THE PREVALENCE OF BIRTH ASPHYXIA AND IMMEDIATE OUTCOMES AMONG PREGNANT WOMEN ATTENDING MATERNAL HEALTH SERVICES AT ISHAKA ADVENTIST HOSPITAL.

BY

MUHUMUZA AMOS

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DECLARATION

I, **Muhumuza Amos** of Registration Number **BMS/0100/113/DU** declare that this dissertation, "*The prevalence of birth asphyxia and immediate outcomes among pregnant women attending maternal health services at Ishaka Adventist hospital."* is my own original work under supervision of Dr.Saima Husnain and has never been submitted in part or fully to any other University or Institution of higher learning for scrutiny for the purpose of an academic award unless stated otherwise.

Signature …… Date……

CERTIFICATION

I, …….certify that this research project report titled, "*The prevalence of birth asphyxia and immediate outcomes among pregnant women attending maternal health services at Ishaka Adventist hospital."* is an original work carried out by **Muhumuza Amos** of registration number **BMS/0100/113/DU** under my supervision.

Dr. Saima Husnain, Consultant Gynecologist.

Signature……..…... Date……..……

DEDICATION

I dedicate this work to the Almighty God who has given me life, faithfully lead and still guiding me through my course.

To my dear parents, Mr. & Mrs. Tindiwensi Charles who have continuously and tirelessly supported me in my studies and played a great role in my life. Thank you for being there for me.

And finally to all my brothers, sister, cousins, uncles and aunts especially my only sister Mrs.Banya confidence, thanks for your support and know that I love you all.

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ACRONYM AND ABBREVIATIONS LISTS

HIE: Hypoxic Ischemic Encephalopathy

IUGR: Intrauterine Growth Retardation

ADHD: Attention deficit hyperactivity disorder

AIDS: Acquired Immunodeficiency syndrome

CVS: Cardiovascular system

DALYs: Disability Adjusted Life Years

DIC: Disseminated intravascular coagulation

HIV: Human Immune Virus

ICU: Intensive Care Unit

IPPV: Intrapulmonary Positive Pressure Ventilation

KIUTH: Kampala International University Teaching Hospital

IAH: Ishaka Adventist Hospital

MDG 4: Millennium Development Goal 4

MPDR: Maternal and Perinatal death review

PaCO2: Partial Pressure of carbon dioxide

PNFP: Private not-for-profit

SIADH: Syndrome of inappropriate antidiuretic hormone secretion

WHO: World Health Organization

SVD: Spontaneous Vertex Delivery

EMC/S: Emergency Caesarean Section

C/S: Caesarean Section

MSB: Macerated Still Births

CPD: Cephalo-Pelvic Disproportion

PROM: Pre labor Rupture of Membrane

MoH: Ministry of Health

BA: Birth asphyxia

DEFINITIONS

Birth asphyxia is a hypoxic insult severe enough to cause metabolic acidosis, neonatal encephalopathy and multiorgan system dysfunction. (***Olga Golubnitschaja et al, 2011)*** WHO defines birth asphyxia simply as "the failure to initiate and sustain breathing at birth."

Newborn or neonate refers to an infant in the first 28 days after birth. The term "newborn" includes premature infants, post mature infants and full term newborns. (***MoH Uganda, 2008***)

Infant is typically applied to children between the ages of 1 month and 12 months; however, definitions vary between birth and 3 years of age. (***Stedman's medical dictionary***)

Stillbirths refers to Pregnancy losses occurring after seven completed months of gestation and are expressed per 1,000 total births. (***Dr. Gelasius Mukasa et al, 2008)***

Hypoxic ischemic encephalopathy is a cellular damage that occurs within the central nervous system (the brain and spinal cord) from inadequate oxygen due to intrauterine hypoxia and birth asphyxia. (***Oxford concise Medical dictionary***)

Perinatal mortality is defined as the "number of stillbirths and deaths in the first week of life per 1,000 live births"***(WHO, 2012)***

Neonatal Mortality Rate (NMR): The number of deaths during the first 28 days of life per 1,000 live births. Early neonatal mortality refers to a death in the first week of life while late neonatal mortality refers to deaths between 7 and 28 days of life. (***Dr. Gelasius Mukasa et al, 2008)***

Live birth is the complete expulsion or extraction from its mother of a fetus/baby of 1000 grams or 28 weeks gestation; which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached.(***MoH Uganda, 2008)***

ABSTRACT

Background: Birth Asphyxia is defined by WHO as "the failure to initiate and sustain breathing at birth." Millions of child deaths and stillbirths are attributable to birth asphyxia, yet limited information is available to high light the burden of the condition to guide policy and practice, particularly at the community level in developing countries like Uganda. This study will compile insight on the prevalence and immediate outcomes of birth asphyxia in pregnant mothers attending maternal health services at Ishaka Adventist hospital.

Method: A descriptive cross sectional study involving a sample size of 310 deliveries obtained from Fisher's et al, 1990 formula was undertaken to review HMIS records from January 2012 to December 2013 in IAH Theatre, Maternity and Pediatric Ward to determine the prevalence and immediate outcomes of birth asphyxia as determined by Apgar Score < 7/10 in 5 minutes, birth weight >1500grams and gestational age >34 weeks.

Results: An overall prevalence of 4.8% was obtained from this study, out of which more males were asphyxiated with 56.9% in 2012 and 58.3% in 2013 compared to females with 43.1% in 2012 and 41.7% in 2013, giving a male to female ratio of 1.4:1 in the study. Generally, statistics showed that on average 267 deliveries were made from 2012 to 2013 at IAH and an incidence of 48/1000 births and an incidence of 52 deaths per 1000 live births was obtained from the study. Majority of the neonates improved well upon resuscitation with 17cases (38.6%) and 23cases (50%) in 2012 and 2013 respectively. In both years, low Apgar score between 0-3 resulted in poor prognosis and no patient improved following resuscitation. Most cases with Apgar score of 4-7 improved 15 cases in 2012 and 20 cases in 2013, a few cases in the same range thus 12 cases died shortly and 25 cases died later in both years. Both MSB and FSB contributed 60 cases (71.8%) in both years. Important risk factors included; obstructed labor 34 cases (26.2%) in 2012 and 40 cases (22.2%) in 2013, followed by the fetal distress 27 cases (20.8%) in 2012 due to idiopathic intrapartum conditions and prolonged labor, 27 cases (15.0%) in 2013.

Conclusion: There is urgent need to institute appropriate measures to prevent and manage asphyxiated newborns in the hospital and region at large. Lastly, Without more attention to improve obstetric care and advance birth asphyxia research, the millions of deaths related to asphyxia, will remain out of reach of effective care, either by skilled or at community level, for many years to come in Uganda.

CHAPTER ONE

1.0 INTRODUCTION

Over 200,000 children under the age of five years still die in Uganda annually, with more than half of these dying in their first year and 45,000 within the first month of life – the newborn period making Uganda the country with the fifth highest number of newborn deaths in sub-Saharan Africa. Despite the struggles by the government of Uganda, in collaboration with development partners to meet a reduction in childhood morbidity and mortality to achieve the Poverty Eradication Action Plan and the Millennium Development Goals, Uganda's neonatal mortality rate possibly an under-estimate, is still very high at 29 deaths per 1,000 live births and has not declined over a period of 15 years. This study will determine the prevalence of birth asphyxia and its immediate out comes in pregnant women attending maternal health services at Ishaka Adventist hospital, as one of the leading causes of neonatal deaths in Uganda and information will be available for health policy makers to make informed decisions on child health. ***(MoH, 2008)***

1.1 BACKGROUND

World Health Organization defines birth asphyxia as "the failure to initiate and sustain breathing at birth." It is a hypoxic insult severe enough to cause metabolic acidosis, neonatal encephalopathy and multiorgan system dysfunction. There have been a main challenge of operationalizing the criteria of definition at community level in developing country settings by using available information according to: feasibility thus the variables should be easily observed by the health workers and easily recollected from the mothers, biological and clinical relevance (defined by review of scientific evidence and expert consensus) thus accurate estimation of the proportion of neonatal mortalities attributable to birth asphyxia is limited. However, definitions of birth asphyxia designed for use in hospital- based settings require evaluation of umbilical cord blood pH, Apgar scores, neurologic clinical status, and markers of multisystem organ function and are not feasible for community settings (***Anne CC. Lee et al, 2008).***

Regarding the definition according to American College of Obstetricians and Gynecologists and the American Academy of Pediatrics, a neonate is labeled to be asphyxiated if the following conditions are fulfilled: (1) Umbilical artery metabolic or mixed respiratory-metabolic academia

with pH less than 7.00; (2) Apgar score of 0 to 3 for longer than 5 minutes; (3) Neurological manifestations (e.g., seizures, coma, or hypotonic); and (4) Multisystem organ dysfunction, e.g., cardiovascular, gastrointestinal, hematological, pulmonary, or renal system**(*Dr Ornella Lincetto, 2007, Shazia et al, 2012)***

Birth asphyxia causes in a global perspective differ between industrialized and non-industrialized countries but the events have their roots in the antepartum, the intrapartum, or the postpartum periods or combinations thereof. A recent review suggests that asphyxia is probably primarily caused by antepartal factors in 50%-70% of cases, intrapartal factors in 20%-40% of cases and postpartal factors in the remaining 10% of cases in industrialized countries. The concept that difficult birth is the main factor of birth asphyxia and subsequent sequelae has in industrialized countries been challenged in the recent years although in developing countries intrapartum events still are the most important cause of birth asphyxia**. *(Ellis et al BMJ, 2000)***

Clinical manifestation of asphyxia in a baby at the time of birth may include: baby is not breathing or breathing is very weak, skin color is bluish or pale, heart rate is low, muscle tone is poor or reflexes are weak, too much acid is in the blood (acidosis), the amniotic fluid is stained with meconium (first stool) and the baby is experiencing seizures.

The clinical diagnosis of perinatal asphyxia is based on several criteria, the two main ones being evidence of cardiorespiratory and neurological depression (defined as an Apgar score remaining less than 7 at 5 minutes after birth) and evidence of acute hypoxic compromise with acidaemia (defined as an arterial blood pH of less than 7 or base excess greater than 12 mmol/L). In many settings, especially resource-poor countries, it may be impossible to assess fetal or neonatal acidaemia. (***William McGuire, 2007).***

Dr. Virginia Apgar developed the Apgar score system in the middle of 20th century and since then, it is still the worldwide practiced grading of the severity of perinatal asphyxia. The score uses five criteria: Appearance, Pulse, Grimace, Activity, and Respiration, shortly APGAR. Ranging from 0 to 10, the scores below 3 are considered as critically low for cases of the highest emergency, 4 to 6 as fairly low, and the scores equal to or above 7 correspond to generally normal states of the newborn's health. In regions with a traditionally high neonatal mortality, the Apgar score is frequently calculated as less than 7. Hence, in Saudi Arabia, the Apgar scores below 7 were registered for 22% of newborns; 7.6% of them represented cases of neonatal morbidity. In Tanzania, Apgar scores below 7 registered for 79% of the neonatal deaths. These

are clear indications for perinatal asphyxia as the major cause of neonatal morbidity. (***Olga Golubnitschaja et al, 2011)***

In management of birth asphyxia anticipation is the key to preventing asphyxia neonatorum. Others include; Good intrapartum care, Adequate and effective resuscitation, ICU monitoring for complications. Regular BP, respiratory, urine output, acidosis among others, General measures; that include, Nurse in thermo-neutral environment thus avoid high environmental temperature as fever is associated with adverse outcome, Avoid hypo or hyperglycemia, Adequate ventilation and avoid hypoxemia and hypercarbia or hypocarbia, Review infection risk and treatment with antibiotics, Maintain adequate hydration but do not dehydrate or overhydrate, Treat jaundice as necessary.

1.2 PROBLEM STATEMENT

According to the statistical data by the Global Burden of Disease Study, worldwide 10.5 million children aged below 5 years die annually and of these 4 million are neonates, representing 38 % of all deaths of children under 5 years of age.(***Olga Golubnitschaja et al, 2011***)Despite the struggles by WHO to achieve the 4^{th} MDG, Birth asphyxia still accounts for the death of approximately 1 million (23%) infants annually and another 1.1 million(25% to 30%) intrapartum stillbirths are also associated with Birth Asphyxia as well as unknown burden of long term neurological disability and impairment in many sub-Saharan countries like Uganda. Such a health emergency is unfortunately under estimated and often even unrecognized in the developing countries where over half of neonatal deaths occur at home in the absence of skilled care and just three major causes account for over three quarters of these deaths – serious infections including tetanus (36%), complications of preterm births (27%) and birth asphyxia (23%), (***Seyal T and Hanif A, 2009***).

To note is that, in Uganda more than half of the 200,000 children under five years that die each year, die in their first year and 45,000 within the first month of life – the newborn period, making Uganda the country with the fifth highest number of newborn deaths in sub-Saharan Africa where birth asphyxia is one of the leading cause of neonatal deaths.***(Dr.Gelasius Mukasa et al, 2008)*** However, the exact prevalence of low Apgar score and attendant risk factors for birth asphyxia remains unknown despite use of the score system for over 50 years especially in developing countries like Uganda where the socioeconomic status is not up to expected standards

and as a result, a large proportion of births and deaths occur in non-hospital settings limiting the availability of data, hence under estimation of the burden of mortality and morbidity due to birth asphyxia and thus the need for an epidemiological research in community based settings together with hospital settings to determine the true prevalence of birth asphyxia in developing countries like Uganda.

1.3 PURPOSE OF THE STUDY

At least 45,000 newborn deaths occur each year and an equal number are stillborn. Uganda's neonatal mortality rate (NMR), possibly an under-estimate, is very high at 29 deaths per 1,000 live births, has not declined over a period of 15 years***.(MoH,2008)*** The common causes of neonatal deaths in Uganda are similar to the rest of Africa and include birth asphyxia, infections and complications of preterm birth. This makes Uganda the country with the fifth highest number of newborn deaths in sub-Saharan Africa. Thus this study will help to contribute to the limited information on the prevalence of birth asphyxia in Bushenyi district enabling district policy makers able to make decisions aimed at reducing newborn morbidity and mortality with particular attention to birth asphyxia, as the country looks forward to achieving the 4^{th} MDG.

1.4 OBJECTIVES

1.4.1 General objective

To determine the prevalence of birth asphyxia and immediate outcomes in pregnant mothers attending maternal health services at Ishaka Adventist Hospital (IAH).

1.4.2 Specific objectives

To determine the total number of births in IAH from Jan2012 toDec2013.

To find out the proportion of asphyxiated births in IAH from Jan.2012 to Dec. 2013.

To assess the immediate outcomes of the asphyxiated neonates in the hospital.

To find out the various factors that lead to birth asphyxia.

1.5 RESEARCH QUESTIONS

What was the total number of births in Ishaka Adventist hospital from Jan. 2012 to Dec. 2013?

What is the proportion of asphyxiated births in pregnant women attending maternal health services in IAH from Jan. 2012 to Dec. 2013?

What are the immediate outcomes of birth asphyxia in Ishaka Adventist hospital?

What are the various factors leading to birth asphyxia?

1.6 JUSTIFICATION OF THE STUDY

Globally, perinatal asphyxia is responsible for 42 million disability life adjusted years, doubling that due to diabetes and three quarters of that due to HIV/AIDS. Almost one quarter of the world's 4 million annual neonatal deaths are caused by perinatal asphyxia and 99% of these deaths occur in low and mid-resource settings (***Kinoti SN, PubMed)***.

To note is that, Uganda is ranked 5th African country among those that contribute 50% of the newborn deaths annually in Africa with stillbirth and birth asphyxia being some of the leading causes of these deaths in the country though there is only a handful of published studies from the developing countries and none from Uganda, to shed light on the magnitude of the problem of birth asphyxia. (***Tunde Adegboyega et al, 2010)***

With little information about the condition in Uganda, it's on this background that I deeply feel that information from this research will bring the problem to light with documented evidence in order to attract the attention and concerns it deserves from the hospital administration and ministry of health in Uganda.

1.7 SCOPE OF STUDY

1.7.1 Geographical scope

This study will be conducted at Ishaka Adventist hospital in Bushenyi district, Western Uganda.

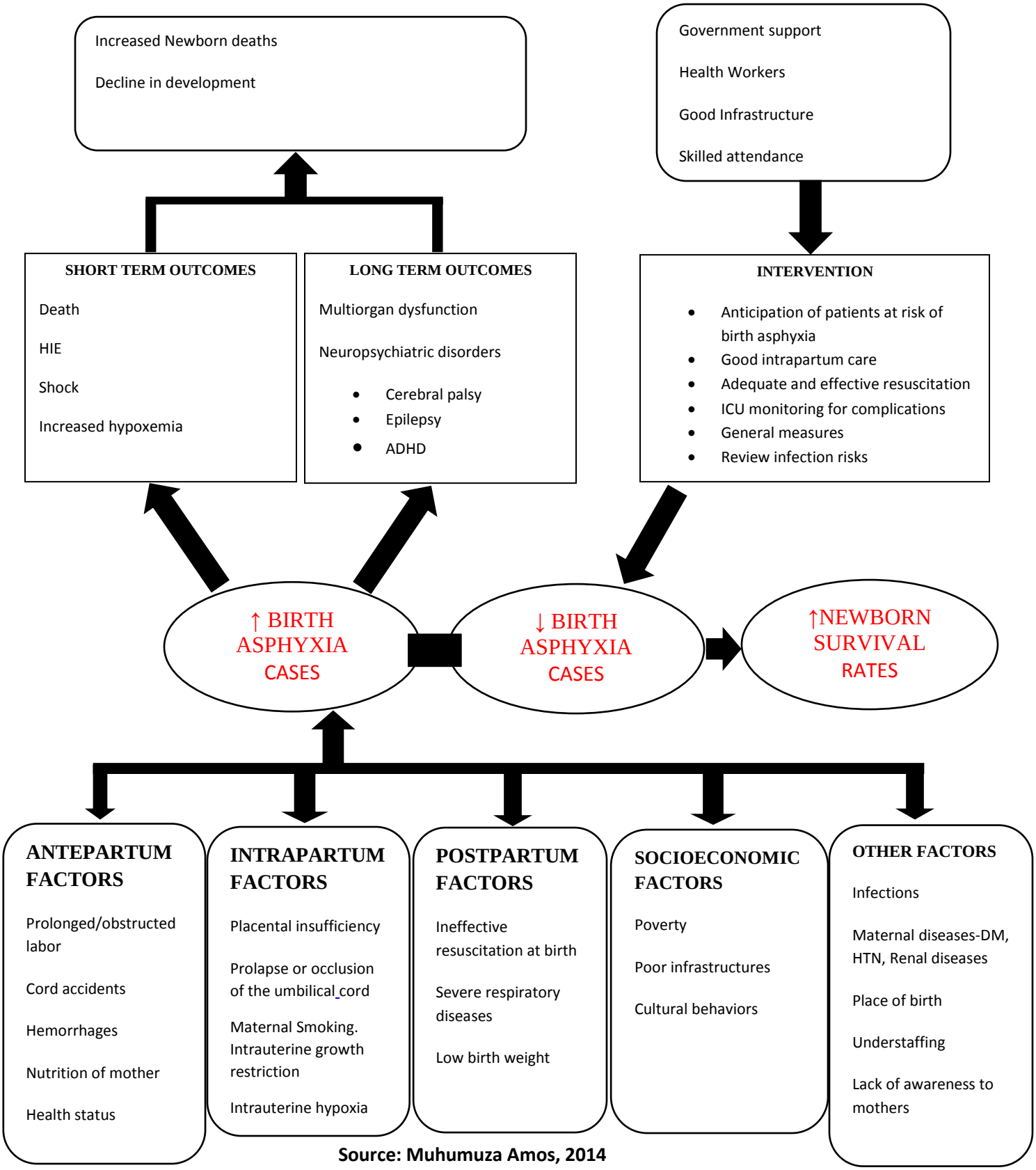
1.7.2 Content scope

This study is restricted to the prevalence of birth asphyxia and immediate outcomes in pregnant women attending maternal health services at Ishaka Adventist hospital. The proportion of asphyxiated births in pregnant women attending maternal health services in the hospital will also be determined in this study. Also factors accounting for these cases in the patients attending Ishaka Adventist Hospital will be determined from the study.

1.7.3 Time scope

A retrospective study will be conducted to find out the prevalence of birth asphyxia and immediate outcomes in pregnant women attending maternal health services at Ishaka Adventist hospital from January 2012 to December 2013.

1.8 CONCEPTUAL FRAME WORK



Source: Muhumuza Amos, 2014

1.8.1 Explanation of the conceptual frame work.

According to the conceptual frame work above, it is postulated that birth asphyxia is as a result of many factors that include: Antepartum, Intrapartum, postpartum and socioeconomic factors which lead to increase in cases of birth asphyxia if no intervention done during pregnancy and delivery period. While use of several intervention measures that include; Anticipation of patients at risk of birth asphyxia**,** good intrapartum care, adequate and effective resuscitation, ICU monitoring for complications, general measures and review infection risks have shown to lower greatly cases of birth asphyxia hence increase in child survival rates.

If birth asphyxia is not dealt with it leads to both short and long term outcomes in infants that include; increase in newborn morbidity and mortality rates, metabolic particulars, impairment and tissue damage, brain injury- hypoxic ischemic encephalopathy, development of severe disabilities in newborns and in return leads to increased deaths of newborn and decline in country's development.

CHAPTER TWO

2.0 INTRODUCTION

This chapter will focus on the burden of birth asphyxia globally, in Africa, Uganda and Ishaka-Bushenyi district.it will involve literature review about birth asphyxia from past researchers as per the set four specific objectives in chapter one.

2.1 GLOBAL PREVALENCE OF BIRTH ASPHYXIA

Birth asphyxia is one of the leading causes of early neonatal mortality especially in developing countries accounting for an estimated 900, 000 deaths each year (***Dr.Ornella Lincetto, 2007)***. Of the 130 million infants born every year globally, about 4 million die in the first 28 days of their life- the newborn period ***(Iawn, Cousens, & Zupan, 2005)***.

Globally, the neonatal mortality rate (NMR) is 36 per 1000 live births. Most of the 5 million deaths annually occur in developing countries, for which the NMR is 39 per 1000 compared with 7 per 1000 for more developed countries. MDG4, to reduce child mortality, sets a target of reducing the under-5 mortality rate (U5MR, the probability of dying by age 5 per 1,000 live births) by two-thirds by the year 2015 from a base line in 1990. The World Health Organization estimates that 38 percent of all under-5 deaths occur in the neonatal period and three-quarters of neonatal deaths occur in the first week, and more than one-quarter occur in the first 24 hours. Neonatal deaths now account for more than 2/3 of all deaths in the first year of life and for about 1/2 of all deaths in <5 children (***Reshma Parvin S. et al, 2012***)

According to WHO, 2001 birth asphyxia has been estimated to account for approximately one-third of the estimated 4 million neonatal deaths annually, resulting in a total of over 1 million neonatal deaths, and an unknown number with long-term neurological disability. In-addition, 40% of the 3.9 million estimated stillbirths (***WHO, 2000***) are thought to be due to intrapartum hypoxia.

Furthermore, National Center for Health Statistics (NCHS), 2002 reported that infant mortality caused by asphyxia neonatorum amounted to 14.4 deaths per 100,000 live births in the United States, representing the tenth leading cause of infant mortality.

In developing countries, asphyxia neonatorum is one of the leading causes of newborn deaths in which 4 to 9 million cases of newborn asphyxia occur each year, accounting for about 20 percent of the infant mortality rate. Of these, an estimated 1.2 million die and at least same number

develop severe consequences such as cerebral palsy, epilepsy and developmental delay. (***World Health Report, 2003; WHO, 2006)***

Africa accounts for 11% of the world's population but more than 25% of the world's newborn deaths are from the continent. Of the 20 countries in the world with the highest risk of neonatal death, 15 (75%) are in Africa. Each year in Africa, 30 million women become pregnant, approximately 1 million babies are stillborn, at least 1 million babies die in their first month of life, about half a million die on their first day and4 million low birth weight babies are born and others with neonatal complications may live, but not reach their full potential. (***Tunde Adegboyega et al, 2010)***

The highest risk countries include; Somalia has the world's highest first-day death rate (18 per 1,000 live births). First-day death rates are almost as high in DRC, Mali and Sierra Leone (17 per 1,000). Liberia which has the highest risk of newborn death in Africa, with 6.6% of babies dying in the first month of life. Five countries account for almost 600,000 deaths, over half the total newborn deaths in Africa ,Ten countries account for over 790,000 deaths, two thirds of the total, Fifteen countries account for over 910,000 deaths, over three quarters of the total deaths worldwide. ***(Nikki Gillette et al, 2013)***

Therefore, Birth asphyxia remains an important problem in developing country communities, accounting for more deaths than measles or malaria, yet receiving much less policy and programmatic attention. If the MDG 4 for child survival is to be achieved, a concerted and coordinated effort is required to reduce birth asphyxia deaths by all involved along the pathway to survival, including women, families, the community, community health workers, health professionals and policy makers – this would also benefit MDG 5 and maternal health as well as stillbirths***. (Joy E Lawn et al, 2007)***

To note is that, perinatal morbidity and mortality can be reduced if high risk infants can be identified and adequately resuscitated. Several authors have established the association between very low Apgar scores and increased perinatal morbidity and mortality.(***C. Ondoa-Onama et al, 2003)***

In addition to the above, following improvements in primary and obstetric care in most industrialized countries, the incidence of birth asphyxia has reduced significantly and less than 0.1% newborn infants die from birth asphyxia whereas in developing countries, rates of birth

asphyxia are several folds higher, ranging from 4.6 per 1000 in Cape Town to 26 per 1000 in Nigeria, and case fatality rates may be 40% or higher. (***WHO, 2006)***

2.1.1 Birth asphyxia in Uganda.

Available estimates indicate that over one quarter (26%) of neonatal deaths in Uganda are due to birth asphyxia. These deaths occur in the early neonatal period and often result from obstructed labor or hemorrhage, and are closely linked to the delay of mothers accessing proper care. A woman with obstructed labor has a 7 to 85 times higher risk of her baby dying compared to a normal birth. Birth asphyxia takes an additional toll, as babies may be stillborn. If they survive, they may suffer permanent disability (***MoH Uganda, 2008***).

According to Tunde Adegboyega et al, 2010report indicates that 1,155,800newborn deaths occur in Africa annually and Uganda contributing 44,500 newborn deaths each year is ranked 5th among countries that contribute 50% of the newborn deaths in Africa and 19th country globally with the highest under-5 deaths. Despite the available information, there is only a handful of published studies from the developing countries and none from Uganda, to shed light on the magnitude of the problem of birth asphyxia.

2.1.2 Babies with low Apgar score in Mulago Hospital, Uganda.

According to Ondoa-Onama C et al, 2003 report, the prevalence of low Apgar score at one and five minutes was 8.4% and 2.8% respectively. Adverse outcome was seen in 57.3% of cases: death in 12.1% and clinical complications in 45.2%. HIE occurred in 21.8%, hypoxemia in 12.9%, hypoglycemia in 16.9% and aspiration pneumonia in 4.8%.

2.1.3 Birth Asphyxia in Ishaka –Bushenyi district

There is so far no epidemiological data available concerning birth asphyxia in Western Uganda, specifically Bushenyi district thus this study will provide a data base of birth asphyxia in the district.

2.2 BIRTHS IN UGANDA ANNUALLY

In Uganda, annual number of births is 1,177,431 births with a birth rate of 6300 births/1,000 population as per the Demographic Health Survey (2011). The fertility rate is 6.0%, NMR per 1000 live births is 23 while PMR is 40 in Uganda.

2.2.1 Births in Bushenyi district annually

According to the 2009 statistical abstract published by the Uganda Bureau of Statistics (UBOS), the 2009 mid-year population projection for Bushenyi district is 841,600 with a sex ratio of 92 males per 100 females and a growth rate of 2% per annum. Bushenyi district has a very young population with children below 5 years constituting about 20% of the total district population. (***Michael Oturu et al, 2010)***

2.3 NEWBORN DEATHS IN UGANDA

Babies born in sub-Saharan Africa have a very high risk of birth asphyxia and of intrapartum stillbirth whereby the condition still accounts for 280,000 deaths a year in sub-Saharan Africa including Uganda. The best intervention is prevention through improved antenatal care and, particularly, skilled attendance and emergency obstetric care.

Recent Demographic and Health Survey data for Uganda reports a national neonatal mortality rate (NMR) of 29 deaths per 1,000 live births for the period 2000 to 2005, compared to 33 and 27 for 1995-2000 and 1990-1995 respectively. Newborn mortality contributes to more than a third of infant mortality (deaths during the first year of life), and at least one-fifth of under-five mortality. ***(MoH Uganda, 2008)***

According to Dr. Sarah Byakika et al, 2012/13 report indicates that Uganda has registered notable reduction in infant and under five mortality in the past two decades. Unfortunately the same does not apply to newborn mortality rates. Maternal mortality ratio has slowly declined from 506 to 438 maternal deaths per 100,000 live births while neonatal mortality rate has almost stagnated at 29 per 1000 live births (***UDHS, 2011***).

In addition to the above, WHO 2005 report indicates that preterm birth accounts for 30% of global neonatal deaths, sepsis or pneumonia for 27%, birth asphyxia for 23%, congenital abnormality for 6%, neonatal tetanus for 4%, diarrhea for 3%, and other causes for 7% of all neonatal deaths. An estimated 1 million children who survive birth asphyxia live with chronic neuro- developmental morbidities, including cerebral palsy, mental retardation, and learning disabilities.(***Reshma Parvin S. et al, 2012)***

Furthermore, neonatal death reports in Uganda indicate that; Preterm 25%, Asphyxia 26%, Sepsis/ Pneumonia 31%, other 7%, Congenital 7%, Diarrhea 2%, Tetanus 2%. Infections (mainly

sepsis and pneumonia), birth asphyxia and complications of preterm birth account for 82 percent of all newborn deaths in Uganda. (***MoH Uganda, 2008)***

Therefore, recognizing that neonatal deaths (deaths in the first 28 days of life) account for almost 40% of under-five deaths, it is clear that MDG4 (aiming for a two-thirds reduction of under-five mortality), cannot be met without substantially reducing neonatal deaths with three major causes accounting for over three quarters of these deaths, being serious infections that include tetanus (36%), complications of preterm birth (27%) and birth asphyxia (23%).(***Joy E Lawn et al,2007***)

2.4 GLOBAL OUTCOMES OF BIRTH ASPHYXIA

Depending on the grade of oxygen deficiency that a newborn suffered at delivery and individual reactions developed under asphyxic event, the corresponding perinatal asphyxia is graduated either as mild or severe one. The latter is the most frequent cause of perinatal and neonatal death as well as of severe injury of central nervous system and damage to other organs resulting in hypoxic-ischemic encephalopathy, nephropathy, and cardiomyopathy as the most usual long-term outcomes. (***Olga Golubnitschaja et al, 2011)***

Furthermore, the outcomes depend on Apgar score at 5 minutes, heart rate at 90 seconds, time to first breath, duration of resuscitation arterial blood gases and acid -base status at 10 and 30 minutes of age. It is measured as short-term (early) and long-term outcome. The early outcome is either death/or presence of hypoxic ischemic encephalopathy (HIE) grade I, II or III, according to Sarnat's staging. (***Shazia et al, 2012)***

According to WHO, 2006 an estimated 1.2 million infants die and at least the same number develop severe consequences, such as epilepsy, cerebral palsy, and developmental delay annually from over four million newborns that develop birth asphyxia globally. The numbers of disability-adjusted life years (DALYs) for birth asphyxia estimated by WHO exceed those due to all childhood conditions preventable by immunization. However, community-based data on disability in less developed settings are rare and studies reliably assessing the cause are virtually nonexistent, making the estimates intrinsically uncertain.

2.5 FACTORS ACCOUNTING FOR BIRTH ASPHYXIA CASES

2.5.1 Maternal diseases

Health condition of the mother, hypertension in pregnancy accounts for some of the cases, age of the mother, and maternal pyrexia during the perinatal period and anemia in pregnancy. (***William McGuire, 2012)*** Other diseases that can affect the health and nutritional status of the fetus during pregnancy and include; Diabetes Mellitus, PIH, Heart, liver and renal diseases and Post term pregnancies (longer than 42 weeks)

2.5.2 Labor and deliveries

Many of the babies delivered outside the specialized centers for the treatment of these babies in the developing countries do not reach the centers on time as a result of poverty and poor infrastructural development, so that by the time they arrive at these centers, complications have already set in. Religious beliefs and ignorance also play a major role in the occurrence of birth asphyxia and its complications (***Hashima-E-Nasreen, 2009***).

Other factors in labor and deliveries that cause asphyxiated babies include; inadequate relaxation of the uterus, early separation of the placenta from the uterus, called placental abruption compression of the umbilical cord, analgesics and opioid analgesics, prolonged labor, Antepartum hemorrhage, premature, multiple gestations and abnormal presentations including cord prolapse and fetal distress. (***William McGuire, 2012)***

Furthermore, high-risk pregnancies for asphyxia neonatorum include: maternal age of less than 16 years old or over 40 years old, low socioeconomic status ,maternal illnesses, such as diabetes, hypertension, Rh-sensitization, severe anemia ,mothers with previous abortions, stillbirths, early neonatal deaths, or preterm birth ,lack of prenatal care ,abnormal fetal presentation or position, alcohol abuse and smoking by the mother ,severe fetal growth retardation ,preterm labor.(***Children's Health*** **)**

2.5.3 Fetal factors

These are due to fetal state and include; prematurity, multiple births (usually LBW or premature), IUGR- inability to compensate for stress, fetal anomalies, Severe anemia limits the oxygen-carrying ability of the blood, heart or lung disease, failure to execute newborn resuscitation.

CHAPTER THREE

3.0 INTRODUCTION

This chapter includes: The Study Design, Study Area, Study Population, Sample Size determination, Sampling technique, Study Criteria, Data Collection Methods, Data Analysis, Data analysis, Ethical Consideration, study limitations, delimitations, References, and Appendix.

3.1 STUDY DESIGN

A descriptive retrospective study was carried out at Ishaka Adventist hospital in Bushenyi district. The researcher reviewed post-natal records of mothers attending maternal health services in the hospital. The study focused on all post-natal records that were included in the sample size from January 2012 to December 2014.

3.2 STUDY AREA

The above study was conducted at Ishaka Adventist hospital in Bushenyi District, Western Uganda. Bushenyi District is bordered by Kasese district to the North, Kamwenge district and Ibanda district to the Northeast, Ntungamo district to the South, Rukungiri to the Southwest and DRC to the West. The main language spoken in Bushenyi district is Runyankole.

Ishaka Adventist Hospital is located in the Ishaka town, Bushenyi District, Western Uganda. Its location is approximately 77 kilometers (48 miles) by road, West of Mbarara, the largest city in the sub-region, immediately North of the junction of the Ntungamo-Kasese Road with the Mbarara-Ishaka Road. This location lies approximately360 kilometers (224 miles) by road, Southwest of Kampala, the capital of Uganda. It is a 110-bed community hospital that is owned and administered by the Seventh-day Adventist Church in Uganda. It primarily caters to the health needs of the rural subsistence farmers who live in the community where the hospital is located. As of 2010 the hospital's professional staff included 3 doctors, 6 clinical assistants and about 60 nurses, midwives and nurse's aides. (***wikipedia.org***)

3.3 STUDY POPULATION

The study involved all births both caesarean sections and spontaneous vaginal deliveries from pregnant women attending maternal health services at Ishaka Adventist Hospital and babies referred to the hospital’s Pediatric wards with birth asphyxia from January 2012 to Dec. 2013.

3.4 SAMPLE SIZE DETERMINATION

To obtain sample size, Fisher's et al 1990 formula was used.

$$n = \frac{z2pq}{d^2}$$

Where

n = Desired sample size

z=Standard normal deviation usually taken as 1.96 at a confidence level of 95%

p = proportion of the study population estimated to be at risk of birth asphyxia in Uganda thus 0.28 (***MPDR Uganda, 2012)***

Thus q= is standardized 1.0-p=0.72

d = degree of accuracy desired is 0.05

$n=z^2pq/d^2$

$$\mathbf{n= \frac{(1.96)^2x0.28x0.72}{(0.05)^2}}$$

n = 310

Therefore the sample size of 310patient'srecords from the above formula was studied.

3.5 SAMPLE TECHNIQUE

The sampling technique involved counting the number of documented deliveries at Ishaka Adventist hospitals, sorting out asphyxiated neonates irrespective of the mode of deliveries and neonates transferred with birth asphyxia to the hospital's pediatric wards from January 2012 to December 2013.Sample size of 310 documented deliveries was involved and systematic random selection of files was done in the hospital records where every even numbered file was selected until the required sample size was attained.

3.6 INCLUSION AND EXCLUSION CRITERIA

3.6.1 Inclusion Criteria

History of delayed cry.

History of fetal distress and diagnosis made by the doctor.

Apgar score <7 at 5 minutes of life.

3.6.2 Exclusion Criteria

Preterms with < 34 weeks of gestation.

Preterms with < 1500 grams birth weight.

Neonates with major congenital malformations of cardiovascular, central nervous system, respiratory system or dysmorphic babies.

Severe hyperbilirubinemia bordering on kernicterus.

Cases with hypoglycemia or meningitis as a cause of encephalopathy

3.7 DATA COLLECTION

Information about deliveries in Ishaka Adventist hospitals was got from the records from theatre, Maternity wards and paediatric wards of the hospital using a designed data collection tool (check list). One research assistant trained on how to use the data collection tool was used in the study. The check list used in data collection was first pretested prior to commencing data collection process in the hospital.

3.8 DATA ANALYSIS

Using, Epi-info 7 and Statistical packaging for social scientists (SPSS) version 16.0 and Microsoft Excel 2013, Data was entered and analyzed statistically in different presentations thus cross-tabulations, bivariate and multivariate variables for events during pregnancy and delivery that lead to birth asphyxia in pregnant mothers attending maternal health services at Ishaka Adventist hospital.

3.9 ETHICAL CONSIDERATIONS

The research proposal was submitted to IREC for approval and a written permit from IREC and hospital authorities was obtained first before commencing the study.

All the legal protocols were followed in accessing, collection and processing data and no administrative persons were asked for undesirable favour in any form.

The information obtained was presented in an aggregate and de-identified form by using codes instead of names on the records.

All results from this research were treated with utmost confidentiality by ensuring that only authorized people gained access to them.

The community Advisory Committee (CAB) was fully involved in the whole process until the completion of the study. Continuous feedback was given to CAB and any advice from them was put into consideration.

3.10 STUDY LIMITATIONS AND THEIR SOLUTIONS

Financial predicaments narrowed the research tools and presentation even though the researcher obtained money from the parents and other relatives to solve the problem.

Gaining access to the hospital's data base and logistics was difficult but the researcher thought permission from the necessary officials.

Some documents were unclearly filled thus the researcher opted for soft copy of hospital records in some instances.

Lastly, there was a problem of finding the hospital authorities for the permission and information access but the research contacted and made arrangements with hospital authorities on when to meet them.

3.11 DISSEMINATION OF RESULTS

Information from this study was disseminated to IREC, a copy to Ishaka Adventist hospital and another was sent to the district health officer in order to create awareness of the need to fight newborn mortality and late complications secondary to birth asphyxia in Bushenyi district.

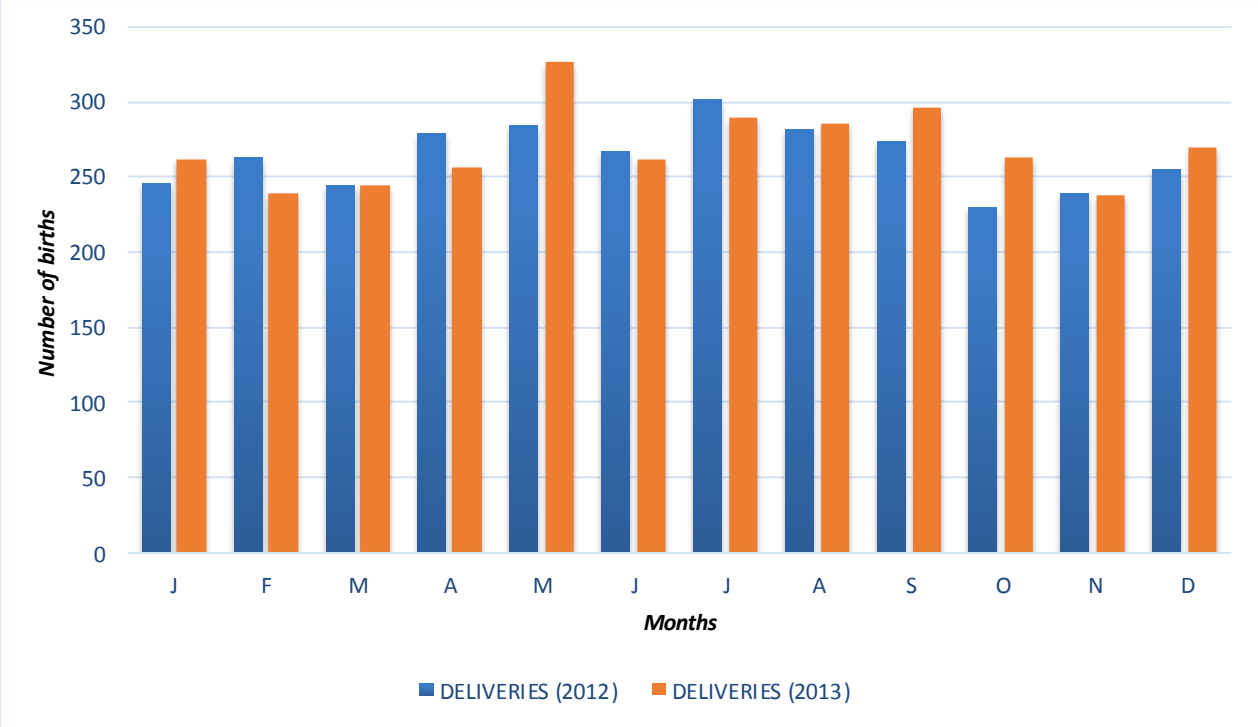
CHAPTER FOUR

4.0 INTRODUCTION

During this study on birth asphyxia from Jan. 2012 to Dec. 2013 at IAH, 345 cases on asphyxiated births were enlisted and a sample size of 310 was obtained using systematic random sampling technique as described in chapter 3. Some cases were excluded due to incomplete information.

4.1 PRESENTATION OF SPECIFIC OBJECTIVE ONE

Figure 1: Shows total number of births at IAH from Jan. 2012 to Dec. 2013



Generally from the data obtained at IAH, statistics showed that the number of deliveries corresponded for the various months of the year 2012 and 2013.

In both years, the highest number of deliveries were in the middle of the year thus around May with 327 deliveries (10.1%) in 2013 and July with 302 deliveries (9.5%) in 2012. The lowest monthly delivery 230 cases (7.3%) was in October 2012. On average 267 deliveries were made in 2012 and 2013 at Ishaka Adventist Hospital (IAH).

Figure 2: Shows total number of live births at IAH from Jan. 2012 to Dec. 2013

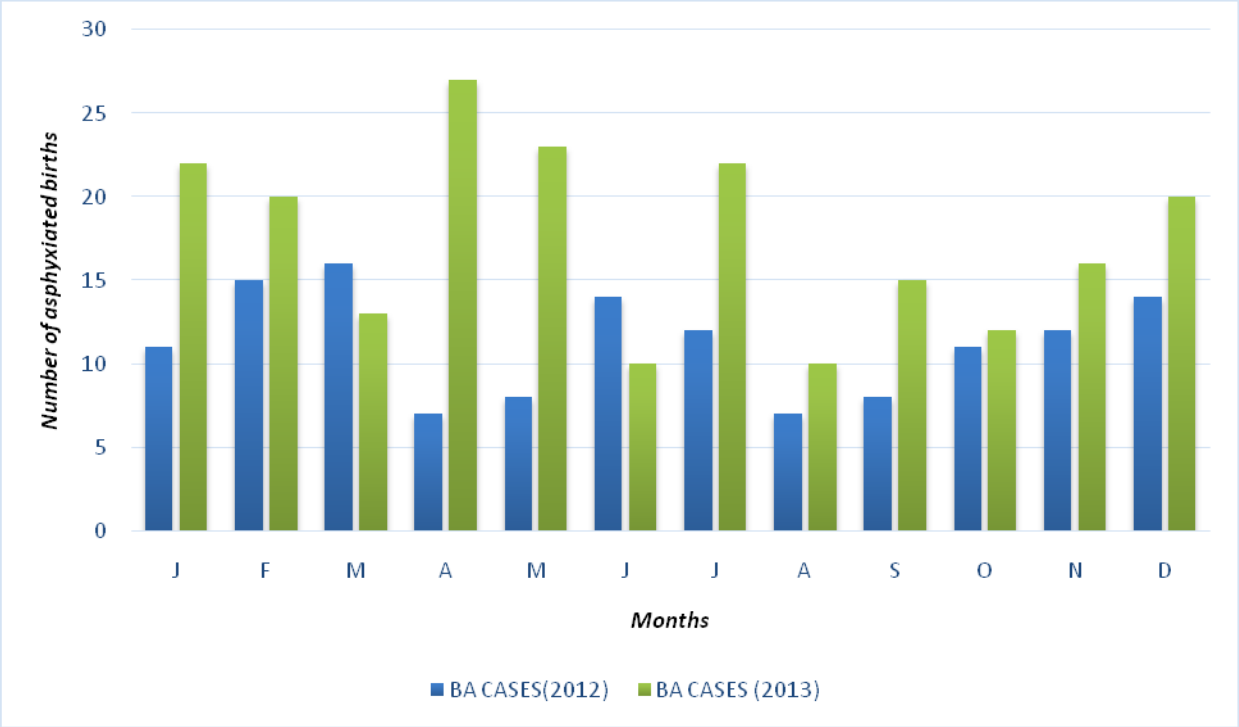
The number of live births corresponded with the total number of deliveries in figure 1 above, meaning neonatal mortality rate is reduced as much as possible in IAH, however, a sharp decline in the number of live births was noted in October 2012 with 134 cases (4.6%) compared to the total deliveries in the same month in figure 1.

In both years, the highest number of live births were in the middle of the year thus around May with 305 live births (9.9%) in 2013 and July with 292 live births (10%) in 2012.

On average 249.5 live births were made in 2012 and 2013 at Ishaka Adventist Hospital (IAH).

4.2 PRESENTATION OF SPECIFIC OBJECTIVE TWO

Figure 3: Shows total number of asphyxiated births from Jan. 2012 to Dec. 2013

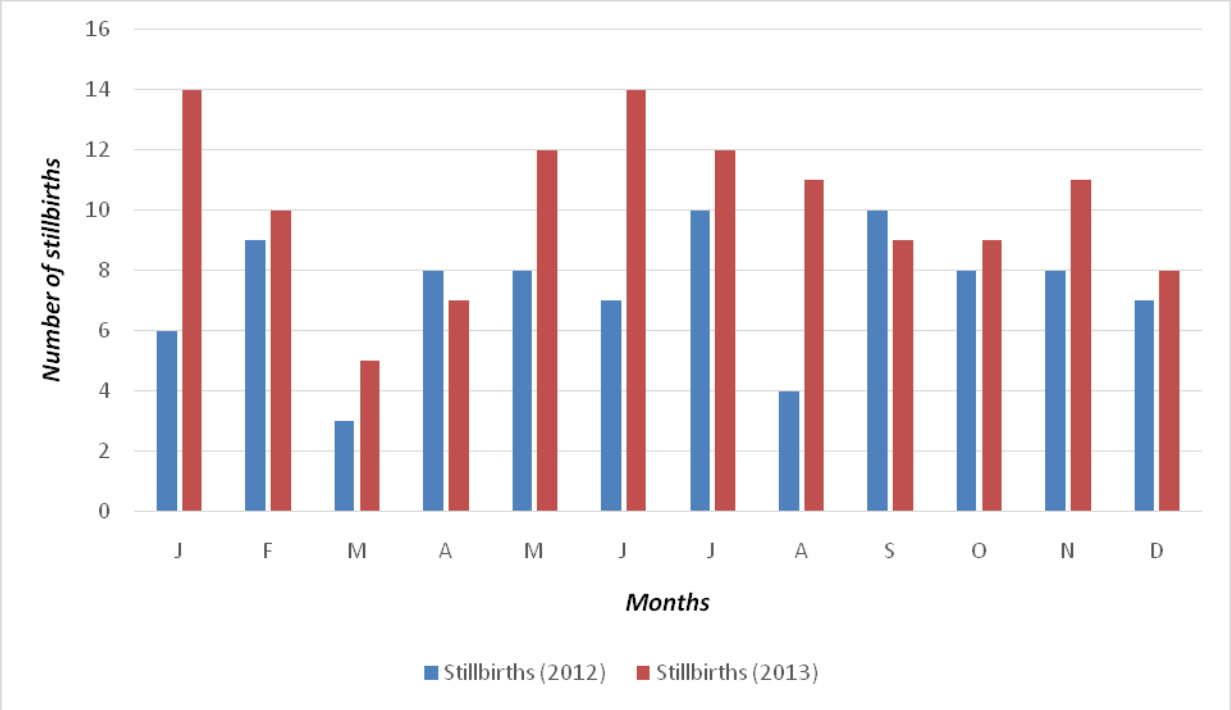


Birth asphyxia, a condition of fetal hypoxia has been shown to be a variable case; this is observed from the variation of the values for the various months. 2013 had the greatest number of birth asphyxia except in June were the highest number was in 2012.

There was also inverse proportionality between birth asphyxia and live birth; this shown birth asphyxia as one of the leading causes of neonatal mortality.

On average 13 cases of asphyxiated births occurred in 2012 and 2013 at IAH.

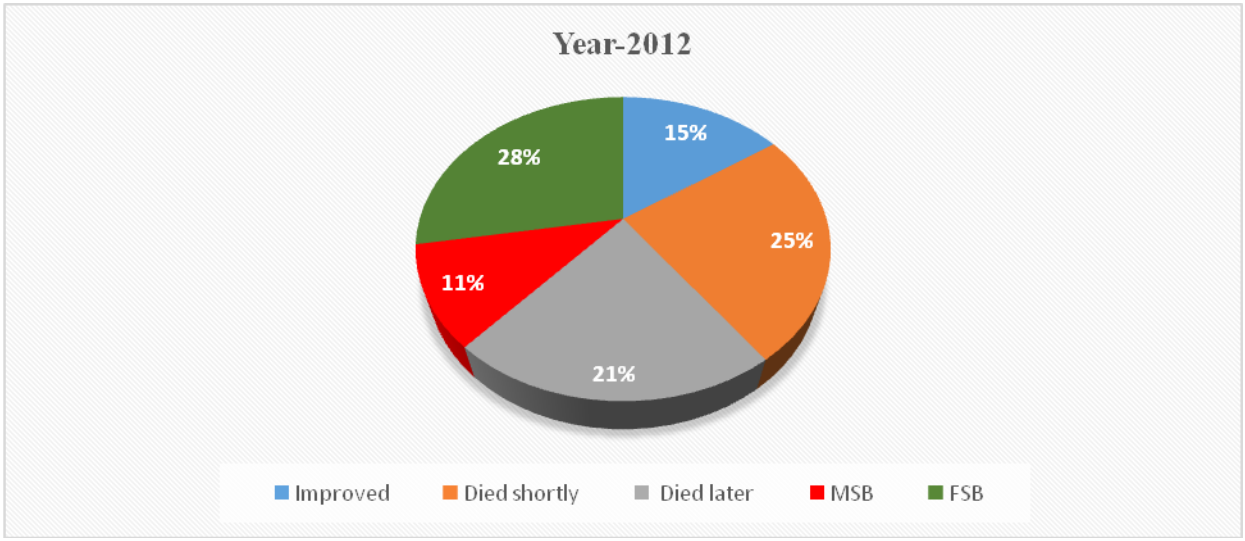
Figure 4: shows number of stillbirths at IAH in 2012 and 2013



Generally stillbirth cases were highest in 2013 especially in January and June with 14 cases (11.5%) in both months except in April 2012 with 8 cases (9.1%) and September 2012 with 10 cases (11.4%). On average 8.8 stillbirth cases occurred in 2012 and 2013 at IAH.

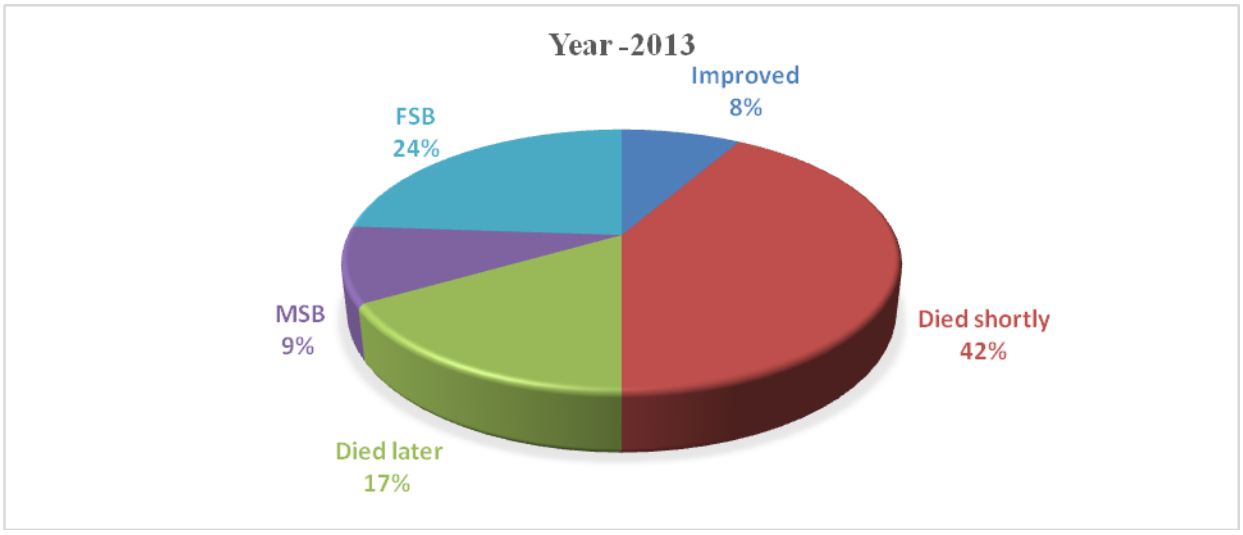
4.3 PRESENTATION OF SPECIFIC OBJECTIVE THREE

Figure 5: Shows immediate outcomes of birth asphyxia at IAH from Jan. to Dec. 2012



The figure above shows that majority of the asphyxiated birth at IAH, 28% had FSB, 25% died shortly,21% died later , 15 % of them improved and then 11% had MSB as immediate outcomes of birth asphyxia in the year 2012.

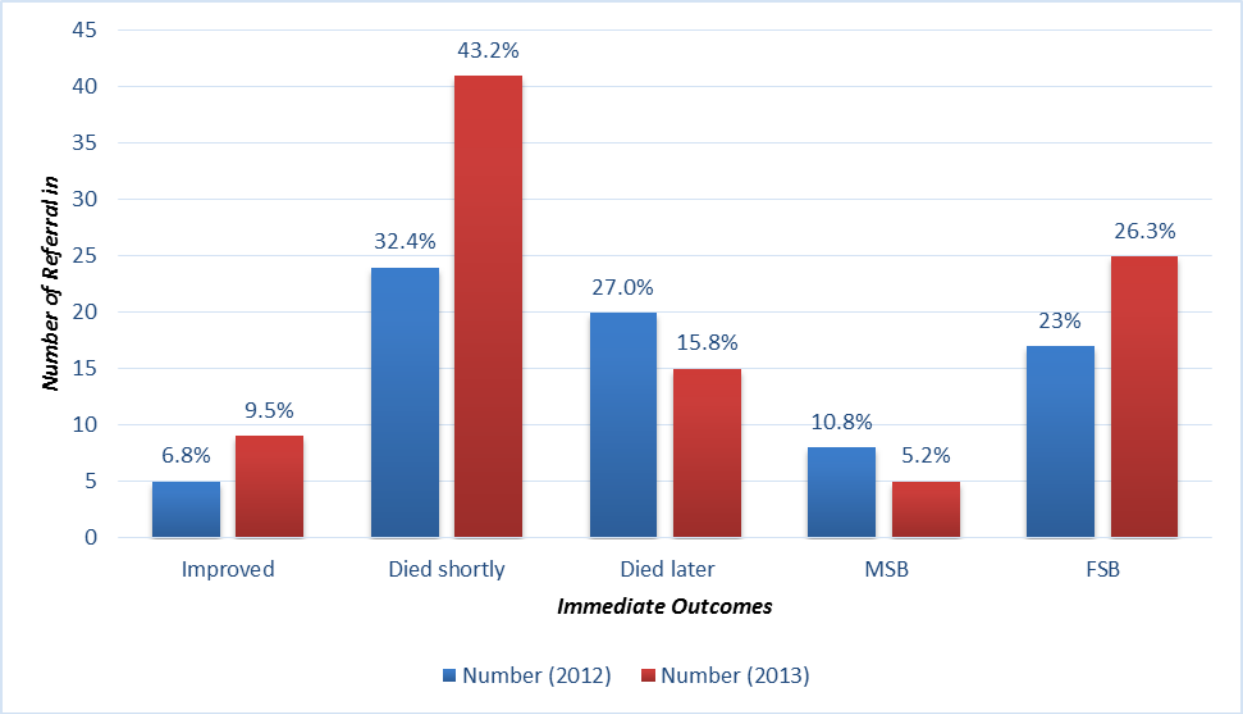
Figure 6: Shows immediate outcomes of birth asphyxia in IAH from Jan. to Dec. 2013



In 2013, however, the results pattern of immediate outcomes changed in the deliveries, in that the majority of the neonates died shortly after delivery 42%, followed FSB at 24%, 17 % of the

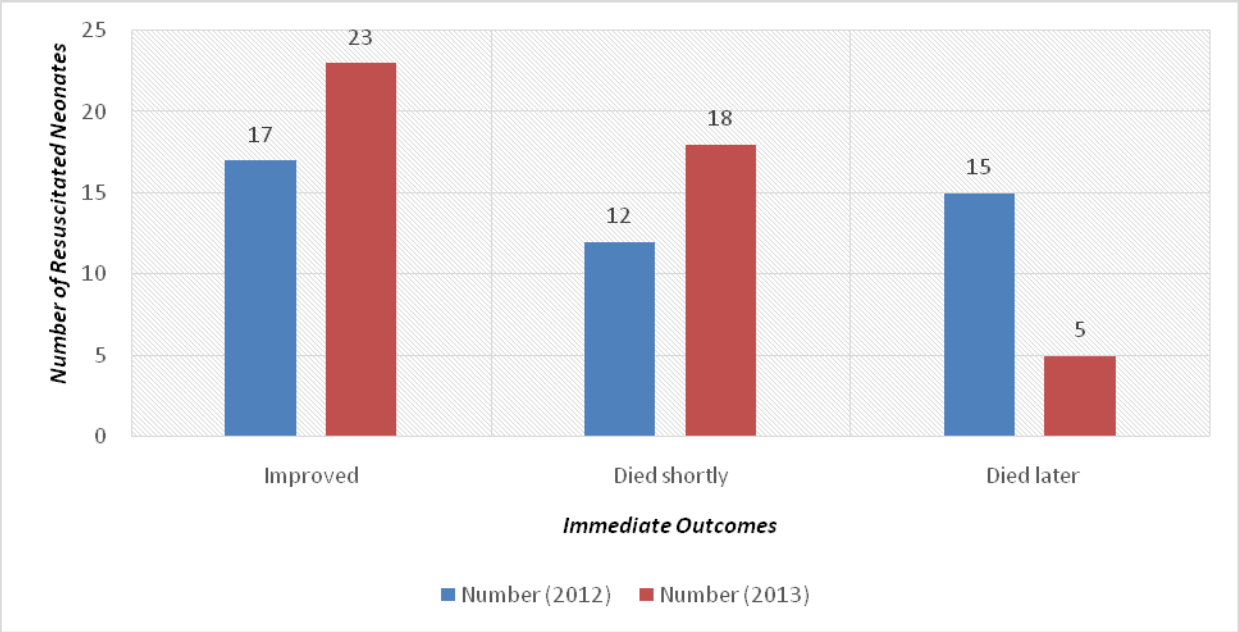
cases died later, while 9% had MSB and lastly 8 % improved despite their low Apgar score after delivery.

Figure 7: Shows number of referral in cases and immediate outcomes



Majority of the Referral in cases were highest 41(43.2%) in 2013 compared to 24 cases (32.4%) highest in 2012 and these died shortly due to birth asphyxia at IAH, followed by FSH with 25(26.3%) cases in 2013. In both years a few of the referral in cases improved 5(6.8%) in 2012 and 9 (9.5%) in 2013. 20 (27.0%) and 15(15.8%) of the cases in 2012 and 2013 respectively died later. 8 cases (10.8%) in 2012 and 5 cases (5.2%) in 2013 were MSB.

Figure 8: Shows resuscitated neonates and immediate outcomes in 2012 and 2013



Of all the neonates who were resuscitated, majority of them improved 17cases (38.6%) and 23cases (50%) in 2012 and 2013 respectively. 18 (39.1%) of the cases in 2013 and 12 (27.3%) of the cases in 2012 died shortly while a few of the cases died later due to resuscitation of the neonates at IAH 5(10.9%) in 2013 and 15 (34.1%) cases in 2012.

Table 1: Shows Apgar score of neonates at birth in relation to Immediate Outcomes

Year	**Jan to Dec. 2012**					
	Immediate outcomes					
Apgar Score	Improved	Died shortly	Died later	MSB	FSB	**TOTAL**
0-3	00	30	08	14	36	**88**
4-6	08	00	11	00	00	**19**
7 & above	12	02	09	00	00	**23**
TOTAL	**20**	**32**	**28**	**14**	**36**	**130**

In 2012, no neonate with Apgar score between 0-3 improved, in the same range most were FSB 36 cases (40.9%), followed by 30 cases (34.1%) died shortly, 14 cases (15.9%) were MSB and

08 cases (9.1%) died later. Most cases with Apgar score of 7 and above improved 12 cases (52.2%), a few cases thus 2 (8.7%) died shortly and 09 cases (39.1%) in the same range died later .08 cases (42.1%) in the range of 4-6 Apgar score improved and 11 cases(57.9%) died later. Both MSB and FSB contributed 60 cases (56.8%) in 2012.

Table 2: Shows Apgar score of neonates at birth in relation to immediate outcomes

Year	**Jan to Dec. 2013**					
	Immediate outcomes					
Apgar Score	Improved	Died shortly	Died later	MSB	FSB	**TOTAL**
0-3	00	65	25	17	43	**150**
4-6	03	10	02	00	00	**15**
7 & above	12	00	03	00	00	**15**
TOTAL	**15**	**75**	**30**	**17**	**43**	**180**

In 2013 still, no neonate with Apgar score between 0-3 improved, in the same range the pattern of immediate outcomes changed with 65 cases (43.3%) dying shortly being the highest, followed by 43 cases (28.7%) FSB, 25(16.7%) died later and 17cases (11.3%) MSB. Most cases with Apgar score of 7 and above improved, 12 cases (80%) and a few cases, 03 (20%) died later. A total of 15 cases improved in 2013 compared to 20 cases in 2012. Both MSB & FSB contributed 60 cases (33.3%) in 2013.

Table 3: Shows immediate outcomes in relation to mode of delivery in 2012

Year	Jan to Dec. 2012					TOTAL
	Immediate outcomes					
Mode of delivery	Improved	Died shortly	Died later	MSB	FSB	
SVD	03	19	13	00	17	**52**
C/S	10	08	10	05	15	**48**
EMC/S	07	05	05	09	04	**30**
TOTAL	**20**	**32**	**28**	**14**	**36**	**130**

In most cases of death due to birth asphyxia, the mother had undergone SVD 19 cases (36.5%) died shortly and 13 cases (25%) died later of the 52 SVD cases, followed by the C/S 08 cases (16.7%) and 10 cases (20.8%) of the 48 cases died shortly and later respectively. The least number of deaths was in the EMC/S group with 05 cases (16.7%) in both those who died shortly and later out of 30 cases. Most cases that improved were of C/S with 10 cases (50%) of the 20 cases that improved in relation to mode of delivery.

Table 4: Shows Immediate Outcomes in Relation to Mode of Delivery in 2013

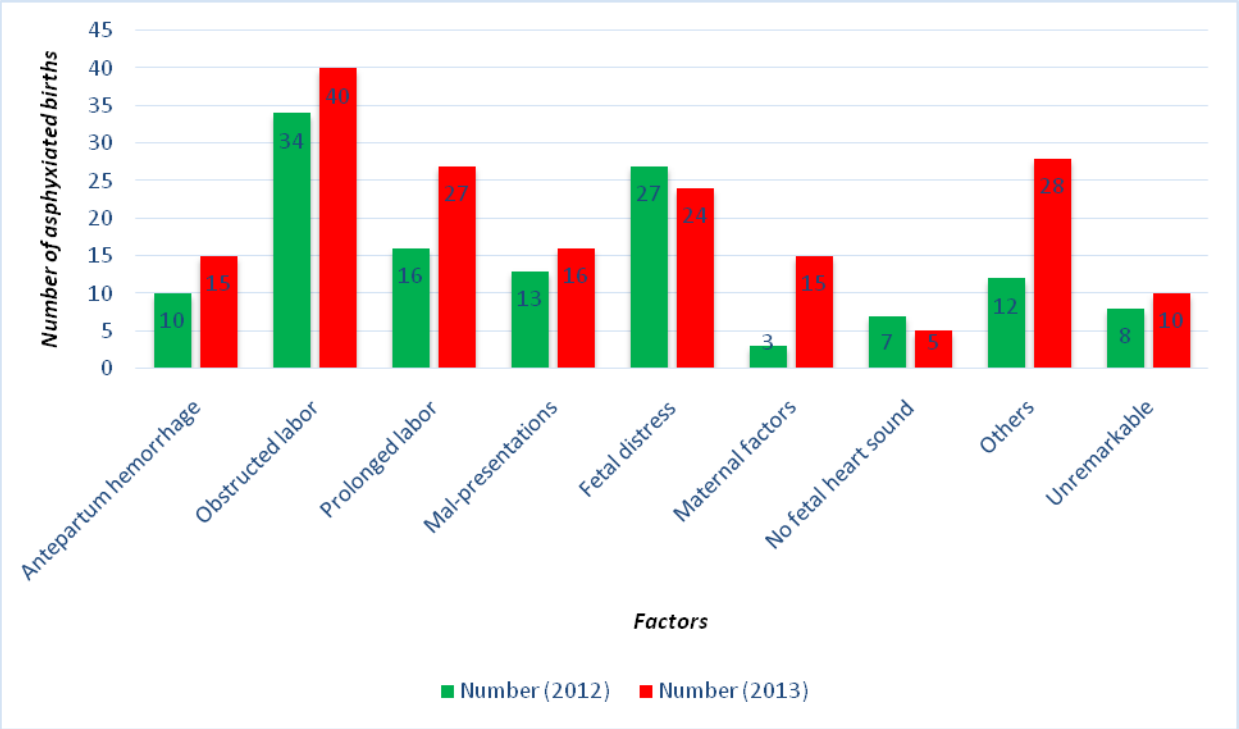
Year	Jan to Dec. 2013					TOTAL
	Immediate outcomes					
Mode of delivery	Improved	Died shortly	Died later	MSB	FSB	
SVD	02	44	15	03	19	**83**
C/S	12	26	07	09	15	**69**
EMC/S	01	05	08	05	09	**28**
TOTAL	**15**	**75**	**30**	**17**	**43**	**180**

In 2013, most birth asphyxia related deaths occurred following mothers undergoing SVD, 44 cases (53%) died shortly and 15 cases(18.1%) died later of the 83 SVD cases thus an increase in cases compared to 2012, followed by the C/S 26 cases(37.7%) and 07 cases(10.1%) of the 69 cases. The least number of deaths was in the EMC/S group with 05 cases (17.9%) died shortly, 08 cases (28.6%) died later and 14 cases (50%) out of 28 cases was due to MSB & FSB. Still

fewer cases, 15 improved in 2013 compared to the 20 cases in 2012 in relation to mode of delivery hence the need to address the condition.

4.4 PRESENTATION OF SPECIFIC OBJECTIVE FOUR

Figure 9: Shows factors accounting for BA during delivery in 2012 and 2013 at IAH



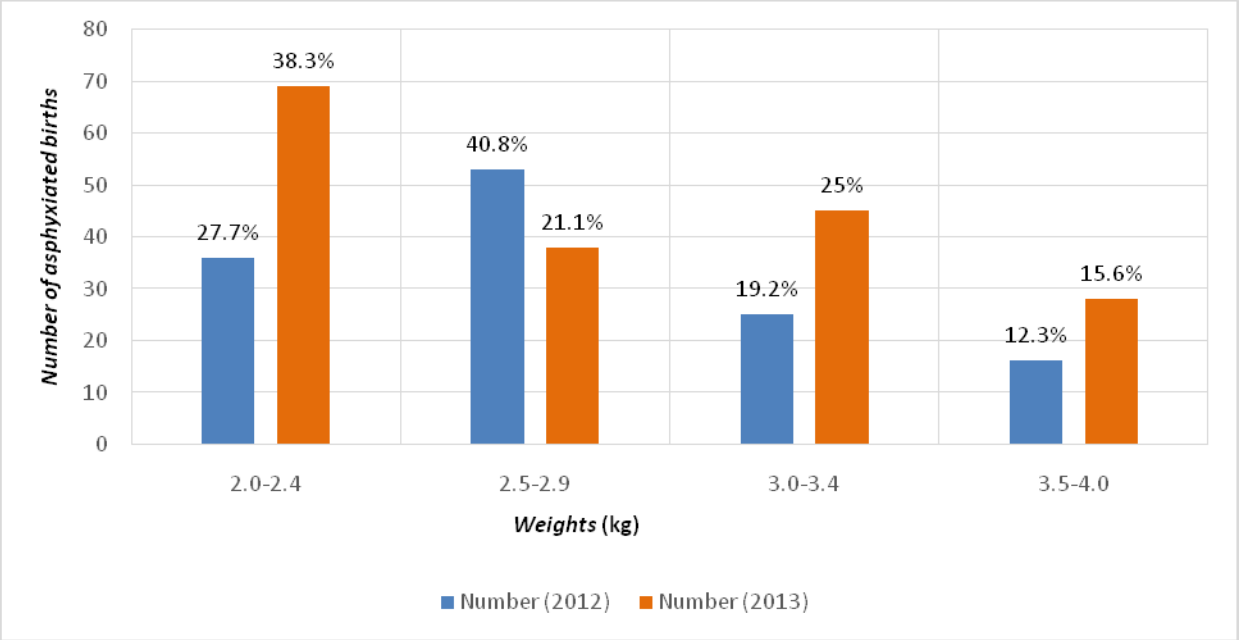
Generally, factor during delivery that account for birth asphyxia accounted for more neonatal deaths in 2013 than in 2012 except for fetal distress and no fetal heart sound. Obstructed labor was the most significant factor associated with asphyxia among the neonates, 34 cases (26.2%) in 2012 and 40 cases (22.2%) in 2013, followed by the fetal distress 27 cases (20.8%) in 2012 and prolonged labor, 27 cases (15.0%) in 2013, others which included factors like severe pre-eclampsia, contracted pelvis, among others contributed 12 cases (9.2%) in 2012 and 28 cases (15.6%) in 2013.

Table 5: Shows gender of the asphyxiated neonates in 2012 and 2013

Year	Jan to Dec. 2012		Jan to Dec. 2013	
Gender	**NUMBER**	**PERCENT**	**NUMBER**	**PERCENT**
MALE	74	56.9	105	58.3
FEMALE	56	43.1	75	41.7

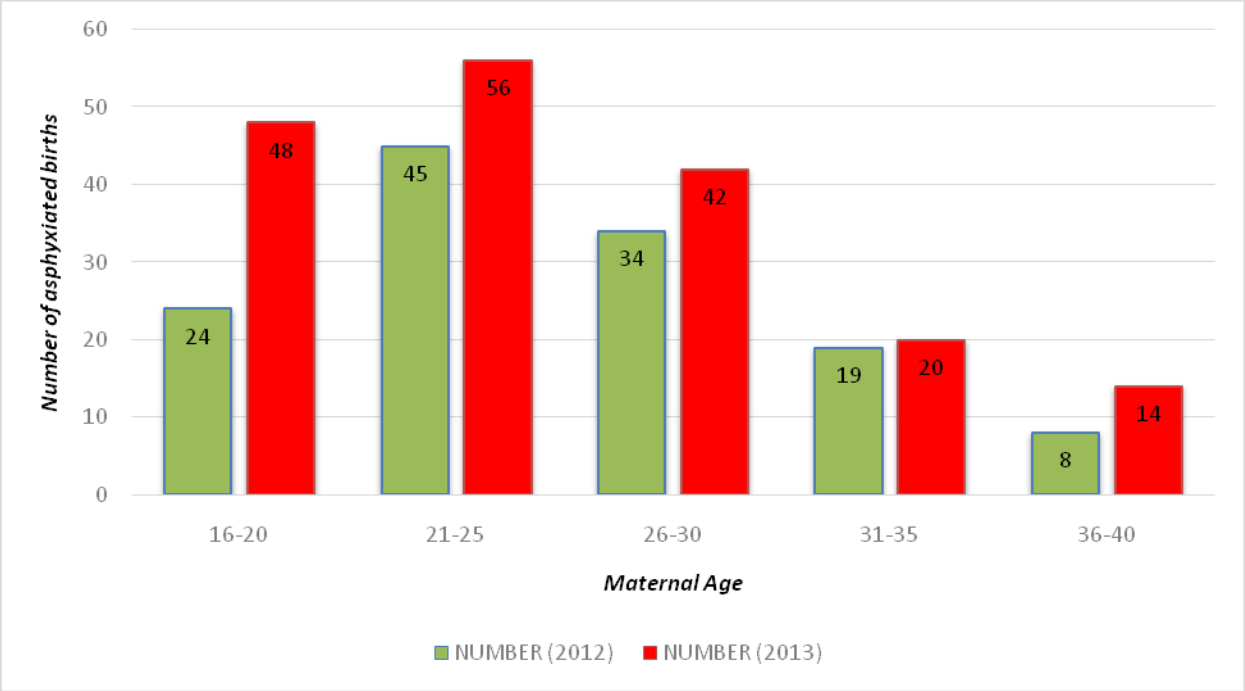
More males were asphyxiated with 56.9% in 2012 and 58.3% in 2013 compared to females with 43.1% in 2012 and 41.7% in 2013 as shown in the table above.

Figure 10: Shows the weights of the asphyxiated neonates in 2012 and 2013 at IAH



Majority of asphyxiated neonates weighed 2.0-2.4 kg 69 cases (38.3%) in 2013 and 2.5-2.9 kg 53 cases (40.8%) in 2012. Fewer cases of asphyxiated neonates weighed 3.5-4.0kg 28 (15.6%) in 2013 and 16 cases (12.3%) in 2012.

Figure 11: Shows maternal age of the asphyxiated neonates in 2012 and 2013 at IAH



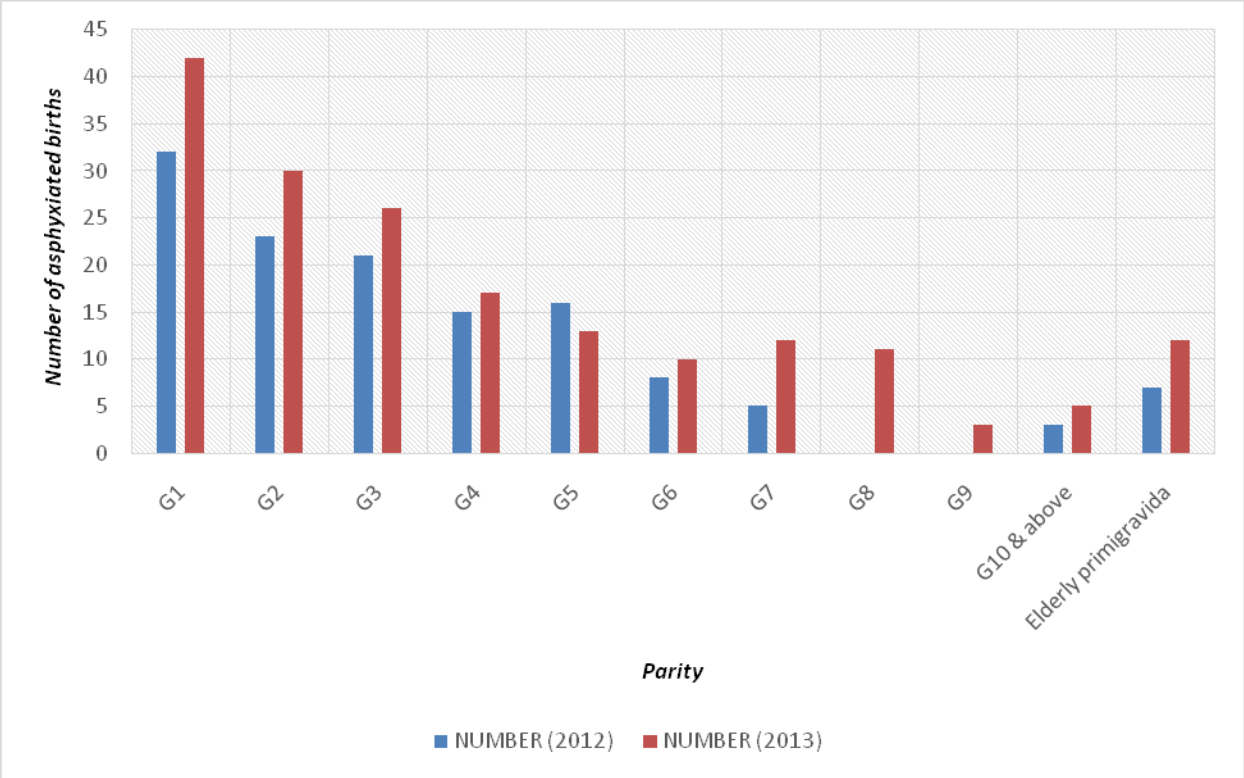
Most of asphyxiated neonates occurred with mothers whose age ranges from 21-25 in both years (45cases (34.6%) in 2012 and 56 cases (31.1%) in 2013), followed by 16-20 years, 48 cases (26.7%) in 2013 and the least number of asphyxiated neonates was in the age group of 36-40 in both years. Age range of 26-30 also contributed a significant number of asphyxiated neonates in both years as shown above.

Table 6: Shows the parity of the mothers with asphyxiated neonates in 2012 and 2013

Year	**Jan to Dec. 2012**		**Jan to Dec. 2013**	
Parity	**NUMBER**	**PERCENT**	**NUMBER**	**PERCENT**
G1	32	24.6	42	23.3
G2	23	17.7	30	16.6
G3	21	16.2	26	14.4
G4	15	11.5	17	9.4
G5	16	12.3	13	7.2
G6	08	6.2	10	5.5
G7	05	3.8	12	6.6
G8	00	00	11	6.1
G9	00	00	03	1.6
G10& above	03	2.3	05	2.7
Elderly primigravida	07	5.4	12	6.6
Total	**130**	**100**	**180**	**100**

Majority of the asphyxiated neonates (47.9%) were delivered by Primiparous mothers in both years with the highest in 2013, 42 cases (23.3%) and 32 cases (24.6%) in 2012, followed by the gravid 2s (34.3%) then gravid 3s (30.6%) in both years while the rest had minimal contributions that declined further with increase in parity of the mother.

Figure 12: Shows the parity of the mothers with asphyxiated neonates in 2012 and 2013



From the figure above, majority of the asphyxiated neonates (47.9%) were delivered by Primiparous mothers in both years with the highest in 2013, 42 cases (23.3%) and 32 cases (24.6%) in 2012, followed by the gravid 2s (34.3%) then gravid 3s (30.6%) in both years while the rest had minimal contributions that declined further with increase in parity of the mother.

CHAPTER FIVE

5.0 INTRODUCTION

This chapter presents discussion of the findings in chapter four according to the research questions of the study. It also contains the conclusion and recommendations based on the discussion of the findings from the study.

5.1 DISCUSSIONS

5.1.1 Discussion on the number of births and proportion of asphyxiated neonates.

The finding from this study showed that the total number of deliveries from Jan. 2012 to Dec. 2013 at Ishaka Adventist hospital was 6,402 deliveries, out of which 5,989 were live births and on average 266.75 deliveries were made in 2012 and 2013 in the hospital.

To note is that, 310 cases (4.8%) were asphyxiated births giving an incidence of 48/1000 births and 5.2% of the live births, giving an incidence of 52 deaths per 1000 live births. This is fairly high as compared to the study carried out in Warri-Nigeria with incidence of 28/1000 births(**G.I Mcgil et al, 2012**) and 29 deaths per 1,000 live births as Uganda's neonatal mortality rate (NMR) that has not declined over a period of 15 years***(MoH,2008)***.

With an incidence of 52 deaths per 1000 live births, this shows that birth asphyxia is one of the leading contributor to the 1,155,800 newborn deaths reported in Africa annually to which Uganda contributes 44,500 newborn deaths though there is only a handful of published studies from the developing countries and none from Uganda, to shed light on the magnitude of the problem of birth asphyxia. (***Tunde Adegboyega et al, 2010)***

In another study according to William McGuire, 2007 showed that estimates of the incidence of perinatal asphyxia vary. In resource-rich countries, severe perinatal asphyxia (causing death or severe neurological impairment) is 1/1000 live births; in resource-poor countries, studies suggest an incidence of 5–10/1000 live births, however, this probably represents an underestimate of the true community incidence of perinatal asphyxia in resource-poor countries. Thus my findings at 52/ 1000 live births, suggest a serious burden of birth asphyxia in relation to neonatal mortality.

From my study, it shows that Uganda's neonatal mortality rate is an under-estimate, at 29 deaths per 1,000 live births. This is backed up by information according to MoH, Uganda 2008 that

stated Uganda's neonatal mortality rate as a possibly an under-estimate, that is still very high at 29 deaths per 1,000 live births and that has not declined over a period of 15 years.

Also a Recent Demographic and Health Survey data for Uganda reported a national neonatal mortality rate (NMR) of 29 deaths per 1,000 live births for the period 2000 to 2005, compared to 33 and 27 for 1995-2000 and 1990-1995 respectively which was an under estimate according to my study. ***(MoH Uganda, 2008)***

Furthermore, according to Dr. Sarah Byakika et al, 2012/13 reported that while Maternal mortality ratio has slowly declined from 506 to 438 maternal deaths per 100,000 live births, neonatal mortality rate has almost stagnated at 29 per 1000 live births.(***UDHS, 2011***).This is lower than my findings at 52 per 1000 live births at IAH from my study hence the need for more studies at national level to study the burden of birth asphyxia in the country and intervene accordingly in order to attain the MDG4.

5.1.2 Discussion of the Immediate Outcomes

Resuscitation is done at birth to ensure adequate ventilation, when withheld many of these babies die or survive with severe neurological damage. Findings on immediate outcomes showed that, the majority of asphyxiated neonates improved well upon resuscitation at the hospital with 17cases (38.6%) and 23cases (50%) in 2012 and 2013 respectively (figure.6). The majority of the deaths were fresh still births followed by those who died shortly (42%) during the resuscitation period in 2013. The results indicates that resuscitation through various means of newly born can increase survival rates and some studies state that although most babies breathe spontaneously at birth, up to 10 percent require some assistance to initiate breathing while less than one percent need extensive resuscitation. (***Dr.Gelasius Mukasa et al, 2010***)

In both years, low Apgar score between 0-3 resulted in poor prognosis and no patient improved following resuscitation. Most cases with Apgar score of 4-7 improved 15 cases in 2012 and 20 cases in 2013, a few cases in the same range thus 12 cases died shortly and 25 cases died later in both years. Both MSB and FSB contributed 60 cases in both years (Table1 &2). Thus use of the Apgar score can help predict the outcomes in neonates with birth asphyxia, early intervention necessity and it's still the most feasible and practical to perform. Therefore, 5 minute Apgar

score is still the valid index for assessing the effectiveness of resuscitation and vitality of newborn. Outcome of birth asphyxia depends on Apgar score at5 minutes, heart rate at 90 seconds, time to first breath, duration of resuscitation arterial blood gases and acid –base status at 10, and 30 minutes of age. According to a study done in Nepal incidence was 2.9 per 1000 live born of whom 20% had severe (Apgar score:1-3) and 80% moderate birth asphyxia (Apgar score: 4-6). ***(Shazia Memon et al., 2012)***

Furthermore, in Tanzania, Apgar scores below 7 registered 79% of the neonatal deaths. These are clear indications for perinatal asphyxia as the major cause of neonatal morbidity (***Olga Golubnitschaja et al, 2011)***

In relation to mode of delivery, most cases of birth asphyxia with poor prognosis occurred in mother who had undergone SVD accounting for a total of 135 cases (43.5%) in both years, this is probably due to factors like obstructed labor, prolonged labor among others that are related with SVD while C/S and EMC/S showed improvement in most of the resuscitated cases in both years. Hence the need to improved obstetric care to reduce the incidence of birth asphyxia in developed countries.

Intrapartum still births (FSB & MSB), accounted for 110 cases (71.8%) of the total immediate outcomes in both years and this gives an incidence of 17 still births per 1000 births.(Table 3& 4) A study done in South Africa shows an incidence of 18 still births per 1000 births ***(Calverton MD, 2008)*** while a study carried out in Nepal and Australia shows, a prevalence of fresh still births to be 10/1000 births and 1/1000 births respectively as compared to my research results of 12 fresh still births per 1000 births (***Ellis et al, BMJ 2000 & Badawi et al, BMJ 1998)***. This implies that the incidence varies markedly from less than 1/1000 in developed (rich) countries to more than 12- fold in developing (poor) countries and thus the need for intervention to reduce this incidence in developing countries like Uganda.

5.1.3 Discussion of Risk Factors for Birth Asphyxia

Generally, risk factors during delivery that account for birth asphyxia resulted into more neonatal deaths in 2013 than in 2012 except for fetal distress and no fetal heart sound.

According to my study, obstructed labor was the most significant factor associated with asphyxia among the neonates, 34 cases (26.2%) in 2012 and 40 cases (22.2%) in 2013, followed by the fetal distress 27 cases (20.8%) in 2012 due to idiopathic intrapartum conditions and prolonged labor, 27 cases (15.0%) in 2013, others which included factors like severe pre-eclampsia, contracted pelvis, Big babies among others contributed 12 cases (9.2%) in 2012 and 28 cases (15.6%) in 2013. These findings were in contrast to the study conducted by Ugwul et al, 2012 in which prolonged labor was reported as the leading risk factor of birth asphyxia.

According to gender, my research findings show that more males were asphyxiated with 56.9% in 2012 and 58.3% in 2013 compared to females with 43.1% in 2012 and 41.7% in 2013. (Table 5) This gives a male to female ratio of 1.4:1 and compared with a study conducted in Warri-Niger Delta of Nigeria, a male to female ratio of 3:2 thus twice my finding was obtained. (**G.I Mcgil Ugwu1 at el, 2012**).The incidence is higher in males probably because females are more resistance to diseases as a result of their XX chromosomes, X being the site of immunoglobulin production, giving them double protection (**Susan & Clark, 2009**). This implies that the males are at a higher risks of developing birth asphyxia than the females.

According to my findings, weight also is in important factor to consider as birth asphyxia cases showed to reduce with increase in birth weights thus highest at 69 cases (38.3%) for 2.0-2.4 kg in 2013 and 53 cases (40.8%) for 2.5-2.9 kg in 2012 while fewer cases weighed between 3.5-4.0kg 28 cases (15.6%) in 2013 and 16 cases (12.3%) in 2012.

To note is that, maternal age could be considered as a risk factor because from my study results, most of asphyxiated neonates occurred in mothers whose age ranged from 21-25 in both years (45cases (34.6%) in 2012 and 56 cases (31.1%) in 2013), followed by 16-20 years and the least number of asphyxiated neonates was in the age group of 36-40 in both years thus it shows that the younger the age group, the more risk for birth asphyxia. This is in agreement to the study carried out by MoH, Uganda in conjunction with UNICEF, Save the Children and WHO **(2008)**

Also in another study, results showed that majority of the mothers that had perinatal deaths were aged between 18 and 30 years 66(75.4%), followed by age category 31-35 (8%). ***(National MPDR, Uganda 2012/13)***

In addition to the above, Parity of mothers with asphyxiated neonates showed that primiparous most probably is a major predisposing factor for birth asphyxia with 47.9% of the cases being from primiparous mothers in both years with the highest in 2013, 42 cases (23.3%) and 32 cases (24.6%) in 2012, followed by the gravid 2s (34.3%) then gravid 3s (30.6%) in both years while the rest had minimal contributions that declined further with increase in parity of the mother.

5.2. CONCLUSIONS

This study found out that Birth asphyxia still remains a serious challenge in developing countries as one of the leading cause of neonatal deaths as well as under-fives mortality though there is only a handful of published studies from these countries and none from Uganda, to shed light on the magnitude of the problem of birth asphyxia. Because of this, the incidence of birth asphyxia is greatly under estimated in developing countries and has been given little attention therefore compromising the achievements of the 4th MDG in many of the developing countries including Uganda. Most of the identified maternal risk factors that were significantly related to birth asphyxia included obstructive labor and prolonged labor among others that are preventable if continuous sensitization of the public, negligence, poverty and improvement in obstetric care among other interventions are addressed in this hospital and Uganda at large.

5.3 RECOMMENDATIONS

Increased attention to the early recognition and management of these factors in community-based maternal and child health programs should be implemented.

Team work should be encouraged among the mid wives, obstetricians and pediatricians in the hospital for proper health service provision.

A well-equipped neonatal unit should be put in place to aid in the management of patients with poor prognosis and emergencies.

A special ward to act as waiting place for pregnant mothers that stay far away from the hospital to reside in as they are being monitored by health workers for early intervention incase need arises.

Prospective study of the incidence and complications of birth asphyxia should be undertaken in several health Centre's, so as to compare with this study in other hospitals in Bushenyi and Uganda.

5.4 STUDY CHALLENGES

There were some unfilled information about neonatal deaths in record, which needs to be improved for future purposes.

Limited information about the condition in Uganda to compare my finding too.

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APPENDICES

APPENDIX 1: DESIGNED DATA COLLECTION TOOL

G/A	SEX	MOD	AANC	POB	RFDP	RFDD	PARITY	DOL	A/S	MGT	IOC

G/A= gestational age

MOD= mode of delivery

AANC=attended antenatal care

POB= place of birth

RFDP=Risk factors during pregnancy

RFDD=Risk factors during delivery

DOL=duration of labor

A/S=Apgar score

MGT=management

IOC=immediate outcome

APPENDIX 2: PROPOSED BUDGET FOR THE STUDY

ITEM	COST PER UNIT	NO. OF UNITS	AMOUNT
Data analysis	100,000/=	1	100,000/=
Printing	10,000/=	4 copies	40,000/=
Data collection tool	100/=	350 copies	35,000/=
Binding	2500/=	4	10,000/=
Research assistants	10,000/=	4	40,000/=
TOTAL COST			**225,000/=**

Funds were provided by the researcher to carry out the study.

APPENDIX 3: WORK PLAN

Month	**Oct. 2014**	**Oct. 2014**	**Oct. 2014**	**Oct. 2014**	**Nov. 2014**	**Nov 2014**	**Dec. 2014**
Proposal							
Approval							
Data collection							
Data analysis							
Report writing							
Submission							

APPENDIX 4: APPROVAL LETTER TO ACCESS RESEARCH RESOURCES AT IAH

KAMPALA INTERNATIONAL UNIVERSITY
EXPLORING THE HEIGHTS

Ishaka Bushenyi * PO BOX 71 Ishaka, Uganda
Tel: +256 (0)771696711/0703817216 Fax: +256 (0) 41 - 501 974
E-mail: admin@kiu.ac.ug * Website: http://www.kiu.ac.ug

OFFICE OF THE DEAN,
FACULTY OF CLINICAL MEDICINE & DENTISTRY

24/11/2014

PERSONNEL OFFICER
ISHAKA ADVENTIST HOSPITAL
P.O.BOX 111 ISHAKA

TO WHOM IT MAY CONCERN

RE: MUHUMUZA AMOS (BMS/0100/113/DU)

The above named is a student of fourth year at Kampala International University pursuing a Bachelor of Medicine, Bachelor of Surgery (MBChB) programme.

He wishes to conduct his research project in your hospital .

Topic: The prevalence of birth asphyxia and immediate outcomes among pregnant women attending maternal health services at Ishaka - Adventist Hospital.

Any assistance given will be appreciated.

FACULTY OF CLINICAL MEDICINE & DENTISTRY
P.O. Box

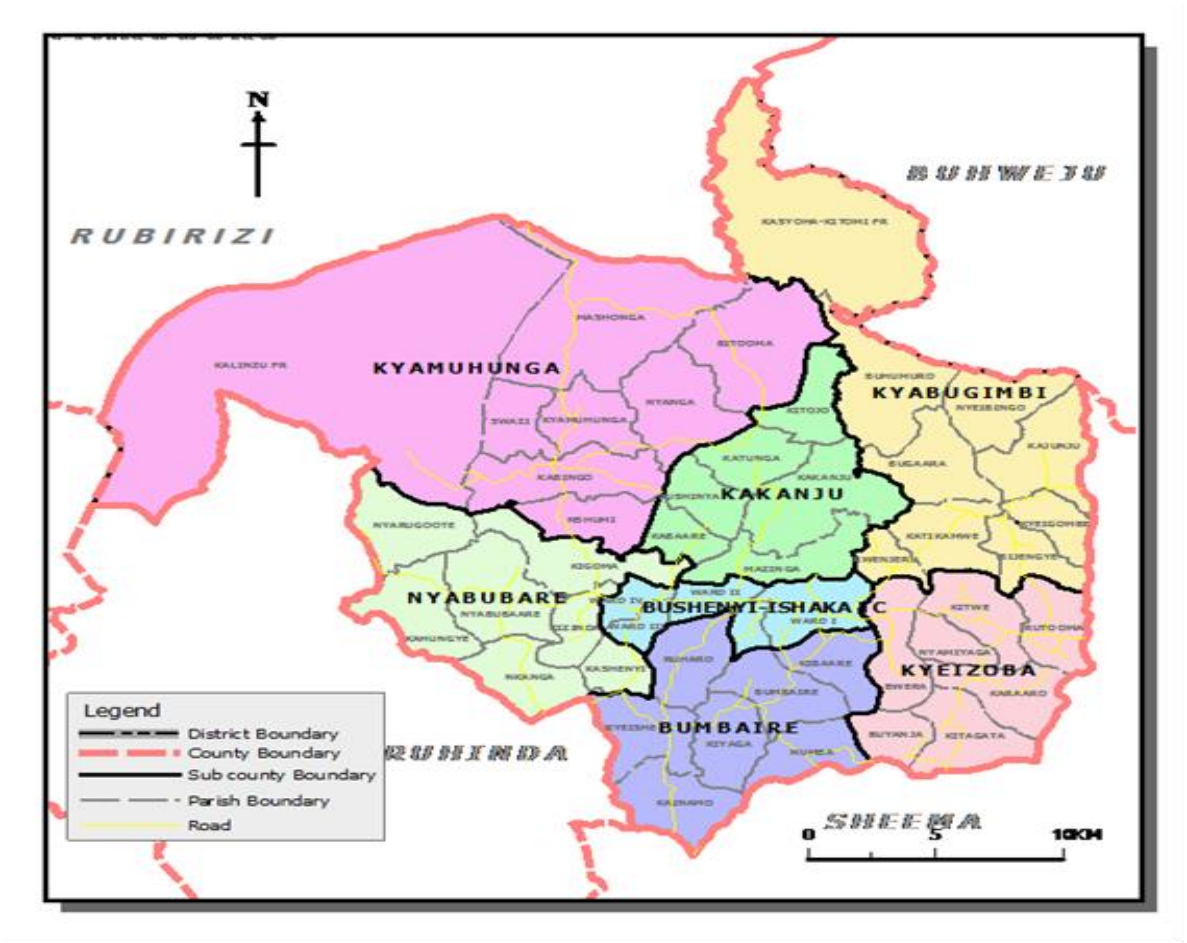
Dr. Akib Surat
Asso. Dean, FCM&D

Granted, subject to observing research ethics & regulations

ISHAKA ADVENTIST HOSPITAL
24 NOV 2014
CHIEF EXECUTIVE OFFICER
P. O. BOX 111, BUSHENYI ISHAKA

"Exploring the Heights"

APPENDIX 5: A MAP OF BUSHENYI SHOWING THE LOCATION OF ISHAKA



APPENDIX 6: A MAP OF UGANDA SHOWING THE LOCATION OF BUSHENYI DISTRICT