facilities that were assessed under the year of review (January 2009 - December 2009). The CFR in the secondary health facility in Ikara LGA (23.4 %) was higher than that of Kaduna North LGA (secondary facility (7.6%) and the tertiary facility (5.7%)). CFR in the secondary health care facility in Ikara LGA was 3X that of the secondary health care facility in Kaduna North LGA. Thus, highlighting the difference in distribution of resources between an urban and rural area as noted above. The proportional mortality rate was calculated for individual LGA, it was observed that Pre-eclampsia/eclampsia was the highest for both LGAs (40.5 % for Kaduna North LGA and 50 % for Ikara LGA), followed by haemorrhage (21.6% for Kaduna North LGA and 36.4 % for Ikara LGA), postpartum sepsis (18.9 % for Kaduna North LGA). This is similar to the study carried out on facility based retrospective analysis in Sagamu, Ogun state Nigeria where it was

found that major causes of maternal deaths were hypertensive disorders in pregnancy (28.0%), haemorrhage (21.3%) and sepsis (20.0%).[77]

The MMR for Ikara (705 per 100,000 live births) was 1.5X that of Kaduna North LGA (465 per 100,000 live births). This finding is similar to the Nigeria MMR values for region

Good referral system is very important in the reduction of maternal death and the cornerstone of EmOC practice. The health care delivery system recognizes the 3 tiers of health facilities: PHC facilities, secondary and tertiary health care facilities. The PHC facilities are designed to be BEmOC facility while the secondary and tertiary are designed to referral centers i.e. CEmOC facilities. The BEmOC facilities are meant to be the first point of call for any pregnant woman with/without obstetric complications. Applying the above 6 signal functions, many obstetric emergencies will be attended to, such as postpartum sepsis, ante partum/postpartum haemorrhage, retained placenta and its products, pre-eclampsia/eclampsia and minor degree of obstructed labour. The BEmOC facility should be able to diagnose, treat, resuscitate and refer where appropriate the above conditions. It is the process of transfer of care of the patient from the first point of call at the primary facility to the next facility for better management that the referral letter is needed. The best referral system is the two-way referral system. This is when complications are recognized, patients are resuscitated and promptly referred to the next referral facility for further management with a letter stating the diagnosis, what measures of resuscitation was carried out before transferring the patient and the patient is sent back to the referring facility with the reply of what was the final diagnosis and treatment given to the patient after recovery. The advantages of the two-way referral system are: patient receives prompt treatment at the referral center thereby avoiding the third delay; the

patient is sent back to the referring facility this allows for patient's confidence in the referring facility; access to EmOC facilities is improved thereby reducing the first and second delay as a result in the confidence in the referring facility (PHC are supposed to be situated within 5km walking radius).

The referral system is best supported by use of ambulance services where available, use of community vehicle where the community is involved (through community advocacy & mobilization) as part of community birth preparedness or advocacy and involvement of local road transport employers. These will remove the second delay which results in maternal death. Also the use of telecommunication as a means of communication between health care facilities on available resources (e.g. bed space, functioning theatre, skilled birth attendant on duty e.t.c) will also help reduce the third delay.

In Kaduna LGA, 27.3% of the PHC had suitable referral forms available but none had a functional two-way referral system. According to a Matron in one of the PHC facilities 'the referral centre blamed their clients for using the PHC facilities and that clients are discouraged from further use of the PHC facilities for future ANC'. None of the PHC had a functional ambulance or mode of communication to support the referral system. In Ikara LGA, out of the 21 PHC studied, 4.8% had referral forms available, functional two-way referral system and functional ambulance to support the referral system. 23.8% had mode of communication with the referral centers.

The absence of a two-way referral system between the health care facilities was generally noted in both LGAs. Thus precluding the PHC staff from being informed about the diagnosis and management of the obstetric conditions which have an all effect on the quality of care received at the lower level of care and the pattern of utilization is also affected because confidence in the lower of care is eroded and limited resources at the

level of referral centers are stretched. The advantages of supporting referral system was noted in a preliminary studies on Facilitating emergency obstetric care through transportation and communication, Bo, Sierra Leone: Focus group discussions revealed poor roads, few vehicles, and high transportation costs as major causes of delay in deciding to seek and in reaching emergency obstetric care. Following intervention through the installation of a radio system linking the hospital, primary health units (PHUs) and the referral vehicle, The number of women with major obstetric complications arriving at Bo Government Hospital (BHG) from the project area increased from 0.9 to 2.6 per month, while case fatality rate dropped from 20% to 10%. In the post-intervention period, approximately half of women with complications from the project area utilizing Bo Government Hospital came by project vehicle. The mean time from the vehicle being called by the primary health units to the patient's arrival at Bo Government Hospital was 3.1h.[38,44]

According to WHO guidelines on EmOC services, 15% of the estimated births should take place in EmOC facilities. It was observed that the proportion of births occurring in all facilities surveyed in Kaduna North LGA was almost 2X that of Ikara LGA and those occurring in EmOC facilities Kaduna North LGA was 12X that of Ikara LGA. The proportion of births in Kaduna North LGA in EmOC facilities was noted to be high (55%) and this could be due to location of Kaduna North LGA which is cosmopolitan with high number of private health care facilities (which are assumed to be offering good maternal health services) and the presence of the tertiary health care facility which is a referral center for all secondary health care facilities in the state and also private health care facilities alike in Kaduna state. This is responsible for drawing women from a wider geographical area than the nominal catchments (service) area of the facility or group of facilities in a geographical area.

In Ikara LGA, the proportion of births that took place in all the facilities surveyed was 38.2%. The total facility births in Ikara LGA were noted to be high. These could be explained by the presence of *community midwives* which is a recent concept introduced by the Federal Government of Nigeria in order to improve the number of skilled birth attendants in rural communities. Also some of the deliveries were conducted at home by the health care personnel and the records of such deliveries were also included in the facilities records. For EmOC facilities alone, the proportion of births was 4.6 % as against 15 % recommended. The findings in Ikara is similar to those of the North-western states at the National level, where Katsina and Sokoto states had 2.8 % and 2.2 % respectively as the proportion of estimated births in EmOC facilities.[10] Findings in Ikara LGA actually gave a close picture to the national level when compared with Kaduna North LGA because it shows the true representation of women drawn only from the catchments area.

The met need in both LGAs was observed to low with that of Ikara LGA (5.6 %) lower than that of Kaduna North LGA (40.9%). Relating the met need for EmOC services to the proportion of births that took place in EmOC facilities, it is noted that in Kaduna North LGA, though the proportion of births in EmOC facilities is more than 3X the recommended it simply meant that the women who actually needed these services were not using them and these facilities (EmOC) were under utilized. In Ikara LGA, There is under utilization of the services both by the normal population and abnormal population (cases of obstetric complications) of pregnant women as observed in the low proportion of births (4.6 %) and met need (5.6 %) for EmOC services. Major obstetric complications managed in health facilities for both LGA was found to be haemorrhage, obstructed labour and pre-eclampsia/ eclampsia. This is similar to a study carried out in Pakistan on analysis of maternal mortality in tertiary care hospital to determine causes and

preventable factors, it was observed that obstetrical haemorrhage and hypertensive disorders were the major causes of death.[80]

The proportion of births through C-section in Kaduna North LGA (6%) was within the recommended range of 5% while that of Ikara LGA was observed to be low; 1.1%. Thus, indicating that women who actually needed this service were not getting it, therefore increasing maternal morbidity and mortality in the LGA as observed in high MMR. The proportion of estimated births that took place by C- section is 1.0% at the national level.[10] The availability of data on obstetric complication is very paramount to monitoring and evaluation of the health care system. Its availability can not be over emphasized in the assessment of achieving the MDG through the use of the process indicators. Data on maternal deaths are not available, because maternal deaths are mostly not reported or misdiagnosed. The use of the process indicators (indicators 2-6) depends on available hospital data. Most of the health facilities in the two LGAs had insufficient data on obstetric complications. This is similar to preliminary study carried out in Kumasi, Ghana on record keeping for maternal mortality programme. The review of records and the record keeping systems revealed deficiencies, most of the information on obstetric complications in the registers was either lacking or inconsistent. Existing case notes and registers were not designed to highlight information on complications.[78]

5.2 CONCLUSION

The use of process indicators as a means of assessing health care facilities in the two LGAs is an indirect means of measuring how far we have gone towards achieving the MDG 5. Having assessed the two LGAs, I found that Kaduna North LGA did not meet the WHO requirement for the availability and accessibility of EmOC facilities per 500,000 thousand populations while Ikara LGA met with the requirement. The estimated proportion of births that took place in the EmOC facilities in Kaduna North LGA and Ikara LGA were 55% and 4.6% respectively (minimum requirement, 15%).

The estimated met need for EmOC facilities was found to be 40.9% and 5.6% for Kaduna North LGA and Ikara LGA respectively (minimum requirement, 100%) while the proportion of births through C-Section were 6.0% and 1.1% for Kaduna North and Ikara LGA respectively (minimum requirement, 5%). The overall case fatality rates for public referral facilities was 5.9% (7.6% for secondary and 5.7% in tertiary facilities) in Kaduna North LGA while that of secondary facility in Ikara LGA was 23.4 % (minimum < 1%).

Using the Nigerian guidelines in terms of provision of all the signal functions and having 24 hr coverage and availability of at least 4 midwives in addition to the signal functions, none of the PHC facilities in both LGA met with the standard, the public referral facilities in Kaduna North LGA met with the standard for BEmOC and CEmOC services in secondary and tertiary health facility respectively, while the secondary facility in Ikara LGA did not meet with the Nigerian standard for BEmOC services. Human resources were found to be more in Kaduna North LGA in both public and private health care facilities. Ikara LGA had more drugs and equipments in the PHC facilities than Kaduna LGA but the reverse is the case in private health care facilities in both LGAs.

5.3 RECOMMENDATIONS

From the above findings from the study, the following recommendations are made:

1. Feed back on the findings of the study will be communicated to the Kaduna State Ministry of Health, the local government health office of Kaduna North and Ikara LGAs and private health care facilities involved in the study.
2. Process indicators, their uses and relevance need to be introduced to the state and local government authorities as tool to the achievement of MDG 5.
3. The findings from the study can serve as a benchmark for intervention in both the state and local government.
4. The LGAs with support of the State Ministry of Health (SMOH) should be able to do a mapping of health facilities in terms of EmOC services provision, identify and upgrade some of the PHC facilities for BEmOC services provision to ensure availability, meeting of standards and equity in coverage.
5. Policies regarding the training of nurses and midwives need to be revisited especially on the use of vacuum extractors for assisted vaginal delivery and the use of MVA kits for incomplete abortion by these two cadres of health workers.
6. The local government needs to improve the staff strength in terms of number of midwives in the PHC facilities, to a least four midwives per PHC.
7. The LGAs with support of the State Ministry of Health should train staff posted to maternal section of the hospitals on life saving skills.
8. SMOH in collaboration with the operators of private health care facilities should institute public private partnership on issues of maternal health.
9. Related services such availability of blood bank services in all secondary health care facilities of the state i.e. at least one per local government area should be established so as to make blood available at each LGA by the SMOH.

10. There is need to sensitize health workers on the relevance of two way referral system to the health care delivery system, and the need to make forms available at all times in the health care facilities. Modern means of communication between health care facilities need to be instituted to support the referral system; this will reduce the second and third delay.
11. Mandatory use of available ambulances to take patients to the next referral level of care should be instituted by SMOH in the secondary health care facilities.
12. There is need to improve on the current record keeping practice. The current delivery register should be upgraded by the FMOH, introducing a column for maternal complications.
13. Communities should be mobilized and educated by the LGAs on utilization of available emergency obstetric care services.
14. Communities should be educated through the use traditional and modern methods of communication by the LGAs on emergency birth preparedness through instituting community emergency loan funds, education on identification of danger signs in pregnancy and identifying available resources that might be useful during emergencies.
15. Maternal death should be seen as a human rights issue and all efforts should be made to make it so by enactment of relevant laws pertaining to reproductive heath rights of women.

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APPENDICES

APPENDIX I

SAMPLE QUESTIONNAIRE **Serial No: _____**

AHMADU BELLO UNIVERSITY, ZARIA, FACULTY OF MEDICINE, DEPARTMENT OF COMMUNITY MEDICINE

QUESTIONNAIRE FOR A STUDY OF AVAILABILITY, ACCESSIBILITY AND UTILIZATION OF EMERGENCY OBSTETRIC CARE IN KADUNA NORTH AND IKARA LOCAL GOVERNMENT AREA KADUNA STATE

Dear Respondents,

This questionnaire is a tool for study in assessing the availability, accessibility and utilization of Emergency Obstetric Care in facilities offering maternal health services, under 12 month period of review: 1st January, 2009 – 31st December, 2009. All information will be treated with total confidentiality.

Thank you.

Dr Bakare Adeola B. Fatimah
Researcher

FACILITY-ASSESSMENT

The questionnaire will be administered to the head of the facility; his/her designated representative or the most senior staff available on duty.

Date _____ **Interviewer** _____

SECTION A: FACILITY REVIEW:

Identification of Facility

1. Name of facility: _____
2. Address of facility: _____
   _____
3. Ward: _____
4. Respondent's designation: _____
   _____
5. Operating Agency
   (a) Government [ ] (b) Mission [ ] (c) Private [ ]

6. Type of Health Facility

(a) Teaching Hospital/Specialist Hospital [ ]

(b) General Hospital [ ]

(c) Rural Hospital [ ]

(d) Comprehensive Health Centre [ ]

(e) Primary Health Care Centre [ ]

(f) PHC Clinics [ ]

(g) Maternity Centres/Homes [ ]

(i) Health Dispensary [ ]

(j) Others (specify) _____

Services

7. Type of maternal health services offered (Please tick)

Maternal Health Services	Available	Not Available
a) Antenatal care		
b) Delivery i) Normal delivery ii) Operative delivery		
c) Postnatal care		

8. How many days in a week is your health facility opened? _____

9. When does the health facility open on each day that it operates? _____

10. When does the facility close on each day that it operates? _____

11. How many shifts do health workers do in this facility officially?

(a) Morning shift only [ ]

(b) Afternoon Shift only [ ]

(c) Night shift only [ ]

(d) Morning and afternoon shifts only [ ]

(e) Morning, Afternoon and Night shift [ ]

12. Is there appropriate accommodation for health workers within this hospital premises where the available health workers are too few to ensure three shifts daily. Yes [ ] No [ ]

13. Facility's Possible EOC Status:

a) Basic EmOC [ ]

b) Comprehensive EmOC [ ]

c) Not EmOC [ ]

Human Resources

14. Cadre of health workers available and EmOC-related skills development

Health workers	**Number available**	**NUMBER trained in ELSS, LSS, MLSS, (Where applicable)**
Obstetrician		
Doctors non-specialist		
Nurse-midwives (double qualified)		
Other Nurses (single qualified)		
Other midwives (single qualified)		
CHO/Nurses/Midwives		
Community Health Officers (non Nurses-Midwives)		
Senior CHEW		
Junior CHEW		
Auxiliary Nurse		
Anaesthesiologist		
Theatre Nurses/ Nurse Anaesthetist		
Laboratory Scientist/Technologist		
Laboratory technician		

Note

ELSS - Extended Life Saving Skills – Doctors

LSS - Life Saving Skills – Nurses

MLSS - Modified Life Saving Skills – Other Health Workers

Infrastructure

15. Infrastructure (Please Tick)

Infrastructure	Available/Functioning	Available/Not Functioning	Not Available
a) Source of power supply			
i) Public source			
ii) Generator			
iii) Solar panels			
b) Laboratory services			
c) Operating Theatre			
d) Blood Bank			
e) Ambulance services			
f) Sources of Water Supply			
i) Bore Hole			
ii) Well			
iii) Tap			
g) Toilet			

Assessing Emergency Obstetric Care Services

16. Are the following obstetric services performed in this health facility (a) routinely? and (b) In last 3 months?

S/N	Signal Functions	Routinely		Last 3 months	
		Yes	No	Yes	No
a.	Parenteral antibiotics (e.g. crystalline penicillin, ampiclox)				
b.	Parenteral Oxytocics (e.g. pitocin, ergometrine, syntometrine)				
c.	Parenteral sedatives / anticonvulsants (valium, paraldehyde)				
d.	Manual Removal of Placenta				
e.	Removal of retained products of conception				
f.	Assisted vaginal delivery (Using acuum/Forceps)				
g.	Blood transfusion				
h.	Caesarean Section				

17. Facility's Actual EOC Status

a) Not EOC [ ]

b) Basic EOC [ ]

c) Comprehensive EOC [ ]

Referral

18. If the facility is classified as (a), does the facility has linkage to:

b) BEmOC facility? Yes [ ] No [ ]

19. If the facility is classified as (b) does the facility has linkage to:

(c) CEmOC facility? Yes [ ] No [ ]

20. Where do you refer your patients to? _____

21. What is the distance from your health facility to the referral centre? (distance in kilometers/minutes) (specify) _____

22. What are the problems associated with referring patients from this facility?

a) Transportation problems [ ]

b) Lack of money (poverty) [ ]

c) Refusal by patients to go [ ]

d) Referral center too far [ ]

e) Lack of consent from spouse or significant other [ ]

f) Complaints of negative attitude of health workers at referral centres [ ]

g) Fear of the referral facility [ ]

h) Other (specify) _____

23. Are referral forms available? Yes [ ] No [ ]

24. Comments on the referral form (suitability, adequacy e.t.c.)

_____

_____

25. Is there a functional two-way referral? Yes [ ] No [ ]

26. * Look specifically in the files for returned referral slips: Specify reasons/evidences for your answer (e.g. returned slips) _____

_____

27. Does the facility have a referral linkage for EmOC displayed? Yes [ ] No [ ]

28. What is the type of functional transport facilities available?

a. Ambulance [ ]

b. Other facility-based (specify) _____

c. Community based (specify) _____

d. None [ ]

29. What communication facilities are available for supporting referral linkages?

30. How effective are the communication facilities?

(a) Very effective [ ] (b) Effective [ ]

(c) Somewhat effective [ ] (d) Ineffective [ ]

Comments: _____

_____

_____

SECTION B

31. Summary of health services data on number of deliveries, obstetric complication and maternal death

If no data at all are available at this facility, check here:- (Skip to Section C)

Delivery Data from Jan. 1 – Dec. 31, 2009

a) Normal deliveries during 12-month period	
b) Caesarean sections during 12-month period	
c) Total deliveries during 12-month period	

32. **Monthly Delivery Data**

Months	**No. of Vaginal Delivery**	**No. of Caesarian Section**
January		
February		
March		
April		
May		
June		
July		
August		
September		
October		
November		
December		
Total		

OMPLICATED OBSTETRIC CASES DURING 12-MONTH PERIOD

TO BE FOLLOWED WHENEVER POSSIBLE
►Enter the number of each type of complicated case treated each month during the 12-month period using the grid below.

TO BE FOLLOWED WHEN IT IS NOT FEASIBLE TO RECORD ALL COMPL I CATI ONS (i.e., when this would be too much work)*
►Enter the number of each type of complicated case treated during the four months underlined — i.e., months 1 4, 7 & 10.

TO BE FOLLOWED ONLY WHEN DATA ON COMPLICATIONS ARE NOT AVAILABLE AT THE FACILITY
►Enter the number of deliveries ___ and the number of 'normal' deliveries ___ for the 12-month period and skip to question 9 below:

Complication *ne, use the most life-threatening.*	Month (write in month above each number)											
	Jan	Feb	Mar	**Apr**	May	Jun	**Jul**	Aug	Sept	**Oct**	Nov	Dec
e* ante -partum												
post-partum												
ostructed labour												
sepsis												
ns of abortion												
a/eclampsia												
nancy												
rus												
s												

MPL I CATED OBSTETRIC CASES *(Complete only ONE of the boxes below.)*

PLAN 1	*PLAN 2*	*PLAN 3*
thly totals 12) = _____	9a. Sum of monthly totals (Q8, columns 1,4,7,10) = _____ 9b. [Q9a] x 3 = _____	9a. (All deliveries) - ('Normal' deliveries) = _____ 9b. [Q9a] x 1.25* = _____ *Correction factor

MATERNAL DEATH DURING 12-MONTH PERIOD

se of maternal death *, use the box life-threatening cause*		Month (write in month above each number)												
		Jan.	Feb.	Mar.	Apr.	May	Jun	Jul	Aug.	Sept.	Oct.	Nov.	Dec.	Total
ge	ante-partum													
	post-partum													
bstructed labour														
sepsis														
ns of abortion														
ia/eclampsia														
gnancy														
erus														
obstetric deaths d causes (not including other) estion 1-7)														
her causes)														
rnal deaths														

35. * What sources of data were used to complete this form?

(e.g., maternity ward register, delivery book, general admission register, etc.)

_____

_____

_____

_____

Quality of Information:

36.* In your informed opinion (from talking to staff, seeing the record system, etc.), what proportion of the complications treated in this facility are recorded on this form? (check one)

a) None [ ] b) Some [ ] c) Most [ ] d) All [ ]

Note

* Interviewer's opinion

SECTION C

CHECKLIST OF EQUIPMENTS/DRUGS

Availability of equipment

	Type	Available/ Functioning	Available/Not Functioning	Not available
1	Stethoscope (adult)			
2	Sphygmomanometer			
3	Urinary Catheters			
4	Surgical Latex Gloves			
5	Adult Airway			
6	Angle Poise Lamp			
7	Cord Scissors			
8	Episiotomy Scissors			
9	Artery Forceps			
10	Sponge-holding forceps			
11	Vaginal Speculum (Cuscus)			
12	Needle Holder			
13	Surgical/Stitch Scissors			
14	Kidney Shape Dish			
15	Plastic Vacuum Extractor/Forceps			
16	Suction Machine			
17	Ambu Resuscitator (Adult)			
18	Torch lights			
19	Sutures			
20	Evidence of high level disinfection (Jik etc)			
21	MVA Kit			

Key drugs		Available	Not available
Oxytocics			
	Ergometrine		
	Syntocinon		
Synthometrine			
	Misoprostol		
	Pitocin		
Other Anticonvulsants			
	Valium		
	Paraldehyde		
	Magnesium Sulphate		
IV Antibiotics			
Local Anaesthetics (e.g. xylocaine)			
General Anaesthetics			
Oxygen			
Corticosteroids			
Analgesic			
IV Fluids (N/Saline, Ringers)			

Thank you for your cooperation

APPENDIX II

LETTER OF INTRODUCTION

DEPARTMENT OF COMMUNITY MEDICINE

FACULTY OF MEDICINE, AHMADU BELLO UNIVERSITY, ZARIA

VICE CHANCELLOR:Professor J. U. Umoh
DVM(ABU)MSPH, Ph.D(Missouri), FCVSN
Ag. HEAD OF DEPARTMENT: Dr. S. H. Idris,
MBBS, DMLD, FWACP (COMM. HEALTH)

Telephone: 069-551718
E-mail: commmedabu@yahoo.com
Fax: 069-550022

Our Ref: CM/M/15.

Date: 6th Jan., 2010.

Dear Sir/Madam,

INTRODUCTION OF MASTER IN PUBLIC HEALTH (MPH) STUDENT AND RESEARCH PROJECT: Dr. Bakare, Adeola B. Fatimah (MPH/MED/09351/2006/2007).

This is to certify that the above named MPH Student is conducting her Research Project on the topic: **AVAILABILITY, ACCESSIBILITY AND UTILIZATION OF EMERGENCY OBSTETRIC CARE IN KADUNA NORTH LOCAL GOVERNMENT AREA, KADUNA STATE.**

I shall be grateful for your assistance in giving her all the necessary information/data relevant to the project title to enable her handle the assignment with confidence and success.

Yours faithfully,

Dr. S.H. Idris
Head of Department.

DEPARTMENT OF COMMUNITY MEDICINE

FACULTY OF MEDICINE, AHMADU BELLO UNIVERSITY, ZARIA

VICE CHANCELLOR:Professor J. U. Umoh
DVM(ABU)MSPH, Ph.D(Missouri), FCVSN
Ag. HEAD OF DEPARTMENT: Dr. S. H. Idris,
MBBS, DMLO, FWACP (COMM. HEALTH)

Telephone: 069-551718
E-mail: commmedabu@yahoo.com
Fax: 069-550022

Our Ref: CM/M/15.

Date: 6th Jan., 2010.

_____

_____

_____

Dear Sir/Madam,

INTRODUCTION OF MASTER IN PUBLIC HEALTH (MPH) STUDENT AND RESEARCH PROJECT: Dr. Bakare, Adeola B. Fatimah (MPH/MED/09351/2006/2007).

This is to certify that the above named MPH Student is conducting her Research Project on the topic: **AVAILABILITY, ACCESSIBILITY AND UTILIZATION OF EMERGENCY OBSTETRIC CARE IN IKARA LOCAL GOVERNMENT AREA, KADUNA STATE.**

I shall be grateful for your assistance in giving her all the necessary information/data relevant to the project title to enable her handle the assignment with confidence and success.

Yours faithfully,

Dr. S.H. Idris
Head of Department.

APPENDIX III

LETTER OF CONSENT TO PARTAKE IN THE STUDY

DR BAKARE, ADEOLA B FATIMAH
DEPT OF COMMUNITY MEDICINE,
FACULTY OF MEDICINE
AHMADU BELLO UNIVERSITY
ZARIA, KADUNA

_____

_____

_____

DEAR SIR/MADAM,

PERMISSION TO USE YOUR FACILITY FOR RESEARCH

I'm Dr Bakare A.B.F, a master's student of Public Health in ABU Zaria carrying out a research on the topic ***Availability, Accessibility and Utilization of Emergency Obstetrics Care in Kaduna North Local Government Area Kaduna.***

The research is being conducted in all health facilities; both public and privately owned hospitals in Kaduna North LGA which provides any form Maternal Health Services (ANC, Delivery and PNC).

The objective of the study is meant to address the following questions:

- Are there health facilities providing Emergency Obstetric Care?
- If such facilities are available, are the facilities well distributed?
- Are the facilities being used by pregnant women who actually need them?
- Are the facilities addressing the needs of pregnant women who actually need them?

The research will assist programme planners in assessing how far we have gone in achieving Millennium Development Goal on maternal mortality.

CONSENT FORM

I hereby ACCEPT/REJECT this facility being included in the above named research.

NAME:

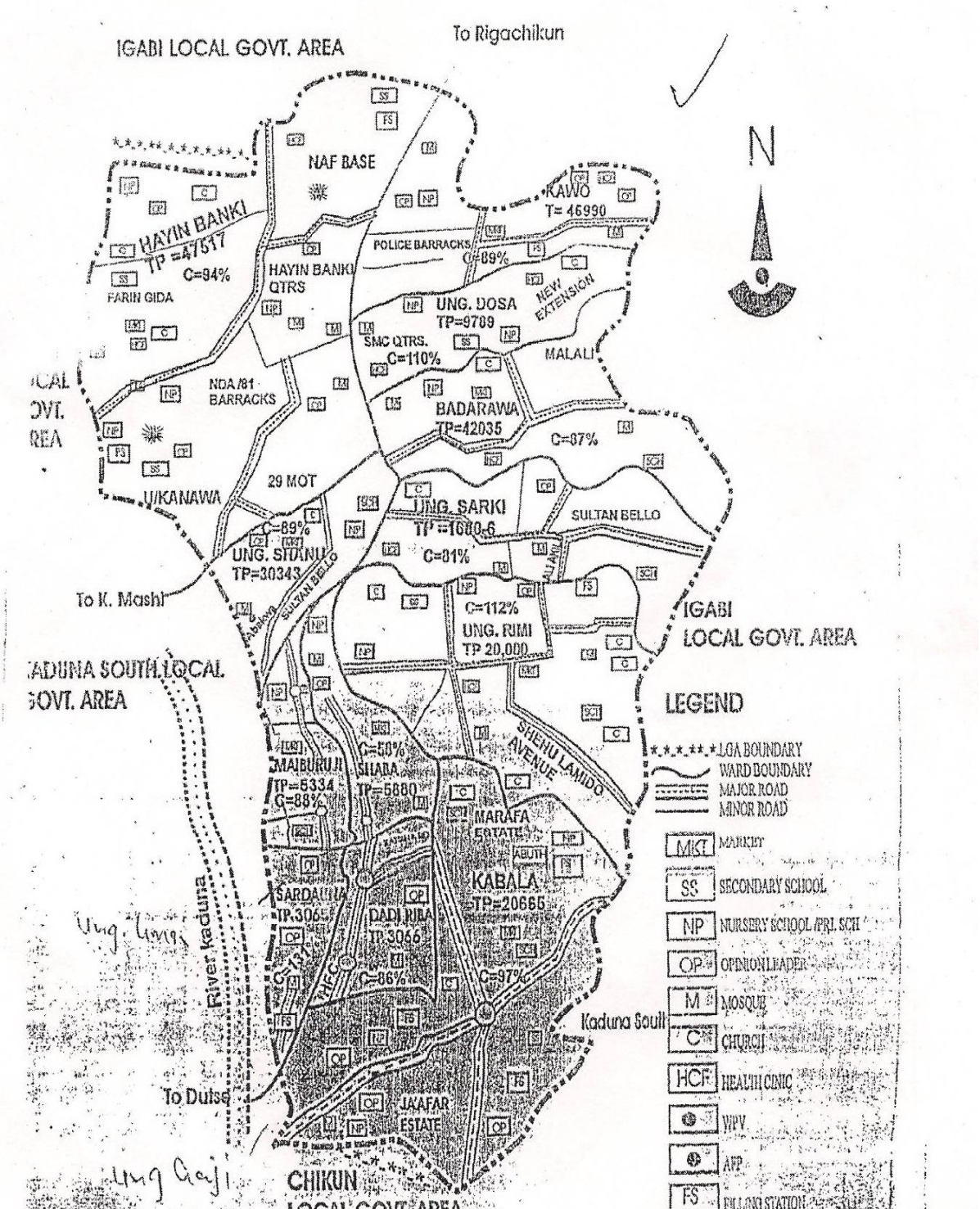
DESIGNATION:

SIGNATURE AND DATE:

Thank You

APPENDIX IV

MAP OF KADUNA NORTH LOCAL GOVERNMENT AREA



APPENDIX V

MAP OF IKARA LOCAL GOVBERNMENT AREA

