BINDURA UNIVERSITY OF SCIENCE EDUCATION

SURVIVAL ANALYSIS OF PRETERM AND SEVERE BIRTH ASPHYXIA INFANTS. A CASE OF BINDURA PROVINCIAL HOSPITAL.

A dissertation submitted in partial fulfillment of the

Requirements for the Bachelor of Science honors degree in Statistics and Financial Mathematics

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APPROVAL FORM

This is to certify, that this research project is the result of my own research work and has not been copied or extracted from past sources without acknowledgement. I hereby declare that no part of it has been presented for another degree in this University or elsewhere.

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DEDICATION

This thesis is dedicated to my family for their support and encouragement. I dedicate this thesis to you guys (Tafara, Marvelous Chomunorwira and our two kids, Ebenezer and Hillary).

ABSTRACT

Prematurity is the major cause of neonatal death world-wide. In Zimbabwe, the neonatal mortality has increased dramatically from 19 deaths per 1000 live births in 2020 to 30 deaths per 1000 live birth in 2021. The main objective of this study was to determine the survival rate of preterm and birth asphyxia infants admitted at Bindura Provincial Hospital. The study also aimed at assessing the risk factors associated with death of these infants. In this study, primary data from January-December 2021 obtained from the Neonatal Unit about premature infants and birth asphyxia was used to determine the survival rate as well as to determine the risk factors associated with infants' deaths. The study was a hospital-based cross-sectional retrospective chart review analysis where data for all preterm infants admitted and discharged at Bindura Provincial Hospital Neonatal Unit from 1st January 2021 to 31st December 2021 was extracted from files and analysed. The Statistical Package for Social Sciences (SPSS), was used to analyse the data and Kaplan Meier survival estimator was used to estimate the survival rate of preterm and birth asphyxia infants. A total of 930 available files for infants admitted at Bindura Provincial Hospital – Neonatal Unit (NNU) were analysed. Overall, a high survival rate was observed (89.4% survived) and a low death rate was observed (10.6% died). Low survival rates were observed for infants with high fetal ages, that is birth asphyxia full term infants and also for those infants with moderate birth weight The survival rate of preterm and birth asphyxia infants in our study was high (89.4%), similar to the findings from comparable studies in other resource-limited settings. Findings from this study have identified respiratory distress syndrome, severe prematurity, low birth weight, and severe birth asphyxia as the main causes of death of preterm and birth asphyxia infants. Findings have also found that "the higher the fetal age coupled with lower birth weight, the lower the chance of new-born infants to survive".

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LIST OF ACRONYMS

Amik	Amikacin
Amp	Ampicillin
BBA	Born Before Arrive
BW	Birth Weight
CPAP	Continuous Positive Airway Pressure
C-section	Caesarian section
ELBW	Extremely Low Birth Weight
EPI	Expanded Programmed on Immunization
GA	Gestational Age
Gent	Gentamycin
HIV	Human Immunodeficiency Virus
KM	Kaplan Meier
KMC	Kangaroo Mother Care
LBW	Low Birth Weight
LMIC	Low Middle Income Countries
MDG	Millennium Development Goal
MoHCC	Ministry of Health Child and Care
NEC	Necrotizing Enter colitis
NNU	Neonatal Unit

NIDCAP	Newborn Individualized Developmental Care and assessment Program
NIVT	Non-Invasive Ventilation Techniques
NVD	Normal Vaginal Delivery
Pen G	Penicillin G
RDS	Respiratory Distress Syndrome
RPR	Rapid Plasma Regain
Sig.	Significance value
SLBW	Severe Low Birth weight
SPSS	Statistical Package for Social Science
TJ	Total Jaundice
VLBW	Very Low Birth Weight
BPH	Bindura Provincial Hospital
WHO	World Health Organization

DEFINITION OF KEY CONCEPTS

***Birth weight*:** The birth weight of a newborn is the first weight recorded after birth, preferably measured within the first hours after birth, before considerable postnatal weight loss has occurred (Brighton Collaboration Low Birth Weight Working Group (2017).

***Complications*:** a circumstance that complicates something. In this study complications that are linked to high neonatal deaths are obstructed labor, fetal distress, prolonged labor, hemorrhage, pre-eclampsia, eclampsia, shoulder dystocia or malpresentation.

***Treatment*:** Any compound used in the management, cure, and prevention of disease or other irregular condition. For the purposes of this study, treatment refer to required antibiotics, phototherapy, CPAP, oxygen and ventilation that should be given to neonate during resuscitation.

***Early neonatal death*:** The death of neonate occurring during the first 7 days of life (Kidanto, 2019).

***Fetal age*:** indicates the duration of pregnancy, dated from the first day of the last menstrual period

***Late neonatal death*:** Death of a neonate occurring after 7 days of life but before 28 completed days of life (Kidanto, 2019).

***Neonatal death*:** Death of a neonate that was born alive, during the first 28 concluded days of life (Kidanto, 2019).

***Survival rate*:** defined as the number of premature and critically sick new-born babies that survived 28 days of their life or discharged from NNU.

Neonatal resuscitation: A set of interventions at the time of birth to maintain the initiation of breathing and circulation of the neonate

***Unavoidable factors*:** Those factors that could not be avoided by any means of treatment or available care at the time. In this study unavoidable factors are associated with severe birth asphyxia.

CHAPTER ONE: INTRODUCTION

1.0 Background of the study

The World Health Organization (WHO) uses a variety of health indicators to assess a country's progress with regard to its inhabitants' health, one of which is the mortality rate for children under the age of five (UNICEF,2016). Almost nine million infants worldwide die during the perinatal and neonatal periods (WHO, 2022). In developing countries, 98% of such fatalities (preterm and birth asphyxia infants) take place (Hoque, Haaq & Islam, 2018). Death rate makes up between 40 and 70 percent of morbidity (Shahidullah, et al., 2017). Compared to newborn infants and under 5-year-old fatality rates, the perinatal death rate is dropping more slowly. The majority of perinatal deaths in underdeveloped countries occur during the first seven days of life, with about 50% occurring during pregnancy or delivery (Hoque, Haaq & Islam, 2018).

Africa has progressed in reducing the death of infants. Despite MDG, infant deaths remain unchanged. The Ministry of Health and Child Care in Zimbabwe is teaching nurses how to prevent babies from dying in special meetings and lessons. Infant deaths are increasing. Mdala & Mash (2015) found that reducing deaths in children under 5 in Zimbabwe could be achieved by upgrading nurseries to level II, implementing Kangaroo Mother Care, providing essential equipment, and using Continuous Positive Airway Pressure.

Birth injury and asphyxia are major causes of death in underdeveloped countries. Buchman (2014) found that disregarding signs of fetal distress during birth led to many neonatal deaths in sub-Saharan Africa. Liu, et al. (2014) found that most infant deaths result from health worker-related factors. Prematurity is a top cause of infant mortality. The survival rate of preterm and birth asphyxia babies is linked to their fetal age and birth weight, with a higher risk for those born earlier or smaller (Ibrahimov, Kodali, & Salihu, 2015). No study in Zimbabwe on the survival rate of preterm and birth asphyxia infants. This study focuses on the survival rate of such infants at BPH NNU from January 1-December 31, 2021.

1.1 Problem statement

The Ministry of Health and Child Care (MoHCC) typically shares information through publications and conferences on the mortality and morbidity of new-born babies. However, very little or no data concerning the survival rate of the preterm and birth asphyxia infants in state hospitals across Republic of Zimbabwe is accessible because there is not much literature on it. In 2014, the MoHCC's Demographic and Health Survey DHS report showed a mortality rate of 20 per 1,000 live births, matching the post-neonatal rate of 19 per 1,000. Additionally, morbidity affected 39 and 54 out of 1,000 live births in the under-5 group. 1 out of 26 infants in Zimbabwe die before age one, while 1 out of 19 do not reach age five. Study will explore risk factors and survival rates for preterm and birth asphyxia infants at BHH neonatal unit.

1.2 Objectives of the study

The primary objective of the current study was to investigate the survival rate of premature and asphyxiated neonates and to evaluate the potential risk factors associated with their mortality within the neonatal unit at BPH, Zimbabwe, during the period spanning from the 1st of January to the 31st of December in 2021.

1.2.1 Specific objectives

1. To analyze the admission and treatment statistics concerning neonates in the BPH NNU based on their viability at birth, gender, method of delivery, and survival rate.
2. To analyze the association between fetal age and birth weight and their impact on the survival rate of neonates admitted at BPH Neonatal Unit.
3. To analyze how medical interventions for neonates in the BPH neonatal unit affect infant survival rates.;
4. To analyze how medical and unsupportive factors impact neonatal survival rates.

1.3 Research questions

This study's focus was on the respondents to the analytical questions that followed:

1. How many neonates were hospitalized, treated, and eventually discharged from the BPH NNU based on their life status at birth, gender, and method of delivery?
2. What is the relationship between fetal age and birth weight with the survival rate of neonates admitted at the BPH NNU?
3. What is the effect of medical interventions administered to both mothers and infants on the rate of survival of premature and birth asphyxia neonates admitted at the BPH NNU?
4. What are the medical, social, and specialty-specific risk factors associated with the suboptimal neonatal survival rates?

1.4 Significance of the study

The investigation can help BPH follow guidelines for birth weight and fetal age, improving neonatal survival in its unit. It could also serve as an educational tool for managing premature or asphyxiated neonates. This study could improve understanding of preterm delivery and birth asphyxia factors, assess treatment efficacy, track care trends, determine expenses, and gauge healthcare utilization.

To the researcher: this study is significant because it serves as management tool for the service which the researcher offers to Bindura Provincial Hospital. The study is important to the researcher since the researcher is passionate about comprehending statistical modeling methodology and analyzing longitudinal data in the healthcare industry. The study is important to the researcher since it offers a great chance to pick up new abilities and raises the bar for academic achievement in analytical programs and beyond. The present investigation has the potential to enrich the existing knowledge base and bestow a level of academic accreditation upon the researcher.

This report is important to Bindura University of Science Education since it offers a unique yet proficient method of data analysis on hospitals. This study also helps to define a university's "brand" in the national and international market place, impacting everything from students' recruitment to faculty retention, to attract new investments.

1.5 Scope of research

This study analyzed survival rates based on fetal age and birth weight from Jan-Dec 2021. Results were depicted via a survival analysis graph. Results were used to determine the health status of premature and underweight newborns treated at BPH's neonatal unit. Only public hospitals in Bindura District were studied. Determining fetal age can be limited when patients cannot specify the time of conception or their last period. This ambiguity may cause researchers to focus more on birth weight analysis than fetal age analysis. Low birth weight cannot serve as a reliable indicator of fetal age or certain pathologies due to its distinct cause of immaturity. Pathologies such as placental insufficiency, exposure to retroviral illness, sepsis, and socio-demographic factors complicate its reliability.

1.6 Limitations

A small range of women who reportedly received dexamethasone (7.2%) could also be due to poor recordkeeping, which will be a limiting issue since under coverage will not offer you a real image of what was happening, that may have affected the analysis as a result of the choice within the records is unknown.

There is no existing analysis on the survival of preterm and birth asphyxia infants within the BPH Neonatal unit in Zimbabwe. The analysis problem was developed supported by the researcher's observations and a literature review consisting of studies wiped out different components of the globe. Additional analysis on the survival of preterm and severe birth asphyxia infants in the neonatal unit needs to be done in Zimbabwe to produce additional native information. The information for the study was collected from the public neonatal unit in Bindura Provincial Hospital. Though most women in Bindura deliver in public hospitals

there's still a desire to conduct a study that may capture participants from each public, non-public, and personal hospitals in Bindura District as a result of there's an opening that the survival rate of preterm and birth asphyxia infants at private hospitals may be completely different from those that deliver in public hospitals. The other limitation is that it had been tough for the researcher to search out the files as a result most of the files were kept in boxes in very little space with no ventilation. Only one employee operates there, and this makes it tough or not possible to retrieve the files if she is not around.

1.7 Chapter Conclusion

This chapter outlined the background and purpose of the search. The study sought to analyse the survival rate of preterm and severe birth asphyxia infants admitted at Bindura Provincial Hospital. This chapter include back ground to the study statement of the problem, objectives of the study, research question, significance of study, scope of research and limitations.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

In the previous chapter, we explored the background of the investigation, pinpointed the research issue, and established the intended goals and objectives of the study. The present section expounds on the pertinent literature review concerning extant data, which pertains to the topic currently under investigation. De Voss, Strydom, Fouche, and Delport (2011) posited that a literature review encompasses a rigorous process of locating, perusing, comprehending, and consolidating published research and conceptual frameworks pertaining to a particular subject matter.

2.2 Global overview of neonatal survival rate

According to the definition given by the World Health Organization in 2016, preterm birth refers to any delivery that occurs before 37 weeks of gestation or less than 259 days from the first day of a woman's last menstrual cycle. According to the research conducted by Quinn and colleagues (2016), roughly 15 million babies worldwide are born prematurely, which has a significant impact on low- and middle-income nations. It plays a significant role in causing around one million deaths of newborns each year and is also a significant factor in causing illness in children. Through the utilization of the gestational age of the fetus, preterm birth can be more narrowly categorized as either extremely premature (less than 28 weeks), very premature (28 to less than 32 weeks), or moderate or late premature (32 to less than 37 completed weeks). The research highlights the methods for classifying premature births based on calculating the fetal age in weeks, which can exhibit significant variation.

In addition, they stressed the significance of evaluating the survival rate of premature babies through the fetal age measurement, and by documenting both stillborn and live-born infants to enhance comparison by determining their fetal age and birth weight. Blencowe et al. (2013) stated that the probability of an infant's survival decreases as the age of the fetus decreases. The research findings suggest that the elevated rates of preterm births in sub-Saharan Africa and South Asia can be attributed to their high fertility rates and the significant number of births in these regions.

The study conducted by Abdo et al. and published in BMC Pregnancy and Childbirth (2019) found that birth asphyxia is a significant factor in causing neonatal death across the globe. Birth asphyxia continues to be a serious issue in Ethiopia, resulting in high rates of both death and illness. It significantly contributes to global neonatal mortality, accounting for 24% of all neonatal fatalities and 11% of deaths in children under the age of 5. Almost the entirety of fatalities caused by asphyxia (98%) transpires within the initial seven days of infancy. Approximately 75% of these fatalities transpire within the initial day, whereas less than 2% occur beyond 72 hours postnatal. The research also indicated that brain damage is frequently caused by birth asphyxia. In severe cases, it can damage cerebral cells and lead to medical complications such as encephalopathy, autism, seizures, and cerebral palsy, possibly resulting in death. The vast majority (80%) of survivors tend to encounter enduring health obstacles throughout their lives, ranging from disabilities, developmental delays, and palsy, to intellectual and behavioral impairments. Moreover, the occurrence of birth asphyxia imposes economic and psychological hardships on both the families and communities affected.

Heliyon 7 (2021) found that globally, preterm births contribute to 15-36% of neonatal deaths. In lower to middle-income nations, premature births contribute to approximately 34-40% of neonatal mortalities and rank as the secondary leading factor for under-five fatalities. 13 million preterm babies are born annually worldwide, with a high percentage in resource-limited settings, especially in eastern Africa. Report: 11% preterm birth rate causes millions of child deaths before age 5. Preterm birth is a top cause of child mortality. 47% of under-5 deaths in 2019 were newborns, with 75% due to preterm birth within the first week. Premature birth is a top cause of infant mortality in developing nations, despite the availability of affordable care. A study found that preterm and birth asphyxia infants at Groote Schuur Hospital in the metropolis have a higher survival rate due to medical advances. Tech improves survival in young, low-birthweight babies, but many have later difficulties. Per Feresu et al. (2015), preterm births result in low birth weight and contribute to high infant mortality rates in Zimbabwe and other developing nations. A recent study found that developed countries have seen a significant increase in preterm and birth asphyxia infants over the past two decades. This is attributed to higher rates of multiple births, increased use of reproductive technologies, older mothers, and changes in clinical practices like cesarean sections. Modern tech improves survival for premature and asphyxiated infants.

The research was prompted by data received from specialists about the survival chances of preterm infants born at 22-23 gestation weeks. Preterm births contribute significantly to neonatal mortality in the US (Patel et al., 2015). Research shows that preterm infants born between 22 and 28 weeks may not survive their first hospital stay, but mortality rates decrease with fetal maturation. Premature and asphyxiated neonates often die soon after birth. Patel et al. In 2015, infant mortality within 12 hours of birth was often due to biological or physiological immaturity. Respiratory distress syndrome is the main cause of death for newborns over 12 hours old. ELBW neonatal survival is correlated with fetal age and birth weight. No significant association was found between delivery mode, 5-minutes Apgar score, admission time, and survival rates of ELBW neonates. A study found that sociodemographic factors, such as race, smoking, and unmarried motherhood, increase the probability of infant mortality. Meanwhile, medical factors such as cesarean section delivery can also result in low fetal age and infant death. (Ibrahimou, Kodali & Salihu, 2015) Smoking during pregnancy lowers survival rates of preterm and birth asphyxia babies.

2.3 Regional overview of neonatal survival rate

Lloyd and De Witt (2013) stated that four million infants in South Africa experience mortality within 28 days of their birth, with the greatest probability of death occurring on the initial day. This accounts for 40% of deaths in infants >5 years. Risk factors for preterm and birth asphyxia infants include hospital infections, lack of antenatal steroids, undiagnosed multiple pregnancies, inadequate resuscitation, and hypothermia. Advances in medicine have increased survival rates at Groote Schuur Hospital. Tech can help premature babies, but they face more struggles as they grow up. Low birth weight in developing countries leads to high infant mortality. (Source: Feresu, Harlow & Woelk, 2015) The study found that various factors contribute to low birth weight in Zimbabwe, including nutrition, maternal care, medical conditions, obstetric complications, and protozoal infection. Prevention efforts are needed to reduce fatalities and illnesses.

The Demographics and Health Survey (DHS)2014 found the infant and under-5 mortality rates were 39 and 54 per 1000 live births respectively. This means 1 in 26 Zimbabwean infants die before turning one and 1 in 19 don't survive to their fifth birthday. Preterm birth is the second leading cause and has a mortality rate 10 times higher than in developed nations. A

study on preterm and birth asphyxia mortality in East Africa showed a wide range of discrepancies from 4.4% to 41% in Zambia and Sudan, respectively. Preterm mortality is linked to birth asphyxia, feeding issues, hypothermia, respiratory disease, jaundice, and enter colitis. Stats show the seriousness of preterm and birth asphyxia for both mothers and healthcare providers worldwide. Indongo found that, in 2014, in Zimbabwe, 46. 4% of infants with a birth weight equal to or less than 1500g and 45. 2% of infants with a fetal age ranging from 26 to 32 weeks did not survive. The investigation identified premature birth, respiratory distress syndrome, birth asphyxia, and sepsis as prominent factors contributing to mortality, accounting for 47%, 23%, 15%, and 15% of cases respectively. Preterm in Zimbabwe caused high mortality and morbidity rates (Indongo, 2014).

A study by Hoque, Haaq & Islam (2015) found that in KwaZulu Natal, premature births caused 56.6% of deaths at Empangeni Hospital, followed by perinatal asphyxia and infectious illnesses. The study suggests that improved antenatal, intrapartum, and postnatal care, including Kangaroo mother care (KMC), can help prevent many neonate deaths. To prevent preterm and severe birth asphyxia, hospitals must provide excellent basic care, equipment, and well-trained healthcare staff for these infants.

2.4 Major causes of neonatal mortality

The precise determination of the causes of preterm birth remains elusive, yet certain risk factors have been identified. In their study, Mdala and Mash (2015) identified several primary factors contributing to neonatal mortality rates during the perinatal period at Onandjokwe state hospital, including preterm birth, severe perinatal asphyxia, abruption of the placenta, and indeterminate causes. Hoque et al. (2015) and Mdala & Mash (2015) conducted studies that revealed similar results regarding the distinct factors that contribute to the decreased survival rate of neonates. Specifically, Mdala & Mash (2015) found that inadequate basic antenatal care, distant referrals for ill neonates, a deficiency in surfactant supply for severely premature and birth asphyxia infants, and residential deliveries were key factors. The outcomes of both studies suggest that addressing these factors could improve the survival rate of neonates.

Prematurity and birth asphyxia are widely regarded as major contributing factors to the mortality and morbidity rates in Zimbabwe. According to the literature review, preterm

delivery and birth asphyxia may be a commonly occurring problem that is not specific to Zimbabwe. Henceforth, the objective of this investigation is to assess the incidence of mortality among preterm and birth asphyxia neonates, specifically the proportion of preterm neonates that have survived for 28 days following birth or have been discharged from the Neonatal Care Unit (NNU) at BPH Hospital, which serves as the primary referral hospital for all birth asphyxia neonates.

El-Mekkawy and Ellahony (2019) asserted that neonatal sepsis represents a significant challenge to global health due to its considerable morbidity and mortality rates. Blood glucose abnormalities such as hypoglycemia and hyperglycemia are frequently encountered in cases of neonatal sepsis. Hypoglycemia may present itself as inadequate feeding, increased muscle tone, cessation of breath, trembling movements, loss of consciousness, and epileptic seizures. Neonatal hypoglycemia carries the potential to cause debilitating injuries to the developing brain, given that glucose is the foremost fuel source utilized by the organ under normal conditions.

The investigation conducted by El-Kabbany and colleagues (2020) provides evidence that Neonatal sepsis (NS) is a prominent contributor to neonatal morbidity and mortality. Additionally, NS represents a significant public health concern, with the highest incidence levels in preterm infants and developing countries. The aforementioned phenomenon entails a systematic inflammatory response aimed at combatting pathogenic invasion, whereby both endothelial cells and neutrophils undergo activation, culminating in the production of oxygen-derived free radicals. This oxidative stress impinges on cellular functionality, which can ultimately lead to organ dysfunction. In normative adult physiology, there exists a robust and cohesive network of antioxidant mechanisms that function to counteract the deleterious effects of reactive oxygen species (ROS). Newborns, particularly those born prematurely, are exceedingly vulnerable to oxidative stress resulting from an inequity between augmented reactive oxygen species (ROS) production and depleted antioxidant capacity.

2.4.1 prematurity and birth asphyxia

Annually, 2.5 million children and over a million African babies die within their first month of life globally (Tadesse et al., Systematic Reviews, 2022). 25% of neonatal deaths worldwide

and 2/3 in Ethiopia are due to birth asphyxia The primary cause of neonatal deaths in Zimbabwe, accounting for 31. 6% of cases, is birth asphyxia, prematurity is the second leading attributable factor (21.8%) and sepsis (18.5%). The absence of global standards and varying methodologies for assessing fetal age complicates the diagnosis of prematurity. Quinn et al. (2016) classified prematurity into three types: extremely premature (<28 weeks), very premature (28 - <32 weeks), and moderate premature (32 - <37 weeks). However, even infants born at 37 or 38 weeks have higher risks than those born at 40 weeks. Tadesse et al. (2022) found factors linked to birth asphyxia globally, including antepartum, intrapartum, and fetal risk factors. Efforts to reduce neonatal mortality from birth asphyxia include global and regional interventions. The SDG-3 aims to decrease neonatal mortality to under 12 deaths per 1000 live births by 2030. Zimbabwe has made progress in child health but birth asphyxia and preterm burden remains high. A review study in Central Africa did not assess birth asphyxia among preterm babies in Zimbabwe. The study aims to analyze the survival rate of asphyxia and preterm newborns at Bindura Provincial Hospital in Zimbabwe.

2.4.2 Fetal age

Blencowe et al. (2013) found lower fetal age equals lower survival chances. Preterm and birth asphyxia are more common in sub-Saharan Africa and South Asia due to high birth rates. Birth weight and fetal age predict preterm and birth asphyxia survival using a graph. Death or morbidity rates were higher in 22-24 week infants for retinopathy of prematurity, late-onset infection, severe brain bleeds, brain damage, intestinal disease, and lung issues than in 25-27 week infants. Younger fetuses had lower infant mortality rates. Low fetal age increases the risk of preterm birth and birth asphyxia leading to respiratory distress syndrome (RDS

2.4.3 Birth weight

Infant birth weight is a commonly studied metric in pregnancy research, linked to newborn health risks. Low birth weight is more prevalent in developing nations and increases health risks. (Amosu, 2014; Shiweda & Amukugo, 2018) Preterm and birth asphyxia infants under 1200g (fetal age < 30 weeks) have high mortality rates.

2.4.4 Alternative causes of preterm and birth asphyxia infants' birth

Causes of preterm and birth asphyxia infant births include spontaneous labor, premature rupture of membranes, and induced birth. Early induction of labor or cesarean birth can also contribute. (Ananya et al., 2015) Genetics may play a role in preterm and severe birth asphyxia, better understanding can lead to prevention solutions. Infant deaths within 12 hours often due to immatureness, while those living longer may succumb to respiratory distress syndrome (RDS), in line with Patel et al. (2015). Necrotizing enter colitis was the leading cause of death from 15 to 60 postnatal days, but bronchopulmonary abnormality became the main cause after 60 days The study reveals a significant decrease in deaths linked to pneumonic causes, immaturity, infection, and central system injury. However, a notable increase in mortality has been observed in association with necrotizing enteritis. Possible misclassification between respiratory distress syndrome and bronchopulmonary abnormalities in death cases. A study by Ibrahimou et al. (2015) found that taking cigarettes during pregnancy and abdominal delivery were the main factors contributing to preterm birth and birth asphyxia. The study shows higher death rates for preterm and birth asphyxia infants, with males and blacks at higher risk than females and whites. Antenatal steroids and surfactant therapy improve infant survival. Temu, Masenga, Obure, Mosha, & Mahande (2016) found that factors related to preterm and birth asphyxia included living alone, lack of formal education, physical work during pregnancy, peasant or businesswoman status, and previous stillbirth. Historical risk factors such as miscarriage, preeclampsia, gap placenta, and inadequate ANC visits, as well as maternal age above 35, multiple pregnancies, low birth weight, UTIs, and abdominal delivery, contribute to premature births (Beck et al., 2017). High rates of preterm and birth asphyxia in African infants could be due to various unidentified factors, according to Quinn et al. (2016). Factors for preterm labor include harm/gap during pregnancy, mechanical factors, hormonal changes, infection, and inflammation. Early detection and treatment of modifiable risk factors can prevent maternal and infant morbidity and mortality (Mamatha, et al., 2017).

2.4.5 Neonatal symptoms and risk factors at birth

Multiple pregnancies increase the chance of premature birth from spontaneous labor or PROM, or due to motherly conditions such as asper-eclampsia or fetal disorders. Quinn et al. (2016) found that maternal age below 17 or over 35 also raises the risk of preterm birth and birth asphyxia. Without global standards and varied methods for assessing fetal age, diagnosing

prematurity is challenging. In developing countries, preterm and birth asphyxia infants face infection risks due to factors such as overcrowded neonatal wards, insufficient staff, improper use of supplies, and excessive antibiotic use, as well as insufficient knowledge and difficulty implementing infection control measures like catheter packets (Resende et al., 2015). The study confirms that infection control measures can prevent late-onset sepsis (LOS) in preterm and birth asphyxia infants. Preterm infants at 22-24 weeks face high risks such as retinopathy of prematurity and, necrotizing enter colitis (Smith, et al., 2012). Doctors (2012) found that preterm and birth asphyxia infants are prone to hypothermia, hypoglycemia, respiratory distress, infections, and other complications.

2.5 Interventions

Interventions in neonatal units aim to reduce complications of prematurity. Common interventions include KMC, CPAP, mechanical ventilation, and NIDCAP. A study by Lawn et al. (2017) found that preterm and birth asphyxia infants are the major causes of infant's death and highlighted the mortality benefit of kangaroo mother care. Kangaroo mother care has been enforced in district hospitals in Malawi, Tanzania, and Ghana, and has shown positive results in reducing severe morbidity from infection. The more neonatal interventions for 22-24 week infants, like antenatal corticosteroids, the better their survival rate. Smith et al. (2019) found that using these interventions more frequently improves survival for preterm and birth asphyxia infants. In 2014, research showed early use of nonstop Positive Airway Pressure with selective surfactant leads to lower infant mortality rates compared to early surfactant therapy (Polin, et al., 2014). The Federal Ministry of Health developed a strategy in 2015 to reduce under-five mortality by two-thirds (Abdo et al., 2019). Starting in 2015, evidence-based interventions were introduced into the strategy, such as community management of pneumonia, community-based newborn sepsis management, newborn intensive care units, newborn corners, and the introduction of Homophiles influenza, pneumococcal, and shifting PMTCT to 'Option B+'. Despite established guidelines and easy access to them at health centers, Ethiopia still reports a high number of newborn deaths from birth asphyxia (Abdo et al, 2019). Infants born at 24-25 weeks have lower death rate with CPAP. Early CPAP leads to reduced ventilation and therapy duration. (Polin et al., 2014) Early CPAP reduces preterm mortality, but RDS operation with INSURE and NIV ensures higher success rates (Permall et al., 2019). The study confirmed mechanical ventilation's superiority to CPAP. Permall et al.

(2019) supported Kirsten et al.'s discovery. Phototherapy for infants with birth weight ≤ 1000 g reduces mortality and kernicterus, thus improving the care of preterm and birth asphyxia infants with hyperbilirubinemia. Proper phototherapy can also lessen the need for exchange transfusion in preterm infants by lowering bilirubin levels. (Maisels et al., 2016).

2.6. The Apgar's score

The Apgar score assesses newborn health after birth. Hatupopi's (2016) study found that some infants who died had a low Apgar score. These infants had high survival odds with proper care, like appropriate resuscitation.

2..7. Conclusion

In this chapter, theories relating to the study were reviewed together with the empirical evidence on survival rate from other countries and the following chapter detailed methodology of the study is presented.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Introduction

The previous chapter reviewed literature on the survival rate of preterm and severe birth asphyxia infants. This chapter centered on the methodology that was employed in this study. The analysis methodology is outlined as a scientific approach to the resolution of the known analysis problem. It presents the analysis approach, style and study space, sampling technique, the material used, information assortment, information analysis, validity, reliability, and moral issues.

3.1 Approach

The research topic was created after consulting pediatricians and neonatologists. Various academic databases and search engines were used to explore the survival rate of preterm and birth asphyxia infants in state hospitals in Zimbabwe. The search at BUSE Library involves extracting relevant journal entries and articles related to a specific domain. We use a keyword approach to refine our search, focusing on terms related to survival rates, outcomes, and risk factors for preterm infants. To the best of our knowledge, only a limited number of articles have been published on the topic of the survival rate of preterm and birth asphyxia infants in Zimbabwe. Insufficient literary resources for our literature review may produce an adverse outcome when attempting to provide a comprehensive summary of Zimbabwe.

3.2 Design

BPH is currently the most referenced Hospital to alternative district hospitals. it's also a house to the antenatal ward (ANW). Under ANW, there's an NNU that admits preterm and birth asphyxia infants. BPH is the most referenced hospital and houses ANW. ANW has a NNU for preterm and birth asphyxia infants. BPH NNU can serve as a reference hospital for these infants from clinics in Bindura District in Mashonaland Central Province in Zimbabwe. This study was conducted in a hospital setting utilizing a cross-sectional retrospective chart review methodology. The study data consisted of records pertaining to all preterm infants admitted and discharged from the neonatal unit between January 1st, 2021 and December 31st, 2021.

3.3 Source of data

The admission book at the Neonatal Unit was the official log, recording data on preterm infants' birth date, age, weight, and associated risks. Death registers were also used to collect information. All files for preterm infants admitted and discharged in this NNU ward from January 1 to December 31, 2021 were recorded.

3.4 Description of data

Data was retrospectively gathered for male and female infants, both living and deceased, who were admitted to BPH NNU due to preterm birth or birth asphyxia. "Available files" referred to records for babies transferred from clinics in Bindura District to BPH NNU were used. If their condition improves but still requires observation, they are referred to the Kangaroo Mothers' neonate ward with their medical records until discharge. Medical records were limited, so only accessible files were utilized. Infants admitted and still in the ward over 2 years old were excluded from the study. Dead infants within delivery area and registered were included.

3.5 Data collection and preparation

A list was created to extract knowledge from a medical register. The tool was designed with input from literature and a neonatologist. The study supervisors approved and analyzed the data collection tool.

Maternal details - medical conditions, HIV result. Fetal age tool - Apgar, due date, and estimated age. Baby's birth record: DOB, sex, length, weight, and discharge/death date. Medical interventions like antenatal steroids, HIV, and booking results were used to correlate preterm and birth asphyxia in infants. With perinatal interventions such as surfactant therapy, CPAP, mechanical ventilator, and oxygen therapy, the survival of preterm and birth asphyxia infants was assessed using Apgar's score. "Active interventions noted as 'yes' if used, 'none' if not." Antibiotics were used to confirm survival in infected babies. Newborns' symptoms within 24 hours of birth, such as jaundice, will be noted using the data collection tool for phototherapy and total body fluid heumatoid. Risk factors were evaluated to support survival or mortality. Recorded risk factors, such as birth location and referral distance, were used to assess if relocating preterm and birth asphyxia infants to Bindura Provincial Hospital's neonate ward would impact their survival. Causes of infant deaths sorted into categories including low birth weight, birth asphyxia, respiratory distress syndrome, prematurity, and TTN.

3.6 Data Analysis

Data was retrieved from the records section, where files are secured. Records were not removed for confidentiality. The number of preterm and birth asphyxia babies in NNU was found from the file. The survival rate for preterm and birth asphyxia infants was based on the number who lived at least 28 days or were discharged from NNU. The number of surviving infants was determined by comparing admissions to discharges in the ward. The categorical variables were measured through the assessment of frequencies and percentages. In this study, the survival rate of infants was examined through the utilization of the Kaplan-Meier estimator, whereby the risk factors associated with preterm birth and birth asphyxia were plotted to determine the likelihood of occurrence.

The survival analysis graph has evaluated various factors that can potentially influence fetal survival. These factors encompass fetal age, birth weight, HIV, usage of CPAP and Ventilator, administration of surfactant and oxygen, location, Apgar score, antibiotics, phototherapy, and TJ. To confirm preterm severity, we used fetal age, birth weight, birth date, discharge date, and age at death. B/W & fetal age identified. Survival rate was analyzed by weeks and birth weight categories, including ELBW, SLBW, VLBW, LBW, and NBW.

Data analyzed with Excel and survival analysis graphs. SPSS was used to analyze data from audit tool (Version 26). Used frequencies/proportions for categorical data, means/standard deviation for continuous data. Excel tables displayed, Kaplan-Meier estimator used for survival analysis graphs.

3.7 Ethical and confidentiality

Study permission granted by BUSE and access granted to medical register by Bindura Hospital's Medical Superintendent for neonatal data from PRETERM Unit. Permission was obtained from the ward matron and sister in charge through the Ministry of Health and Child Care. Information was archived for confidentiality. Restricted access to the researcher only was used (access pin code). and there were no fabrications or falsifications.

3.8 Chapter conclusion

The chapter delved in the discussion of methodologies. A brief discussion of survival analysis was made. The necessary tests for the model were also discussed and these include SPSS, excel

tables displayed, Kaplan-Meier estimator used for survival analysis graphs. Procedure for carrying out this research from its genesis to the end were discussed in this chapter.

CHAPTER FOUR: DATA PRESENTATION, ANALYSIS AND DISCUSION

4.0 Introduction

The previous chapter dealt with the background of the study, problem statement, purpose and objectives of the study. The chapter analyzed survival rates of preterm and birth asphyxia infants at BPH NNU and discusses findings, draws conclusions, and provides recommendations for observation and analysis. This section presents the findings of the study based on the initial research goals which were:

1. To analyze the admission and treatment statistics concerning neonates in the BPH NNU based on their viability at birth, gender, method of delivery, and survival rate;
2. To analyze the association between fetal age and birth weight and their impact on the survival rate of neonates who were admitted to the Neonatal Unit (NNU) at BPH;
3. To analyze how medical interventions for neonates in the BPH neonatal unit affect infant survival rates.;
4. To analyze how medical and unsupportive factors impact neonatal survival rates.

4.1 Life expectancy at birth, gender, delivery method and survival rate

The Neonatal Unit (NNU) serves as a specialized reference unit dedicated to providing high-intensity care to critically premature infants and newborns who have experienced birth asphyxia from healthcare facilities across Zimbabwe. Within the maternity ward, the unit is staffed by 36 doctors in conjunction with 66 registered nurses serving the needs of the entire ward, including the neonatal unit (NNU), and an additional 50 enrolled nurses within the confines of the maternity ward. At NNU, a system of alternately assigning 24 registered nurses has been implemented, with a monthly rotation ensuring that a total of 17 registered nurses are present at any given time.

The unit is comprised of a total of 16 beds.

Table 4.1.1 Personnel and accommodation statistics

Staff categories	Number of staff
Doctors	36
Registered Nurses	66(whole maternity)
Enrolled Nurses	50 (whole maternity)

For preterm and birth asphyxia infants hospitalized at BPH NNU,930 names that were available in the admission book were examined. Out of 930 (see outcomes in Table 4.1.2), 831 preterm and birth asphyxia infants were discharged from the ward after being deemed stable (survived) while 99 did not survived (died). There were a total number of 418 (45%) female and 512 (55%) male infants admitted to the ward. According to the findings ,80% of infants were delivered via normal vaginal delivery (NVD), 20% via caesarean section (C-Section). Infants delivered via C-section (94.0% (n=172) had a greater survival rate than those delivered via NVD (88.2% (n=659). C-section was more frequent than vaginal delivery, and chi-square test determined significance. This evaluation checks for significant differences between variables. Results show no correlation between survival rate and gender. Males made up 89.8% and females 88%. A study found significant survival rate differences for preterm and birth asphyxia babies delivered by NVD versus C-section. 05 = 0.001

Table4.1.2 Gender at delivery

Gender at delivery	Total N	Died	Survived	
			N	Percent
male	512	52	460	89.8%
female	418	47	371	88.8%
Overall	930	99	831	89.4%

Overall Comparisons

	Chi-Square	df	Sig.
Log Rank (Mantel-Cox)	.415	1	.519

Test of equality of survival distributions for the different levels of Gender at delivery.

Table 4.1.3 Mode of delivery

Mode of delivery	Total N	Died	Survived	
			N	Percent
NVD	747	88	659	88.2%
C/S	183	11	172	94.0%
Overall	930	99	831	89.4%

Overall Comparisons

	Chi-Square	df	Sig.
Log Rank (Mantel-Cox)	6.469	1	.011

Test of equality of survival distributions for the different levels of Mode of delivery.

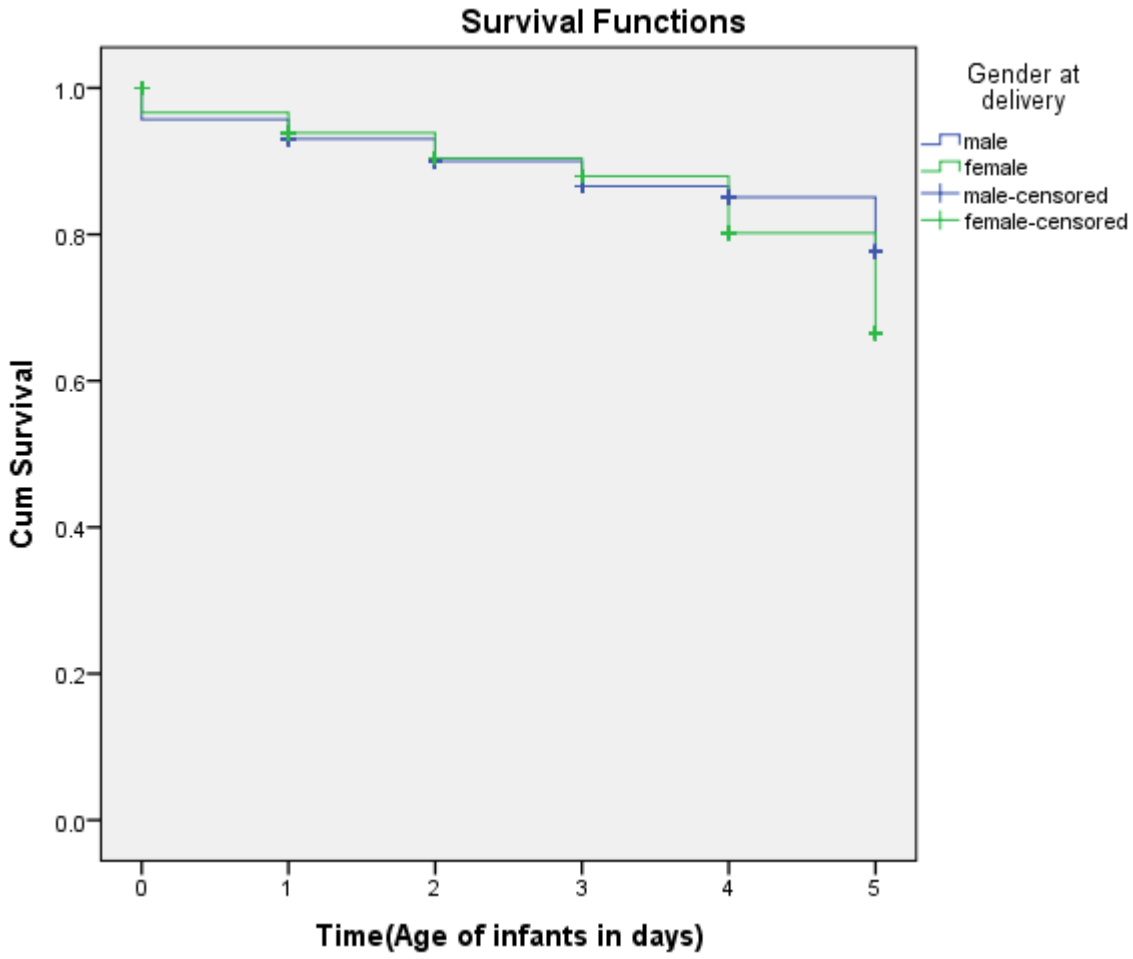

Figure 4.1.2. Kaplan Meier on Gender at delivery.

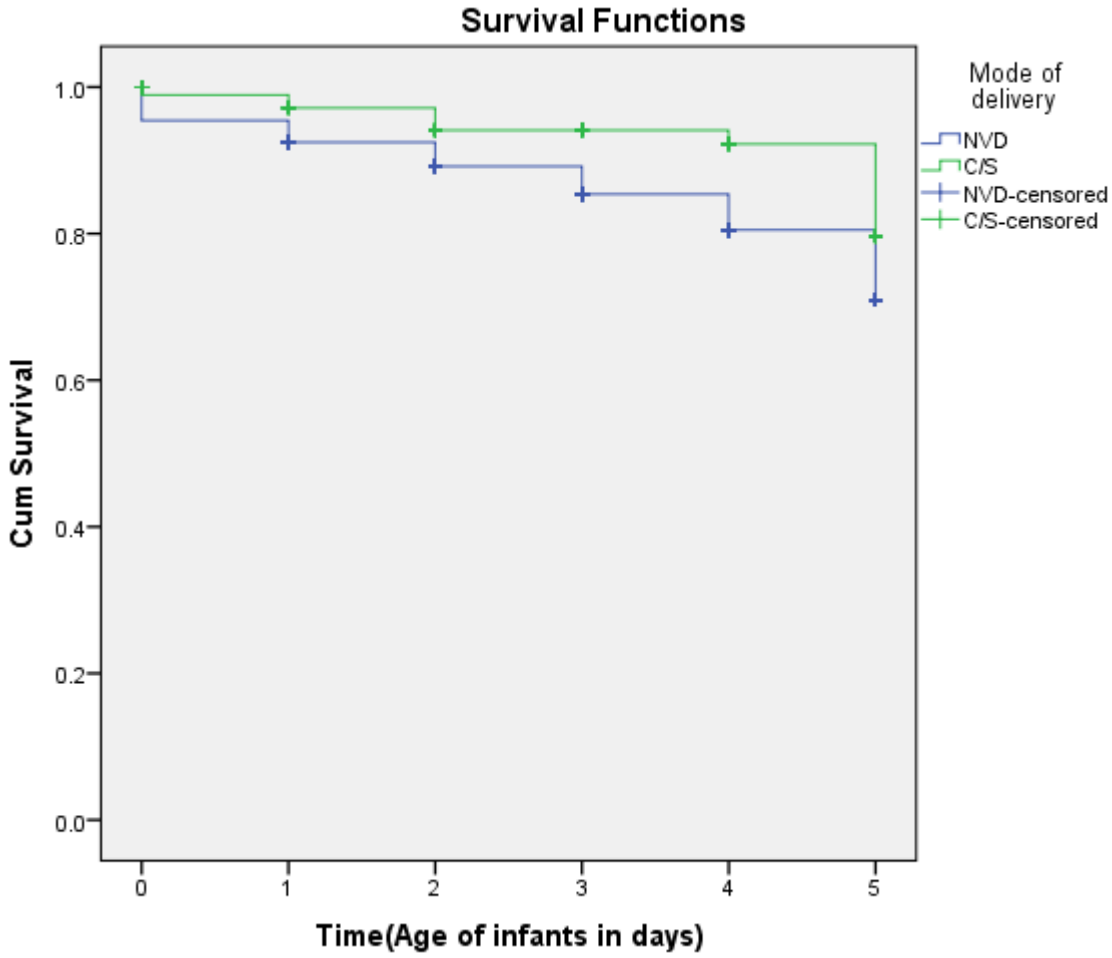

Figure 4.1.3. Kaplan Meier on Mode of delivery.

Table 4.1.4 Survival of new born babies on HIV positive and negative mothers

Mother's HIV Status	Total N	Died	Survived	
			N	Percent
negative	850	96	754	88.7%
positive	80	3	77	96.2%
Overall	930	99	831	89.4%

Overall Comparisons

	Chi-Square	df	Sig.
Log Rank (Mantel-Cox)	3.210	1	.073

Test of equality of survival distributions for the different levels of Mother's HIV Status.

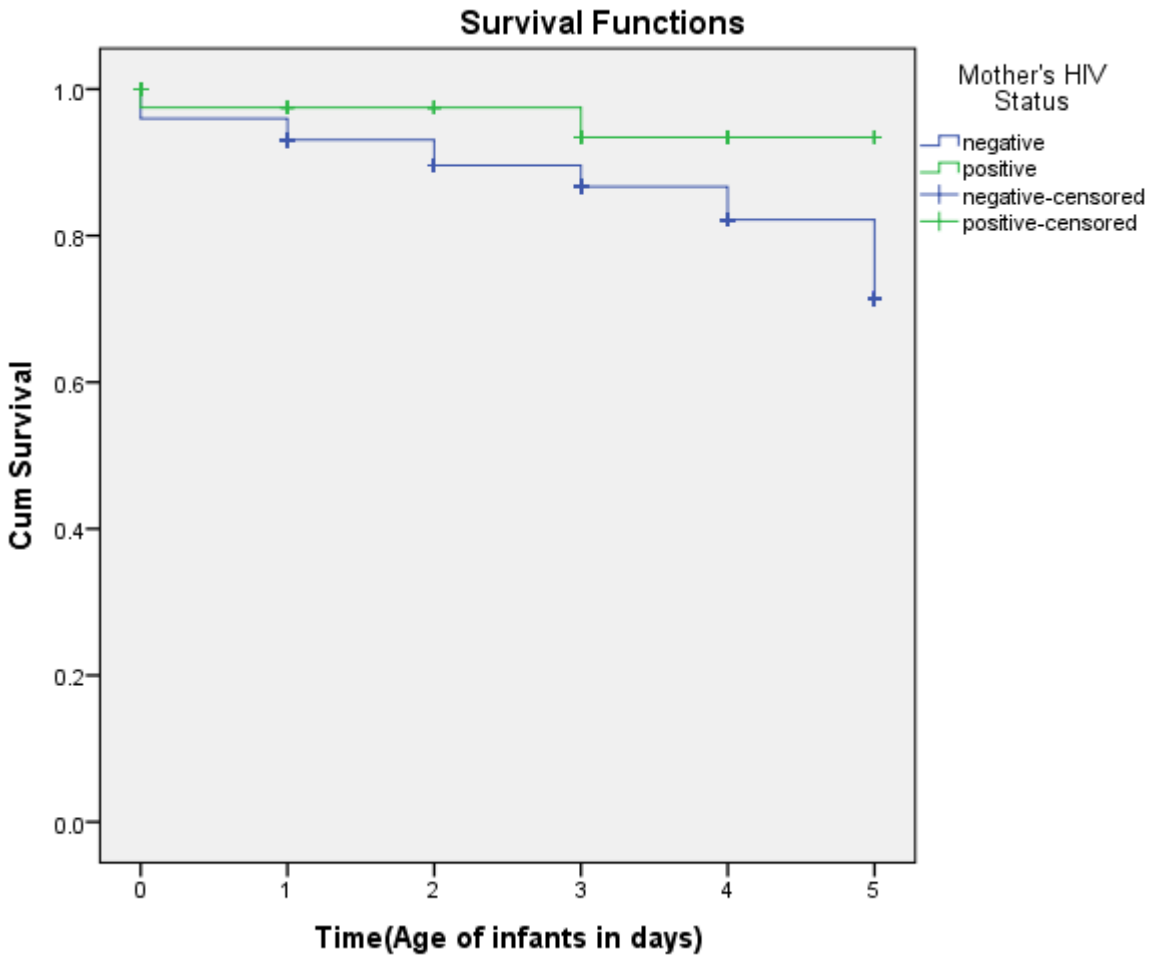

Figure 4.1.4. Kaplan Meier on HIV positive and negative mothers.

Table 4.1.4 shows that 97% of infants from HIV-negative mothers died, compared to 3% from HIV-positive mothers. HIV-positive mothers had a 96.2% survival rate for their infants while HIV-negative mothers had an 88.7% survival rate. HIV-positive mothers' infants had higher survival rates.

4.2 The effect of birth weights and fetal age on survival rates

Results were grouped by fetal age and birth weight for our second objective. Analysis shows 7.4% (27) of 366 extremely premature babies (FA- 25-32 weeks) died, while 92.6% (339) survived (Table 4.2.1, Figure 4.2.1). Out of 287 premature infants, 257 (89.5%) survived and 30 (10.5%) died. Out of 95 moderately preterm/asphyxiated infants, 81 (85.3%) survived and

14 (14.7%) died. Premature and full-term pregnancies have survival rates of 84.4% and 84.9%, respectively, with a statistical association based on fetal age. 0.001 < 0.05.

Table 4.2.1 Different levels of Fetal Age.

FA category (dates, sonar or ballard) in weeks	Total N	Died	Survived	
			N	Percent
Extremely preterm infants (25-32 weeks)	366	27	339	92.6%
Very preterm infants (32-37 weeks)	287	30	257	89.5%
Moderate preterm infants (37-39 weeks)	95	14	81	85.3%
Birth asphyxia full term infants (40-41weeks)	109	17	92	84.4%
Birth asphyxia full term (> 41 weeks)	73	11	62	84.9%
Overall	930	99	831	89.4%

Overall Comparisons

	Chi-Square	df	Sig.
Log Rank (Mantel-Cox)	9.092	4	.059

Test of equality of survival distributions for the different levels of FA category (dates, sonar or ballard) in weeks.

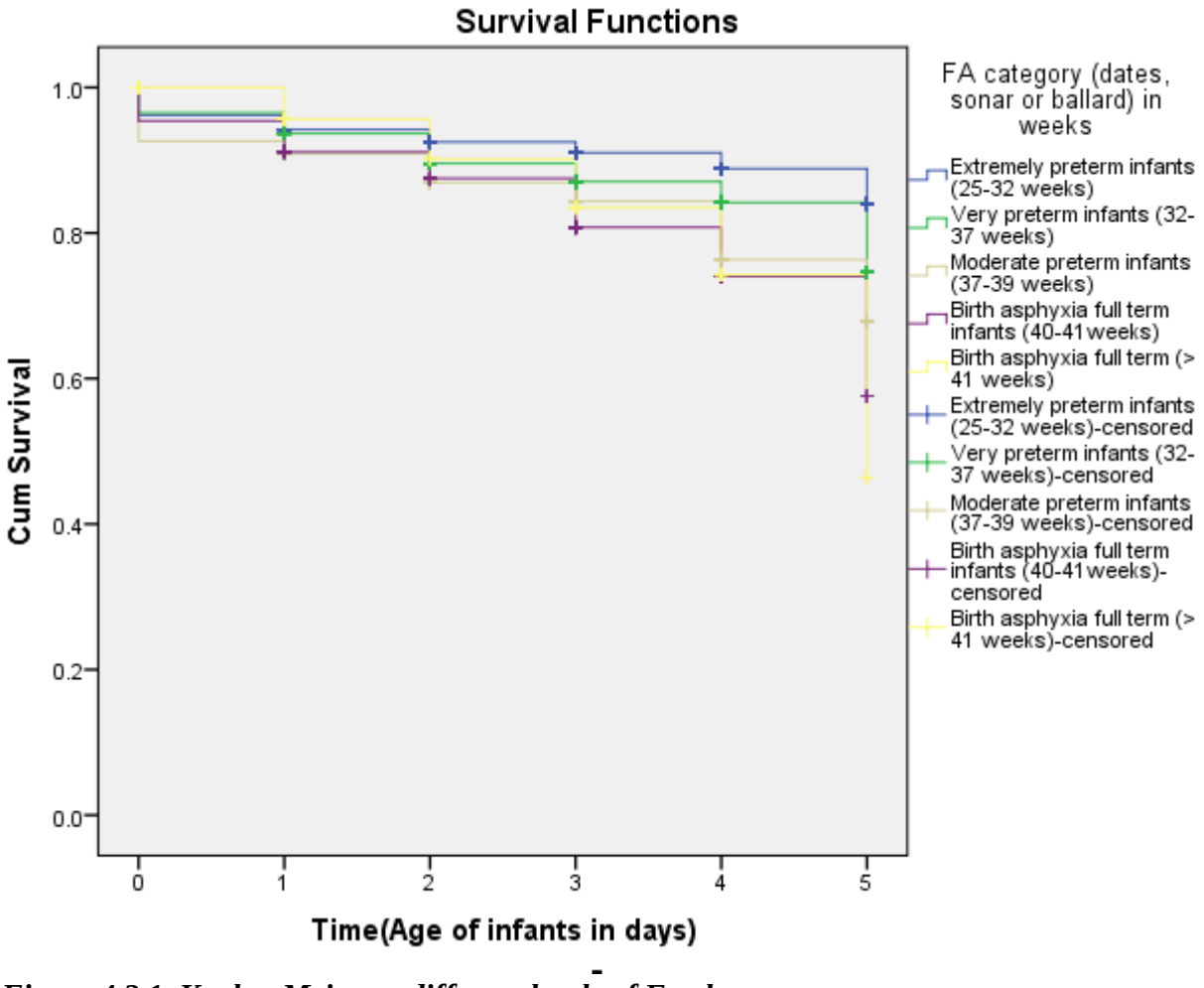

Figure 4.2.1. Kaplan Meier on different levels of Fetal Age.

See Table 4.2.2 for infant survival rates by subgroup. All 6 infants <600g survived. 94.7% of SLBW infants survived. 73 infants: 90.4% VLBW, 9.6% mortality. LBW infants have a survival rate of 89.0%, while normal birth weight infants have a survival rate of 89.5%. Birth weight affects survival. 0.0001 < 0.05.

Table 4.2.2 Weight birth.

Weight at birth	Total N	Died	Survived	
			N	Percent
Extremely low birth weight (ELBW) <600 g	6	0	6	100.0%
Severe low birth weight (SLBW) 600-900 g	19	1	18	94.7%
Very low birth weight (VLBW) 900-1500 g	73	7	66	90.4%
Low birth weight(LBW) 1501-2500 g	670	74	596	89.0%
Normal birth weight(NB) >2500 g	162	17	145	89.5%
Overall	930	99	831	89.4%

Overall Comparisons

	Chi-Square	df	Sig.
Log Rank (Mantel-Cox)	1.262	4	.868

Test of equality of survival distributions for the different levels of Weight at birth.

Figure 4.2.2 shows LBW infants had lower survival chances up to day 3, while ELBW had the highest. After day 3, survival chances increased for other categories and decreased sharply for LBW.

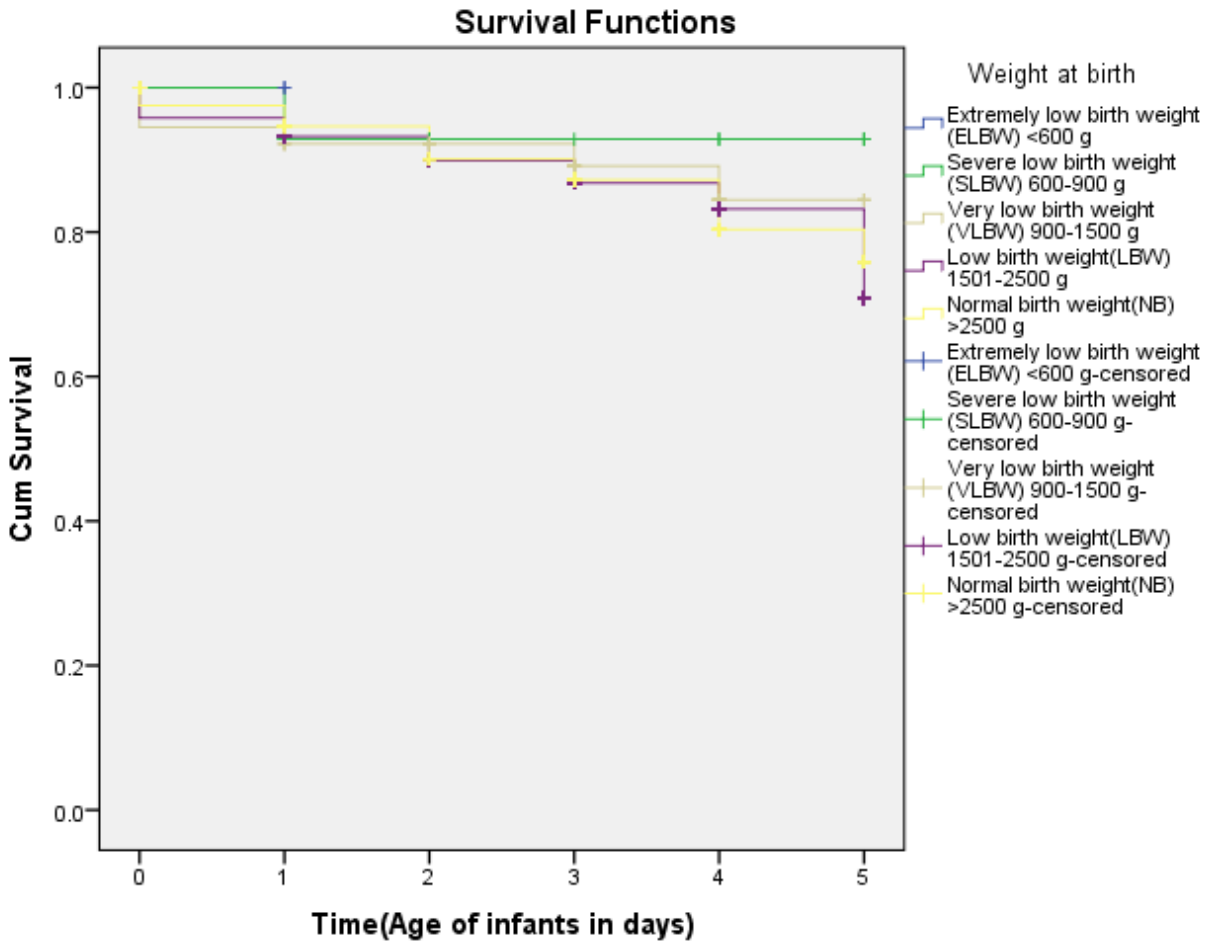

Figure 4.2.2. Kaplan Meier on Weight at birth

4.3 Reason for admission

Most male and female newborns were admitted (56.77%) due to low birth weight, while 172 (18.49%) were admitted for birth asphyxia. Low birth weight was a major cause for admission of 83 male and female infants (8.92%), as indicated in Table 4.3.1.

Table 4.3.1 Reason for admission

Reasons for admissions	Total N	Died	Survived	
			N	Percent
Birth asphyxia	172	17	155	90.1%
Respiratory Distress Syndrome	55	8	47	85.5%
Very low birth weight	48	3	45	93.8%
Extremely low birth weight	44	5	39	88.6%
Severe low birth weight	83	15	68	81.9%
Low birth weight	528	51	477	90.3%
Overall	930	99	831	89.4%

Overall Comparisons

	Chi-Square	df	Sig.
Log Rank (Mantel-Cox)	7.178	5	.208

Test of equality of survival distributions for the different levels of Reasons for admissions.

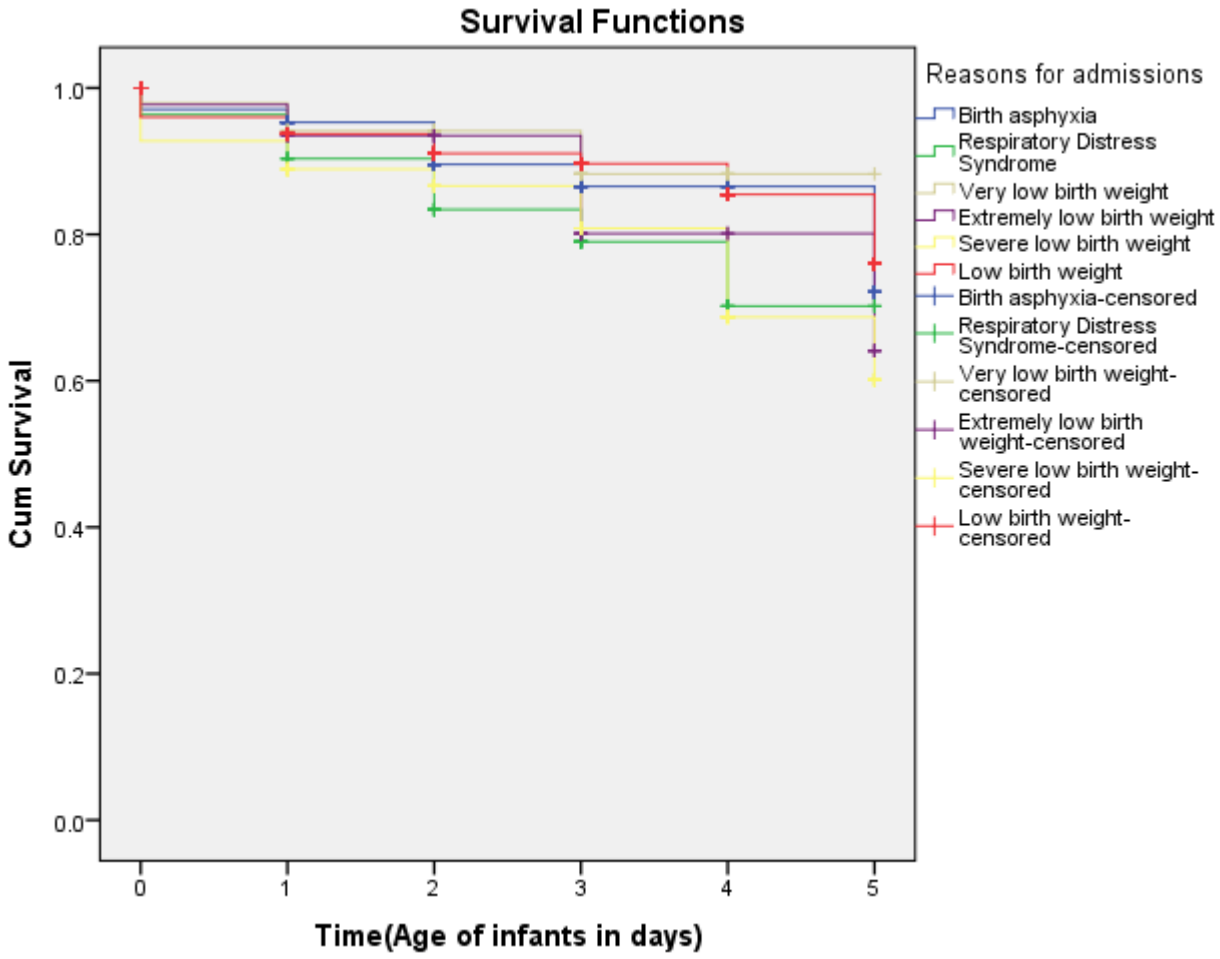

Figure 4.3.1. Kaplan Meier on Reason for admission.

4.4 The effect of medical treatments given to pregnant women and infants on the survival rate

To assess the effect of medical interventions on preterm and birth asphyxia infant survival at Bindura Provincial Hospital Neonatal Unit, we analyze prenatal interventions. Antenatal care and booking outcomes are variables for prenatal interventions, while perinatal care involves monitoring jaundice, CRP, and using therapies such as phototherapy and oxygen masks. Use Apgar score to assess fresh burns at 1, 5, and 10 minutes.

4.4.1 The prenatal circumstances

a. Maternal influences on survival rate

To assess preterm and birth asphyxia infant survival, mothers' HIV status was noted during booking. Tables and Figures 4.4.1.1 reveal higher survival rates (89.8%) among HIV-positive and negative infants with known maternal status, compared to those with unknown status (85.4%).

Table 4.4.1.1 Survival rate according to HIV booking results (mothers)

Mother's HIV booking results	Total N	Died	Survived	
			N	Percent
negative	746	76	670	89.8%
positive	88	9	79	89.8%
unknown	96	14	82	85.4%
Overall	930	99	831	89.4%

Overall Comparisons

	Chi-Square	df	Sig.
Log Rank (Mantel-Cox)	2.361	2	.307

Test of equality of survival distributions for the different levels of Mother's HIV booking results.

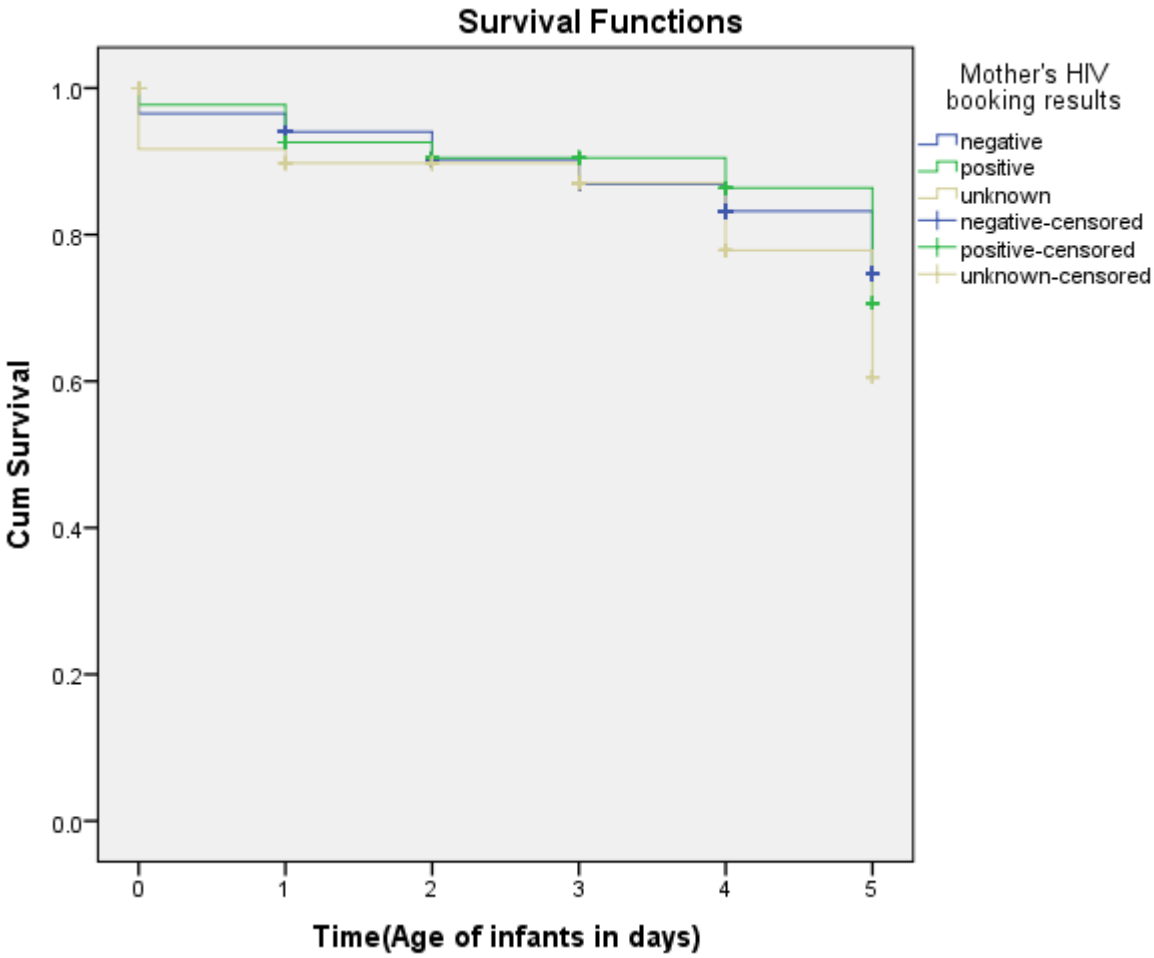

Figure 4.4.1.1Kaplan Meier on HIV booking results (mothers)

b. Effect of Medical treatments received by mother on survival rate

Table 4.4.1.2 (Mothers who received dexamethasone), revealed that only (7.2%) of women reported receiving dexamethasone which may be result of poor record-keeping and may have impacted the analysis because it is uncertain what the alternative in the records was.

Table 4.4.1.2 Mothers who recieved Dexamethasone

Mother's who received dexamethasone	Total N	Died	Survived	
			N	Percent
Dexamethosone given	67	6	61	91.0%
None	863	93	770	89.2%
Overall	930	99	831	89.4%

Overall Comparisons

	Chi-Square	df	Sig.
Log Rank (Mantel-Cox)	.013	1	.908

Test of equality of survival distributions for the different levels of Mother's who received dexamethasone.

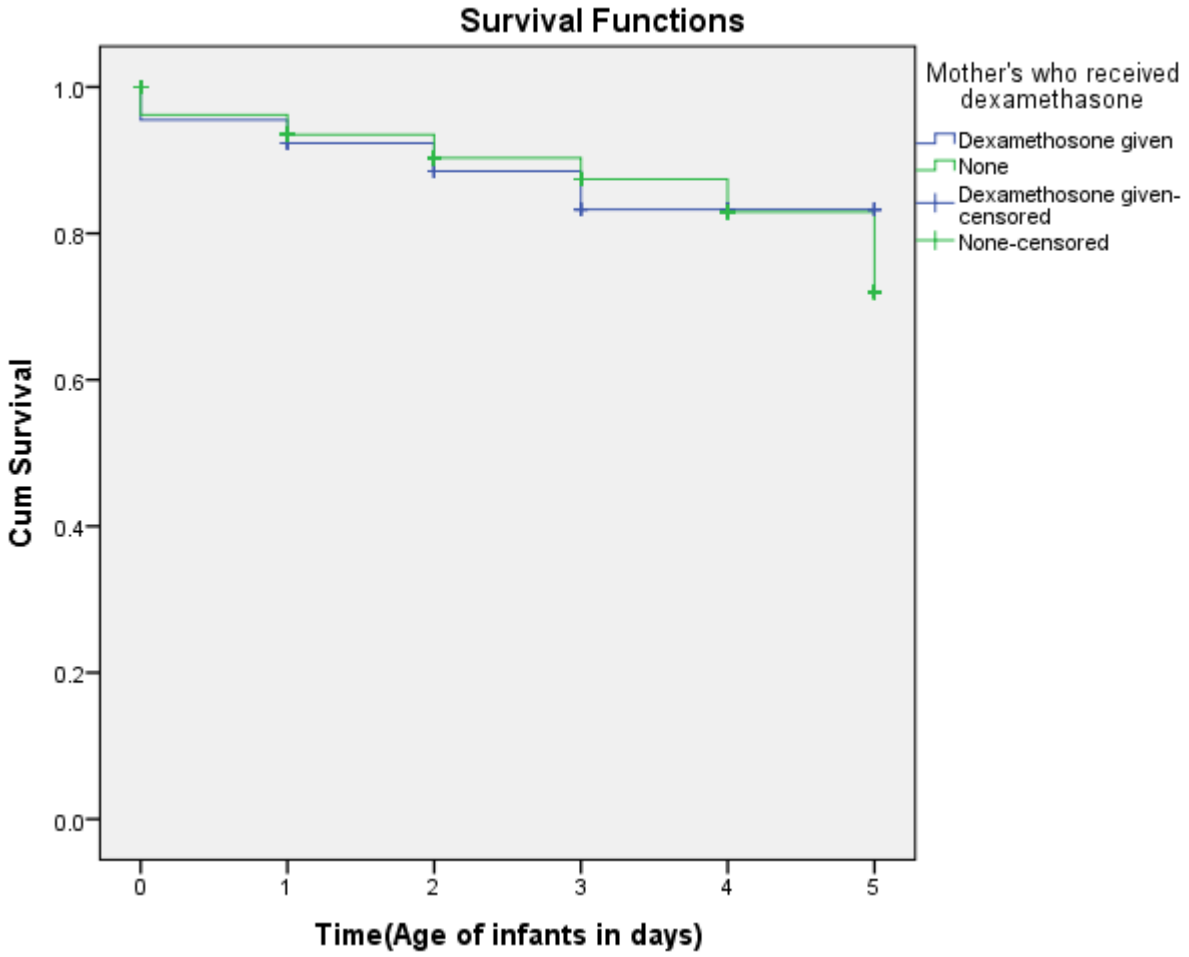

Figure 4.4.1.2Kaplan Meier on Mother's who received dexamethasone.

4.4.2 The perinatal interventions

4.4.2.1 Ventilator intervention, Surfactant and Oxygen treatment on the survival rates

Neonatal mechanical ventilator: Managing preterm and birth asphyxia infants with respiratory distress syndrome (RDS) requires the use of a neonatal mechanical ventilator. According to *Table 4.4.2.1 below*, 127 (88.2%) of 831 preterm and birth asphyxia infants were put on ventilator survived.

Table 4.4.2.1 Survival rate accordig to Ventilator intervention.

Preterm and birth asphyxia infants on ventilator	Total N	Died	Survived	
			N	Percent
Yes	144	17	127	88.2%
None	786	82	704	89.6%
Overall	930	99	831	89.4%

Overall Comparisons

	Chi-Square	df	Sig.
Log Rank (Mantel-Cox)	.207	1	.649

Test of equality of survival distributions for the different levels of Preterm and birth asphyxia infants on ventilator.

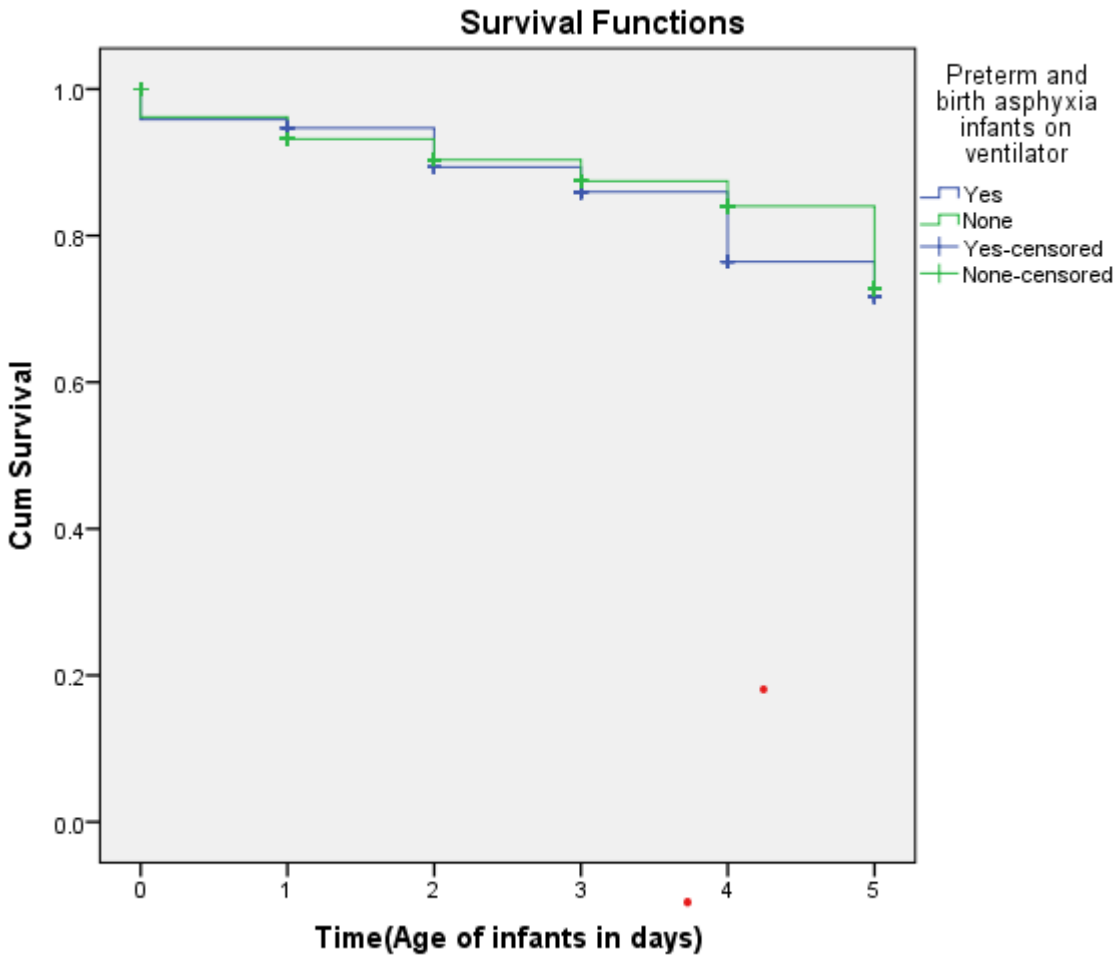

Figure 4.4.2.1 Kaplan Meier on Ventilator intervention

The survival analysis in Figure 4.4.2.1 shows that preterm and birth asphyxia infants not put on ventilators had a higher survival rate (88.2%) compared to those put on ventilators (89.6%).

Only 89.8% (n=141) of newborns given surfactant (Table 4.4.2.2) survived. The study found a significant connection (sig 0.103) between surfactant use and survival of preterm and birth asphyxia infants.

Table 4.4.2.2 Survival rate according to Surfactant treatment

Surfactant	Total N	Died	Survived	
			N	Percent
Yes	157	16	141	89.8%
None	773	83	690	89.3%
Overall	930	99	831	89.4%

Overall Comparisons

	Chi-Square	df	Sig.
Log Rank (Mantel-Cox)	.097	1	.756

Test of equality of survival distributions for the different levels of Surfactant.

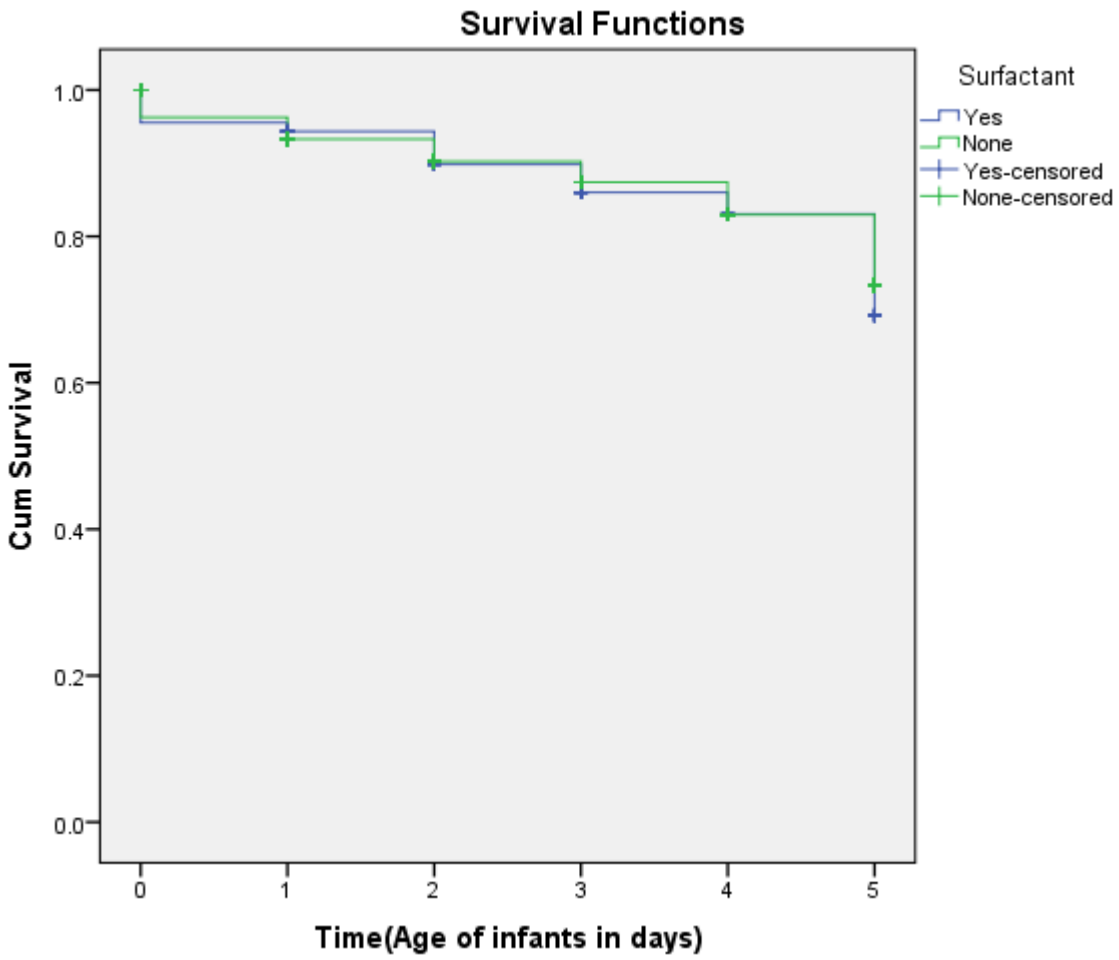

Figure 4.4.2.2 Kaplan Meier on surfactant treatment

Preterm and asphyxia babies given surfactant were more likely to survive (Fig. 4.4.2.2).

Of the 930 infants studied (Table 4.4.2.2), 161 did not receive oxygen therapy. Oxygen administration increased the survival of preterm and birth asphyxia infants. 91.3% survived, showing a significant correlation (sig 0.000). Table 4.4.2.3 shows that oxygen therapy lowers mortality in preterm and birth asphyxia infants.

Table 4.4.2.3 Survival rate according to Oxygen treatment.

Oxygen days	Total N	Died	Survived	
			N	Percent
Yes	769	67	702	91.3%
None	161	32	129	80.1%
Overall	930	99	831	89.4%

Overall Comparisons

	Chi-Square	df	Sig.
Log Rank (Mantel-Cox)	18.347	1	.000

Test of equality of survival distributions for the different levels of Oxygen days.

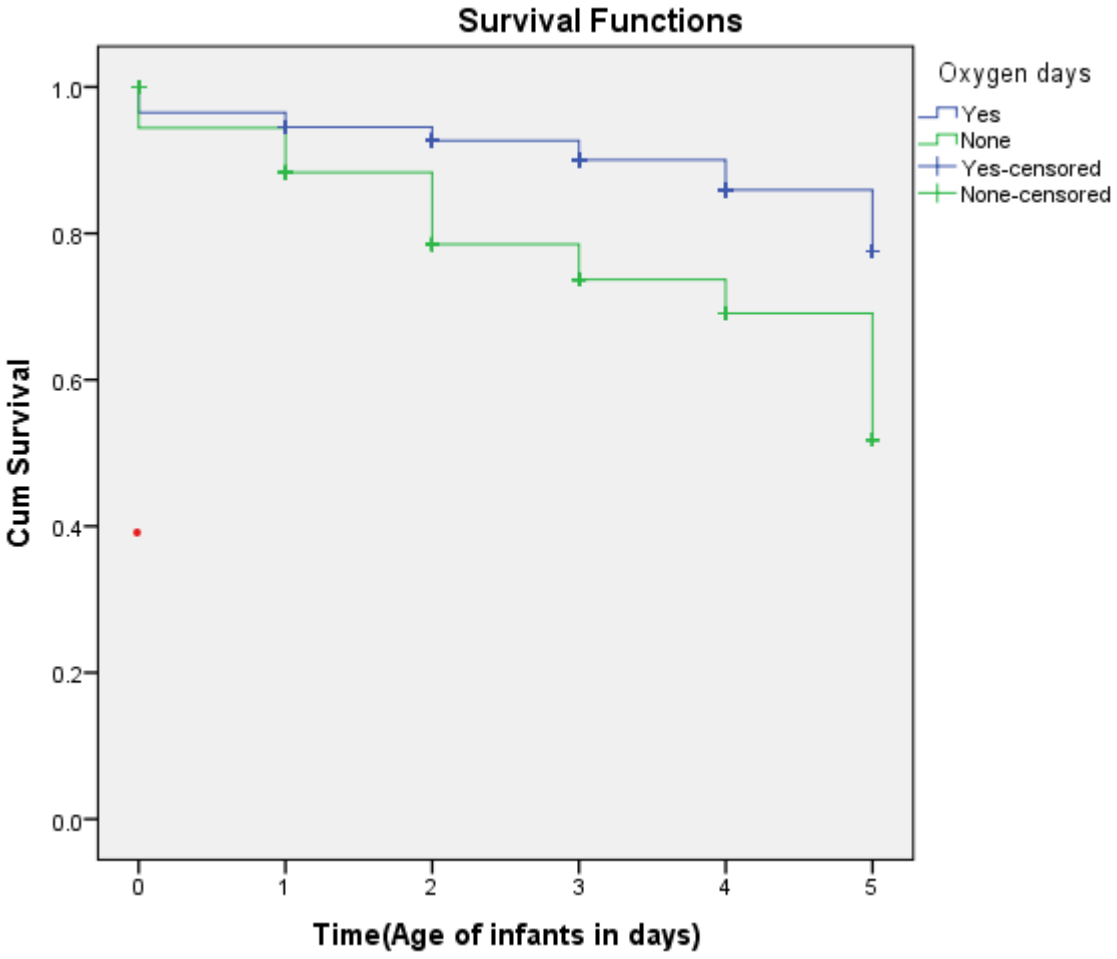

Figure 4.4.2.3 Kaplan Meier on oxygen treatment

Contrary, the survival analysis graph showed that from day 1, newborn infants receiving oxygen had poorer survival rate than new-born infants not receiving oxygen (as presented on Figure *4.4.2.3)*.

Table 4.4.2.4 showed improved survival of premature infants with severe birth asphyxia. Refer to Table 4.4.2.4 and Figure 4.4.2.4. Additional survival percentages by category. TJ > 400 umol/l had 88.9% survival (n=24), 0-200 umol/l had 89.4% survival (n=790), and 201-400 umol/l had 89.5% survival (n=17).

Table 4.4.2.4 Survival rate according to Total Jaundice (umol/l)

Total Jaundice category	Total N	Died	Survived	
			N	Percent
0-200	884	94	790	89.4%
201-400	19	2	17	89.5%
>400	27	3	24	88.9%
Overall	930	99	831	89.4%

Overall Comparisons

	Chi-Square	df	Sig.
Log Rank (Mantel-Cox)	.156	2	.925

Test of equality of survival distributions for the different levels of Total Jaundice category.

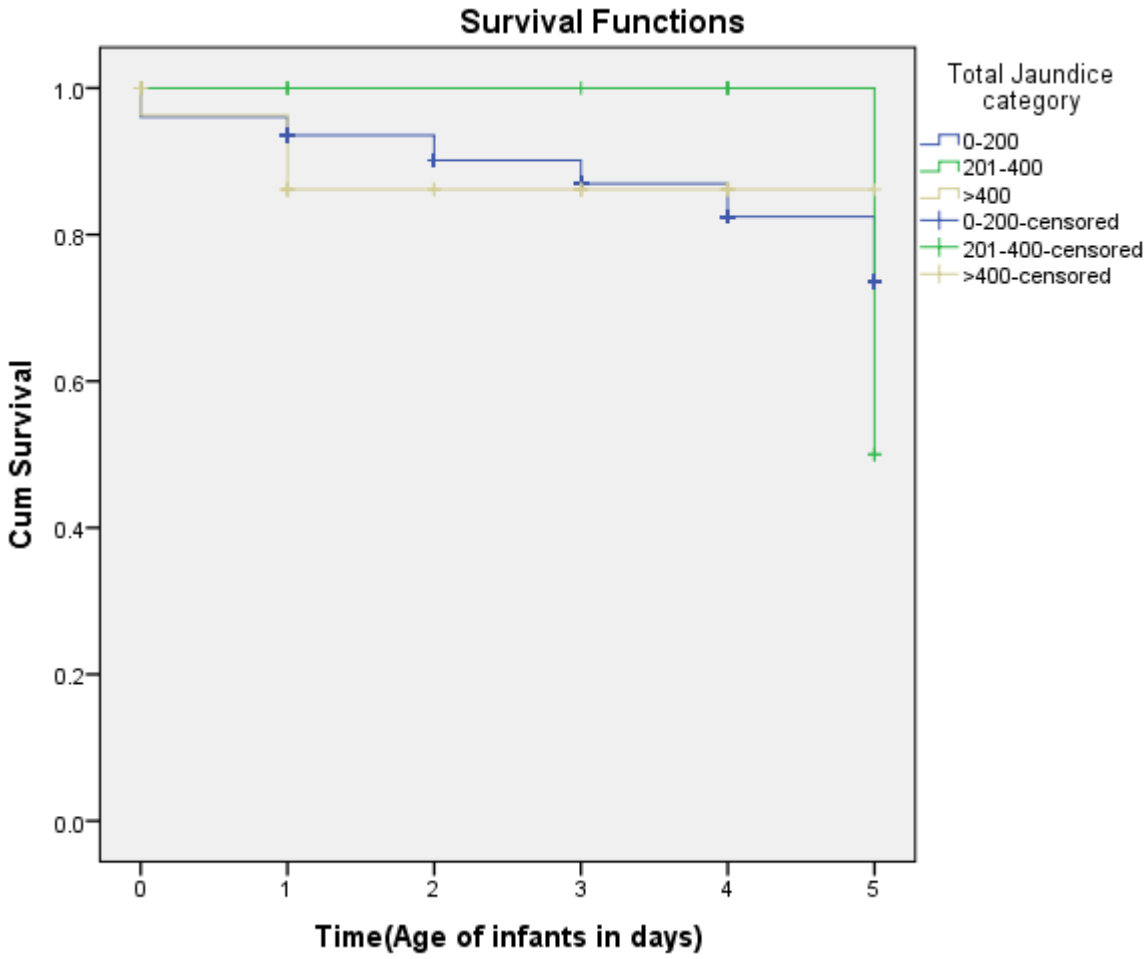

Figure 4.4.2.4 Kaplan Meier on Total Jaundice.

APGAR score on the survival rates

Scores from the APGAR at 1 and 5 minutes: According to the findings, an infant's chance of survival decreases with decreasing Apgar score and increases with an increasing Apgar score. This was corroborating on Tables 4.4.2.5 and 4.4.2.6, with respective survival rates of 89.7% and 90.6% at 0-3 Apgar scores at one minute and five minutes.

Table 4.4.2.5 Survival rate according to Apgar score at 1 minute.

APGAR Score at 1M category	Total N	Died	Survived	
			N	Percent
low (0-3)	68	7	61	89.7%
Medium (4-6)	111	13	98	88.3%
Normal (7-10)	751	79	672	89.5%
Overall	930	99	831	89.4%

Overall Comparisons

	Chi-Square	df	Sig.
Log Rank (Mantel-Cox)	.215	2	.898

Test of equality of survival distributions for the different levels of APGAR Score at 1M category.

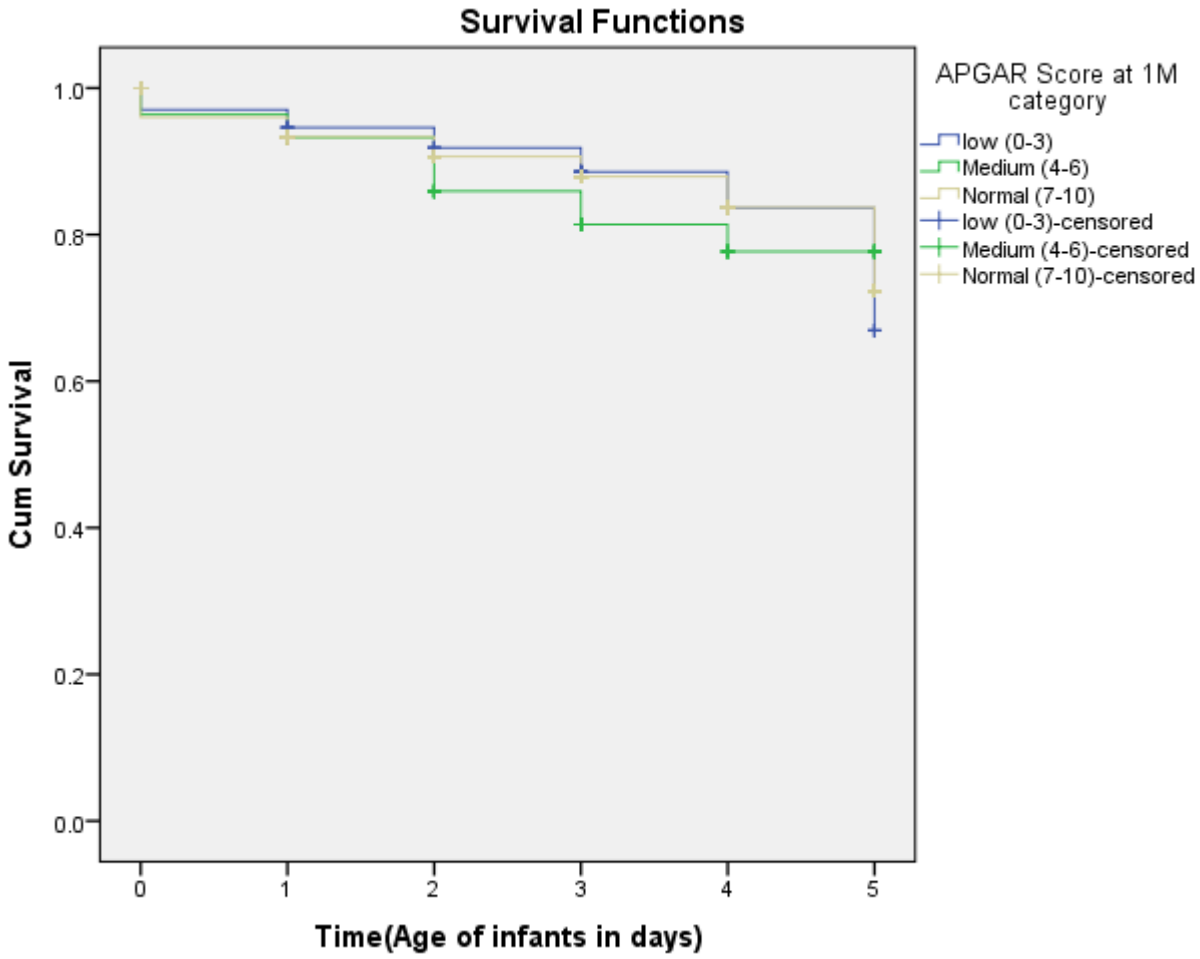

Figure 4.4.2.5 Kaplan Meier on the Apgar score at 1 minute

Table 4.4.2.6 Survival rate according to Apgar score at 5 minutes

APGAR Score at 5M category	Total N	Died	Survived	
			N	Percent
Low (0-3)	64	6	58	90.6%
Medium (4-6)	108	15	93	86.1%
Normal (7-10)	758	78	680	89.7%
Overall	930	99	831	89.4%

Overall Comparisons

	Chi-Square	df	Sig.
Log Rank (Mantel-Cox)	1.721	2	.423

Test of equality of survival distributions for the different levels of APGAR Score at 5M category.

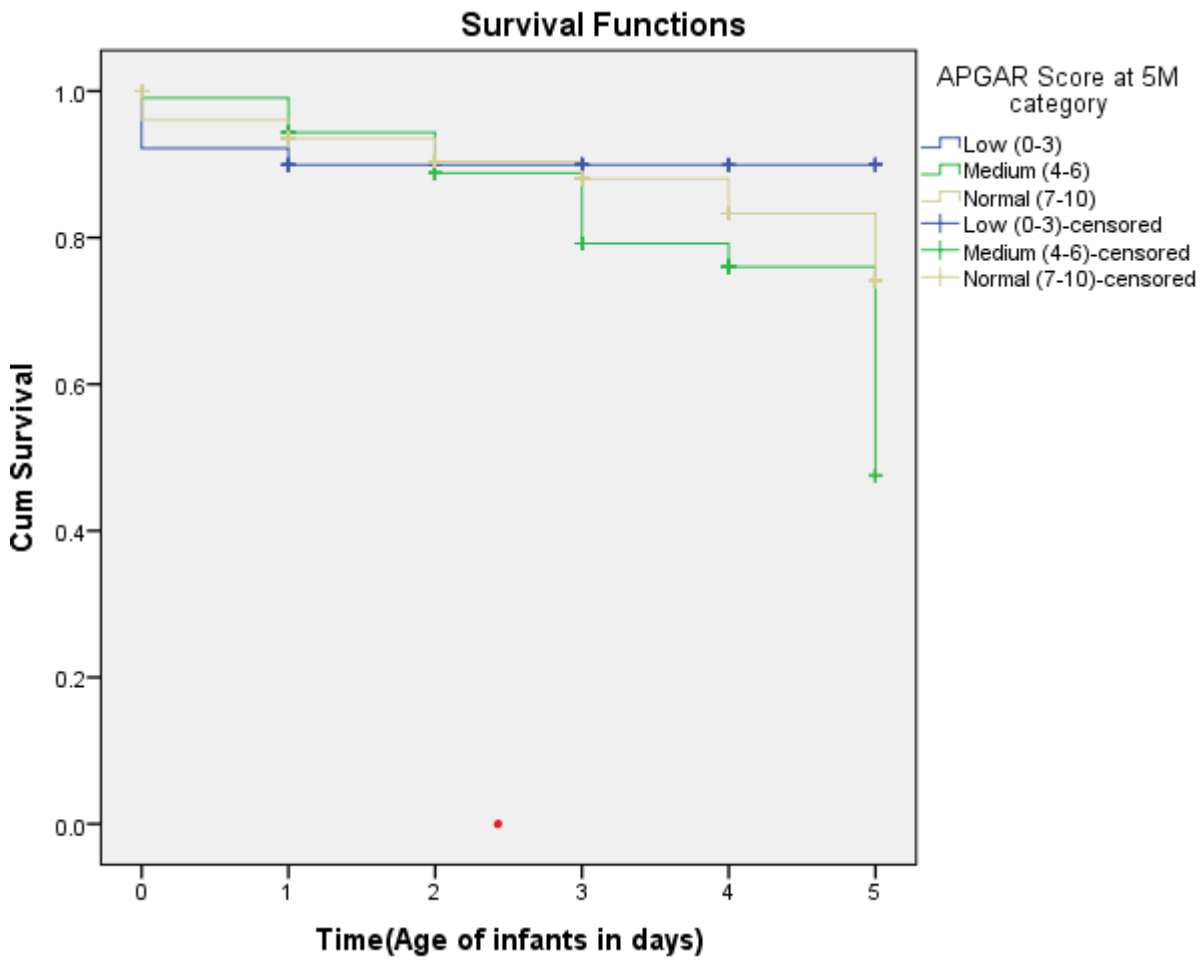

Figure 4.4.2.6 Kaplan Meier on the Apgar score at 5 minute

Table 4.4.2.6 indicated that from day 2 the preterm and birth asphyxia infants with normal Apgar scores (7-10/10) had a better chance of surviving.

Table 4.4.2.7 Apgar score statistics

APGAR Score 1M category	Low (0 - 3)	7	10.3%	61	89.7%	68	7.3%
	Medium (4 - 6)	13	11.7%	98	88.3%	111	11.9%
	Normal (7 - 10)	79	10.5%	672	89.5%	751	80.8%
APGAR Score 5M category	Low (0 - 3)	6	9.4%	58	90.6%	64	6.9%
	Medium (4 - 6)	15	13.9%	93	86.1%	108	11.6%
	Normal (7 - 10)	78	10.3%	680	89.7%	758	81.5%

Apgar score stats show that lower scores (1-5) mean lower survival chances (8.6% and 2%). Higher or normal scores (7-10) lead to higher survival rates (43.4% and 86.2%).

Intervention using phototherapy to increase survival rates

From Table 4.4.2.8 and Figure *4.4.2.8,* The phototherapy intervention resulted in an 82.5% success rate (52 out of 63) on infants who needed the treatment as shown in Table 4.4.2.8 and Figure *4.4.2.8.*

Table 4.4.2.8 Survival rate according to Phototherapy.

Phototherapy	Total N	Died	Survived	
			N	Percent
Yes	63	11	52	82.5%
None	867	88	779	89.9%
Overall	930	99	831	89.4%

Overall Comparisons

	Chi-Square	df	Sig.
Log Rank (Mantel-Cox)	3.006	1	.083

Test of equality of survival distributions for the different levels of Phototherapy.

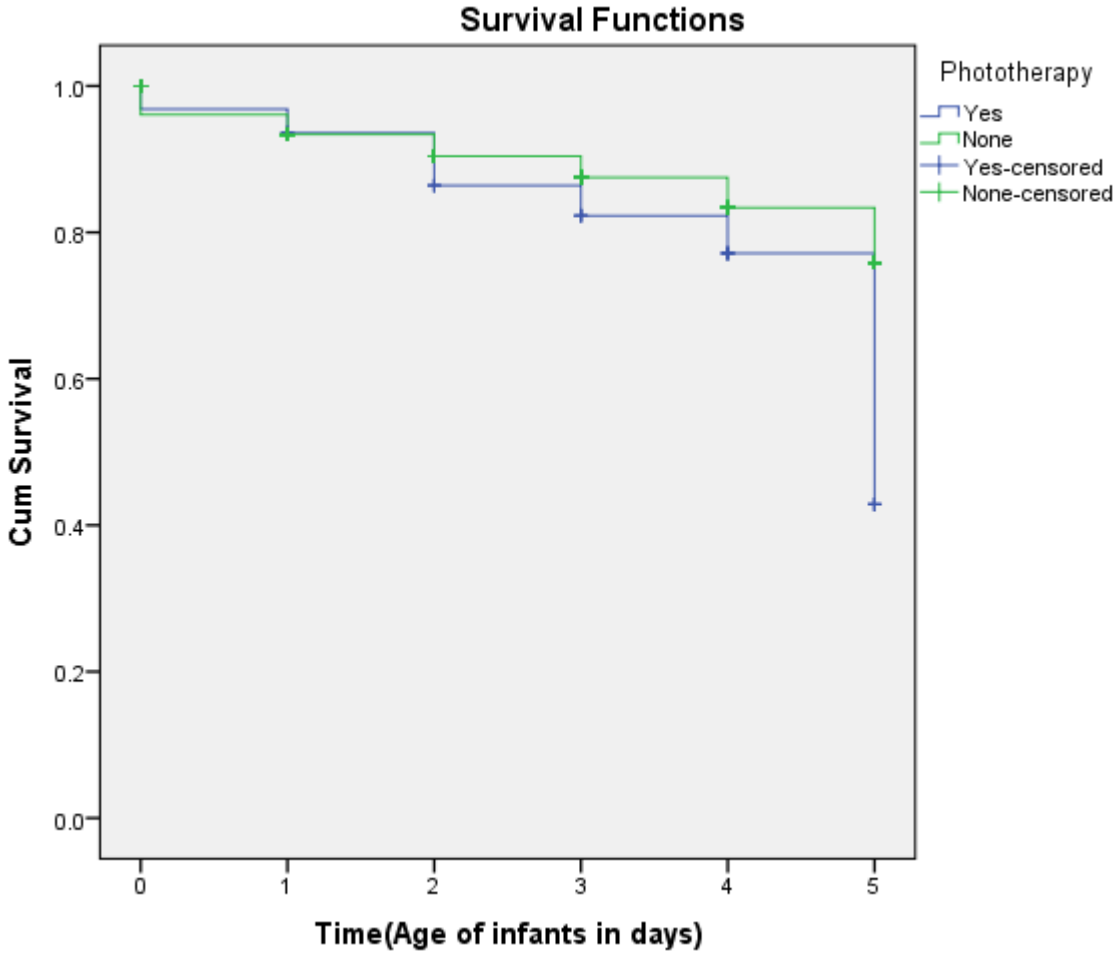

Figure 4.4.2.8 Kaplan Meier on Phototherapy intervention

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CPAP intervention on the survival rate

The CPAP intervention yielded an 89.1% success rate (164 out the 184) on infants who required the treatment.

Table 4.4.2.9 CPAP intervention.

CPAP	Total N	Died	Survived	
			N	Percent
Yes	184	20	164	89.1%
None	746	79	667	89.4%
Overall	930	99	831	89.4%

Overall Comparisons

	Chi-Square	df	Sig.
Log Rank (Mantel-Cox)	.339	1	.560

Test of equality of survival distributions for the different levels of CPAP.

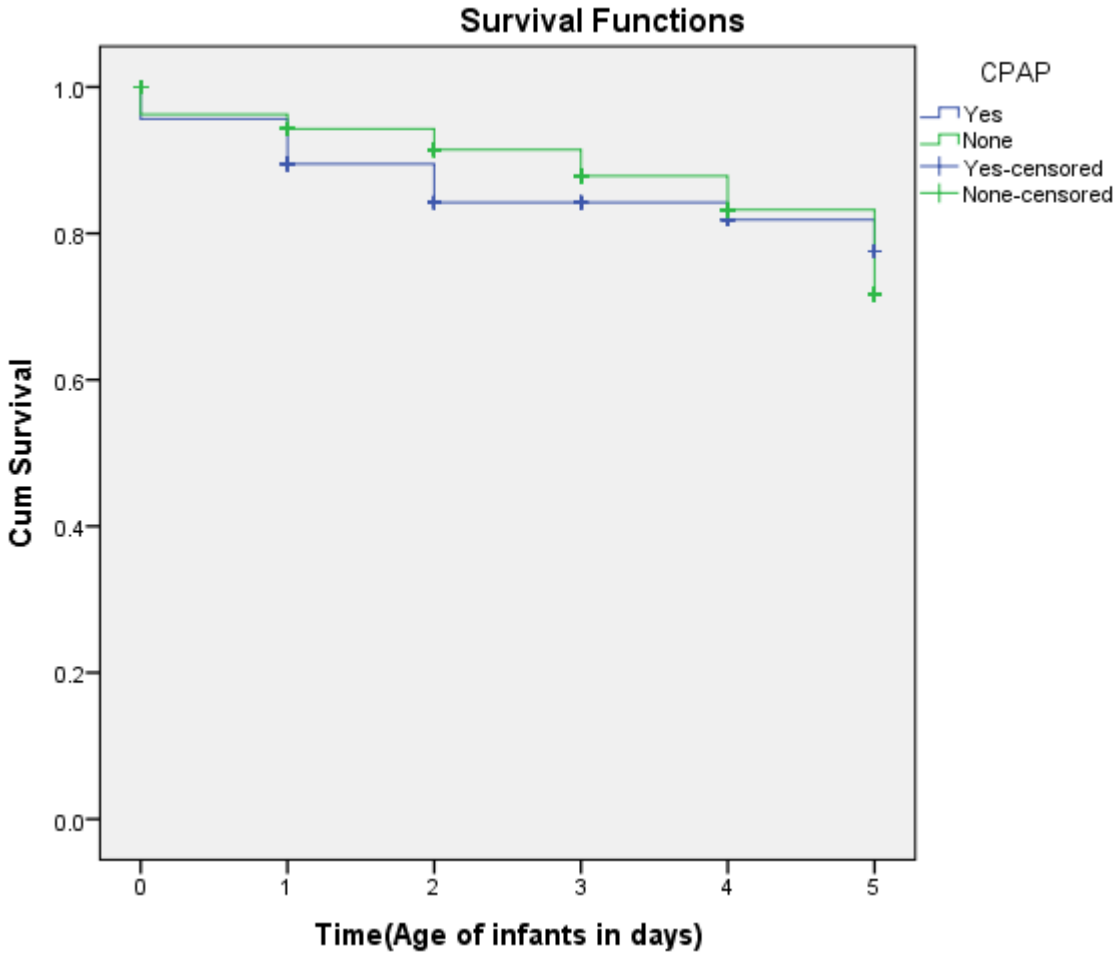

Figure 4.4.2.9 Kaplan Meier on CPAP intervention.

Use of antibiotics during pregnancy

Out of the 930 infants admitted in NNU, 17.74% of them received the first line antibiotics categories (L1) *(see table 4.4.2.10 for Antibiotic categories and table 4.4.2.11 for antibiotic given*). The specific outcomes for each category were as follows: First-line antibiotics 90.3% (n=149) survivors, second-line antibiotics (L2) = 96.0% (n=24), L1 + L2 = 90.4% (n=141). Infants given antibiotics in the L2 category had the highest survival rate, at 96.0%.

Table 4.4.2.10 Antibiotic categories

Categories	Antibiotic given
First-line Antibiotics (L1)	Pen G & Gent
Second-line Antibiotics (L2)	Amp & Amik
L1 + L2	Pen G + Gent & Amp + Amik
Others	Unknown, None, Gent, Amikacin, Pen G only

Table 4.4.2.11 Survival rate according to Antibiotics given.

Antibiotic infants given to infants	Total N	Died	Survived	
			N	Percent
First line antibiotics (L1)	165	16	149	90.3%
Second line antibiotics (L2)	25	1	24	96.0%
L1+L2	156	15	141	90.4%
Others	584	67	517	88.5%
Overall	930	99	831	89.4%

Overall Comparisons

	Chi-Square	df	Sig.
Log Rank (Mantel-Cox)	1.391	3	.708

Test of equality of survival distributions for the different levels of Antibiotic infants given to infants.

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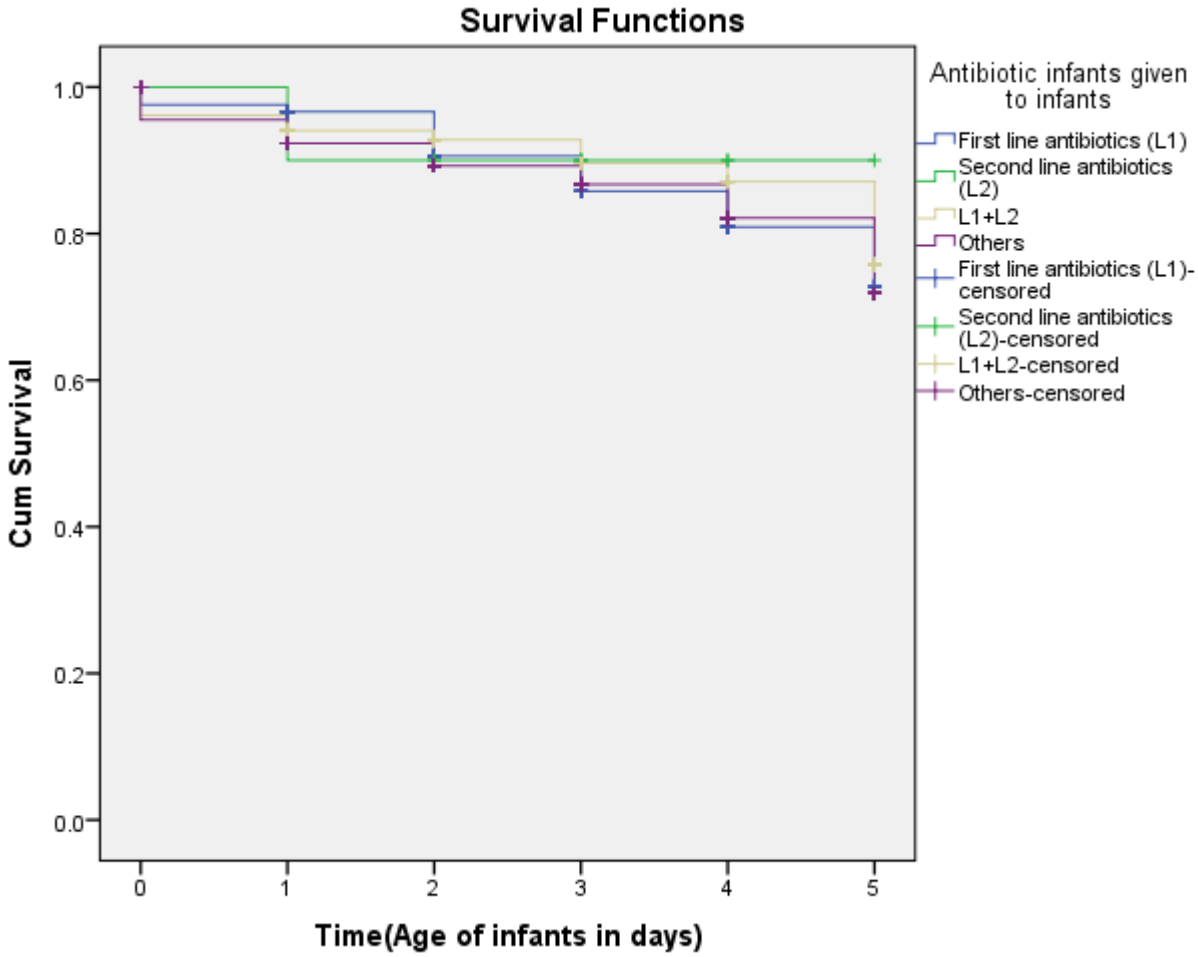

Figure 4.4.2.11 Kaplan Meier on antibiotics given

Figure *4.4.2.11* above of the graph illustrate that from 0 day up to 20 days, infants given a combination of L1 + L2 had a good chance of surviving.

4.5 Confounding factors (distance) on the survival rate of preterm and birth asphyxia infants.

Table 4.5.1 Survival rate according to Location of delivery.

Location of delivery	Total N	Died	Survived	
			N	Percent
Chiwaridzo	6	1	5	83.3%
Manhenga	4	2	2	50.0%
Tarlington	1	0	1	100.0%
BPH	755	79	676	89.5%
Takunda	6	2	4	66.7%
Foothills	6	2	4	66.7%
BBA	36	3	33	91.7%
Home	80	6	74	92.5%
Rutope	8	1	7	87.5%
Rusununguko	27	3	24	88.9%
Trojan	1	0	1	100.0%
Overall	930	99	831	89.4%

Overall Comparisons

	Chi-Square	df	Sig.
Log Rank (Mantel-Cox)	14.081	10	.169

Test of equality of survival distributions for the different levels of Location of delivery.

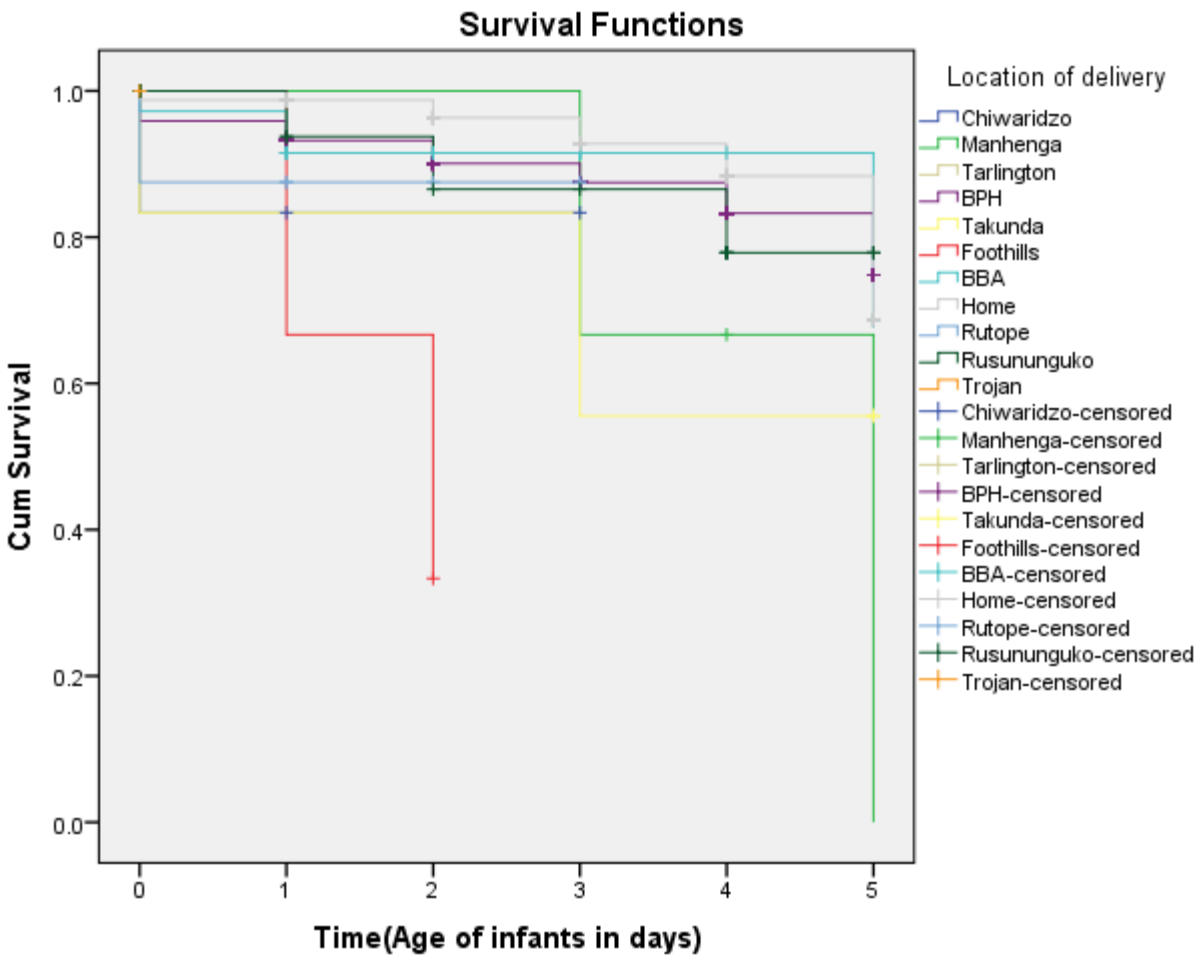

Figure 4.5.1 Kaplan Meier on the Location of delivery.

Table 4.5.1 shows that the overall survival rate for all regions was 89.4%, the highest percentage survival rates were recorded in Trojan, and Tarlington had the highest percentage survival 100.0% followed by BBA and Home delivery 91.7%and 92.5% respectively. BPH the referral hospital of all clinics in the Bindura district, 89.5% (n=676), Rusununguko 88.9% (n= 24), Rutope 87.5% (n=7), and Chiwaridzo 83.3% (n=5) respectively. Takunda 66.7% (n= 4), Foothills 66.7% (n=4), Manhenga 50.0% (n= 2) are the specific percentages for each site.

Table 4.5.2 Distance and how long it takes from district hospitals to BPH NNU (use of Google map) and these are the fastest time taken by ambulance to reach the Bindura Provincial Hospital Neonatal Unit.

Location of delivery	Distance (KM)	Time (in hours, minutes)
Chiwaridzo	11	12 Minutes
Chipadze	6	10 Minutes
Manhenga	21	21 Minutes
Tarlington	29	27 Minutes
Takunda	36	30 Minutes
Foothills	12	12 Minutes
Rutope	55	1 Hour and .40 Minutes

Rusununguko	80	2 Hours
Trojan	6	6 Minutes
Home Delivery	6-80	10 Minutes to 2 hours
Born Before Arrival (BBA)	10-100 miters	3 To 6 Minutes

Born Before arrival has the shortest referring distances, followed by Trojan clinic and Chipadze clinic as shown in Table 4.5.2. The Rusununguko and Rutope clinics with a respective distance of 80 and 55 KM are the farthest referring clinics in terms of both time and geography. The distance from home birth to Bindura Provincial Hospital is both short and long. On home deliveries, however, there was no precise indication of the delivery location.

4.6 Determinants of infant mortality in preterm and severe birth asphyxia

According to Table 4.6, severe birth asphyxia (n=17) was the second most common cause of infant death after severe prematurity (n=51). It is noteworthy to note that only 23 infants died as a result of Low, very low, and extremely low birth weights.

Table 4.6 Causes of deaths

Causes of death	Total N	Died	Survived	
			N	Percent
Severe birth asphyxia	172	17	155	90.1%
Respiratory Distress Syndrome	55	8	47	85.5%
Low birth weight	48	3	45	93.8%
Very low birth weight	44	5	39	88.6%
Extremely low birth weight	83	15	68	81.9%
Severe Prematurity	528	51	477	90.3%
Overall	930	99	831	89.4%

Overall Comparisons

	Chi-Square	df	Sig.
Log Rank (Mantel-Cox)	7.178	5	.208

Test of equality of survival distributions for the different levels of Causes of death.

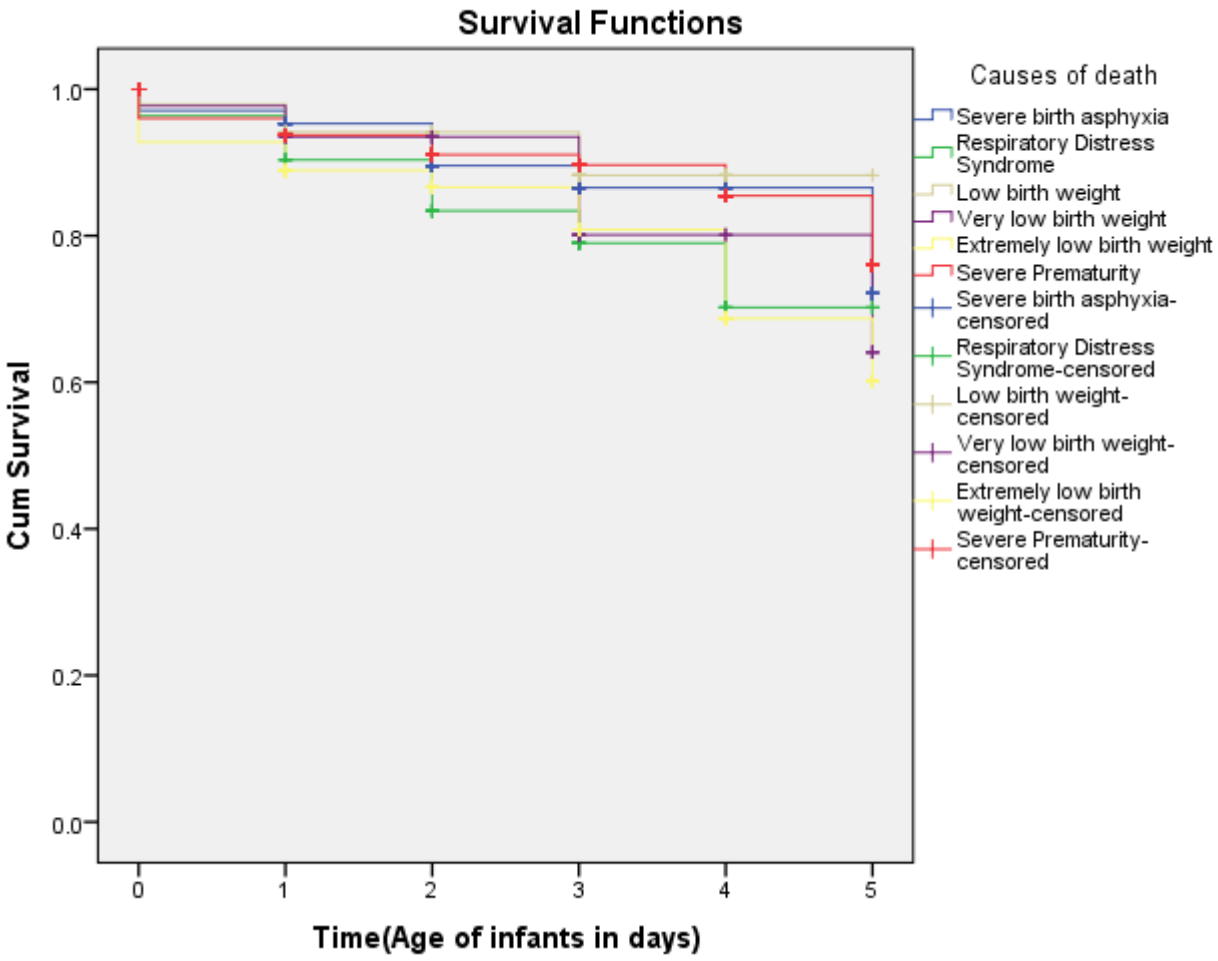

Figure 4.6 Kaplan Meier on Causes of death

4.7 Life expectancy on birth, gender, mode of delivery and survival rate

The study found that 930 infants were admitted to BPH NNU from Jan-Dec 2021, indicating a high rate of preterm and birth asphyxia births in Zimbabwe. This aligns with WHO's 2012 findings that 70% of preterm births occur in Africa and South Asia due to lower-income levels. 89.4% of preterm and birth asphyxia infants admitted at BPH-NNU survived, with lack of skilled staff attributed to the 10.6% mortality rate. Analysis shows few qualified pediatricians in the unit admitting over 50 infants monthly. Shortage of skilled pediatricians could harm preterm and birth asphyxia infants. A study by Mdala & Mash (2015) concludes that trained workers are necessary to improve survival rates of under-five infants. The male infants were 512 (55.1%) and female infants were 418 (44.9%). Survival rate was not linked to gender, with females and males having 88.8% and 89.8% survival respectively. Chi-square analysis showed

no significant difference between genders. Similar findings were seen in Shim et al.'s (2017) analysis on infant mortality. A study found that caesarean sections increased the risk of infant deaths, while natural vaginal delivery had high mortality rates. (Ibrahimou, Kodali & Salihu, 2015) The analysis showed that 94.0% (n=172) of caesarean babies survived, compared to 88.2% (n=659) of babies born naturally. The reasons for the higher survival rate in caesarean births may include preterm or birth asphyxia infants born naturally due to self-induction caused by medication or other factors during pregnancy. Pediatricians confirmed that self-induced delivery lowers survival rates in natural vaginal delivery. These infants have low birth weight due to self-induced abortion, which is a leading cause of infant mortality. 670 infants had low birth weight (<2500 g) and some with grave birth defects including gastrointestinal, heart, and respiratory organ conditions, reducing their chances of survival. 68 infants died due to birth asphyxia and severe prematurity, according to Table 4.6. Many NVD infants are born at home with no proper resuscitation, making it too late to save them when they reach the hospital. Medical staff will still try to save them, but to no avail.

4.8 The impact of fetal age and birth weight on survival rate

4.8.1 Birth weight

Low birth weight is the main cause of infant deaths, with higher mortality rates for babies weighing 1501-250g. The best survival rate (100%) was found in infants with extremely low birth weight (<600 g). This supports Luthuli & McKerrow's (2019) findings that the highest survival rate was in babies weighing >1500 g. Infant weight at birth is often used in studies and is linked to mortality and morbidity. Low birth weight survival rates may be misleading due to a small sample size. (Amosu, 2014) The lack of basic care for infants in perinatal care can affect their survival. The researcher believes overcrowding in the 16-bed unit (admitting 40-60 infants a month) may compromise infant care and increase infection risks. Martines et al. (2015) found that experienced care during birth and community-based care with postnatal home visits improve survival rates for preterm and birth asphyxia infants. Our study agrees with Luthuli & McKerrow (2019) that normal birth weight babies' survival rates increase with fetal age and birthweight. Mode of delivery, 5-minute Apgar score, and time to admission did

not affect NBW neonatal survival rates. Per Table 4.2.2, babies with certain birth weights had lower survival rates.

4.8.2 Fetal age

Fetal age is the most effective indicator of prematurity. Most premature infants (GA 25-32 weeks) had a mortality rate of 7.4%, with 92.6% surviving. Agrees with Blencowe et al. (2019): lower fetal age, lower survival chances. Prematureness is classified by fetal age as extremely premature (<28 weeks), very premature (28-32 weeks), and moderate or late premature (32-37 weeks) (Quinn, et al. 2016). Survival rate decreases as fetal age increases: Extremely premature 92.6%, very premature 89.5%, moderate premature 85.3%, full term 84.9%. This is consistent with Ibrahimou, Kodali, & Salihu's (2015) finding that preterm infants have higher death rates with decreasing age or weight. Fetal age and weight are good indicators of survival rate. The analysis aligns with Patel et al. (2015), who found 25% of infants born at 22-28 weeks don't survive initial hospitalization, with mortality decreasing with each additional completed fetal week. Low fetal age infants have a low survival rate due to factors such as low birth weight, asphyxia, and respiratory distress syndrome (refer to Table 4.6). These conditions may also lead to death for full term infants. Very preterm and birth asphyxia babies require extended hospital stays, increasing their risk of acquiring nosocomial infections. Overcrowding in BPH-NNU caused nosocomial infections. Our analysis demonstrated that the number of beds available for infants ranging from 40-60 per month was merely 16. This phenomenon is comparable to the findings of Luthuli and McKerrow's (2019) investigation, wherein the likelihood of survival was demonstrated to increase with fetal age and birth weight. Resende et al. can be attributed to as the authors of the respective text. According to the study by (2015), preterm and asphyxiated newborns in developing nations are susceptible to infections in densely populated neonatal care units. Our findings agree with Resende et al. (2015) as most infants (51 deaths) died from severe prematurity, followed by severe birth asphyxia (17 deaths) and extremely low birth weight (15 deaths). Results show that NICU infections were mostly because of overcrowding with 16 beds for 40-60 infants monthly.

4.9 Reason for admission

Most admissions were due to low birth weight, birth asphyxia, severe low birth weight, and respiratory distress syndrome (refer to Table 4.3.1). Most preterm and birth asphyxia infants

experience underdeveloped organs, with the most frequent issue being respiratory distress syndrome due to immature lungs. Preemies get RDS due to low surfactant levels in their lungs. Keeps air sacs open. Premature babies struggle to breathe due to undeveloped lungs. Neonates experiences a cessation of breathing lasting for more than 15 seconds is recognized as an apnea in medical field. Hoque et al. (2015) found that prematurity, low birth weight, and neonatal infection are primary reasons for neonatal hospitalization. Birth asphyxia infants have digestive, congenital, blood, and viral/bacterial issues.

4.10 Maternal factors on survival rate

Infants of HIV-positive mothers have a higher survival rate (96.2%) due to close monitoring of growth, neurodevelopment, and exposure to infectious diseases compared to infants of HIV-negative mothers (88.7%). Low survival rate in HIV-negative mothers may be due to lack of prophylaxis given to infants within 24-48 hours, resulting in harmful viruses causing NEC, suppressing the immune system, leading to nosocomial infections and death. This is addressed in the MoHCC Strategic Plan-2017/2018 – 2021/2022 concerning maternal health and safety. HIV transmission from mother to child has reduced to 3% in 2017 from 13% in 2012, thanks to the introduction of lifelong ART for PMTCT (OPTION B+) in 2014, in accordance with WHO guidelines. Child Health success includes better stillbirth, neonatal and infant mortality rates, under five mortality rate, and expanded immunization.

4.11 Impact of Medical treatments received by mother on survival rate

The limited proportion of females (7. 2%) reportedly administered with dexamethasone may be attributed to inadequate record-keeping, which could potentially compromise the validity of the analysis given the obscurity of the data selection process. The researcher asserts that certain maternal immunizations may have been inaccurately documented, potentially casting doubt on the validity of the study's findings.

4.12 The perinatal interventions

Resuscitation helps a baby breathe properly with oxygen therapy, suction, and ventilation. 88.2% of ventilated infants survived, while 10.4% of non-ventilated infants died. This is not evidence of harm from the treatment, but rather indicates that ventilated infants are severely asphyxiated at birth and require extreme measures, which can increase mortality rates. Infants on ventilators are underdeveloped and vulnerable, likely to acquire fatal infections. Issue:

Infants referred from district hospitals have high death risks. Poor resuscitation and basic care during transportation to BPH-NNU worsens their condition. Cannualisation and positive pressure ventilation can cause ventilator-induced respiratory organ injury and infection. Carvalho et al. (2018) found mechanical ventilation harmful for preterm and birth asphyxia infants; non-invasive techniques are safer. Our study cannot confirm these results as ventilator use was unknown. 91.3% (n=702) of infants given oxygen survived, while only 10.2% (n=16) given surfactant didn't. Oxygen may aid in the recovery of infants suffering from respiratory distress syndrome. Infant survival rates below 50% after surfactant treatment may be caused by Cannualisation injuries. The use of surfactant during Cannualisation can increase the risk of infection and decrease survival rates. BPH NNU accommodates 16 beds and admits 40-60 infants monthly. Overcrowding leads to difficulty controlling infection. Oxygen given to infants with respiratory distress syndrome resulted in a 91.3% survival rate. Oxygen can improve survival for jaundiced infants. Infant jaundice is common in premature and some breastfed babies due to their underdeveloped liver. Our study shows that Total jaundice (TJ) does not correlate with survival rates of preterm and birth asphyxia infants. Lower Apgar scores indicate higher chances of survival, with an 89.7% to 90.6% survival rate for 0-3 Apgar scores at 3- and 5-minute intervals. Similar to Hatupopi (2016), 16% of neonatal deaths at the studied hospital had a low Apgar score at birth. Phototherapy can help decrease bilirubin levels and reduce transfusion needs in neonates. Phototherapy is administered by assessing bilirubin levels according to guidelines for all weights and fetal age. This helps clinicians evaluate the risk of hyperbilirubinemia or jaundice in newborns over 35 weeks. Phototherapy is given when neonates have high TJ levels, with a success rate of 82.5%. Phototherapy lowers bilirubin levels and increases survival rates, reducing the need for transfusions and preventing kernicterus (Bhutani & Wong, 2013). 89.1% of infants given CPAP survived, with the rest dying from prematureness and respiratory issues like RDS. Early CPAP with selective surfactant administration lowers mortality compared to early surfactant therapy (Polin et al., 2014). 17.74% of infants received L1 antibiotics. Survival rates for L1, L2, and L1+L2 were 90.3%, 96.0%, and 90.4%, respectively. The top survival rate for infants was 96% with L2 antibiotics. First-line antibiotics are initially used with high clinical effectiveness and fewer side effects. 2nd-line antibiotics are used if first-line meds are ineffective or produce side effects. High survival in L2 indicates either mild disease or effective antibiotics. Giving infants

more antibiotics decreases their chances of survival. A study found that antibiotics disturb important bacteria in infants and can lead to increased risks of necrotizing enter colitis and other immune-related diseases. Results align with literature as 99 of 930 infants died from low birth weight, birth asphyxia, prematurity, and respiratory distress.

4.13 Confounding factors and obstetric factors

The survival rate for all regions was 89.4%, with Trojan and Tarlington having the highest at 100%. Home delivery had a rate of 92.5%, born before arrival had 91.7%, BPH had 89.5%, Rusununguko had 88.9%, Chiwaridzo had 83.3%, Takunda and foothills had 66.7%, and Manhenga had 50%. The researcher believes BPH's high survival is due to the hospital's proximity to mothers and a high number of admitted infants compared to other clinics. It's worth noting that remote referral points had lower survival rates than BPH. Infants' conditions may worsen due to dislodged tubes and lines, leading to poor survival outcomes. Looking at Table 4.6, most cited infant deaths were due to blood problems (like symptoms and thrombocytosis) related to birth asphyxia, resulting in low survival rates. Maintaining homeostasis and treating metabolic disorders rely on fluid and balance. An electrolyte imbalance occurs when levels are too high or low, which must be maintained for proper bodily function. Please provide more context or the specific text that needs to be shortened.

4.14 Conclusion

In this chapter, data visualization and analysis were provided. According to the findings, there is a significant decrease in the likelihood of survival in low FA (<31 weeks) and low birth weight (<1500g) infants. According to the findings, the place and the methods of delivery can hurt an infant’s chance of surviving a preterm birth or birth asphyxia. Infants born preterm or birth asphyxia have a lower survival rate when given antibiotics and resuscitation.

The findings of the investigation revealed a positive correlation between fetal age or birth weight and mortality rates in premature and birth asphyxia neonates. Alternative factors such as delivery location, appropriate resuscitation methods, administration of antibiotics and vaccines, along with maternal vaccination of the mother, if performed dutifully, have demonstrated the potential to enhance the survival rate of infants. Mechanical ventilation and surfactant therapy during childbirth have been identified as perinatal factors that decrease the likelihood of survival for neonates born preterm or with birth asphyxia.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

The previous chapter centered on the discussion of the results. This chapter can check up on the conclusion and suggestions wherever applicable.

5.2 Conclusion

The study discovered that the survival rate at Bindura Provincial Hospital – the neonatal unit was 89.4% like the findings from comparable studies in different resource-limited settings. The conclusion was drawn as per the study's objectives, and recommendations for any observation and analysis are developed.

A total of 930 infants were admitted to the ward from 1 January to 31st December 2021. Male infants (55.1%) outnumbered female infants (44.9%) and also the higher survival was determined with infants delivered through caesarian delivery (94.0%).

The analysis ended that the lower the fetal age the higher the prospect of infants to survive. It also finished that infants with a birth weight of < 1500 g had a higher chance of living.

This study also found that positive HIV mothers harm the survival rate of preterm and birth asphyxia infants. The study also discovered that some medical interventions like ventilators and surfactants improved the survival of preterm and birth asphyxia infants. the requirements for intubation and positive pressure ventilation are related to respiratory organ injury {which might} lead to infant infection and eventually can cause death. Therefore, needed skilled medical personals. The use of oxygen, phototherapy, and CPAP yielded victorious survival rates as a result of the majority of infants who received these medical interventions surviving. The study finished that second-line antibiotics were effective since 96.0% of infants administered first-line antibiotics had survived.

The overall survival rate for infants from the furthest referral points was around 88.9%, compared to the local infants.

5.3 Recommendations

Based on this study, the subsequent recommendations seem to apply to the development of the survival rate in BPH NNU:

• There could be a want for extending the BPH neonatal unit to be able to accommodate additional infants to avoid overcrowding within the ward, this method will reduce the infant's infection to produce quality health care;

• Ministry of Health and Child Care need to make sure that different health facilities that refer their crucial preterm and birth asphyxia infants to Bindura provincial hospital have qualified pediatricians in their neonatal ward. They need to strengthen health care systems in the country, grouping workforce information to work out staffing ratios, and infants' outcomes, and provide and demand to possess learned hands within the most required areas;

• Ministry of Health and Child Care needs to develop a Nursery integrated set of technologies designed to combat the foremost common causes of newborn death and appearance for effective health interventions in low-resource settings;

• To roll out a country-wide awareness campaign on prematureness and infants born with birth defect's survival;

• They need to educate the community regarding the results of birth reception. There could be a need to equip and build good human capability capable of effectively running different referral centers. The study recommends that the Ministry of Health and Child Care need to upgrade the neonatal ward from district-referring clinics from far areas such as Rutope, Takunda, Tarlington, and Manhenga to be able to attend to crucial preterm and severe birth asphyxia infants;

• The study ended that second line antibiotics were effective since of infants administered first-line antibiotics had 96.0% survival. However, this show that there's a need to improve;

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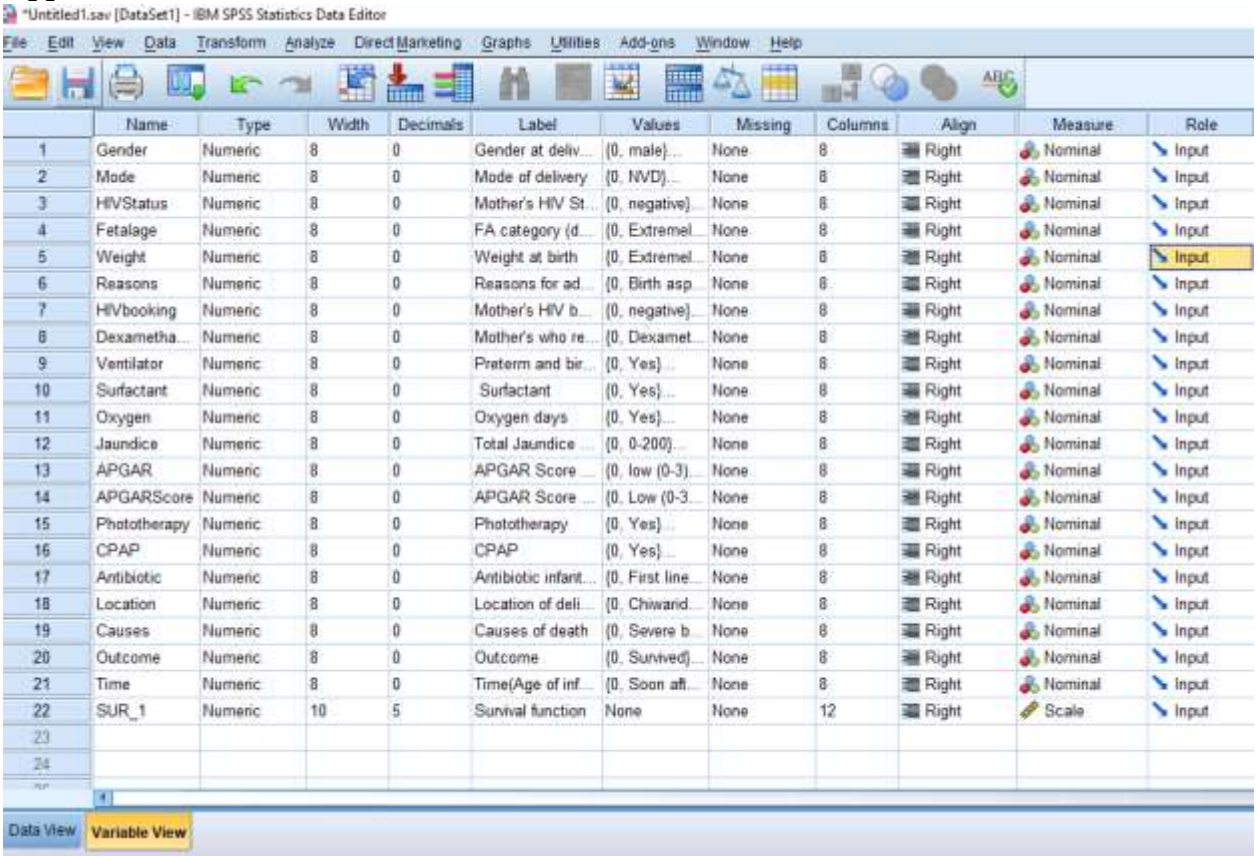
APPENDIX

Appendix 1


*Untitled1.sav [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	Gender	Numeric	8	0	Gender at deliv...	{0, male}...	None	8	Right	Nominal	Input
2	Mode	Numeric	8	0	Mode of delivery	{0, NVD}...	None	8	Right	Nominal	Input
3	HIVStatus	Numeric	8	0	Mother's HIV St...	{0, negative}...	None	8	Right	Nominal	Input
4	Fetalage	Numeric	8	0	FA category (d...	{0, Extremel...	None	8	Right	Nominal	Input
5	Weight	Numeric	8	0	Weight at birth	{0, Extremel...	None	8	Right	Nominal	Input
6	Reasons	Numeric	8	0	Reasons for ad...	{0, Birth asp...	None	8	Right	Nominal	Input
7	HIVbooking	Numeric	8	0	Mother's HIV b...	{0, negative}...	None	8	Right	Nominal	Input
8	Dexametha...	Numeric	8	0	Mother's who re...	{0, Dexamet...	None	8	Right	Nominal	Input
9	Ventilator	Numeric	8	0	Preterm and bir...	{0, Yes}...	None	8	Right	Nominal	Input
10	Surfactant	Numeric	8	0	Surfactant	{0, Yes}...	None	8	Right	Nominal	Input
11	Oxygen	Numeric	8	0	Oxygen days	{0, Yes}...	None	8	Right	Nominal	Input
12	Jaundice	Numeric	8	0	Total Jaundice ...	{0, 0-200}...	None	8	Right	Nominal	Input
13	APGAR	Numeric	8	0	APGAR Score ...	{0, low (0-3)...	None	8	Right	Nominal	Input
14	APGARScore	Numeric	8	0	APGAR Score ...	{0, Low (0-3...	None	8	Right	Nominal	Input
15	Phototherapy	Numeric	8	0	Phototherapy	{0, Yes}...	None	8	Right	Nominal	Input
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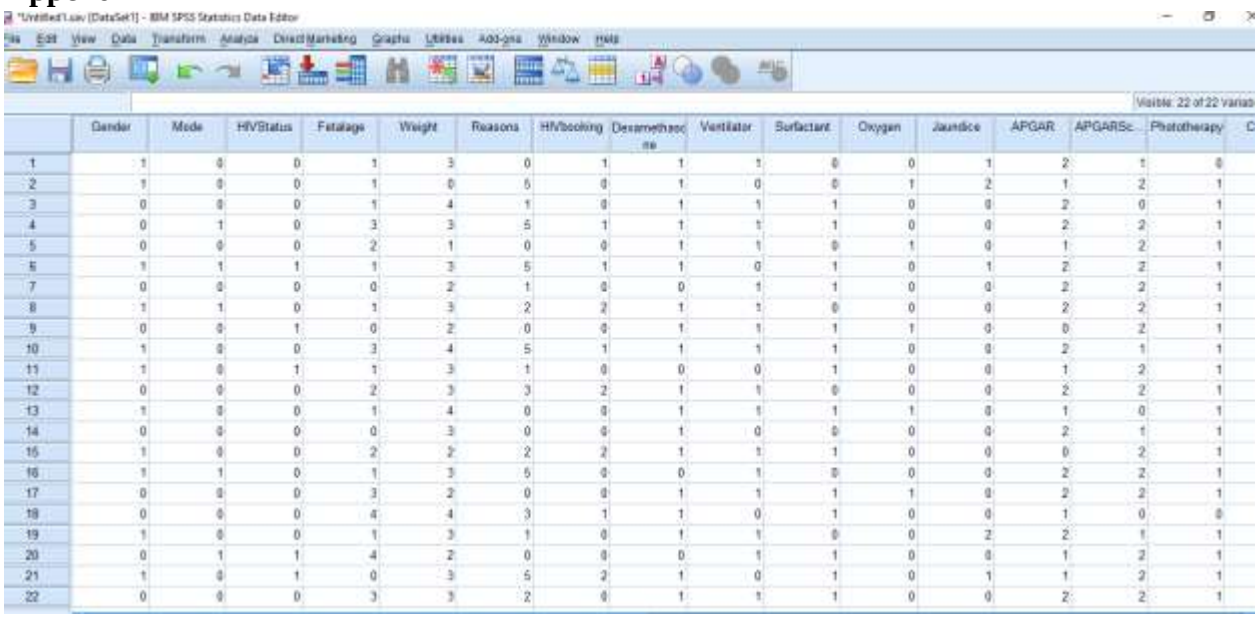
20	Outcome	Numeric	8	0	Outcome	{0, Survived}...	None	8	Right	Nominal	Input
21	Time	Numeric	8	0	Time(Age of inf...	{0, Soon aft...	None	8	Right	Nominal	Input
22	SUR_1	Numeric	10	5	Survival function	None	None	12	Right	Scale	Input
23											
24											

Data View | Variable View

Appendix 2



	Gender	Mode	HIVStatus	Fetalage	Weight	Reasons	HIVbooking	Dexamethasone	Ventilator	Surfactant	Oxygen	Jaundice	APGAR	APGARSc	Phototherapy
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2	1	0	0	1	0	5	0	1	0	0	1	2	1	2	1
3	0	0	0	1	4	1	0	1	1	1	0	0	2	0	1
4	0	1	0	3	3	5	1	1	1	1	0	0	2	2	1
5	0	0	0	2	1	0	0	1	1	0	1	0	1	2	1
6	1	1	1	1	3	5	1	1	0	1	0	1	2	2	1
7	0	0	0	0	2	1	0	0	1	1	0	0	2	2	1
8	1	1	0	1	3	2	2	1	1	0	0	0	2	2	1
9	0	0	1	0	2	0	0	1	1	1	1	0	0	2	1
10	1	0	0	3	4	5	1	1	1	1	0	0	2	1	1
11	1	0	1	1	3	1	0	0	0	1	0	0	1	2	1
12	0	0	0	2	3	3	2	1	1	0	0	0	2	2	1
13	1	0	0	1	4	0	0	1	1	1	1	0	1	0	1
14	0	0	0	0	3	0	0	1	0	0	0	0	2	1	1
15	1	0	0	2	2	2	2	1	1	1	0	0	0	2	1
16	1	1	0	1	3	5	0	0	1	0	0	0	2	2	1
17	0	0	0	3	2	0	0	1	1	1	1	0	2	2	1
18	0	0	0	4	4	3	1	1	0	1	0	0	1	0	0
19	1	0	0	1	3	1	0	1	1	0	0	2	2	1	1
20	0	1	1	4	2	0	0	0	1	1	0	0	1	2	1
21	1	0	1	0	3	5	2	1	0	1	0	1	1	2	1
22	0	0	0	3	3	2	0	1	1	1	0	0	2	2	1