

**FACTORS CONTRIBUTING TO BIRTH ASPHYXIA IN NEWBORN
BABIES AT MNAZI-MMOJA HOSPITAL IN ZANZIBAR**

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AT MNAZI-MMOJA HOSPITAL IN ZANZIBAR**

By

Zuwena Ali Salim

**A dissertation Submitted in (partial) Fulfilment of the Requirements for the
Degree of Masters of Sciences in Midwifery and Women's Health of**

**Muhimbili University of Health and Allied Sciences
October, 2017.**

CERTIFICATION

The undersigned certify that she has read and hereby recommend for acceptance by the University of Muhimbili dissertation entitled “*Factors Contributing to Birth Asphyxia in Newborn Babies at Mnazi-Mmoja Hospital in Zanzibar*”, in fulfillment of the requirements for the degree of Master of (Midwifery and Women’s Health) of Muhimbili University of Health and Allied Sciences

Dr Sebalda Leshabari (PhD, MPH, RN)

(Supervisor)

Date _____

DECLARATION AND COPYRIGHT

I, **Zuwena Ali Salim**, declare that this **dissertation** is my original work and that it has not being presented and will not be presented to any other University for a similar or any other degree award.

.....

Signature

.....

Date

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DEDICATION

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ABSTRACT

Background: Birth asphyxia continues to present a major clinical problem worldwide and becomes alarming which has long-term impacts on health outcomes in children's life. Birth asphyxia is the one of the commonest causes of neonatal morbidity and mortality in developing countries. Knowledge of factors contributing to birth asphyxia may prevent this fatal condition by regular assessment and monitoring of the progress of labor.

Aim: The aim of this study was to assess factors contributing to birth asphyxia in newborn babies at Mnazi-Mmoja hospital (MMH) in Zanzibar.

Materials and methods: Descriptive retrospective study design was used that employed quantitative approach. In this study, simple random sampling method was used, whereby, 399 files of pregnant mothers who delivered from Jan 2016 to March 2017 were reviewed; lottery method was used to select the sample size. Data abstraction forms were used to collect information from women's files; the following aspects were addressed: Social demographic characteristics (age, marital status, and mother's occupation), maternal factors (number of antenatal visits, parity, last antenatal records (Haemoglobin level, blood pressure, time of admission), existing maternal health problems, apgar score) and Institutional factors (frequency of Fetal Heart Rate (FHR) assessment, mode of delivery, birth attendants, frequency of contraction monitoring and vaginal examination).

Results: A total of 144 (36%) out of 399 neonates were found to have birth asphyxia. Factors that were found to be statistical significant in contributing to birth asphyxia were prolonged labor ($p=0.001$), prematurity ($p=0.000$), improper fetal heart rate assessment ($p=0.000$), being delivered by doctors ($p=0.000$) and Vaginal delivery ($p=0.000$). Though, in logistic regression results revealed that vaginal delivery (95% CI: 3.372 – 14.747, $p < 0.001$), being delivered by midwife (95% CI: 0.901 – 2.511, $p < 0.118$) and prolonged labour (95% CI: 0.374-1.163, $p=0.151$) contributing in birth asphyxia. However age, parity, mother's occupation, number of antenatal visits, existing

maternal health problems, contraction monitoring and vaginal examination didn't show any statistical significant.

Conclusion: Results show that most factors contributing to birth asphyxia are preventable if there is early identification of risk factors during antenatal care and intrapartum care.

Recommendation: On job training on importance of regular assessment and monitoring of progress of labor and delivery is needed in order to ensure good outcome of the mothers and their babies so that to reduce or prevent birth asphyxia which cause most neonatal mortality rate.

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LIST OF ABBREVIATIONS

ANC	Antenatal Care
AOR	Adjusted Odds Ratio
GA	Gestational Age
HBB	Helping baby breathe
HIE	Hypoxic Ischemic Encephalopathy
HIMS	Health Information Management System
HIV	Human Immune Virus
LCVE	Low cavity vacuum extraction
LMIC's	Low-middle Income Country
MMH	Mnazi-Mmoja Hospital
MTUHA	Mfumo wa Taarifa za Uendeshaji wa Huduma za Afya
MUHAS	Muhimbili University of Health and Allied Science
PPV	Positive Pressure Ventilation
SDGs	Sustainable Development Goals
SPSS	Statistical Package of Social Science
SVD	Spontaneous vertex delivery
ABD	Assistance breech delivery
C/ S	Caesarian Section
TDHS	Tanzania Demography Health Survey
UNICEF	United Nation International Children's Emergency
LBW	Low Birth Weight
VLBW	Very Low Birth Weight
WHO	World Health Organization
ZNZ	Zanzibar
FHS	Fetal Heart Sound

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DEFINITION OF TERMS

Anemia in pregnancy: According to WHO (2012) defined anemia as hemoglobin concentration of less than 11g/dl and haematocrit of less than 0.33. Grade of anemia are mild (8-10.9g/dl), moderate (7-8g/dl), severe (<7.5g/dl) and very severe (<5.5g/dl).

Apgar score: A method of rapidly assessing the general state of a baby immediately after birth, a maximum of 2 points is given for each of the following sign (Appearance, Pulse, Grimace, Activity and Respiration) usually measured at one minute and five minutes after delivery (Oxford concise Ed, 2003)

Birth asphyxia: Is defined as the failure to initiate and sustain breathing at birth (WHO, 2012).

Infant: Child from one month to one year (Oxford concise Ed, 2003)

Midwife: Is a person who has successfully completed a midwifery education programme that is duly recognized in the country where it is located and that is based on the ICM Essential Competencies for Basic Midwifery Practice and the framework of the ICM Global Standards for Midwifery Education; who has acquired the requisite qualifications to be registered and/or legally licensed to practice midwifery and use the title 'midwife' and who demonstrates competency in the practice of midwifery (ICM, 2011)

Operational definitions

Maternity ward: Is a combination of admission ward, antenatal ward, labor ward and post-natal ward in which nurse-midwife on duty is responsible to take care to all four wards at same time.

Neonate: Any infant from birth up to the 28th day of life.

Nurses-midwives: Has higher than certificate in nursing/midwifery education

CHAPTER ONE

1.1 Introduction/Background

Birth asphyxia is an insult to the fetus or newborn due to failure in inhalation or breathing weakly leading to diminish oxygen perfusion to various organs (Aslam et al., 2014). Asphyxia is a situation that occur when there is an impairment of blood-gas exchange, leading to hypoxemia (lack of oxygen) and hypercapnia (accumulation of carbon dioxide). The combination of the decrease in oxygen supply (hypoxia) and blood supply (ischemia) results in a fall of biochemical changes within the body which cause neuronal cell death and brain damage lead to multiple organ systems dysfunction (Aslam et al., 2014). Hypoxic-ischemic injury to the brain as well as very important organs may outcome in perinatal asphyxia. If the perinatal asphyxia is a satisfactory degree or extended beyond the capacity of the fetus to compensate may lead to severe disability and subsequently death (Murray et al., 2016). Birth asphyxia has been defined as a delay in initiation natural respiration upon delivery of a newborn. Its severity has been connected to the degree of depression of the Apgar score (Mwakyusa, 2009).

According to the World Health Organization (WHO) (2012), Globally, about one quarter of all neonatal deaths are caused by birth asphyxia, representing 38% of all deaths of children below 5 years of age. In low-income countries 23% of all neonatal deaths occurred due to birth asphyxia. Birth asphyxia is a leading cause of mortality and morbidity in neonates in developing countries, with an incidence of 100-250/1000 live births compared to 5-10/1000 live births in the developed world. It remains a significant cause of loss of life and adverse developmental outcome. The major causes of neonatal deaths globally were estimated to be infections (35%), preterm births (28%) and birth asphyxia (23%) (Kiyani, 2014). According to a study conducted by WHO in 2005, it showed that birth asphyxia was one of the leading causes of neonatal deaths within the first week of life (Aslam et al., 2014). Globally 10% of all newborns require resuscitation at birth. The World Health Organization estimated that 3% of approximately 120 million infants born in developing countries developed birth asphyxia with approximately 900,000 of these newborns dying each year in developing

countries. Many of these deaths are avoidable if the right measures are put in place. Birth asphyxia is the most common cause of neonatal seizures, but what triggers those seizures is unknown (Mohamed, 2014). About 10 million infants worldwide suffer perinatal asphyxia per year, It is estimated that 23% of neonatal deaths worldwide can be attributed to birth asphyxia which associates to nearly 1 million neonatal deaths per year and at least same number develops severe consequences such as cerebral palsy, epilepsy and developmental delay (World Health Report, 2003). The presumed causes of neonatal deaths globally have remained unchanged over the past decade and include infections (~30%), prematurity (~30%), and asphyxia (~25%) (Hege et al., 2012). Birth asphyxia is one of the commonest causes of neonatal morbidity and mortality in developing countries (Ugwu et al., 2012). In Nigeria, A total of 864 out of 26,000 neonates seen within this period had birth asphyxia (Ugwu, 2012).

Tanzania is a sub-Saharan African country with an infant mortality rate of 43 deaths per 1,000 live births, the under-5 mortality rate is 67 deaths per 1,000 live births, and the child mortality rate is 25 deaths per 1,000 live births. During the same period, neonatal mortality is 25 deaths per 1,000 live births (TDHS, 2015-2016). In Muhimbili Hospital (Tanzania) severe asphyxia was presenting 45% of cases. Asphyxia ranked upper limit as a cause of possible source of death in both fresh stillbirths (42%) and early neonatal deaths (41%), whereas untreated syphilis ranked uppermost for macerated stillbirths (18%) (Kimambo, 2008). In the area of study, the problem of asphyxia is increasing and become alarming as many children born in maternity wards end up with asphyxia due to many reasons include shortage of maternity staffs, prolonged labor, lack of knowledge and skills of the maternity staffs on immediate resuscitation of the asphyxiated neonates and lack of basic newborn resuscitation equipments such as suction machines, oxygen concentrators, and drug supply. Other factors are associated with the knowledge of pregnant mothers on using local herbs during labor, level of education of pregnant mothers and poor attending to antenatal visit. Ekta, A &Nayan, L (2013) found that birth asphyxia is common in the babies of the mothers who had not received proper antenatal care, maternal anemia, primipara, meconium stained liquor babies have more chances of getting birth asphyxia. At the same time, the study found that birth asphyxia is an

important cause of morbidity and mortality in the neonatal period and the consequences of asphyxia are multi-systemic. Improvement in the quality of neonatal resuscitation (NR) techniques is therefore crucial to the reduction of early neonatal deaths due to asphyxia at Mnazi-Mmoja hospital. In addition, the neonatal resuscitation procedure requires the use of specialized knowledge and skills of the staffs so these poor practices enhance the increase of morbidity and mortality among the newly born infants.

1.2 Problem Statement.

Birth asphyxia is a challenging public health problem and it is the major predictor of infant morbidity which contributes substantially to the overall burden of neonatal mortality at Mnazi-Mmoja hospital (MMH) in Zanzibar, the trends is increasing from day to day, birth asphyxia is the fourth cause of neonatal death in Zanzibar which account 7% (MoHZ, 2014). In 2013 total admissions for neonatal babies were 2694, among them 219 were due to birth asphyxia while in 2015 total admissions were 2425, among them 339 were birth asphyxia which increasing to 5.85% (MMH, 2015).

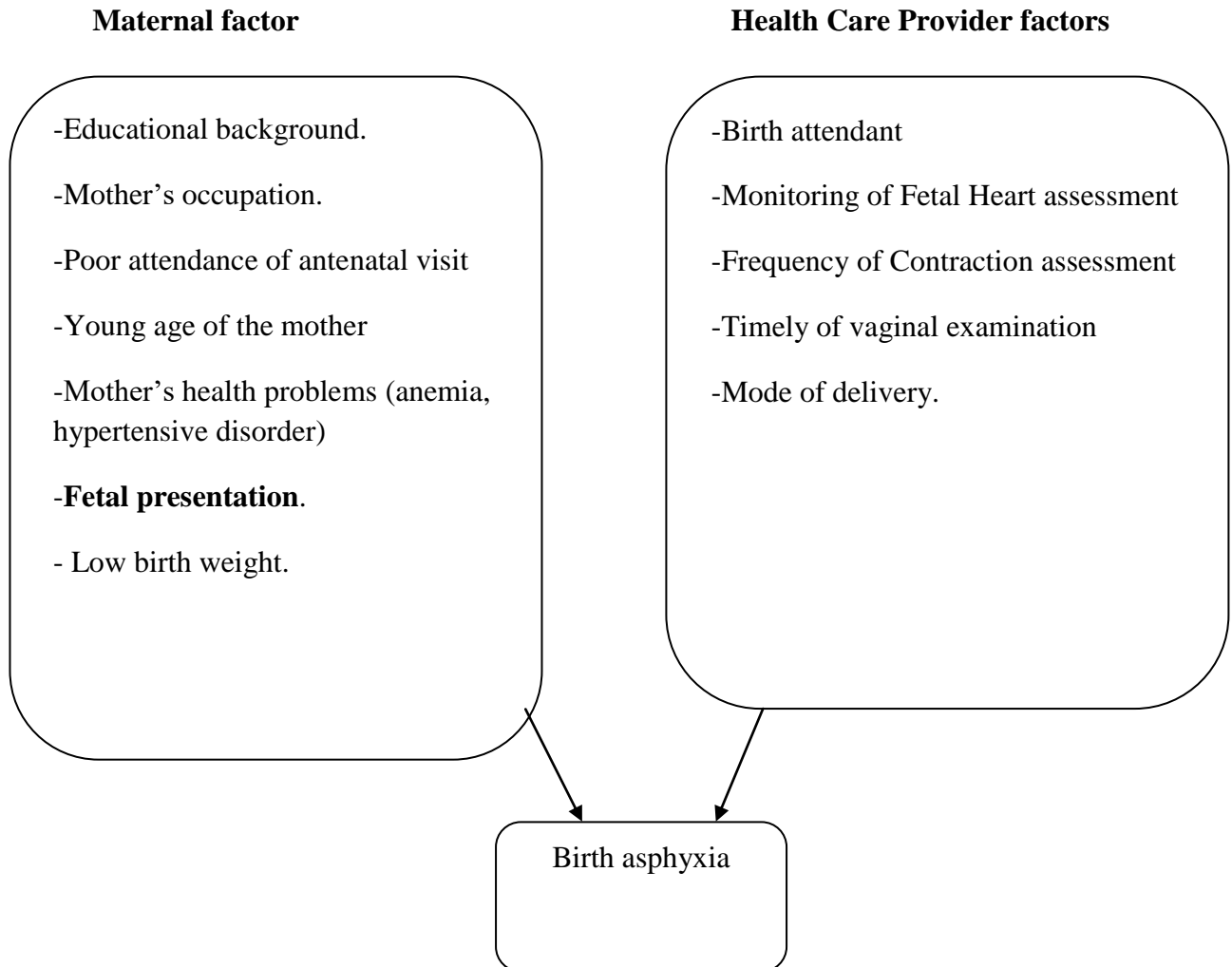
Normally pregnant mother who is in labor should not exceed 20 hours before delivery for prime gravid and 12 hours for multigravida, good managements and monitoring of women during antenatal, labor and delivery help to decrease or prevent birth asphyxia (Zhang et al, 2010). Despite knowledge and practice on management of women during labor and delivery at Mnazi-Mmoja hospital, but still factors contributing to birth asphyxia are unknown and the number of birth asphyxia cases are increasing and alarming which has a long-term impact on health outcomes in children's life, which may lead to multiple organs dysfunction, damage to the brain's tissues that can cause seizures, neurological problems, cerebral palsy, epilepsy, developmental delay, encephalopathy with long lasting disabilities and even death (World Health Report, 2003).

However numerous studies on factors contributing to birth asphyxia to newborn babies have been carried out Worldwide but in Zanzibar no published study relating to birth asphyxia has been found, therefore this study strives to assess factors contributing to birth asphyxia to neonate at Mnazi-Mmoja Hospital in Zanzibar.

1.3 CONCEPTUAL FRAME-WORK

Is a written or visual presentation that explains either graphically or in narrative form the main things to be studied – the key factors, concepts or variables and the presumed relationship among them (Miles and Huberman, 1994)

Figure 1: Conceptual framework



Source: Conceptual framework developed from various literature reviews (Ekta, A &Nayan, L, 2013; Narithin, 2014; Chikuse, 2012; Farhana, et al; 2014; Blandina Mbaga; 2013).

Conceptual framework was used by researcher to assess the goals for research and develop appropriate research questions and methodology, also it helped the researcher during analysis and presentation of findings.

1.4 Significance of the Study

The study results aimed to contribute in generating knowledge and awareness of birth asphyxia. It inform knowledge gaps and practices to policy makers, the Ministry of Health, stakeholders, hospital managements and health workers on factors contributing to birth asphyxia so as to improve practices and policy, which help to make strategies on reduction of occurrence of birth asphyxia in order to improve the quality and outcome of the pregnancy and prevent lifelong consequences. The ability to identify knowledge gaps early will help health care workers to identify and implement timely and appropriate interventions that will lead to better neonatal outcomes in the world and decrease neonatal death according to sustainable development goals (SDGs).

1.5 Research Questions

1. What are maternal factors contributing to birth asphyxia in newborn babies at Mnazi-Mmoja hospital in Zanzibar from Jan 2016- March 2017?
2. What are the Health Care Provider factors contributing to birth asphyxia in newborn babies at Mnazi-Mmoja hospital in Zanzibar from Jan 2016- March 2017?

1.7 Objective of the Study

1.7.1 Broad Objective

To assess factors contributing to birth asphyxia in newborn babies at MMH in Zanzibar

1.7.2 Specific Objectives

1. To determine maternal factors that contributes to birth asphyxia in newborn babies at MMH hospital Zanzibar from Jan 2016- March 2017.
2. To identify **Health Care Provider factors** that contributes to birth asphyxia in newborn babies at MMH hospital in Zanzibar from Jan 2016- March 2017.

CHAPTER TWO

2.0 LITERATURE REVIEW

This chapter aims to present a critical review of the literature on factors contributing to birth asphyxia in newborn babies. The vast majority of the millions of children dying before the age of 5 are born in developing countries; neonates (≤ 28 days of age) constitute more than 40% of these deaths. Efforts to reduce neonatal mortality have lagged behind; hinder fulfillment of the millennium development goal to reduce child mortality, the major causes of neonatal mortality globally are infections (36%), prematurity (28%), asphyxia (23%) and congenital malformations 7% (Kruse et al., 2012). Risk factors of birth asphyxia in community and hospital based settings in developing countries have been categorized into demographic, antepartum and intrapartum (Farhana, et al 2014). Tanzania is a sub-Saharan African country with an infant mortality rate of 65.74 deaths/1000 live births and a neonatal mortality rate of 26 deaths/1000 live births in 2012 (Mbwele et al., 2012) but in 2016 infant mortality rate of 43 deaths per 1,000 live births, the under-5 mortality rate is 67 deaths per 1,000 live births, and the child mortality rate is 25 deaths per 1,000 live births. During the same period, neonatal mortality is 25 deaths per 1,000 live births (TDHS, 2015-2016). In this study, the researcher seeks to investigate factors contributing to birth asphyxia and the reviewed literature will be sought according to the research objectives.

2.1. The maternal factors that contributes to birth asphyxia in newborn babies.

Perinatal asphyxia is a global problem causing serious sequelae regarding morbidity and mortality. It is a leading factor contributing in perinatal and neonatal mortality, which reflects social, educational and economical standards of a community, mother may have medical conditions that can lower her oxygen levels, there may be a problem with the placenta that prevents enough oxygen from circulating to the fetus or the baby may be unable to breath after delivery, also found that 38% newborns were home delivered and all of them had HIE while mortality was 40%, in this study (64%) had no antenatal visit, which is significant, risk for birth asphyxia along with home and untrained delivery practices (Farhana, et al., 2014). About 2.8 million neonatal deaths that occurred

worldwide in 2013 that occurred below 6 week of life correspond to 36% and 73%, respectively, birth asphyxia and prematurity are the primary causes of early neonatal deaths, and together can be reduced with therapeutic interventions. In 2012, Brazil rank tenth among the countries with the upper most amount of preterm births and sixteenth in the number of deaths resulting from preterm birth complications, basic cause of deaths between 0 and 6 days of life in infants with birth weights less than 1500 g in 2013, intrauterine hypoxia and birth asphyxia were responsible for 5.4% of them (Almeida, 2015).

Health education provided through antenatal visit is an important tool required for reducing the burden of birth asphyxia in the developing world. The aim of antenatal care is to detect and prevent obstetric complications, which may arise during pregnancy, childbirth and postnatal period. Most of the mothers surveyed had poor knowledge about the risk factors and sequelae of birth asphyxia. The health system needs to improve health education of expectant mothers about birth asphyxia (Ogunlesi, 2013). In Nigeria, most of the mothers surveyed had poor knowledge about the risk factors and sequelae of birth asphyxia. The research suggested that health system needs to improve health education of expectant mothers about birth asphyxia (Ogunlesi, 2013). In Ethiopia, the literature showed that delivery mothers had low knowledge about neonatal danger signs including the risk factors of asphyxia. Ante natal Care (ANC) is a good entry for screening and counseling during pregnancy, and has a potential to improve both maternal and fetal health. ANC visits can be used for addressing other health care needs such as family planning, immunization, tetanus, HIV and malaria prevention, screening for HIV and other infections, and screening and care for diabetic and hypertensive disorders (Mmbaga, 2013).

Moreover other studies done in UK have shown that complimentary alternative medicine products in pregnancy are most often used for the relief of nausea, vomiting, anxiety, stress, depression, backache, labor induction, headaches, migraine, urinary tract problems, cough/cold and indigestion, also conventional medicine such as herbal *raspberry* leaf or *homeopathic Caullophylum* to prepare the womb and cervix for

childbirth (Bishop, 2011), while in Malaysia, the same literature showed that there is increased use of herbs during pregnancy (34.3%) and during labor is (73%). They use the herbs because they believe that it may shorten and ease labor. They use herbs like *anastaticahierochuntia*. Pregnant mothers believe that herbal products do not contain harmful chemicals and are free of side effects compared to modern medicine (Sooi & Keng, 2013). Utilization of herbs throughout pregnancy is to soothe pregnancy and smooth the progress of child birth is common practice in Nigeria, the awareness of using herbs in pregnancy is acquired from relative, traditional, medical practitioners and herbs sellers. Pregnant women apply herbs for some reasons to stop spontaneous abortion and miscarriage, to ensure good development of the fetus, to prevent sickness such as anemia, malaria, constipation, nausea and hypertension, to facilitate labor and to have a attractive, weight and healthy baby (Gbadamosi, 2014).

Ekta & Nayan (2013) found that birth asphyxia is common in the babies of the mothers who had not received proper antenatal care. This socio-economic factors influence health care seeking behaviors of pregnant women and potentially threaten maternal/newborn survival, an individual's socio-economic status is one of the most powerful predictors of health in both industrialized and developing countries. Socio-economical status can be viewed as a complex product of social influences and individual factors that reflect access to care and health resources, environmental exposures, stressor and health behaviors. Common parameters include income, level of education, intrapartum related complication and preterm birth, for defining socio-economical status more comprehensively, and these measures are frequently combined, because each indicator alone is considered inadequately to reflect socioeconomic status. The same social factors that are known to influence general health outcomes can also impact birth asphyxia and mortality. Not only that but also other literature said that the most terribly affected people are from rural communities within Sub-Saharan Africa where inequitable health coverage predominantly influences survival. In addition to that Ekta & Nayan (2013) conclude that maternal anemia, primipara, meconium stained liquor babies have more chances of getting birth asphyxia.

Risk factors of birth asphyxia include increasing or decreasing maternal age, prolonged rupture of membranes, meconium stained fluid, multiple births, non-attendance for antenatal care, low birth weight infants, malpresentation, augmentation of labor with oxytocin, ante-partum hemorrhage, severe eclampsia and pre-eclampsia, ante partum and intrapartum anemia(Hafiz et al, 2014). Traditionally it is pronounced that very premature neonates (VP, GA<32 weeks) and very low birth weight (VLBW, BW ≤ 1500g) neonates have a particularly high risk of death. These neonates represent approximately one quarter of all premature neonates (Kruse et al., 2012).

2.2. The Health Care Provider Factors that contributes to birth asphyxia in newborn babies.

Study done in Pakistani suggest that asphyxia incidence is very high in developing countries like Pakistan where health facilities are restricted to urban areas and only small population (21%) is getting benefits. Since it is a preventable problem and long term neurological sequelae are almost untreatable once asphyxia happened, so it is better to avoid as occurred as early as possible (Farhana, et al 2014). In New Delhi India, the study found that there is a need for education to enhance the knowledge and skill of nurses-midwives to identify birth asphyxia and its potential complications leading to neonatal mortality during the first few hours after birth. As practical skills appear to decline faster than theoretical knowledge, regular in-service instruction is required every year.

The study suggests that as adequate knowledge and skill of health professionals is essential for improving the neonatal outcome especially in managing asphyxia, training programmes are the key strategy in promotion of health care services (Narithin, 2014). In Ghana, the study revealed that although the midwives were primarily responsible for technical care involving health assessment, setting up intravenous lines, and administering medications, and they consist of the majority of frontline skilled care workers in maternal and newborn health care but they meet growing pressure due to shortage of skilled staff in managing labor and delivery. With the low nurse/midwife density ratio (10.5 per 10,000 populations) the recent decrease to 9.3 per 10, 000 population has primed the stage for increased workload in nurse/midwifery practice

where poor skill mix has been a pre-existing issue across the country that cause significant number of birth asphyxia of the newborns, in low-and-middle income countries (LMICs), very little information exists on care experiences of midwives regarding birth asphyxia (Ani-amponsah, 2016).

However study done in Nigeria conclude that majority of nurses-midwives have very good knowledge of the basic skills needed for the management of birth asphyxia. They also have positive attitudes in managing such cases but lack appropriate ability to put the skills into practices for professional care (Ezenduka et al., 2016). Although in Malawi, literatures showed that midwives had knowledge of birth asphyxia but there are gaps in their capacity to diagnose warning signs of birth asphyxia through partograph use. In addition, the midwives did not adhere to all steps of resuscitation guidelines. In addition, the facilities did not have adequate resuscitation equipments and supply (Chikuse, 2012). Not only that but also the literature in Western Kenya illustrates that the overall knowledge about managing and performing neonatal resuscitation among health professionals was poor. Majority of health workers lack skills and techniques on wiping meconium from the face and nose while the head appears before delivery. Nurses-midwives lack essential techniques to maintain breathing if a baby is not breathing well after full delivery, there are also skills gap on suctioning mouth and nose before drying and stimulating and to keep facemask cover the nose, mouth and chin during mask ventilation (Gebreegziabher et al., 2014).

Moreover another study done in Muhimbili national hospital in Tanzania by Sepeku in 2011, conclude that the prevalence of birth asphyxia increased and caused by inadequate resuscitative facilities and unskilled health workers. Furthermore, many literatures illustrates that health workers face many challenges on managing birth asphyxia in hospitals, these include lack of equipments, inadequate knowledge, medicine and other supplies, inadequate midwives and doctors work and other human resources crisis due to brain drain, overload and lack of training on resuscitation of the asphyxiated newborn babies (Gebreegziabher et al., 2014).

CHAPTER THREE

3. METHODOLOGY

3.1 Research Design

Descriptive retrospective study design was used that employed quantitative approach. This study design was selected in order to obtain preliminary measures of association and quickly estimate the effect of an exposure on an outcome. A retrospective study uses existing data that have been recorded for reasons other than research. In health care these are often called “chart reviews” because the data source is the medical record.

3.2 Study Population

The target population included all women delivered at Mnazi Mmoja Hospital (MMH) from Jan 2016 to March 2017.

3.3 Sampling Procedure

In this study, simple random sampling method was used, whereby all study population have equal chance to participate in the study so all files of women who delivered from Jan 2016 to March 2017 were included, and these files were obtained from medical records at MMH after receiving permission from Hospital management and head of medical records department. lottery method was used whereby the researcher had 2 papers, one paper was written “Yes” and another one was written “No”, after mixing thoroughly the researcher chose one paper, if the 1st selected paper was “Yes” so the 1st file was included in the sample and the 2nd file was not included in the sample or if the 1st selected paper was “No” the 1st file was not included in the sample and the 2nd file was included in the sample. So if the 1st file was selected another selected files were 3,5,7,9, and so on, that procedure was continued until the required sample size was reached.

3.4 Sample Size

The sample size (n) was calculated using the following formula by Naing, L. Winn, T. & Rusli, B. N (2006).

$n = Z_{\alpha}^2 p(100-p)/d^2$, where

n=minimum required sample size

Z_{α} =standardized normal deviate corresponding to a significant level α

P=is the expected proportion, 50% will be used as a standard Proportion.

ϵ = 5% maximum margin of error

n= 384.

Adjusting for non response, $n = n \times (100\%/100\%-f \%)$

Adding 4% of non response rate (n), $384 \times 4/96 = 16$. $384 + 15 = 399$.

Sample size =399.

3.5 Inclusion Criteria

All files of women whose delivered from Jan 2016 to March 2017

3.6 Exclusion criteria

Mother's records which were missed more than 5 selected variables, if it was selected, it was redundant and the second one was chosen to compensate the exclusion one.

3.7 Study Setting

The study was conducted at Mnazi-Mmoja referral Hospital (MMH) in Zanzibar at maternity ward. This hospital was purposely selected because it is the main referral hospital in Zanzibar and was the only hospital which report high number of birth asphyxia at Zanzibar in 2016. Also it serves large number of pregnant mothers having labor pains including obstetric complications as well as all obstetric complicated cases from different Hospital and health center in Zanzibar are referred to this hospital. MMH is the largest tertiary public health institution in Zanzibar and it is situated in Stone Town at Vuga, the historic center of Zanzibar City. The hospital has an outpatient clinic, specialized clinics, as well as several wards for inpatient services. Although it is called the referral hospital but basic outpatient services are also provided to the nearby communities. It is the teaching hospital where by nursing and midwifery students,

medical students, foreign students, as well as interns come for learning and practical purposes. The hospital contains 400 beds, on average; the hospital attends to over 600 outpatients, 71 admissions and 40 deliveries on a daily basis.

The hospital is fairly well- staffed with native and foreigner medical personnel like doctors, nurses-midwives and others. MMH has about 1080 workers, among them almost 354 nurses, 8 in master level, 35 nurse officers and the rest are nurses-midwives.

In maternity ward where the study was conducted, there are 5 nurse officers 36 nurse-midwives and 16 medical doctors, on average the hospital attend 40 -60 deliveries on daily basis. Also being a referral hospital, it is assumed that it has largest number of nurses-midwives who care for patients with diverse conditions such as obstetric, gynecological, medical, surgical, traumatic, and neurological and burns.

3.8 Data Collection

Data abstraction forms (Appendix A) were used to collect information from mother's records which were obtained from medical records at Mnazi-Mmoja Hospital. Permission from hospital management and head of medical records department was granted. All files of women who delivered in maternity at MMH from Jan 2016 to March 2017 were reviewed; data abstraction form contained the following aspect: demographic data such as (age, marital status, mother's occupation), maternal factors such as (Parity, number of antenatal visit, last antenatal records (hemoglobin level, blood pressure, time of admission),existing maternal health problems, Apgar score) and Institutional factors such as (Assessment of FHR, contraction, vaginal examination, mode of delivery and birth attendants) and this data abstraction form was developed after an extensive literature reviewed and consultation of midwifery specialists and statistician. The data collection was done from May 2017-June 2017.

3.9 Research Instruments

Data abstraction forms were used as an instrument to collect information from mother's records whose delivered in maternity at MMH from Jan 2016 to March 2017, and this data abstraction form was developed after an extensive literature reviewed (Ekta, A & Nayan, L, 2013; Narithin, 2014; Chikuse, 2012; Farhana, et al; 2014; Blandina Mbaga;

2013) and consultation of midwifery specialists and statistician. The tool contained 3 parts, which was demographic data (Age, education status, occupational status, marital status etc), maternal factors (parity, booking status, any obstetric complication etc) and Institutional factors (uses of partogram, contraction monitoring, FHR assessment, mode of delivery etc).

3.10 Training of Research Assistants

The study was recruited one research assistant that was assisted in data extraction exercise. There was a two days training prior to the data extraction process. A qualification for the research assistant was degree holders in nursing and midwifery and with an experience in managing the mothers with labor. The training was included explanation skills on the nature of the study objectives, rationale and how to fill the research instruments properly. Training of the research assistant was helped to gain knowledge concerning the study topic hence better results.

3.11 Validity

Data abstraction form was achieved and reviewed by the midwifery specialists and research experts to assess relevance of tool items and study objectives. To ensure construct validity the researcher measure each question and provided option on how well the test measure and answer the research objectives also the tool was pretested used small sample size and data were collected and analyzed to assess the accuracy of the tool. Validation of data abstraction form was considered if it was given the answer of the question as expected.

3.12 Reliability

The tool was pre-tested among mother's files which were obtained from medical record so as to assess reliability of the instrument and its applicability to the midwifery context, after doing a pre-test if there was any question which was not clear it was corrected and tested again. The cronbach's alpha coefficient of 0.8 and above was used to indicate consistent of the results. The reliability issues that were likely to occur in collecting data from records were data management (how the data been stored, what the security of the data), data diagnosis (inspection of data errors, determining inconsistencies, checking for

data redundancy and completing partially or imperfect information), accessibility, security or confidentiality, relevance and accuracy and quality assurance (is the process to ensure the data is consistency and free from errors) was done in order to assess, verify and ensure the accuracy of collected data.

3.13 Pilot Study.

This was done at Mnazi-Mmoja hospital prior to data collection period by abstracting 10% of sample size which is 38 patient's records (which were not included in the study). So as to test the data abstraction form and results of the pilot study were used to ensure clarity and completeness of the checklist so as to modify the content of data abstraction form. Test-retest was performed to ensure reliability of questions after doing a pre-test, when there was any question which was not clear it was restructured and tested again.

3.14 Data Management.

Every data abstraction form was cross checked by the principal investigator before proceeding to ensure completeness of data and they were stored in a locked secure cupboard.

3.15 Data Analysis

Collected data were entered, cleaned, coded, verified and analyzed by using the statistical package of social science (SPSS) version 21 with assistance of data manager. Statistical significance from a comparison of proportions was tested. A significance level of 0.005 and 95% confidence interval (C.I) were used. Differences were considered statistically significant if $p < 0.005$, then regression analysis was run in order to isolate and identify variables that have significant association with dependent variable and measure the effect of each factor to other factors. Multiple regression tests were used to predict which variable has more effect in contributing birth asphyxia compared with other variables. Factors that were investigated and tested by using multiple regression tests were those factors which show statistical significant in chi-square test (prolonged labor, prematurity, birth attendants, improper FHR assessment and mode of delivery).

3.16 Ethical Considerations

The study was carried out after ethical clearance granted by Muhimbili Institution Review Board, MUHAS Directorate of Research and Publications (Appendix B). Before the commencement of the study, permission to conduct the study was requested and granted from Zanzibar Medical Research Ethical Review Committee (Appendix C) and also permission to conduct the study was granted by Mnazi-Mmoja Hospital. This study was retrospective review of case notes of patient's files of labor and delivery progress therefore consent from the women were not be obtained. To maintain anonymity patient's files were identified by numbers and not names and all information related to this study were kept confidential in the cupboard with lock and no one have had access of it, except the research team only.

3.17 Dissemination of the findings

Findings from this study will be disseminated to Muhimbili University of Health and Allied Sciences (MUHAS) as partial fulfillment for the award of Degree of Master of Midwifery and Women Health. Copies will be submitted to Mnazi-Mmoja Hospital Zanzibar, MUHAS School of Nursing, MUHAS library and UNFPA-Zanzibar. Furthermore, the research will be published in midwifery journals and presented in a scientific conference.

CHAPTER FOUR

RESULTS AND INTERPRETATION

4.0 Introduction

This chapter presents results and interpretation of data collected from 399 women's files. The data collected were analyzed based on the objectives of the study.

4.1: Social Demographic characteristic of study population

Most of the study population had the age range of 20-29 years (58.7%). Majority of women were married 387 (97%). More than half of the respondents 232 (58.1%) were primigravida. Majority 311 (78%) of the study population were unemployed.

Table 1 below shows the social demographic characteristics of study population.

Table 1: Social Demographic Characteristic of the study population

Demographic Characteristics	Frequency (n=399)	Percent (%)
Marital status		
Single	12	3.0
Married	387	97.0
Age		
15-19	36	9.0
20-24	116	29.1
25-29	118	29.6
30-34	67	16.8
35-39	45	11.3
40-44	17	4.3
45-49	36	9.0
Parity		
Primigravida	232	58.1
Multigravida	107	26.8
Grandmultipara	60	15.0
Mothers' Occupation		
Employed	46	11.5
Petty traders	19	4.8
Farmer	13	3.3
House wife	311	77.9
Student	9	2.3
Others	1	0.3

4.2: Factors contributing to birth asphyxia

4.2.1: Maternal factors contributing to birth asphyxia

Factors which were investigated included last antenatal records (time of admission, number of antenatal visit, last visit hemoglobin, last blood pressure) and obstetric factors (prolonged labor, prematurity, prolonged rupture of membranes, cord accident, malpresentation, placenta praevia and placenta abruption).

4.2.1.1: Distribution of maternal last antenatal records

About 129 (32.4%) of pregnant mothers were admitted from midnight to early morning (00:00-06:59 hours). 188 (47.1%) of pregnant mothers attended antenatal visits more than four times. Moreover 202 (50.6%) of pregnant mothers had normal hemoglobin and about 225 (56.4%) of pregnant mothers reported to have low blood pressure during admission. Table 2 below presents maternal last antenatal records.

Table 2: Frequency distribution of maternal last antenatal records (n=399)

Last Antenatal records	Number	(%)
Time of Admission		
07:00-12:59	111	(27.8)
13:00-18:59	79	(19.8)
19:00-23:59	80	(20.0)
00:00-06:59	129	(32.4)
No of Antenatal visit		
0-1	24	(6.0)
2-3	187	(46.9)
4>	188	(47.1)
Last visit hemoglobin		
Anemia	21	(5.3)
Low hemoglobin	74	(18.5)
Normal hemoglobin	202	(50.6)
Not checked	102	(25.6)
Last blood pressure		
High blood pressure	20	(5.0)
Normal blood pressure	154	(38.6)
Low blood pressure	225	(56.4)

4:2:1.2: Frequency distribution of Obstetric factors contributing to birth asphyxia.

Study results show that 99 (24%) have prolonged labor, majority of mother with labor 396 (99.2%) have no cord accident or placenta praevia. More than half 364 (91.2%) of mother with labor have no malpresentation but 44 (11%) have revealed prematurity. Table 3 below has more information

Table 3: Frequency distribution of Obstetric Factors (n=399).

Obstetric Factors	Number	(%)
Prolonged labor		
Yes	99	(24.8)
No	300	(75.2)
Cord accident		
Yes	3	(0.8)
No	396	(99.2)
Fetal presentation		
Breech	33	(8.3)
Transverse	2	(0.5)
Vertex	364	(91.2)
Placenta praevia		
Yes	3	(0.8)
No	396	(99.2)
Placenta Abruptio		
Yes	1	(0.3)
No	398	(99.7)
Prolonged rupture of membrane (hrs.)		
Yes	9	(2.3)
No	389	(97.5)
N/A	1	(0.3)
Prematurity		
<37 weeks	44	(11.0)
>37 weeks	355	(88.9)

4.2.2: Frequency distribution of Health Care Provider Practice factors contributing to birth asphyxia.

4.2.2.2: Frequency distribution of Labor progress

Study findings revealed that majority 194 (48%) of pregnant mothers were assessed for Fetal heart rate only on admission. Half of women 203 (51%) were assessed for uterine contractions on admission only and about half 190 (47.6%) of women were assessed per vaginally only on admission. Table 4 below has more information.

Table 4: Frequency distribution of labor progress (n=399).

Labor progress	Number	(%)
Timing of FHR		
On admission	194	(48.6)
After every 30 minutes	34	(45.3)
More than 30 minutes	181	(6.0)
Uterine contraction assessment		
After every 30 minutes	37	(9.3)
More than 30 minutes	159	(39.8)
Only on admission	203	(50.9)
Vaginal examination		
On admission	190	(47.6)
Less than 4 hours	117	(29.3)
After every 4 hours	30	(7.5)
More than 4 hours	62	(15.5)

4.2.2.3: Frequency distribution of Birth Attendants and mode of delivery

About 175 (43.9%) pregnant women were delivered by midwives followed by student midwives 105 (26.2%) and majority of women 339 (85.0%) delivered by spontaneous vaginal delivery (SVD) followed by emergency caesarean section 44 (11.0%). Table 5 has more information

Table 5: Frequency distribution of Birth Attendants and mode of delivery (n=399).

Variables	Number	(%)
Birth attendant		
Doctors	97	(24.3)
Midwives	175	(43.9)
Intern Doctors	13	(3.3)
Students	105	(26.2)
Mode of delivery		
Spontaneous vaginal delivery	339	(85.0)
Emergency caesarian section		
Vacuum extraction	44	(11.0)
Elective C/S	4	(1.0)
Assisted breach delivery	2	(0.5)
	10	(2.5)

Factors Contributing to Birth Asphyxia

Study revealed that factors contributing to birth asphyxia and show statistical significant with birth asphyxia were prolonged labor ($p=0.001$), pre-maturity ($p=0.000$), monitoring of Fetal heart rate ($p=0.000$), mode of delivery (SVD) ($p=0.000$) and birth attendant (Doctors) ($p=0.000$). Table 5 below has more information.

Table 5: Factors Contributing to Birth Asphyxia (n=399)

Variable	Number	%	(p-value)
Prolonged labor			
Yes	99	24.8	(p=0.001)
No	300	75.2	
Prematurity			
<37 weeks	44	11.0	(p=0.000)
>37 weeks	355	88.9	
Fetal heart rate monitoring			
On Admission	194	48.6	(p=0.000)
After every 30 minutes	34	6.0	
More than 30 minutes	181	45.3	
Mode of delivery			
Spontaneous vaginal delivery	339	85.0	(p=0.000)
Emergency caesarian section	44	11.0	
Vacuum extraction	4	1.0	
Elective C/S	2	0.5	
Birth Attendant			
Doctor	97	24.3	(p=0.000)
Midwives	175	43.9	
Intern Doctors	13	3.3	
Students	105	26.2	

4.3: Further analysis of factors contributing to birth asphyxia

Factors that were statistically significant were analyzed again by logistic regression to measure the size of the effect of one factor to other factors with birth asphyxia. Univariate and bivariate was not done because chi-square has already done so multiple logistic regression was done and results showed SVD was seven times more likely to contribute to birth asphyxia compared with other modes of delivery (AOR = 7.052, 95% CI: 3.372 – 14.747, $p < 0.001$). Midwives were one times more likely to deliver babies with birth asphyxia compared with other birth attendants (AOR = 1.504, 95% CI: 0.901 – 2.511, $p < 0.118$), those with prolonged labour also show less risk on contributing to birth asphyxia compared with those with no prolonged labour (AOR=0.660, 95% CI: 0.374-1.163, $p=0.151$). Other factors didn't show any risk of contributing to birth asphyxia and were not statistical significant. Table 6 has more information.

Table 6. Multivariable Regression analysis for factors contributing to Birth Asphyxia

Variables	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Birth Attendant								
Midwives	.408	.261	2.438	1	.118	1.504	.901	2.511
(RC)								
Mode of delivery								
SVD	1.953	.376	26.927	1	.000	7.052	3.372	14.747
Other mode (RC)								
Prolonged labour								
Present	-.416	.290	2.067	1	.151	.660	.374	1.163
Absent(RC)								

CHAPTER FIVE

DISCUSSION, RECOMMENDATIONS AND CONCLUSION

5.1. INTRODUCTION.

This chapter discussed the study findings, recommendation and conclusion. The discussion based on maternal and institutional factors contributing to birth asphyxia.

5.2. DISCUSSION

Neonatal mortality, morbidity and long term birth complications had been related to maternal and obstetric associated risk factors. Birth Asphyxia is a perinatal problem that may result into death or permanent disability. Prevention of birth asphyxia and its complications depend on early identification of pregnant mothers with obstetric complications or pregnant mothers with high risk and appropriate interventions should be taken. In this study, risk factors contributing to birth asphyxia which show statistical significant in chi-square test were prolonged labor, mode of delivery, birth attendant, prematurity and monitoring of fetal heart sound but in multivariable regression analysis determined that only three factors (Spontaneous Vaginal Delivery, Midwives and Prolonged labor) show statistical significant and other factors showed not statistical significant although have risk in contributing to birth asphyxia.

Health Care Provider Practices Factors contributing to birth asphyxia

Mode of delivery has showed statistical significant with birth asphyxia, in this study Spontaneous vaginal delivery (SVD) was major risk factor contributing to birth asphyxia 67.4% ($p=0.000$). This could be due to the presence of prolonged labor which has shown to contribute in birth asphyxia, the results correlates with the study of Perinatal factors leading to birth asphyxia among term newborns in a tertiary care hospital done by Asad & colleagues in 2014 revealed that SVD was the most mode of delivery showing significant association with birth asphyxia 87 (44.39%, $p=0.001$) followed by caesarian section ($p=0.001$). Same findings by Chiabi & colleagues in 2013 determined that SVD presented 54.4% ($p=0.001$), also similar results with Aslam (2014) concluded that SVD was frequent in both asphyxia cases 77 (62.6%) and control group 68 (58.1%). In

different study done by Gone & colleagues in 2013 results show that instrumental delivery was major risk factor in their study ($p=0.00$) and elective caesarean section was found to have protective effect. Also contrasted by Tabassum & colleagues in 2014 in Pakistani in cross-section study revealed that breech delivery show statistical significant with birth asphyxia ($p<0.03$). In multivariable analysis SVD was 7 times more likely to contribute in the occurrence of birth asphyxia (AOR 7.052, CI 3.372-14.747, $p=<0.001$) but contrasted by Tabassum & colleagues in 2014 revealed that breech delivery has statistical significant and contribute six times more likely to occurrence of birth asphyxia (OR 6.2, 95% CI: 2.8 -13.8).

In this study results revealed that birth attendants show statistical significant with birth asphyxia ($p=0.000$), deliveries by doctors had high risk (38.9%) in contributing to birth asphyxia, this is because most of high risk mothers were managed by doctors and also doctors attend the pregnant mothers at late stage. This study were similar to lee (2007) revealed that deliveries by doctors have high risk for birth asphyxia (RR 3.24, CI 2.28-4.60, $p=0.00$) followed by Auxiliary Nurse Midwives (RR 2.58, CI 1.60-4.20, $p=0.00$) but contrasted by Nickson Mwanza (2014) in prospective case control study revealed that most of the babies with asphyxia were delivered by midwives 28 (39%), followed by senior resident medical officers 26 (36%) and registrars 17 (24%). Moreover, Aslam (2014) use retrospective Case control study with 240 study participants seen deliveries by midwives were significantly associated with increased risk of birth asphyxia (OR 0.17 CI 95% 0.05-0.51, $p=<0.01$). In addition to that midwives seen as institutional factor contributing by 1 times in occurrence of birth asphyxia even if show no statistical significant (AOR 1.504, CI 0.901-2.511, $p=<0.118$).

Improper monitoring of fetal heart rate have significant relationship with birth asphyxia ($p=0.000$). In this study result shown that majority of pregnant women 48.6% have been monitored for fetal heart rate only on admission. In this aspect the researcher didn't seen any published research talked about fetal heart monitoring but findings was supported by Liston & colleagues in 2002 in their guideline of fetal health surveillance in labor said that the aim of intrapartum fetal surveillance is to improve fetal outcomes by identifying

fetuses with hypoxia academia at a point in order to prevent birth asphyxia. Also supported again by Liston & colleagues in 2007 on monitoring of fetal surveillance in antepartum and intrapartum period will decrease the incidence of birth asphyxia while maintaining the lowest possible rate of obstetrical intervention. Additionally, the National Collaborating Centre for Women's and Children's Health in UK (2014) stated that the care that a woman receives during labor has the potential to affect her – both physically and emotionally and the health of her baby so that to prevent life birth consequence and death.

Maternal factors contributing to birth asphyxia

Prolonged labor also showed statistical significant in contributing birth asphyxia. In this study prolonged labor affect neonate for 34.7%. Prolonged labor is an indicator of poor outcome. This emphasizes the importance of intrapartum fetal monitoring which would detect early fetal compromise and timely interventions that can improve birth outcome. The associations were found to be statistically significant ($p < 0.001$) with birth asphyxia. This is compared with the study done at Ahmadabad by Dalal & Bodar (2013) revealed that prolonged labor affect neonate for 16%, similar to the study of Perinatal factors leading to Birth asphyxia among term newborns in a tertiary care Hospital done by Asad & colleagues in Pakistan in 2014 revealed that prolonged labor (72%) remained the most important determinant of birth asphyxia and result show that prolonged labor and birth asphyxia have strong correlation. So improving awareness of easy access to a health services at delivery might play a role in reducing the incidence of birth asphyxia. Also the study “Risk factors of birth asphyxia” done by hafiz Muhammad (2014) revealed that prolonged labor were significantly associated with increased risk of developing birth asphyxia (OR 16.16 CI 95% 3.74-69.75, $p = < 0.01$) as similar study done by Tabassum & colleagues in 2014 in Pakistan revealed that prolonged labor show statistical significant with birth asphyxia (OR 5.2, 95% CI: 3.3 - 8.3) as well as study done by Ugwu (2012) determined that prolonged labor show statistical significant with birth asphyxia.

In addition to that, in this study prematurity carried a substantially higher risk 11.0% of birth asphyxia and showed strong association with birth asphyxia ($p = 0.000$) similar to

Anne CC. Lee(2007) results determined that with gestational age 34 to 37 weeks increasing the risk of birth asphyxia by a factor of (1.61, 95% CI: 1.13–2.27) and gestational age <34 weeks increasing risk by a factor of (14.33, 95% CI: 10.31–19.91), also study done by Ugwu (2012) presented that prematurity has high risk causing birth asphyxia (17.9%), in study done at Nepal (2007) revealed that prematurity showed significant association with birth asphyxia (OR 3.5). Furthermore, premature infants are more vulnerable to brain damage during delivery due to the immaturity of their blood-brain barrier lead to birth asphyxia.

5.2. STRENGTH OF THE STUDY

- The study used simple random sampling so every study population has equal chance to participate in the study hence minimized bias.
- The study determined the factors that contribute to birth asphyxia so midwifery services can be strengthening to prevent neonatal morbidity and mortality.

5.3. STUDY LIMITATIONS

This study reviewed mother's records, hence there was incomplete documentation. To mitigate these issues MTUHA, delivery book and report book which were obtained at maternity ward were used to capture some information after getting permission from Ward in-charge.

5.4. CONCLUSION

Results revealed that most factors contributing to birth asphyxia are preventable if there is early identification of risk factors during antenatal and intrapartum care. Preventive strategies must be developed to reduce the burden of birth asphyxia which may result in death in most cases or to live with a major handicap or lifelong disability.

5.3. RECOMMENDATION

Findings highlight things that need recommendation in practice, policy and future research.

Practice

Mnazi-Mmoja Hospital needs to conduct on job training on importance of regular assessment and monitoring of the progress of labor to ensure good outcome for the mothers and their babies so that to reduce or prevent birth asphyxia which cause most neonatal mortality rate .

Policy

-Mnazi-Mmoja Hospital needs to provide updated guidelines on effective monitoring of labor process and used by all health facilities.

-Supervision may be taken into consideration for effective implementation of midwifery services.

Future research

In-depth individual views on factors contributing to birth asphyxia were not captured because this study used data abstraction form hence pure qualitative approach can be used in order to capture those views from community and health workers.

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APPENDIX A: Data abstraction form.

Serial no.....

Identification no.....

Section 1: Demographic Data

1	Age of the mother:		
2	Parity of the mother	<input type="checkbox"/>	
3	Level of education	1.No formal education <input type="checkbox"/>	3.Secondary education <input type="checkbox"/>
		2.Primary education <input type="checkbox"/>	4.College or university <input type="checkbox"/>
4	Occupations	1.Employed <input type="checkbox"/>	3.House wife <input type="checkbox"/>
		2.Petty trader <input type="checkbox"/>	4.Student <input type="checkbox"/>
			5. Others.....
5	Mother marital status	1.Single <input type="checkbox"/>	3.Divorced <input type="checkbox"/>
		2.Marriage <input type="checkbox"/>	4.Widow <input type="checkbox"/>

Maternal factors

1	Date of admission		
2	Time of admission		
3	Time of onset of labor		
4	Last antenatal finding	1.Gestation age at booking <input type="checkbox"/>	2.Last visit blood pressure <input type="text"/>
		3.Last visit hemoglobin <input type="checkbox"/>	4.Number of antenatal visit <input type="checkbox"/>
		88= not checked	
		88= not checked	

5	Obstetric factors			
		1. Difficult/prolonged labor	<input type="checkbox"/>	
		2. Cord accident	<input type="checkbox"/>	
		3. Mal presentation: Type	Breech <input type="checkbox"/> transverse <input type="checkbox"/>	
		4. Antepartum haemorrhage	1a. Placenta Praevia	<input type="checkbox"/>
			1b. Placenta abruption	<input type="checkbox"/>
			2. Blood loss	a) Mild
b) Moderate	<input type="checkbox"/>			
c) Severe	<input type="checkbox"/>			
5. Prolonged rupture of membrane	<input type="checkbox"/>	Duration.....hrs		
6. Pre maturity	<input type="checkbox"/>	Gestational Age.....wks.		

Health Care Provider factors

1	Risk factors detected during ANC	1. Yes <input type="checkbox"/>	2. No <input type="checkbox"/>
2	The risk factors detected by health provider on admission?	1. Yes <input type="checkbox"/>	2. No <input type="checkbox"/>
3	Maternal illness	1. Pre-eclampsia	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>
		2. Ante-partum hemorrhage	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>
		3. Diabetic Mellitus	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>
		4. Eclampsia	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>

		5. Severe malaria	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>
		6. HIV/AIDS	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>
		7. Others (specify).....	1 Yes <input type="checkbox"/> 2. No <input type="checkbox"/>
4	Was partogram used?	1. Yes <input type="checkbox"/> 3.99=NA <input type="checkbox"/> 2.No <input type="checkbox"/>	
5	Was action line crossed?	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>	<input type="checkbox"/> 9=NA <input type="checkbox"/>
6	If yes was there action taken?	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>	<input type="checkbox"/> 9=NA <input type="checkbox"/>
8	Contraction assessed accordingly (every 30 minutes)	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>	3.99 = NA <input type="checkbox"/>
9	How was frequently in hours	Duration.....minutes	
10	Fetal heart sound on admission	1. Present <input type="checkbox"/>	2. Absent <input type="checkbox"/>
11	If yes	1. Regular <input type="checkbox"/> 2. Irregular <input type="checkbox"/>	3.99=NA <input type="checkbox"/>
12	Last fetal heart sound record	Hours <input type="checkbox"/> min <input type="checkbox"/> before birth	
13	Monitoring heart sound sounds	1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>	3.99=NA <input type="checkbox"/>
14	How frequently in hours	1. Hours <input type="checkbox"/>	2.99 = NA <input type="checkbox"/>
15	Vaginal examination performed	1. Yes <input type="checkbox"/>	2.No <input type="checkbox"/>
16	How frequently in hours	1. Hours <input type="checkbox"/>	2.99 = NA <input type="checkbox"/>
17	Membrane ruptured	1. Yes <input type="checkbox"/>	2.No <input type="checkbox"/>

18	Time of membrane ruptured		
19	Amniotic Fluid	1.Nomal <input type="checkbox"/> 2.Meconium stained <input type="checkbox"/>	3. <input type="checkbox"/> lood staining <input type="checkbox"/>
20	Mode of delivery	1.Spontaneous Vaginal deliery <input type="checkbox"/> 2.Emergency Caesarian Section <input type="checkbox"/> 4. Assissted Breach Delivery <input type="checkbox"/>	3.Vaccum Extraction <input type="checkbox"/> 4. Elective C/S <input type="checkbox"/>
21	Birth weight (Kgs)		
22	Birth attendant	1.Dr. <input type="checkbox"/> 2. Midwife <input type="checkbox"/>	3.Inte Dr. <input type="checkbox"/> 4.Others..... .
23	Fetal sex	1. M <input type="checkbox"/>	2. F <input type="checkbox"/>
24	Apgar score	1. At 1 min	2.At 5 min
25	Resuscitation done?	1. Yes <input type="checkbox"/>	2. No <input type="checkbox"/>
26	The outcome of the baby	1. Alive <input type="checkbox"/>	2.Death <input type="checkbox"/>

APPENDIX B: Letter for ethical clearance

**MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR OF POSTGRADUATE STUDIES**

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Ref. No. MU/PGS/SAEC/Vol. IX/

3rd May, 2017

Ms. Zuwena Ali Salim
MSc. Midwifery and Women's Health
MUHAS.

RE: APPROVAL OF ETHICAL CLEARANCE FOR A STUDY TITLED: "FACTORS CONTRIBUTING TO BIRTH ASPHYXIA IN NEWBORN BABIES AT MNAZI-MMOJA HOSPITAL IN ZANZIBAR"

Reference is made to the above heading.

I am pleased to inform you that, the Chairman has, on behalf of the Senate, approved ethical clearance for the above-mentioned study. Hence you may proceed with the planned study.

The ethical clearance is valid for one year only, from 2nd May, 2017 to 1st May, 2018. In case you do not complete data analysis and dissertation report writing by 1st May, 2018, you will have to apply for renewal of ethical clearance prior to the expiry date.


Prof. Andrea B. Pembe
DIRECTOR OF POSTGRADUATE STUDIES

cc: Director of Research and Publications
cc: Dean, School of Nursing

APPENDIX C: Permission letter from ministry of health Zanzibar



ETHICAL CLEARANCE LETTER

PROTOCOL NUMBER: ST /0007/APRIL/017

DATE: 21 APRIL, 2017.

ZUWENA ALI SALIM
STUDENT RESEARCHER

PROTOCOL TITLE "Factors Contributing to Birth Asphyxia in New Born Babies at Mnazi Mmoja Hospital in Zanzibar."

RE: ETHICAL CLEARANCE FOR CONDUCTING MEDICAL RESEARCH IN ZANZIBAR.

This is to certify that the research protocol entitled "Factors Contributing to Birth Asphyxia in New Born Babies at Mnazi Mmoja Hospital in Zanzibar." was received and reviewed by the Zanzibar Medical Research and Ethics Committee on April, 2017.

We would like to inform you that the decision of the committee to this protocol was "Approved".

The permission to undertake data collection is for one year beginning from the date of this letter.

The principal investigators have to provide progress report after six months and final report to the Ministry of Health and the Zanzibar Medical Research and Ethics committee ZAMREC.

Seek permission to publish from ZAMREC.

Any change made to the protocol need to be submitted to the committee for approval prior to its implementation

Thanks in advance,


DR. MSAFIRI MARIANI
SECRETARY
ZAMREC
ZANZIBAR