# AVOIDABLE PERINATAL DEATHS AS SEEN AT MUHIMBILI NATIONAL HOSPITAL, DAR-ES-SALAAM TANZANIA.

By

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A dissertation submitted in partial fulfilment of the requirements for the degree of Master of Medicine ( Obstetrics and Gynaecology) of Muhimbili University of health and Allied Sciences

Muhimbili University of health and Allied Sciences

October, 2007

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The undersigned certifies that he has read and hereby recommends for acceptance by the **Muhimbili University of health and Allied Sciences** a dissertation entitled**: Avoidable Perinatal Deaths as seen at Muhimbili National Hospital 2007**, in partial fulfilment of the requirements for the degree of Master of Medicine in Obstetrics and Gynaecology of Muhimbili University of health and Allied Sciences.

.....

DR KILEWO.C.D.S

(SUPERVISOR)

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## DEDICATION

To My Mother Margreth, whose prayers will ever hold me.

To my Father Simon who passed away 1997 who's sincere love natured and encouraged me throughout my education carrier.

My wife Dr. Neema, my Son Kevin and Daughters Irene, Dorine and Doris who missed me mostly when I was away working for my dissertation.

## ABSTRACT

In developing countries perinatal mortality is still very high and remains a challenge in the care of pregnant women. In a poor resource country like Tanzania knowing the avoidable causes of perinatal deaths can greatly have an impact on perinatal mortality and designing effective and measurable interventions with the available resources.

**Objective:** To determine factors contributing to avoidable perinatal deaths at Muhimbili National Hospital from 1st November 2006 to 31st January 2007.

**Methodology:** This was a cross sectional descriptive study.

All pregnant women admitted in the labour ward and eclampsia ward for delivery during the study period and had perinatal deaths of birth weight ≥1500gm were included in the study.

**RESULTS:** There were 2628 deliveries during the study period with 192 perinatal deaths. Among them 129 were stillbirths where by 80 were FSBs and 49 MSBs. There were 63 first week neonatal deaths. The Perinatal mortality rate was 73/1000 births. Stillbirth and early neonatal death rates were 49/1000 births and 24/1000 live births respectively. Twenty five babies had birth weights of <1500gm and were excluded from the study.

The median age of the study populstion was 26 ± 1.86, where 61.7% (103/...) had primary school education. Most of the women attended their antenatal care at health centre and dispensary level; 77% (129) and 18% (30) at hospital level while 8/..(5%) women did not attend at all. Suboptimal factors identified in 134 (80.2%) mothers who had perinatal deaths 36(21.5%) deaths were possibly avoidable while 57(34.1%) were likely avoidable. To 41(24.6%) mothers the suboptimal factors unlikely contributed to perinatal deaths. Pre-eclampsia/ eclampsia, severe anaemia, malaria,and HIV/AIDS were

the most common medical conditions observed in mothers who had perinatal deaths. Birth asphyxia and prematurity were the leading causes of deaths.

**Conclusion:** Pre-eclampsia/eclampsia, severe anemia, malaria, and HIV/AIDS were the common medical conditions that contributed to perinatal deaths.

Improving antenatal care at health centers and dispensaries levels and intrapartum care at MNH is essential in order to prevent avoidable perinatal deaths.

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## ABBREVIATIONS

| | |
|---|---|
| AIDS | - Acquired Immunodeficiency Syndrome. |
| END | - Early Neonatal Death |
| FSB | - Fresh Stillbirth. |
| MSB | - Macerated Stillbirth. |
| PM | - Perinatal Mortality |
| MNH | - Muhimbili National Hospital. |
| FHR | - Fetal heart rate. |
| WHO | - World Health Organization. |
| DM | - Diabetes Mellitus. |
| APH | - Ante partum hemorrhage. |
| HT | - Hypertension. |
| PPH | - Post partum hemorrhage. |
| ABD | - Assisted breech delivery. |
| SVD | - Spontaneous vaginal delivery. |
| C/S | - Caesarean section. |
| MUHAS | - Muhimbili University of Health and Allied Sciences |

# 1.0 INTRODUCTION AND LITERATURE REVIEW

## 1.1 INTRODUCTION

Perinatal mortality remains a challenge in the care of pregnant women worldwide particularly in developing countries including Tanzania and it is a devastating and painful experience for the mother[1]. Over the past 35 years several major improvements in health care have been achieved. Mortality among children aged under five was reduced in the world by half between 1960 and 1990 from 216 per 1000 live births to 107 per 1000 live births [2] but prenatal mortality has not followed the same trend.

WHO estimates the number of perinatal deaths worldwide to be greater than 7.6 million per annual, with 98% of these deaths occurring in developing countries[3].

Stillbirths account for over half of all perinatal deaths. One third of stillbirths takes place during delivery, and are largely avoidable. Intrapartum deaths are closely linked to place of delivery care.

Global estimates of intrapartum stillbirths and intrapartum related neonatal deaths account for almost 10% of deaths in children under 5 years however intrapartum stillbirths are a huge and invisible problem that is potentially avoidable[4].

In developing countries, just over 40% of deliveries occur in health facilities and lower than one in two take place with the assistance of a doctor, midwife or qualified nurse.[1]

Perinatal mortality result from poor maternal health, inadequate care during pregnancy, inappropriate management of complications during pregnancy and delivery, poor hygiene during delivery and the first critical hours after birth, and lack of newborn care. It also reflects the quality of obstetric and pediatric care available.

The causes of stillbirths and early neonatal deaths are closely linked and examining just one or the other can underestimate Muhimbili University of Health and Allied Sciences. the true level of mortality around delivery[5].

Stillbirths mostly result from problems that happen in utero during the antenatal period or during labor and delivery and they are grouped into pre-partum and intrapartum.

Pre-partum factors include chromosomal anomalies, chromosomal birth defects, non immune hydropsfetalis and infection (e.g. syphilis) and maternal medical conditions.
The reported incidences of major congenital malformation in stillbirth is highly variable and depend on whether postmortem was done, and if so, the experience and training of the person who did it[6].

Intrapartum factors involve birth asphyxia, obstructed labour, placenta abruption, poor monitoring of labour, cord accident, ruptured uterus, birth trauma, premature ruptured of membranes and choriamnionitis.The large proportion of deaths are potentially avoidable

(if the avoidable causes are known ). It is likely that a significant reduction can be achieved by minor improvements in the organization and quality of health care.

To address the problem of stillbirths and early neonatal deaths the avoidable factors contributing to perinatal deaths in developing countries must be understood.

Stillbirth preventability (avoidability) classification as adopted from the Alberta perinatal and neonatal statistics and maternal mortality annual report is classified as Non-preventable, possible preventable and ideal preventable[7].

Non-preventable death is where prenatal care and fetal surveillance were adequate and appropriate; also intervention was available, accessible, appropriate and timely, but circumstances surrounding the death were unpreventable.

Possible preventable death is where the compromise was not detected or not appreciated also there were inappropriate, inadequate or untimely intervention.

Ideally preventable death is when there is a sudden compromising event for the fetus or newborn where intervention was not possible in this occasion[7].

Placenta is an important organ for the growing fetus; it receives blood with nutritional materials from the mother. In case of any disruption, the fetus will be deprived of oxygen, nutrients and the end of it will result in fetal demise.

The cause of fetal death due to placental abnormality sometimes is associated with maternal medical conditions, for example placenta abruption is associated with hypertensive disorder in pregnancy in about half of the cases. Thus such cases could be classified as" maternal cause". Placental abruption is seen as an acute cause of the fetal death that most often is difficult to be prevented.

Clinically significant placenta and membrane infection rarely cause death in the absence of significant fetal infection.

Maternal factors include antiphospholipid antibodies disorders, hypertensive disorders, trauma, abnormal labour, maternal sepsis, acidosis, hypoxia and DM.

Antiphospholipid antibodies are associated with decidual vasculopathy, placenta insufficiency, placental infection, fetal growth restriction, recurrent abortions, and fetal death. Women with auto antibodies are therefore at increased risk for adverse pregnancy outcomes.[8]

## 1.2 LITERATURE REVIEW

Perinatal mortality is an essential measure of quality of obstetric care, health status and socio-economic development. The reported global total of stillbirth vary from 0.7 million to 1.6 million[9].

Population-based studies in various regions of Tanzania have shown perinatal mortality rates of 82/ 1000[10] and 68/1000 births[11] and half of them had low birth weight. Some perinatal and neonatal conditions are almost invariably fatal, whereas others are more easily managed.

Evaluating the gestational-specific risks of stillbirths and neonatal deaths from a study done in London (U.K), it was found that the rate of stillbirths at term (2.3 per 1000 total births) and post term (1.9 per 1000 total births) were similar. But when calculated per 1000 ongoing pregnancies, the rate of stillbirths increased six-folds from 0.35 per 1000 ongoing pregnancies at 37 weeks to 2.12 per 1000 births ongoing pregnancies at 43 weeks of gestational age. Neonatal mortality rate fell significantly with advancing gestation from 151.4 per 1000 live births at 28 weeks to 1.6 per 1000 live births at 43 weeks[13].

Perinatal mortality intervention and hospital perinatal mortality were analyzed in United Kingdom in which a higher intervention score and higher number of consultant

obstetricians' per1000 births were both independently and significantly resulted to lower stillbirths[14].

Influence of interpregnancy interval has been studied in Sweden in a comparison of interpregnancy interval between 13 and 35 months, very short interpregnancy intervals (0-3 months) were in the univariate analyses, associate with increased risk of stillbirth and early neonatal deaths. However after adjusting for maternal characteristics and previous reproductive history women with interval of 0-3 months were not at increased risks of stillbirths or early neonatal deaths compared to woman with interval of 72 months and longer [15].

A perinatal audit, comparing cases of perinatal deaths among children of African immigrants residing in Sweden, with stratified sample of among native Swedish mothers to test hypothesis that suboptimal care in perinatal services resulting in perinatal deaths were more common among immigrants mothers from the horn of Africa, when compared with Swedish mothers. It was observed that the rate of suboptimal factors likely to result in potentially avoidable deaths was significantly higher among African immigrants due to insight in socio-culture differences in pregnancy strategies, but also suboptimal performance of certain health centre routine in the Swedish perinatal syterm[16].

Kapoor and his colleagues in their study done in India to determine the perinatal deaths in urban slums of Lucknow found out that the stillbirth rate and PMR were 37.2 and 59.0 per 1000 respectively. The highest relative risk of stillbirth was due to poor obstetric

history followed by prematurity, low socioeconomic status and woman with inadequate prenatal care. The leading cause of death was birthasphyxia (42%) followed by prematurity (14.03) and infection (12.3%). It was therefore recommended that the reduction of the perinatal deaths will depend on registration of pregnant mothers, detection of high-risk cases and timely interventions[17].

On determining risk factors for perinatal asphyxia in a study conducted in India it was observed that prolonged second stage of labour, vaginal breech delivery, PIH, and fetal growth retardation contributed to increased risk for perinatal asphyxia .Amongst all stillbirths significant factors that contributed to asphyxia were prolonged second stage of labor and cord accidents [18]. It was therefore concluded that to avoid these deaths, there was need to strengthen intrapartum management and early identification of mothers with PIH or intrauterine growth retardation.

In southern Beirut, analysis of early neonatal deaths revealed that a larger proportion of deaths were among low birth weights in the range of 1000-2000g. [19] Furthermore it was revealed that a larger proportion of stillbirths occurred close to the time of delivery, while the smaller proportion consisted of macerated stillbirths indicating earlier death during gestation.

A study done to identify, classify and grade the avoidable factors into a prenatal audit if can be useful in identifying problem areas in south Africa was found that their problem

areas which were immediately remedial were identified as labour management-related problems, administrative problems in obtaining syphilis results and estimation of fetal weight. Others were lack of patients education, poor attendance to ANC and documentation[33].

Data from 44 countries with vital statistics registration were analyzed and the stillbirth rates ranged from five per 1000 births in rich countries to 32 per 1000 births in south Asia and sub-Sahara Africa. Therefore improving data on stillbirth is the first step towards making stillbirths count in public-health action [20]. This is because poor data keeping resulted to underestimation of the perinatal mortality in Asia.

In Argentina, Egypt, India, Peru, South Africa and Viet Nam the studies conducted to report stillbirths and early neonatal mortality and quantify the relative importance of primary causes of perinatal mortality, it was found that the stillbirth rate and early neonatal deaths were 12.5 per 1000 births and 9.0 per 1000 live births respectively.

The common primary obstetric causes of perinatal deaths were spontaneous preterm delivery and hypertensive disorders (28.7%) and (26.3%) respectively, and the most important cause of END death was birth asphyxia[21].

In a study designed to identify suboptimal care, intrapartum and term neonate deaths at the Omdurman hospital-Sudan, it was found that a large number of deaths were due to

poor antenatal care even sometimes at consultant level. The perinatal deaths were significantly more common in young mothers, grand multipareous mothers and with previous history of stillbirths and premature delivery. It was concluded that intrapartum and neonatal deaths of mature infants could be reduced by improving quality of care[22].

In a study done in Harare [23], it was found that the rate of stillbirths was high and was predominantly due to preterm births and to a lesser extent low birth weight. It was concluded that to avoid the high rate of stillbirths it would require a better understanding of the determinants of preterm births and strategies in addressing this particular subset of high risk births.

In another study done in Zimbabwe it was found that women who delivered stillbirths were less likely to have received prenatal care, and rural residence resulted in more women with risk of fetus dying in utero; and the risk of death decreased with increasing gestational age. In their study 21% of stillbirths were fresh[24].

In another study conducted in Kenya to identify and quantify risk factors for perinatal mortality in a Kenyan district hospital and assessing the proportion of perinatal deaths attributable to labour complications, maternal under nutrition, malaria, anaemia and HIV it was found that, the perinatal mortality rate was 118 per 1000 births. Complications of labour such as haemorrhage, premature rupture of membranes and obstructed labour increased the risk of death between 8- and 62-folds, and fifty three percent of all perinatal

deaths were attributable to labour complications however placental malaria and maternal HIV, on the other hand, were not associated with perinatal mortality[25].

Perinatal mortality rates for the five-years period in Tanzania between 1999-2004 were 42 deaths per 1000 pregnancies, and it was found that there were more perinatal deaths in urban than rural areas (56 and 38 per 1000 live births respectively). It also showed that Zanzibar had higher perinatal mortality rate than mainland Tanzania 56 and 41 per 1000 pregnancies respectively, where in Unguja there was higher perinatal mortality rate than Pemba[26].

In a population based study done from1989-1994 in rural northern Tanzania to determine and evaluate the causes of stillbirths and neonatal deaths, showed that there were 60 stillbirths and 49 early neonatal deaths. Infection-related deaths were most common (53), followed by asphyxia-related deaths (32) and pre-maturity-related deaths (20).

Twenty one deaths (15%) were probably avoidable and 13 (10%) were possibly avoidable[27].

In a three years study from 1999 to 2003 at MNH to categorise perinatal deaths as well as to identify key factors in perinatal care that could be improved, it was observed that PMR was 124/1000 births where by infants weighing 2500 or more contributed about 41% of the total perinatal deaths. Majority of early neonatal deaths among infants weighing 2500 or more had an Apgar score of less than 7 at 5 minutes[12].

On determining the magnitude and determinants of asphyxia neonatorum at Muhimbil Medical Centre, it was found that 218(5.6%) babies were born dead or had an Apgar score of 1 and almost died immediately[28].

Pregnancy associated with hypertension was analyzed at M.N.H. Patients with hypertension had a higher stillbirth rate, lower birth weight, higher prematurity rate and a higher maternal mortality [29]. These mothers were probably poorly managed during antenatal visits.

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## 2.0 STATEMENT OF THE PROBLEM AND RATIONALE OF THE STUDY

Perinatal mortality in Tanzania is still very high, 69 per 1000 births[1]. It is 124 per 1000 births at Muhimbili National Hospital[12].

Although some perinatal deaths are unavoidable, majority of perinatal deaths in developing countries are actually avoidable. Studies have shown that perinatal mortality in developing countries can be reduced by simple reorganization of the daily routines. Reorganization is one aspect but most important is to know the avoidable causes of perinatal deaths and timely interventions.

This study aimed at identifying suboptimal factors that cause avoidable perinatal deaths here at Muhimbili National Hospital so that effective and measurable interventions to reduce perinatal mortality can be put in place. Findings from this study will provide information which will form the basis for improvement of perinatal care at Muhimbili National Hospital. The findings may stimulate further research at community level.

## 3.0 OBJECTIVES

**3.1 Broad objectives:** To determine factors contributing to avoidable perinatal deaths at Muhimbili National Hospital.

**3.2 Specific objectives:**

1. To classify Perinatal deaths using simplified Wigglesworth's classification.
2. To determine the causes of avoidable perinatal deaths in babies weighing ≥ 1500gm.
3. To describe the level of delay of care for the women with avoidable perinatal deaths.
4. To determine the proportions of avoidable perinatal deaths

## 4.0 METHODOLOGY

**4.1 Study design;** Cross-sectional descriptive study.

### 4.2 Study area

The study was conducted at the labor ward, Muhimbili National Hospital (MNH) Dar es Salaam from 1st November 2006 to 31st January 2007. Muhimbili National Hospital is a tertiary care level and is the referral centre for district hospitals in Dares salaam and coastal region. The estimated population of Dar-es-Salaam city is 3 million people. Because of congestion in the district hospitals in Dar es Salaam and a poor function of the referral system many women with low risk pregnancies come to deliver at Muhimbili. In addition, it is a teaching hospital for the Muhimbili University College of Health Sciences of the University of Dar es Salaam.

Currently there is on going major renovation of the MNH including the maternity block, Therefore all delivery services are temporarily provided in another building with similar structure like that of maternity but the theatres are about 300 metres away and patients must be taken there by ambulance

The number of deliveries per month ranges from 600-900. There are three working shifts for nurses, each with six midwives, a tem of doctors; one intern doctor, one resident/registra, one specialist obstetrician, and one consultant obstetrician are on call every day. There is an admitting firm every day and this takes care of all women in the

labour ward and emergency admissions in admitting wards. Pregnant women are routinely examined in the admission room or in Eclampsia ward as they came for delivery or admission.

A detailed history is taken and more information is retrieved from the antenatal card records and transferred to the partogram.

On admission FHR is auscultated by fetoscope or Doppler machine.

There are two obstetric theatres one for emergency operations and this operates 24 hours. The second one is for elective obstetric and gynaecological operations. However in case of an emergency when theatre one is occupied the second theatre for an elective is normally used for emergency cases. After a normal vaginal delivery patients are observed in hospital for 6-12 hours before being discharged home. Babies delivered by C/S and those with Apgar score <7 at five minutes or having birth problems are admitted in the neonatal ward for care and treatment. This ward is just one floor above the labour ward. The length of stay in this unit depends on how fast the neonate improves from the morbidity he or she has suffered.

There are 5 doctors at the neonatal unity: one consultant neonatologist, two paediatricians and two registrars. There are five nurse midwives in each of the morning, afternoon and evening shifts. The ratio of nurse to neonates is 1:33 and on night shift there is one intern

doctor, a resident and a paediatrician on call every day. The unit also admits sick babies from other hospitals within Dar-es-Salaam. The bed capacity of MNH neonatal unity is 88, but normally 160-170 neonates are in the unit daily.

**4.3 Study duration**

The study was conducted for three months from 1st November 2006 to 31st January 2007.

**4.4 Study population:**

All pregnant women admitted in the labor ward and Eclampsia ward at Muhimbili National Hospital for delivery were eligible for recruitment if they gave birth to Stillbirths or their babies died within seven days after birth.

**4.5 Study Sample size estimate.**

$n=N z^2p (1-p)/ \quad d^2 (N-1) +z^2p (1-p)$

N=total population

P= prevalence of the condition of interest =12.4%

z= value corresponding to the 95% confidence level =1.96

d=absolute precision =5%

P=expected proportion in the population =12.4%

$$n= z^2p (p-1)/d^2 = \frac{3.842\times0.124\times0.877,}{0.0025}$$

**n** =167.

This was a minimum sample size which could be used for analyzing these data.

**4.6 Inclusion criteria:** All stillbirths and early neonatal deaths that weighed 1500gm and above delivered at MNH during the study period.

**4.7 Exclusion criteria:** 1 All admitted neonates from home.

2. Those who did not sign consent

**4.8 Training of the research assistants:**

Two nurse midwives were trained on the purpose of study, methods of interview and filling of the questionnaires. This was done through one-day training by the principal investigator

**4.9 Pilot study:** A pilot study was conducted to check understanding of the questions, recruiting procedure and collection of data before starting the actual data collection

**4.10: Recruitment**

Women who delivered stillbirths or who had early neonatal deaths were approached and after a discussion regarding the fetal outcome they were requested to join the study. Those who agreed were then recruited and interviewed. For this study detailed information was collected from mothers with perinatal deaths of weight ≥ 1500 gm. These are babies with high chance of survival in our environment. Their partograms were

reviewed to study labour progress, fetal well being and adequacy of management of labour and delivery as per identified risk factors behind every perinatal death.

Their antenatal period was reviewed using ANC cards and retrieved relevant risk factors identified and documented during antenatal visits which included interventions/ treatments given recorded. The gestational age was determined by LNMP and USS if was done. Where it was not possible clinical method such ballord score for newborn was used.

History of premature ruptures of membrane, cessation of fetal movement, duration of labour was noted. Any meconium stained liquor during labour, trend of fetal heart rate during labour were also noted from the partogram. Maternal medical problems and any treatment given were documented.

In case of caesarean section the interval between the decisions making for the operation to the time of performing caesarean section was documented. Any possible cause of delay was also documented.

All files of early neonatal deaths were reviewed by a team of neonatologists where I was privileged to participate. Date and time for delivery, time of admission and date of deaths were documented. Conditions of babies on admission and management were documented.

The clinical diagnosis cause of death was noted from the files. The principal investigator was doing daily supervision of data collection by reviewing the data collection forms and filled in the missing information before mothers were discharged from the hospital.

Simplified Wigglesworth's classification of perinatal deaths was used in this study to classify the perinatal deaths[29] .This method classifies perinatal deaths into five groups; Group1. Normally formed macerated stillbirths i.e. any macerated stillbirths except the one with severe congenital anomaly. Group 2 involves congenital malformations i.e. perinatal death associated with severe or lethal malformations e.g. anencephaly, hydrocephaly or congenital malformation of internal organs. Group 3 involves Conditions associated with prematurity i.e. babies borne before 37 weeks of gestation age, Group 4 includes asphyxia conditions that developed in labour and group 5 involves conditions specific to neonate e.g. infection, blood group incompatibilities, hypothermia and any specific neonatal conditions not included in the other groups.

It is used particularly in situations where investigation facilities are limited and autopsies are not routinely done .The classification helps to delineate major obstetrical or neonatal factors that contribute to perinatal deaths.

Suboptimal care classification was adopted from the Euro Natal study which classify cases in three levels of delay, 1 Community, 2.Infrastructure or Service organization and 3 is care. . The identified suboptimal factors were evaluated to find out whether contributed to foetal death and assessed to find out whether the deaths were avoidable. The term was referred to if the avoidability under the prevailing circumstances (e.g. health facilities, infrastructure, resources and routines), hence referring to the immediate actions taken or omitted by the persons involved. Unavoidable deaths may have been caused by either recognized or unrecognized conditions. Deaths were regarded as possibly 'avoidable' if there was a fair or good chance of survival if the danger signs had been recognized and correct steps had been taken at the appropriate time. The death was regarded as an unavoidable death if there was little or no chance that the baby would have survived, even if the correct decisions had been made in time. Due to the fact that there was no prepared panel of experts sitting together to evaluate these deaths, the filled questionnaires which had summaries of information both of antenatal and intrapartum care of the pregnancy and delivery of the Stillbirths and early neonatal deaths in the study were circulated among a team of experts (obstetricians, neonatologist and a nurse midwife. The experts individually and independently evaluated each form and gave their opinion whether a death was avoidable or not and the factors identified or sub optimal care contributing to the death. These experts used their experience in evaluating perinatal deaths. The principal researcher was privileged to save in this team of experts included five gynecologists, one senior pediatrician in neonatal unit and one senior nurse midwife

in the labour ward. The conclusion was reached when more than half of the members reached the same decision independently after going through the questionnaires.

**4.11: Data collections:**

A structured questionnaire was used for data collection. Questionnaire was structured in English. The interview was conducted by 2 nurses and principal researcher. Each questionnaire that was filled was counter-checked by principal researcher and any missing information was obtained before the woman was discharged from hospital.

**4.12 Data analysis.**

All questionnaires were coded and data entered into computer using EPI Info 6 software .data cleaning was done before data analysis by using SPSS software. Frequency distribution was used to summarize data.

**4.13 Ethical issue:**

The aim and benefits of the study were explained to all participants.

They were free to pull out of the study any time they wanted and that could not interfere with their treatment schedule. Those who were not ready to participate in the study were managed according to the hospital protocols.

A verbal consent was considered sufficient for one to be recruited.

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Women, who delivered stillbirth and those with early neonatal death, were counseled as per hospital protocol, informed about the possible causes and how to intervene in the next pregnancy. Follow up was made till discharge and those who needed psychologist support were accordingly handled.

**4.14 Ethical clearance:** Ethical clearance was granted by the MUHAS research and publication committee and permission to conduct the study was obtained from Muhimbili National Hospital.

**4.15 Limitations of the study**

Early discharge nursing mothers due to ward overcrowding especially of normal weight babies who were observed for 6-12 hours only post delivery. Any morbidity or mortality that occurred within one week outside the institution after discharge was missed.

**4.16 Definitions of terms:**

**Perinatal mortality** =birth of a dead fetus of at least 28 weeks of gestational age plus death of live born babies during the first seven days f life.

**Perinatal mortality rate:** =Number of stillbirths plus early neonatal deaths per1000 births.

**Stillbirth** = birth of a dead fetus at 22 weeks of gestational age weighing 500g or more by WHO criteria, at MNH stillbirths is the births of dead fetus at least 28 weeks of gestation age weighing 1000g or more

**Stillbirth rate**= Number of stillborn infants per 1000 infants born, including live births and stillbirths.

**Neonatal mortality rate**=Number of neonatal death per 1000 live births.

**END** = Death of live-born infant during the first 7 days after births

**Early neonatal period** = period from birth through to the first 7 days of life.

**Neonatal period** = period from birth through to 28 completed days of life.

**Avoidable deaths=** if there was a fair or good chance of survival if the danger signs had been recognized and correct steps had been taken at the appropriate time.

**Unavoidable deaths=** if there was little or no chance that the baby would have survived, even if the correct decisions had been made in time.

**Suboptimal care=** care that diverge the agreed standard of care.

## 5.0 RESULTS:

There were 2628 neonates born during the study period. Among them 129 were SBs where by 80 deaths were FSBs and 49 were MSBs. There were 63 early neonatal deaths. There were 192 perinatal deaths, 25(13%) babies had births weights of <1500 gm and were excluded from the analysis of avoidable perinatal deaths (Table 3).

The stillbirth, early neonatal deaths and perinatal mortality rates were 49/1000 births, 24/1000 live births and 73/1000 deliveries respectively. Out of the 167(87%) perinatal deaths of babies weighing ≥ 1500 gm, 158 were single ton, 7 resulted from twins and 2 resulted from triplets.

Among the 167 women who had perinatal deaths 79(47.6%) were admitted from home, 70(42.2%) were transferred in from district hospitals and 18(10.8%) were transferred in from MNH wards and ANC. Majority of the mothers 129(77%) had attended antenatal clinics at dispensaries and health centers, and only, 30(18%) had antenatal attendance at second level of care (District hospitals). Eight (5%) women did not attend antenatal clinic at all. Suboptimal care was identified in 134(80.2%) mothers where by in 36(21.5%) mothers the perinatal deaths were possibly avoidable, and in 57(34.1%) mothers the deaths were likely avoidable. To 41(24.6%) mothers, sub optimal care was unlikely to have contributed to perinatal deaths. In 33(20%) mothers no element of suboptimal care was observed.

Severe pre-eclampsia/eclampsia, severe anaemia, malaria, HIV/AIDS were the common medical conditions observed in mothers who delivered stillbirths and those who had early neonatal deaths.

**Table 1: Socio-demographic - reproductive characteristics of woman with perinatal mortality N=192**

| Variables | n | (%) |
|---|---|---|
| **Mother's age (years)** | | |
| 15-19 | 25 | (13.0) |
| 20-24 | 56 | (29.1) |
| 25-29 | 53 | (27.6) |
| 30-34 | 37 | (19.3) |
| 35-45 | 21 | ( 10.9) |
| **Parity on admission** | | |
| 0 | 63 | (32.8) |
| 1 | 34 | (17.7) |
| 2-4 | 76 | (39.6) |
| 5+ | 19 | ( 9.8) |
| **GA in weeks** | | |
| 28-30 | 31 | (16.1) |
| 31-33 | 29 | (15.1) |
| 34-36 | 54 | (28.1) |
| ≥37 | 78 | (40.6) |
| **Level of education** | | |
| No formal | 34 | (17.7) |
| Primary school | 118 | (61.5) |
| Secondary and above | 40 | (20.8) |
| **Marital status** | | |
| Single | 47 | (24.5) |
| Married | 131 | (68.2) |
| Divorced | 7 | (3.6) |
| Widowed | 7 | (3.6) |
| **Prenatal care** | | |
| 1-2 visits | 66 | ( 34.4) |
| 3 and above visits | 118 | (61.4) |
| Not at all | 8 | (4.1) |
| **Occupation** | | |
| Employed | 31 | (16.1) |
| Unemployed | 139 | (72.4) |
| Petty trader | 20 | (10.4) |
| Student | 2 | (1.0) |

The social-demographic and reproductive characteristics of the study population are summarized in table 1.

The mean age of women with Perinatal mortality was 26.186 ± 6.06 and the mean parity was 1.808 ± 1.885.

Majority of the mothers (68%) were married and had primary level of education (61%). Majority of the women had more than one antenatal visit; eight women did not attend ANC at all. Majority of perinatal deaths occurred at gestational age ≥34 weeks.

**Table 2: Distribution of perinatal mortality by weight. N=192**

| **Weights in** | **Total** | | **MSB** | | **FSB** | | **ENND** | |
|---|---|---|---|---|---|---|---|---|
| **grams** | **n** | **(%) of total** | **n** | **( %)** | **n** | **(%)** | **n** | **(%)** |
| 1000-1499 | 25 | (13.0) | 5 | (20%) | 8 | (32.0) | 12 | (48.0) |
| 1500-2499 | 79 | (41.1) | 25 | (56.8) | 32 | (44.4) | 22 | (43.0) |
| 2500-3499 | 65 | (33.9) | 16 | (36.4) | 26 | ( 36.1) | 23 | (45.0) |
| 3500 and above | 23 | (12.0) | 3 | (6.8% | 14 | (19.4) | 6 | (11.8.) |
| **Total** | **192** | | **49** | | **80** | | **63** | |

Many of the Perinatal deaths (45.9) had good birth weight ≥ 2500gm

**Table 3: Wigglesworth's classification of perinatal mortality, N=192**

| Groups | n | (%) |
|---|---|---|
| 1 Normally formed macerated stillbirths. | 49 | (25.5) |
| 2 Congenital malformations. | 4 | (2.1) |
| 3 conditions associated with prematurity. | 29 | (15.1) |
| 4 Asphyxia conditions developing in labour. | 92 | (47.9) |
| 5 Involve conditions specific to neonate. | 18 | (9.4) |
| **Total** | **192** | **(100)** |

The above table shows classification of perinatal mortality by simplified Wigglesworth's classification.

Majority of perinatal deaths occurred due to asphyxia developing during labour.

**Table 4: Distribution of SB and END by mode of delivery. (N=167 perinatal deaths)**

| Variables | Total | | MSB | | FSB | | ENND | |
|---|---|---|---|---|---|---|---|---|
| | n | (%) of total | n | (% ) | n | (%) | n | (%) |
| SVD | 105 | (100) | 34 | (32.4) | 42 | (40.0) | 29 | ( 27.6) |
| LSCS | 48 | (100) | 9 | (18.8) | 24 | (50.0) | 15 | (31.3) |
| LCVE | 8 | (100) | 0 | (0) | 4 | (50.0) | 4 | (50.0) |
| ABD | 6 | (100) | 1 | ( 16.7) | 2 | (33.3) | 3 | (50.0) |
| **Total** | **167** | | **44** | | **72** | | **51** | |

Table 4 shows mode of birth among the 167 perinatal deaths where by those with birth weights of less than 1500gm were excluded and included those with birth weight of 1500gm and above. Majority of the stillbirths and early neonatal deaths were born by spontaneous vaginal delivery. Among FSBs 24(33%) were delivered by c/s while among early neonatal deaths 15(29.4 %) were also delivered through c/s.

**Table 5: Frequency distribution of identified Obstetric and maternal medical conditions for mothers who had perinatal deaths. N=167**

| Obstetric and maternal medical condition | TOTAL | | MSB | | FSB | | END | |
|---|---|---|---|---|---|---|---|---|
| | n | (%) | n | (%) | n | (%) | n | (%) |
| Severe pre-eclampsia | 40 | (100) | 14 | (35.0) | 18 | (45.0 | 8 | (20.0) |
| Abruption placenta | 20 | (100) | 3 | (15) | 17 | (85.0) | - | (0) |
| Obstructed labour | 18 | (100) | - | (0) | 12 | (66.7) | 6 | (33.3) |
| Eclampsia | 16 | (100) | 4 | (26) | 5 | (31.3) | 7 | (38.9) |
| Severe anaemia | 16 | (100) | 4 | (25.0) | 9 | (56.3) | 3 | (18.8) |
| HIV/AIDS | 16 | (100) | 6 | (37.5) | 3 | (18.8) | 7 | (43.8) |
| Prematurity | 14 | (100) | - | (0) | - | (0) | 14 | (100) |
| Malaria | 10 | (100) | - | (0) | - | (0) | 4 | (40.0) |
| Ruptured uterus | 8 | (100) | 1 | (12.5) | 7 | (87.5) | | (0) |
| Chorioamnionitis | 6 | (100) | 2 | (33.3) | 4 | (66.7) | | (0) |
| Others | 3 | (100) | 1 | (33.3) | 1 | (33.3) | 1 | (33.3) |

Friquencies of obstetrics and maternal medical conditions for mothers who had perinatal deaths with births weight ≥1500gms are summarized in table5.

Severe pre-eclampsia and eclampsia, were the common medical condition observed to mothers who delivered stillbirths and those with END.

**Table 6a: Distribution of frequencies of avoidable factors reported pre-labour.N=167**

| Avoidable factors reported | Total | MSB | FSB | END |
|---|---|---|---|---|
| No birth plan for woman with known risk factor | 34 | 8 | 16 | 10 |
| Poor response to PROM by patient | 33 | 18 | 12 | 3 |
| No screening for syphilis at ANC | 19 | 9 | 7 | 3 |
| Inadequate follow up of decreased foetal kicks by mother, | 16 | 8 | 8 | – |
| Failure to use steroids for premature labour | 13 | – | 3 | 10 |
| Poor response to PROM by care provider | 11 | 6 | 2 | 3 |
| Never attended ANC | 8 | 1 | 4 | 3 |
| No sub optimal care identified | 33 | 12 | 15 | 6 |
| **Total** | **167** | **62** | **67** | **38** |

The frequencies of pre-labour avoidable factors identified to mothers with perinetal deaths of birth weight of ≥ 1500gms are summarized in table 6a.

Among mothers who had stillbirths or early neonatal deaths majority 134 were found to have pre-labour suboptimal care reported.

**Table 6b: Frequencies of Intrapartum and postnatal factors of suboptimal care. N= 167 with overlapping figures.**

| Intrapartum and postnatal factors | Total freq | MSB | FSB | END |
|---|---|---|---|---|
| No intrapartum foetal heart monitoring | 43 | - | 26 | 17 |
| Medical personnel under estimated foetal size (large for pelvis) | 28 | - | 19 | 9 |
| Delayed Operative intervention after decision | 24 | - | 20 | 4 |
| Delayed referral for tertiary care | 23 | - | 20 | 3 |
| Inadequate personnel or facility in labour ward and the neonatal unit. | 20 | - | - | 20 |
| Prolonged second stage with no intervention | 18 | - | 12 | 6 |
| Failures of patients seeking medical care during labour | 15 | - | 12 | 3 |
| Traumatic assisted delivery | 8 | - | 3 | 5 |
| **Total** | **179** | **-** | **112** | **67** |

Factor of suboptimal care observed during delivery (intrapartum) of mothers who had stillbirths and to the neonates deaths are summarized in table 6a, with overlapping figures i.e. some of the cases had more than one factor .

The leading avoidable factor reported during delivery (intrapartum) was absence of FHR monitoring.

**Table 7: Classification of level of suboptimal care to women with perinatal deaths.**

**N=167**

| Level of delay | Total | | SBM | | FSB | | ENND | |
|---|---|---|---|---|---|---|---|---|
| | n | ( % ) | n | (%) | n | (%) | n | (%) |
| 1.Maternal/social/Community | 45 | (100) | 16 | (35.6) | 23 | (51.1 | 6 | (13.3) |
| 2.Infrastructure/service of organization | 44 | (100) | 6 | (13.6) | 28 | (63.6) | 10 | (22.7) |
| 3.Care | 65 | (100) | 13 | (20.0) | 30 | (46.2) | 22 | (33.8) |

Different levels of suboptimal care to the mothers who had stillbirths and early neonatal deaths are shown in table 7 with overlapping figures.

Delay in care was the most serious problem during the study.

Only 3 women who had perinatal deaths had delayed in all three levels.

## 6.0 DISCUSSION

The study aimed at identifying suboptimal factors most likely contributing to avoidable perinatal deaths at Muhimbili National Hospital. The Euro Natal classification was used to classify levels of delay according to the relative contribution to avoidable perinatal deaths. Wigglesworth's classification of perinatal mortality was used to classify perinatal deaths. The classification was used as it fitted with the situation as at MNH where autopsy is not routinely done.

In Tanzania just over the 47 % of deliveries occurs in the health facilities and less than one in two takes place with assistance of doctor, midwife and qualified nurse[1]. The perinatal mortality is still high even at the secondary and tertiary level of care like Muhimbili National Hospital where there are more skilled attendants and facilities. The majority of these deaths are avoidable if the appropriate interventions were done at the right time .

The high mortality at MNH is possibly because MNH is the largest referral centre in Dar es Salaam (currently is National Hospital) and therefore would expect to have higher mortality rates than other hospitals because these hospitals refer their complicated cases late to Muhimbili national Hospital.

Currently there is ongoing renovation of the maternity Block therefore currently all services are temporally provided at another Block. C/s are performed at a distant place where ambulance is needed to transfer patients from labour ward to theater.

The reported high perinatal mortality in this study is an underestimate due to short hospital observation time particularly for neonates without obvious problems. Normally after delivery mothers and the neonates are observed in the postnatal ward for six to twelve hours then are discharged home if there are no maternal or neonate problems. Thus these babies could die at home or any other hospital during the neonatal period without notification. Readmitted babies were also not included in this study.

The three district hospitals in Dar-es-Salaam (Amana, Mwananyamala and Temeke) have upgraded their delivery facilities since 2001 but they are still small and do not always provide 24 hours operative services and hence some of the women are transferred to MNH, sometimes late and increase the number of complicated deliveries at MNH.

Perinatal mortality in this study was 73 per 1000 births; it is smaller than the figure of 124 per 1000 births reported from another study[12]. However another small community based study in northern Tanzania has reported a lower figure of 68 per 1000 biths.[11]

Among the 167 women studied suboptimal care was provided to these mothers during ANC visits and delivery and therefore contributed to high perinatal mortality where by 36 deaths were possibly avoidable and 57 were likely avoidable. It showed that these deaths were avoidable under the prevailing circumstances given existing disease pattern,

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health facilities, infrastructure and routines hence referring to immediate action or omitted by the person involved[24].

Among the 167 mothers with perinatal deaths majority were unemployed and eight did not attend ANC at all and the reasons were unknown. In low resource countries perinatal care is extremely important and even if only one attendance remain important factor in obstetric care [25]. Further reduction of periantal mortality may be possible by focusing medical services to woman of Low Socio-economic status [16].

In this study 54.1% neonates weighed less than 2500gm (table 2) and 15.1% were pre-term births (table 3). It shows that low birth weight due to premature births increase the risk for perinatal death. Improving quality of care of pregnant women, intrapartum care and critical 24 hours post birth of neonate will reduce perinatal deaths among infants with low birth weight.

In this study neonate weighing 2500gm or more contributed to about 45.9% to the total perinatal deaths with majority of deaths resulting from labour-related complications mostly birth asphyxia.

Despite of high C/S at MNH during the study period it did not save babies whose indications for C/S were for them. This was due to delaying in referring patients to MNH

care from district hospitals, unavailability of ambulance and lack of theater space at MNH.

The leading maternal medical conditions contributing to perinatal deaths were severe, pre-eclampsia, followed by Eclampsia, anaemia, and infections; the leading infections were HIV/AIDS, malaria and chorioamnionitis. These were inadequately managed at ANC which contributed to high perinatal mortality rate.

Improvement of antenatal care and special attention to common diseases like hypertension, pre-eclampsia anemia and infections is needed to avoid the avoidable perinatal deaths.

HIV/AIDS classically doesn't cause perinatal death but it is a risk factor. therefore education to pregnant mother about HIV/AIDS preventions and encouraging voluntary counseling and testing and use available of antiretroviral drugs will reduce the risk of mother to child transmission of HIV/AIDS and hence to same extent will reduce perinatal mortality among HIV/ADS infected mothers.

Obstetric conditions that contributed to perinatal deaths during the study period were obstructed labour, ruptured uterus and abruption placenta. The cases of ruptured uterus resulted from delayed referral to MNH and delayed operative intervention after the

decision at MNH. Reasons for delay to refer patients to tertiary care were unknown while delay operative interventions were due to lack of ambulance and theatre space at MNH. These deaths were avoidable if one could identify the mothers with risks factors and plan time and mode of delivery and improve quality of intrapartum care and facilities at MNH.

Abruption placenta was not possible to detect as the circumstances where the deaths occurred were not possible to identify and intervene.

The perinatal deaths following maternal medical and obstetric conditions were high during the study period compared to these observed in developed countries. The difference suggests that improvement in health system performance particularly in prevention and treatment of obstetric and neonatal complications should be important in order to reduce perinatal deaths in developing countries even in populations with access to secondary level of care like Dar es Salaam municipal hospitals and tertiary level of care like Muhimbili National Hospital.

Maternal anaemia and malaria were observed in current study with slight high PM. The supplementation of every pregnant woman with ferrous sulphate has shown decreased risks of anaemia in pregnancy.

Malaria in pregnancy is generally accepted to increase the risk of low birth weight and maternal anaemia. This is a highly endemic area for malaria especially P. *falciparum.*

This can be managed by making sure that every pregnant woman receives prophylaxis for malaria and encouraging pregnant women to use mosquito nets in order to reduce malaria in pregnancy hence to some extent to decrease perinatal deaths.

During the study period factors related to suboptimal care were observed in women who delivered stillbirths and those who had early neonatal deaths. In 134 mothers with avoidable perinatal deaths, pre-labour factors like poor response to PROM by the patient or health care worker, absence of screening for syphilis during ANC visit and absence of plan for delivery women in with recognized risk factors. During labour there was lack of itrapartum FHR monitoring, delay referral and decision making. Therefore education to all pregnant women about danger signs, earlier detection of danger signs by health care personnel and taking appropriate action will therefore reduce theses avoidable deaths.

The number of women deliveries at MNH is high and majority of these deliveries are normal cases which could deliver at primary or secondary level giving room for few hospital workers to deal with high risk mothers therefore close following up of mothers is impossible.

Current study showed that health care providers were responsible for more 65(38.9%) of the avoidable perinatal deaths(table 7) thus included both inadequate care of pregnant mothers, failure to identify women who had risk factors and knowing their limitations to cases that could not be handled at their levels and refer them earlier to MNH. The results

were not comparable to community based study in rural northern of Tanzania where by health workers contributed to more than half of cases [25]. Therefore there is a need to improve ANC care and consultation at dispensaries and health centers since majority of pregnant mothers had their antenatal visits at health centre and at dispensary levels (table 1). These areas need to be revisited to know the staffing and qualifications of their health care providers as they are the base and taking care of majority of pregnant women and training more healthcare providers in order to improve quality care provided by these centers.

The use of partograms was a problem observed in this study. It was observed from peripheral to MNH that the partograms were poorly used or not used at all. For most of pregnant mothers who delivered by c/s after the decision for caesarean section was made to operative delivery there were no FRH monitored and resulted to higher number FSB. Routine fetal heart monitoring to delivery could have saved the lives of most of these babies. The need to improve obstetric care at MNH and proper use of partograms is important in order to reduce avoidable perinatal deaths and avoiding unnecessary C/S to mothers who had FSB and with reason for operation was of fetal indication.

Neonatal unit at MNH need to be improved by employing more nurses since the ratio of one nurse to neonates is 1:33 in actual sense it is not possible to take care of them. Decongestion of neonatal unit at MNH is important as the numbers of neonates in the unit not corresponding to the available facilities. This can be done by expanding this unit at MNH together with establishing the neonatal units at the three municipal hospitals and

supply to these hospitals with enough facilities which have been their main reason for referring their pregnant mothers to MNH, by doing so will in reduce perinatal mortality at Muhimbili National Hospital.

In the absence pre-existing criteria to judge quality of care, the judgment was therefore on the basis of experts experience and this could increase bias to the study.

Early discharges due to ward overcrowding especially of normal weight babies who were observed for 6-12 hours post delivery, mortality that occurred within one week outside the institution after discharge was missed these could limit the study.

## 7.0 Conclusions and recommendations

Pre-eclampsia/eclampsia, severe anemia, malaria, and HIV/AIDS were the common medical conditions that contributed to perinatal deaths. These were inadequately managed therefore contributing greatly to stillbirths and early neonatal deaths.

Prevention and adequate treatment is of great important towards the reduction of perinatal mortality.

Improving antenatal care at health centers and dispensaries levels and intrapartum care at MNH is essential in order to prevent avoidable perinatal deaths.

Future efforts should be directed towards strengthening health centers and dispensaries and improving the referral systems for high risk patients.

The existing staffs need a refresher course on use of partogram as instrument used in intrapartum monitoring during labour and delivery.

The government should establish neonatal units to all three municipal hospitals and employ more workers at MNH neonatal units to improve care of the sick neonates.

There is a need to establish criteria based audit of cases of perinatal mortality instead of method used in this study.

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## 9.0 APPENDIXES

**Muhimbili national hospital perinatal mortality form**

**S. No. .....**

1. Hosp.No.: .....

2. Age: ..... .....

3. Parity.....

4. Delivery no: .....

5. Date of admission.....

6. Time of admission (Hours).....

7. Date of delivery.....

8. Time of delivery (Hours).....

9. Marital status: 1. Single
   2. Married
   3. Divorced
   4. Widowed

10. Source of admission: 1.Home
    2. Hospital transfer
    3. Antenatal clinic or ward (MNH)

11. Level of education: 1. No formal education.
    2. Primary school.
    3. Secondary school and above.

12. Occupations

    1. Employed
    2. Unemployed
    3. Petty trader
    4. Peasant
    5. Student

13. Is there antenatal card present?

    1. Yes  2.No

14. If yes fill the following

    1. Gestational age at booking ..... 99=NA
    2. Last visit blood pressure ..... 88= Not checked
    3. Last visit hemoglobin .....88= Not checked

15. Attendance of antenatal clinic .....times.

16. Gestational age (weeks) by LNMP.....

17. Where mostly attended her ANC visits: 1.Hospital
    2. Health centre (HC)
    3. Dispensary
    4. Private
    5. Others

18. Risk factor detected during ANC  1.Yes  2.No

19. If yes was she aware of the problem  1.Yes  2.No  99 =NA

20. Was there risk factor detected by health provider on admission? 1. Yes 2No

21. If yes was there action taken 1.Yes 2.No 99=NA

22. Maternal illnesses

1. Antepartum haemorrhage 1 2
2. Pre-Eclampsia 1 2
3. Eclampsia 1 2
4. Severe Anaemia 1 2
5. Severe malaria 1 2
6. HIV/AIDS 1 2
7. Diabetes Mellitus 1 2
8. Others-specify .....

23. Foetal heart sounds on admission at M.N.H: 1.present 2 absent.

24. If yes 1.Regular 2. Irregular 99=NA

25. Last foetal heart sound record: 1. hrs____, min.: ... before birth. 99 NA

26. Monitoring of foetal heart sounds: 1.Yes 2. No. 99 =NA

27. How frequently in hours .....hrs. 99=NA

28. Induction of labour 1.Yes 2. No

29. If yes 1. Oxytocin 2.Misoprostol 3.99

30. Mode of delivery 1. SVD

2. Elective C/S
3. Emergence C/S
4. ABD
5. LCVE

31. Number of foetus delivered.....

32. Dilatation of cervix at decision of C/S (centimeters) ..... 99 =NA

33. Indication for C/S2..... 99 =NA

34. Interval between decision for C/S and operation .....hrs 99=NA

35. Cause of delay for C/S; 1.Lack of theatre space 1 2

2. Ambulance unavailable 1 2

3. Lack of doctor 1 2

4. Unknown 1 2

36. Amniotic fluids: 1.Normal

2. Meconiums stained

3. Blood staining

37. Was parthogram used? 1. Yes

2. No

38. Was the action line crossed? 1. Yes

2. No 99=NA

39. Action taken after action line crossed..... 99=NA.

40. Birth weight in grams.....

41. Birth Attendant: 1.Dr. 2. Nurse 3.Trainee Dr. 4. Nurse)

42. Fetal Sex: 1. M 2. F

43. Apgar 1min.....at5min .....,

44. Resuscitation done: 1.Yes 2.No. 99=NA

45. If yes what: 1. Bag and mask ventilation 1 2

2. Chest compression 1 2

3. Endotrachea intubation 1 2

46. Perinatal deaths: 1.MSB

2. before admission FSB.

3. after admission at M.N.H FSB

4. ENND

47. Any congenital malformations1.Yes (explain.....) 2. No

48. If ENND – Day of death ($1^{st}$ $2^{nd}$ $3^{rd}$ $4^{th}$ $5^{th}$ $6^{th}$ $7^{th}$); (in hours _____ if on $1^{st}$ day).

49. Previous history of stillbirth or early neonatal death 1. Yes 2. No 99=NA

50. Causes of intrapartum death: 1. severe birth asphyxia 1 2

2. Ruptured uterus 1 2

3. Traumatic breech delivery 1 2

4. Cord prolapsed 1 2

5. Abruption placenta 1 2

6. Maternal hemorrhage other than abruption placenta 1 2

7. Infections (e.g. Chorioamniotis) 1 2

8. Unknown causes 1 2

9. Other (Specify) .....

51. Causes of early neonatal death:

| | | |
|---|---|---|
| 1. HIE/birth asphyxia | 1 | 2 |
| 2. RDS | 1 | 2 |
| 3. Meconium aspiration syndrome | 1 | 2 |
| 4. Septicemia | 1 | 2 |
| 5. Prematurity | 1 | 2 |
| 6. Meningitis | 1 | 2 |
| 7. Malaria | 1 | 2 |
| 8. Congenital abnormalities | 1 | 2 |
| 9. Tetanus | 1 | 2 |
| 10. Severe jaundice | 1 | 2 |
| 11. Sudden death | 1 | 2 |
| 12. Head injury during delivery | 1 | 2 |
| 13. Ulack of resuscitating facilities | 1 | 2 |
| 14. Unknown | | |

52. Avoidable factors reported pre:

| | | |
|---|---|---|
| 1. Poor response to PROM patient | 1 | 2 |
| 2. Poor response to PROM care provider | 1 | 2 |
| 3. Never attended ANC | 1 | 2 |
| 4. Failure to use steroids for premature labour | 1 | 2 |
| 5. in adequate follow up of decreased foetal kicks | 1 | 2 |
| 6. No screening for syphilis at ANC | 1 | 2 |

7. Attempted termination of pregnancy 1 2

8. Patients decline admission/treatments 1 2

9. No plane for delivery inspite of known risk factor 1 2

10. Others specify .....

53. Avoidable intrapartum factors:

1. Lack of intrapartum foetal heart monitoring 1 2

2. Traumatic assisted delivery 1 2

3. Failure responds to haemorrhage 1 2

4. Lack of hospital equipment/facility 1 2

5. Inadequate staffing 1 2

5. Delayed referral for tertiary care 1 2

7. Delayed hospital transfer due to lack of transport 1 2

8. Delayed Operative intervention after decision 1 2

9. Failures of patients seeking medical care during labour 1 2

10. Prolonged second stage with no intervention 1 2

11. Medical personnel under estimated foetal size (large for pelvis) 1 2

12. Medical personnel under estimated foetal size (very small baby) 1 2

54. Avoidable neonatal factors reported:

1. Lack of oxygen 1 2

2. Inadequate personnel or facility in the neonatal unit. 1 2

3. Lack of antibiotic. 1 2

**Classification of suboptimal factor**

| | | | |
|---|---|---|---|
| 55. Level of delay | 1. Maternal/social community level | 1 | 2 |
| | 2. infrastructure/service organization | 1 | 2 |
| | 3. Care | 1 | 2 |

56. Suboptimal factor their contribution to fetal death 1.unlikely

2. Possibly

3. Likely

Perinatal deaths=stillbirths +early neonatal deaths

SBF=stillbirths fresh (intrapartum deaths)

SBM =stillbirths macerated

C/s caesarean section

Elective caesarean section- done before labour onset

Emergency caesarean section = c/s done on urgent circumstances to serve baby or the mother because of an emerging complication.

ENND=early neonatal deaths

PROM –premature rapture of membranes

RDS respiratory distress syndrome

HIE-Hypoxic Ischemic Encephalopathy

SVD –spontaneous Vertex delivery

ABD assisted breech delivery

PIH pregnancy induced hypertension

Poor response to PROM patient -patient failure immediately to report to health care facility after premature rapture of membranes

Poor respond to PROM doctor –doctor failure to manage patient with PROM according to hospital protocol

Prolonged second stage of labour- extending second stage to more or equal to one hour without intervention

88=stands for not checked (e.g. Blood pressure, HB) 99= NA/NOT APPLICABLE

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