FACTORS INFLUENCING NEONATAL SEPSIS IN NEONATES IN KYABUGIMBI HC1V BUSHENYI, WESTERN UGANDA

BY

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DCM/0008/152/DU

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DECLARATION

I **SSENKUMBA AKILEO** declare that this proposals my own work and it has never been presented to any university or any institution for the award of a degree, a diploma, or any other qualification whatsoever.

Where the work of other people has been included, acknowledgement to this has been made in accordance to the text and preferences.

Signature……..... **Date…….....**

SENKUMBA AKILEO

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APPROVAL

I do recommend that the proposal be presented to faculty board for examination and approval for the student to conduct this research under my supervision.

Signature..... **Date**.....

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LIST OF ACRONYMS AND ABBREVIATIONS

ANC	Antenatal Care
DHO	District Health Officer
EOS	Early Onset Sepsis
FGD	Focus Group Discussion
HIV	Human Immunodeficiency Virus
HSSP	Health Sector Strategic Plan
IMCI	Integrated Management of Childhood Illnesses
IPT	Intermittent Presumptive Treatment for Malaria
LBW	Low Birth Weight
MCH	Maternal and Child Health
MDG	Millennium Development Goal
MOH	Ministry Of Health
NMR	Neonatal Mortality Rate
PDC	Parish Development Committee
PMTCT	Prevention of Mother to Child Transmission of HIV
TBA	Traditional Birth Attendant
TT	Tetanus Toxoid
UDHS	Uganda Demographic and Health Survey
WHO	World Health Organization
IMNCI	Integrated Management of Neonatal and Childhood Illness

OPERATIONAL DEFINITIONS

A neonate (New born): Baby from birth until 28 completed days of life.

Antenatal care: Health care provided to the pregnant woman, within a clinic or outreach service context.

Birth weight: Weight of baby within 48 hours of birth (ideally taken as soon as after birth as possible).

Care during delivery: This is the time from onset of labor until completion of the third stage of labor; interventions may include skilled birth attendant, high quality emergency obstetric care and basic resuscitation.

Care during pregnancy: Care throughout pregnancy until onset of labor including care both at home and in the formal health care system such as in an antenatal clinic.

Gestational age: Number of complete weeks of pregnancy since the last menstrual period of the mother: Gestational age can also be assessed by examining the physical characteristics of the baby.

Intermittent Presumptive Treatment 2 (IPT2): Refers to the receipt by the pregnant woman of at least two doses of Fansidar after the first trimester.

Live birth: A baby born with any sign of life regardless of weight or gestation.

Low birth weight: Birth weight of <2500g.

Neonatal mortality rate (NMR): Refers to the number of neonatal death per 1000 live births.

Neonatal mortality: Refers to the probability of dying within in the first month of life.

Neonatal period: The first 28 days of life**,** divided in to early neonatal period (first 7 days) and late neonatal period (day 8-28).

Neonatal sepsis: Refers to generalized bacterial infection documented by appositive blood culture in the first 28 days of life.

Newborn (Neonatal) care: Care from birth till 28th completed day of life including care both at home and in formal health care system.

Preterm birth: Live birth before 37 completed weeks of gestation.

Risk factors for neonatal mortality: Refers to the factors that are responsible for the neonatal death.

Skilled attendant: Individuals with midwifery skills (i.e. doctors, midwives, nurses) who trained to proficiency in the skills to manage normal deliveries diagnose and manage or refer complicated cases.

Tetanus toxoid 2 (TT2): Refers to receipt by the woman of reproductive age of at least 2 doses of tetanus toxoid vaccine with a one month interval between the doses

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ABSTRACT

This study was conducted in Bushenyi western Uganda at Kyabugimbi HCIV to determine the risk factors of neonatal sepsis in, so as to recommend interventions for the DHT to improve neonatal health. A questionnaire consisting of both closed and open ended questions was used to collect both qualitative and quantitative data. SPSS was used for data entry and analysis and data was presented in tables**.**

Majority were Banyankole accounting to 60.5% of the respondents. Of these majority of the respondents were ranging from 20-25 years with 51.2%, followed by 26-30 years with 28%. With majority of the respondents were from rural with 65.1% and urban with 34.9%. In Additional to this majority of the respondents where for primary level with 58.1% and the least were college and higher institution level with 9.3%. Majority of the mother visited health facilities ANC accounting to 95.3% of the respondents. According to the study the average duration of labor was approximately 15 hours. The virginal examination was averagely 5 times before delivery. The mother attended ANC with an average approximated as 3 times before delivery. Majority of the mother delivered by spontaneous vaginal delivery with 58.1% and Caesarean section was 34.9%. Majority of the mother were assisted by health professionals with 83.7%.

The respondents' neonates' sex majority were females with 55.8% and male with 44.2%. The average days of neonate was approximating to 9 days with maximum days being 27 days and minimum days less than a day that is 0.17 days. And majority of these neonates were born from hospitals with 55.8%. Majority of the neonates had fever like symptoms accounted to 95.3%.

In conclusion, this study has found that both maternal and neonatal factors had contributed to the risk of neonatal sepsis. History of maternal UTI/STI, place of delivery, low Apgar score at 5^{th} minute and not crying immediately at birth were identified as possible independent risk factors of neonatal sepsis. On the other hand; Residence, parity, ANC service utilization, mode of delivery, foul smelling liquor, prematurity and low birth weight were not found to be statistically associated with risk of neonatal sepsis. This study has also observed that the onset of neonatal sepsis was higher in the first week of neonate's life. Strengthening of antenatal screening of mothers, perinatal care of newborns and interventions of babies born with complications are recommended.

CHAPTER ONE:

1.0 Introduction

This chapter presents the background, problem statement, main objective, specific objectives, research questions, and study justification.

1.1 Background

Neonatal sepsis is a leading cause of neonatal morbidity and mortality, particularly in the Developing countries. It is estimated to cause 26% of all neonatal deaths worldwide (Lawn, 2009). Its Incidence varies from country to country but is much higher in developing countries (Keisha et al, 2009).

Neonatal sepsis is a clinical syndrome of bacteremia characterized by systemic signs and symptoms of infection in the first month of life. Neonatal sepsis encompasses systemic infections of the newborn including septicemia, meningitis, pneumonia, arthritis, osteomyelitis and urinary tract infection of the newborn.

According to the international pediatric sepsis consensus conference of 2010, neonatal sepsis is Defined as systemic inflammatory response syndrome in the presence of or as a result of suspected or proven infection in a neonate. Infection could be of bacterial, viral, fungal, or rickettsia origin. Depending on the onset of the disease, neonatal sepsis is divided into early neonatal sepsis or late onset sepsis. Early neonatal sepsis (EOS) is mainly due to organisms acquired before and during delivery (or Fetal maternal infection), whereas late onset sepsis (LOS) is due to organisms acquired after delivery from the environment, (nosocomial or community sources).

In Sub-Saharan Africa some studies have reported neonatal sepsis to be prevalent(Partnership, 2016) in a number of countries. In Kenya, 5.46 cases per 1000 live births have been recorded in Kilifi (Berkley *et al.,* 2005); Is Nigeria in sub Saharan Africa, 6.5 cases of neonatal sepsis per 1000 live births while Zimbabwe has recorded 21 cases of neonatal sepsis per 1000 live births(France, Cochetière, Matamoros, & Gras-leguen, 2013). A recent study in Ethiopia indicates that neonatal sepsis in the major newborn killer accounting for more than one third of neonatal deaths (Gebremedhin*et al.,* 2011). In Tanzania it is estimated that neonatal sepsis

account 29% of the neonatal deaths (Manji, 2009) and its prevalence varies between regions. Neonatal sepsis prevalence of 38.9% (Kayange *et al.*, 2010) and 25% (Mhada *et al.*, 2012) has been reported in Mwanza and Dar es Salaam, respectively. Despite a considerable burden of neonatal sepsis, there are only a few data on the precise incidence and aetiology of maternal or early onset neonatal bacterial sepsis in sub-Saharan Africa, largely because of a lack of reliable laboratory facilities (Seale *et al.*, 2009).

In the last two decades, a remarkable progress has been shown on maternal, but the neonatal health is a part of the 'unfinished agenda'. The world is experiencing an increase in the proportion of fewer than five deaths occurring in the neonatal period. Yet despite the neonatal deaths are preventable, they are concentrated in the world's poorest countries where Uganda is among many factors contribute to high mortality due to infections and delays in the identification and treatment of newborns with infection, specifically; including under-recognition of illness, delay in care seeking at the household level, delay in initiation of treatment, and lack of access to both progress of newborn survival.

Highly trained health workers in developing countries can manage sepsis in neonates. Many centers have studied the common causative agents of neonatal sepsis with their sensitivity patterns. But there are little is known in this area about the factors of neonatal sepsis in the country and the study area, hence the need to do a research in this effect. This study, therefore, is aimed to determine the risk factors of neonatal sepsis at Kyabugimbi Health center IV, Bushenyi, western Uganda

1.2. Problem Statement

An estimated 45,000 newborn die each year in Uganda, making Uganda the country with the fifth highest number of newborn deaths in sub-Saharan African. Recent demographic and health survey data for Uganda reports nationally mortality rate (NRM) of 29 deaths per 1000 live births for the period 2000 to 2005. Most of these deaths occur during the first four weeks of life that is in their first 28 days. In Uganda the main cause of neonatal mortality was sepsis and pneumonia accounting 31% of neonatal death whereas diarrhea, tetanus, congenital, preterm, asphyxia and other took 69% (situation analysis of newborn health in Uganda.pdf 2015). Basing on Uganda demographic and health survey 2016 the unde-5 mortality rate was 64 deaths per 1000 live births and neonatal mortality rate was 27 deaths per 1000 live births.

In Bushenyi district, only 20% of mothers deliver in health facilities. (2012 / 2013 financial year DHO report). This implies that the majority (80%) of mothers deliver at home. Even those mothers who deliver in health facilities are discharged earlier. Some neonatal deaths occur at home and this probably means that the NMR estimate for the district may be lower than the actual.

Thus publishing of clear study on factor influencing neonatal Sepsis at Kyabugimbi HCIV, Bushenyi district will help in establishment of clear solution for neonatal sepsis. This in turn reduces neonatal deaths due to neonatal sepsis and this reduces mortality rate thus helping in achieving millennium goal 4.

1.3 STUDY OBJECTIVES

1.3.1 Main Objectives

To determine the risk factors of neonatal sepsis in Kyabugimbi HCIV, so as to recommend interventions for the DHT to improve neonatal health.

1.3.2 Specific Objectives

1. To determine the socio-demographic factors influencing neonatal sepsis in Kyabugimbi HCIV
2. To identify neonatal nursing practices that influence neonatal health in Kyabugimbi HCIV.
3. To identify the maternal health seeking behaviors affecting neonatal mortality in Kyabugimbi HCIV.

1.5 Research Questions

1. What are the socio-demographical factors influencing neonatal sepsis in Kyabugimbi HCIV?

2. What are the nursing practices that influence neonatal sepsis in Kyabugimbi HCIV?

3. What are maternal behaviors affecting in seeking neonatal health in Kyabugimbi HCIV?

1.4. Study justification

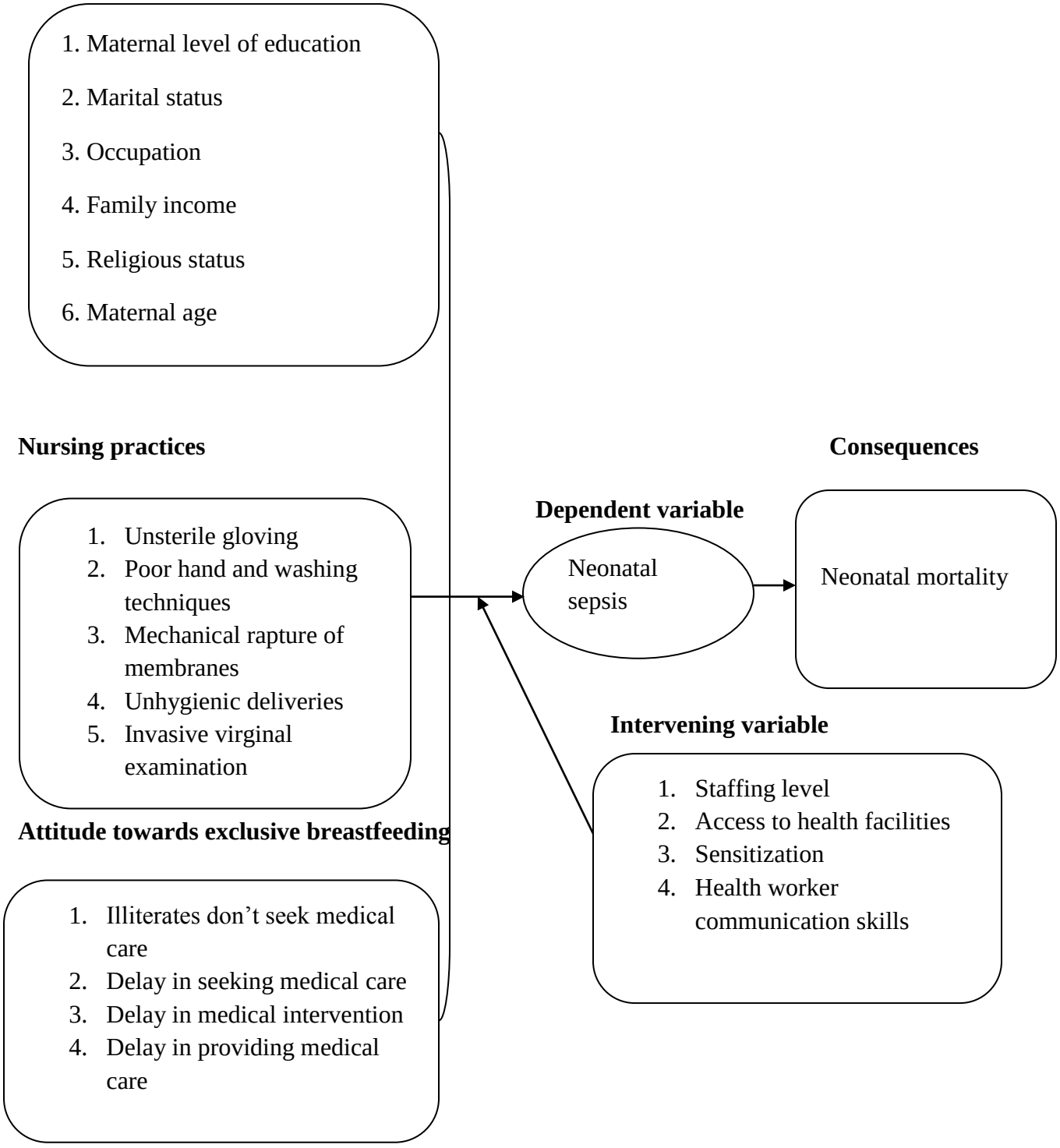
In Kenya, 5.46 cases per 1000 live births have been recorded in Kilifi (Berkley *et al.,* 2005); Is Nigeria in sub Saharan Africa, 6.5 cases of neonatal sepsis per 1000 live births while Zimbabwe has recorded 21 cases of neonatal sepsis per 1000 live births(France, Cochetière, Matamoros, & Gras-leguen, 2013).

Neonatal sepsis is a major public health problem in Kyabugimbi HCIV and Bushenyi District at large and the factors responsible for it are not clear. Therefore, the study findings will bridge the information gap and enable the DHT to design appropriate interventions. Once in place, these interventions will address the problem of neonatal mortality, the under 5 mortality will decrease hence addressing MDG-4.

There is no specific policy regarding neonatal health care, information generated from this study may be found useful in the formulation of one at the Ministry headquarters. This therefore means that the study may benefit not only Kyabugimbi HCIV in Bushenyi District but the entire country.

CONCEPTUAL FRAME WORK

Figure 1: conceptual frame work



CHAPTER TWO

LITREATURE REVIEW

2.1 Introduction

According to the international pediatric sepsis consensus conference of 2005, neonatal sepsis is defined as systemic inflammatory response syndrome in the presence of or as a result of suspected or proven infection in a neonate. Infection could be of bacterial, viral, fungal, or rickettsial origin. Neonatal sepsis encompasses various systemic infections of the newborn, such as septicemia, meningitis, pneumonia, arthritis, osteomyelitis etc.

Depending on the onset age of the disease, neonatal sepsis is divided into early onset neonatal sepsis or late onset sepsis. Early onset neonatal sepsis (EOS) most often appears within 24 hours of birth. The baby gets the infection from the mother before or during delivery (due to GBS colonization during pregnancy, preterm delivery, rupture of membranes longer than 18 hours before birth and chorioamnionitis) whereas late onset sepses (LOS) are infected after delivery (due to having a catheter in a blood vessel for a long time and staying in the hospital for an extended period of time). However, there is little consensus as to what age limits apply, with early onset ranging from 48 hours to 7 days after delivery. In the last two decades, a remarkable progress has been shown on maternal and child deaths, but the neonatal health is a part of the 'unfinished agenda'. The world is experiencing an increase in the proportion of under-five death occurring in the neonatal period. Yet despite the neonatal deaths are preventable, they are concentrated in the world's poorest countries. And 85% of all the neonatal were occurred in low and middle-income countries (LMICs) even though they are home to only 62% of the world's newborns.

Globally 15% of neonatal deaths are caused by neonatal sepsis and particularly it is a major concern in the LMICs. Furthermore, it is also associated with increased medical costs, prolonged hospital stay and potentially poor long-term neuro developmental outcomes. Surviving infants, approximately one-fourth of neonates, have significant neurological squeal as a consequence of CNS involvement, septic shock or hypoxemia secondary to severe parenchymal lung disease

despite prompt instigation of effective antibiotic therapy. Despite of this, the world is witnessing a steady decline in the number of neonatal deaths due to sepsis, the neonatal mortality from sepsis declined by only 28 percent. On the continent of Africa, Seventeen percent of neonatal deaths in sub Saharan Africa are attributed to neonatal sepsis as compared to only 6% of neonatal deaths are due to sepsis in high income countries. Neonatal sepsis, the major newborn killer in Ethiopia, accounts for more than one third of neonatal deaths. In Tigray region, neonatal sepsis is also a major cause of neonatal morbidity and deaths next to prematurity and birth asphyxia. It causes 24% of neonatal deaths with an incidence rate as high as 10% per 1000 live births. Many factors contribute to the high mortality due to infections due to delays in the identification and treatment of newborns with infection, specifically; including under-recognition of illness, delay in care seeking at the household level, delay in initiation of treatment, and lack of access to both appropriately trained health workers and to high quality services to manage sepsis. It is particularly poignant that many neonatal deaths occur in the community, without the newborn ever having contact with the appropriate health services (Destalem Gebremedin Half berthed and Kahsu Gebrekirstos-2015

Indeed, strategies that can prevent and treat neonates with sepsis are essential to accelerate the progress of newborn survival. In many developing country settings, however, the identification and treatment of newborns with infection is unsatisfactory and epidemiological data from developing countries showed differences in the incidence, risk factors, pattern and antimicrobial sensitivities of pathogens and mortality from that of developed countries. Identification of risk factors and early institution of therapy, thereby can improve neonatal mortality and morbidity

Many centers have studied the common causative agents of neonatal sepsis with their sensitivity patterns. But there are limited studies tried to verify the risk factors of neonatal sepsis in the study area as well as in the country as a whole. Hence, there is a need to carry out a research to come up with the risk factors of neonatal sepsis.

This study, therefore, is aimed to determine the factors influencing neonatal sepsis in Kyabugimbi Health center IV

2.2 Socio-demographic factors

Despite changes in the treatment of neonatal septicemia, the outcome in newborn sepsis has not changed remarkably particularly in the resource-poor parts of the developing world where the mortality rates remain high. This implies that there may be other factors with strong influences on the survival of septicemic babies such as maternal age, low socio-economic and educational status.

Al-Hosani et al,2003; in their study of mortality risk factors in children under 5 years in Abu Dhabi, found significant association of neonatal mortality with young maternal age, first pregnancy, first birth or delivery, low birth weight, <24 month interval since last pregnancy, preterm birth, history of previous death among siblings and ill health at the time of birth. Lack of formal maternal education, age, marital status and relatively low income also had significant association with neonatal sepsis hence increased NMR.("nalugoda-godfrey-chs-masters.pdf," n.d 2007.)

BMC pregnancy and children, the findings, drawn from a population-based survey of all mothers of infants in a demographic surveillance site in two rural districts of Uganda, showed that the proportion of newborn babies who receive the essential newborn care practices is generally low and did not differ much by socioeconomic group (Peter Waiswa *et al* 2010). It was further found that both demand and supply side strategies are needed to ensure that these simple but essential interventions are universally promoted within the continuum of care at scale irrespective to socioeconomic status in order to improve newborn survival in Uganda and similar settings. The level of coverage of essential newborn care practices in this setting was generally poor and did not differ by socioeconomic grouping when assessed as composite practices. Despite being policy, most neonatal interventions are not reaching newborns, suggesting a "policy-to-practice transition" in which "suboptimal" practices are being replaced with "modernistic" practices may be underway requiring attention and action.

2.3 Nursing practices

Nurses are central in a hospital effort to improve quality care and nursing practices are of great importance to this study. Neonatal sepsis is clinically diagnosed by a combination of clinical signs, nonspecific Laboratory tests and microbiologically confirmed by detection of bacteria in

blood by culture (Merchant et al, 2013).During labor and its management, un necessary frequent digital vaginal examinations, use of unsterile gloving technique, unsterile delivery instruments and lack of enough delivery beds as greatly contributed to increased neonatal sepsis hence increased NMR.

According to Rev Latino-Am. Enfermaem 2014 in the study of nursing diagnoses of newborns with in a neonatal intensive care unit, five nursing diagnosis (NDs) predominated sample of newborns (NBs) with neonatal sepsis, distributed in domains safety/protection, nutrition and elimination and exchange; risk of shock; risk of fluid volume imbalance; dysfunctional gastrointestinal motility; neonatal jaundice and impaired gaseous exchange. The NDs found reflected the health needs of infected neonates and may lead to formulation of specific nursing care measures within the domains of NDs. various significant relationships were outlined between the different NDs and the neonate's characteristics, which encouraged discussion and converge for new knowledge. However, these relationships deserved to be thoroughly elucidated though further research with greater statistical rigor on the same issue, so as to ascertain if there is significant association between the events were reported.

2.4 Health seeking behaviors

Earlier diagnosis of sepsis would enable proper management and low probability of sepsis but since many mothers report late to the health facilities and many discharged against medical advice due to lack of knowledge about neonatal complications that would arise following delivery.

Mahejabin F *et a*l 2014, in a study about mothers` health seeking behavior in urban slum Dhaka city Ethiopia found that majority (91%) of mothers were biological mother, 65% were illiterate. This study showed 91% mother sought health care services during child illness. It was evident that survival was higher in children born in proper health facilities and attended by professional staff than those born at home and attended by unskilled people.("nalugoda-godfrey-chs-masters.pdf," n.d 2007.)

A similar study in Brazil about mothers' care seeking behavior during their infants' illness, found that 1/3 of deaths occurred health units and 2/3 occurred at home. Three major groups of factors that appeared to contribute to most deaths were delay in seeking medical care, medical

intervention reported as ineffective by the mothers and delay in providing medical care to children who arrived at the hospital too late in the day.("nalugoda-godfrey-chs-masters.pdf," n.d 2007.)

Furthermore, Peterson et al 2004 in their study coping with pediatric referral in Uganda, a study that was conducted in 12 health facilities, only 28% completed referral after 2 weeks. Reasons advanced included lack of money, transport problems and responsibilities at home. Children with incomplete referral continued treatment at referring health units. It was noted that where referral was difficult, more specific IMCI referral criteria should be used and first level health workers should be empowered to manage severely ill children..("nalugoda-godfrey-chs-masters.pdf," n.d 2007.)

2.5 Integrated Management of Childhood Illnesses (IMCI)

IMCI is for those who may not be familiar with the term, WHO and UNICEF initiated strategy for the identification and management of childhood morbidity and mortality in developing world. IMCI promotes improvement not only of health professionals' clinical management of cases but also of health systems and of family and community practices. The challenge is to disseminate these undoubtedly laudable, systematic guidelines to health professionals all over our rather diverse world (J Thomson and A Chavan WHO, 2005). IMCI strategy is designed to address major causes of child mortality at the levels of community, health facility, and health systems.

According to assessed effectiveness of facility-based IMCI in rural Tanzania, findings showed that facility based IMCI is good value for money, and support widespread implementation in the context of health sector reform, basket funding, good facility access, and high utilization of health facilities (Science Direct volume 364, 2004).

CAPTER THREE

METHODOLOGY

3.1 Study design

A cross-sectional study design that is analytical in nature was used to determine the factors influencing neonatal sepsis. The design was allowed for one-time data collection on factors influencing neonatal sepsis. Quantitative and qualitative techniques was applied in data collection, analysis and presentation.

3.2 Study area

This study was carried out in Kyabugimbi health center IV, Bushenyi, western Uganda. It serves villages in Kyabugimbi sub-county since it is a sub-district hospital located a few km from Mbarara Kasese road. Kyabugimbi is on 56.6sq.km land area, its economy depends mainly on agriculture as the source of food for the population, subsistence income for most families and provides direct employment to 80.4% of its population.

According Uganda bureau of statics (UBOS), based on provisional results National pan-Hellenic council (NPHC), 2014, Kyabugimbi had a total population of 19,384 people (10150 females, and 9234 males) and a population density of 340.5. There were 2838 children aged 0-4 years and literacy status of 7293 literates and 1775 illiterates, target population for women in fertile age(that is 13years to 45 years) was 1707 (17%). Percentage of house hold with less than two meals a day is 11.5%.

The Kyabugimbi Health Center is level IV primary health care center located in the Bushenyi District of South Western Uganda at an altitude of approximately 1400 meters. The Kyabugimbi Health Center IV offered a general service, provided pediatric, adult and maternity care. Limited in-patient pediatric facilities make this health center primarily an outpatient center.

The health center provided care to approximately 10–20 pediatric patients per day, with seasonal fluctuations (~1-2 neonates per day). Primarily, care was provided by nurses with 1–2 years of training and clinical officers (2-year diploma trained paramedical with diagnostic and therapeutic training) and the center operation was primarily during the day time. The Integrated Management

of Childhood Illness (IMCI) guidelines form was used at the center and these are part of the national guidelines of care in the diagnosis and treatment of the most common childhood illnesses. This health center could treat the common diseases of childhood including, but not limited to diarrhea, pneumonia, malaria, skin and soft tissue infections and tuberculosis. This health center conducted health promotion and immunization activities in the community. A referral strategy for these illnesses would be generally based on the national guidelines and IMCI. The catchment population of the Kyabugimbi health center IV was rural and composed primarily of households dependent upon subsistence and small-scale farming or small businesses catering to the immediate needs of the community. The nearest referral center was approximately 25 km away. In this population approximately 17% of children less than five years are considered underweight, 36% stunted and 8% wasted (unpublished data from the baseline survey conducted by Healthy Child Uganda in Bushenyi District in 2012).

3.3 Study population

The target population was all mothers who deliver within Kyabugimbi HCIV maternity Unit since the research is interested in determining factors influencing neonatal sepsis. Study population was obtained according to selection criteria, that is inclusion and exclusion criteria.

3.3.1 Inclusion criteria

All neonates from day 1 to 28 days of age attending Kyabugimbi health center IV between the month of June and July, 2017 who`s mothers were consented.

3.3.2 Exclusion criteria

All neonates to mothers who are too ill, with mental illness, neonates brought by care takers or maids lacking enough information about the neonate and neonates with acute illness.

3.3.3 Sample size estimation

Krejcie and Morgan table was used to determine the sample size

Table 1: krejcie table

Populasi (N)	Sampel (n)	Populasi (N)	Sampel (n)	Populasi (N)	Sampel (n)
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

3.3.4 Study variables

Dependent variable

Neonatal mortality and morbidity

Independent variables

These included; socio-economic and demographic characteristics, detection of sickness and ability to seek for health care, individual care factor, household environment including accessibility to health care.

3.4 Data collection management

A questionnaire consisting of both closed and open ended questions was used to collect both qualitative and quantitative data. Qualitative data was collected in relation to neonatal care practices, detection of sick neonates, seeking of health care and hindrances, perception of neonatal deaths in Kyabugimbi Health center IV and its risk factors. Quantitative data was collected in relation to demographic characteristics, individual neonatal care factors and health seeking behavior.

3.5 Data analysis

Statistical Package for Social Sciences (SPSS) was used for data entry and analysis. Descriptive analysis was done and presented in terms of mean, median. Frequency which was reported in terms of numbers and percentages using tables**.**

3.6 Quality control

In order to ensure quality control questionnaires was pre- tested and adjustments will be made accordingly.

3.7 Limitations and delimitations

• Since the study was done on admitted neonates, thus results were lacking generalizability to the entire population in the catchment area due to possible chances of poor health seeking behavior.

• Lack of microbiology, diagnosis by different caregivers raised errors in the identification of cases and controls in the study.

3.8 Ethical consideration

Authority to conduct the research was sought from the Graduate School of Kampala International University- Western campus. Ethical clearance to conduct the study will be sought from the Ethics committee of Kampala International University.

The researcher was report to the Chief Officer for health and in charge of Kyabugimbi health center IV. The benefits of the study was highlighted to the respondents and they was informed that there was no risks involved by participating in the study. Informed written or thumb print consent was sought from the respondents who were selected to take part in the study. Mothers who are less than 18 years of age signed consent forms before participating in the study. Participants were assured of confidentiality by using codes such as B_0 to represent the name participants. The names of the participants were included in the questionnaires only for reference during the interviews. All the participants was also be assured that the information they gave would only be used for purposes of research and that findings would be communicated to them.

CHAPHTER FOUR

DATA PRESENTATION

4.1 INTRODUCTION

This chapter presents the findings of the results from the 52 respondents who participated in the study entitled "assessing the factors influencing neonatal sepsis in Kyabugimbi Health Center IV." Of these 52 respondents 43 turned up. The results were purely raw data from the respondents and were presented in accordance to the study objectives as arranged below:-

4.2 SOCIAL-DEMOGRAPHIC CHARACTERISTICS WITH THEIR INDEX NEONATES FINDINGS

Table 2: table showing socio-demographic finding

	Mothers' age groups	Frequency	Percent
	15-20	8	18.6
	21-25	18	41.9
	26-30	12	27.9
	31-35	2	4.7
	>35	3	7.0
	Total	43	100.0
	Religion of mothers		
Valid		3	7.0
	catholic	15	34.9
	Mungu	1	2.3
	Muslim	4	9.3
	orthodox	5	11.6
	protestant	14	32.6
	seventh day	1	2.3
	Total	43	100.0

	Mothers' tribe	Frequency	Percent
Valid		2	4.7
	Mukiga	12	27.9
	Munkojo	1	2.3
	Munyankole	26	60.5
	Mutoro	2	4.7
	Total	43	100.0
	Residence		
	rural	28	65.1
	urban	15	34.9
	Total	43	100.0
	Marital status		
	divorced	4	9.3
	married	24	55.8
	separated	1	2.3
	single	14	32.6
	Total	43	100.0
	Occupation		
	housewife	22	51.2
	civil servant	3	7.0
	business woman	7	16.3
	private organization	2	4.7
	daily worker	7	16.3
	Total	41	95.3
Missing	System	2	4.7
	Total	43	100.0
	Sex of neonates		
	Male	18	41.9
	Female	25	58.1
	Total	43	100.0

Majority were Banyankole accounting to 60.5% of the respondents, 27.9% were Bakiga, 4.7% were Batoro, 2.3% were Bankojo, and 4.7% didn't specify their tribes. Of these majority of the respondents were ranging from 20-25 years with 41.9%, followed by 26-30 years with 27.9%, 15-19 years accounted to 9.3%, 35. The least were those aged 31-35 years with 4.6%.

With majority of the respondents were from rural with 65.1% and urban with 34.9%. In Additional to this majority of the respondents where for primary level with 58.1%, followed non-educated with 18.6%, secondary with 14.0, and the least were college and higher institution level with 9.3%. The respondents' neonates' sex majority were females with 55.8% and male with 44.2%.

Table 3: age of neonates

		age of the neonate
N	Valid	43
	Missing	0
Mean		9.0488
Minimum		.17
Maximum		27.00

The average days of neonate was approximating to 9 days with maximum days being 27 days and minimum days less than a day that is 0.17 days.

HEALTH RELATED FACTORS

Table 4: Table showing health related factors finding

visiting health facility for ANC	Frequency	Percent
no	2	4.7
yes	41	95.3
Total	43	100.0
Helper during delivery		
health professional	36	83.7
relative	3	7.0
TBA	4	9.3
Total	43	100.0
parity		
0-2	24	55.8
3-5	16	37.3
6-9	3	7
Total	43	100.0
Place of delivery		
health center	12	27.9
home	7	16.3
hospital	24	55.8
Total	43	100.0
Type of delivery		
Caesarean section	15	34.9
Instrumental vaginal delivery	2	4.7
Spontaneous vaginal delivery	25	58.1
Bleeding during pregnancy		
APH	9	20.9
bleeding	4	9.3
no bleeding	20	46.5
PPH	10	23.3
Total	43	100.0

Majority of the mother visited health facilities ANC accounting to 95.3% of the respondents. Of these mothers neonates majority were 1st and 2nd born accounting to 55.8%. And majority of these neonates were born from hospitals with 55.8%, health center were 27.9%, and lastly homes with 16.3%. Majority of the mother delivered by spontaneous vaginal delivery with 58.1%, Caesarean section was 34.9% and instrumental vaginal delivery was 4.7%. Whereas 2.3% didn't specify. Majority of the mother were assisted by health professionals with 83.7%, TBA making 9.3% and the least were assisted by relatives that is 7%.

Table 4: Table showing helper of mothers with any bleeding during pregnancy

	duration of labor	number of times of virginal examination	number of times of receiving antenatal care
Valid	43	40	42
Missing	0	3	1
Mean	15.4884	5.3000	3.0952
Mode	18.00	6.00	4.00
Range	47.50	9.00	5.00
Minimum	.50	1.00	.00
Maximum	48.00	10.00	5.00

According to the study the average duration of labor was approximately 15 hours. The virginal examination was averagely 5 times before delivery. The mother attended ANC with an average approximated as 3 times before delivery.

4.4 NEONATAL HEALTH RELATED FACTORS

Table 6: Table showing gestation age, APGAR score, and birth weight

		gestational period	AGPAR score at 1 minute	weight of the neonate at birth	APGAR score at 5 minutes
N	Valid	42	42	37	41
	Missing	1	1	6	2
Mean		36.7929	.6500	2.6622	.8902
Range		15.50	.90	3.40	.40
Minimum		26.50	.00	.50	.60
Maximum		42.00	.90	3.90	1.00

According to the study the average gestation age was approximately 37 weeks, the average birth weight of neonate was 2.7Kgs, the APGAR score averagely was approximating to 0.7 at 1 minute and at 5 minutes approximated to 0.9.

4.5 MAJOR SIGNS AND SYMPTOMS THAT NEONATES PRESENTED WITH.

Table 5: Table showing major symptoms that neonates present

	temperature >37.7 c or < 35.5 c	Frequency	Percent
Valid	no	2	4.7
	yes	41	95.3
	Total	43	100.0
	Reduced movements		
	no	12	27.9
	yes	31	72.1
	Total	43	100.0
	Not able to feed		
	no	17	39.5
	yes	26	60.5
	Total	43	100.0

Majority of the neonates had fever like symptoms accounted to 95.3% and those with no they were 4.7%. Most of the neonates had reduced movements 72.1%, those with no reduced neonates' was 27.9%. In addition to this most of the neonate were not able to feed accounting to 60.5% and 39.5% were able to feed.

4.5 How factors contribute to neonatal sepsis

Table 6: table showing the relationship independent factor with dependent factors

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.347[a]	.120	-.005	.332	.120	.958	5	35	.457

a. Predictors: (Constant), sex of the neonate, age of the neonate, occupation of the respondents, mother age in complete years, highest education level

This table provides the *R* and R^2 values. The *R* value represents the simple correlation (COR) and is 0.347 (the "**R**" Column), which indicates a high degree of correlation (COR). The R^2 value (the "**R Square**" column) indicates how much of the total variation in the dependent variable, **temperature >37.7 c or < 35.5 c**, can be explained by the independent variables, sex of the neonate, age of the neonate, occupation of the respondents, mother age in complete years, highest education level. In this case, 12.0% can be explained, which is high.

Table 7: table explaining how factor contribute to neonatal sepsis

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.148	.285		4.028	.000	.569	1.726
	mother age in complete years	.011	.010	.175	1.069	.292	-.010	.031
	highest education level	-.047	.046	-.173	-1.020	.315	-.142	.047
	occupation of the respondents	.006	.029	.037	.226	.823	-.052	.064
	age of the neonate	-.008	.008	-.166	-1.010	.319	-.024	.008
	sex of the neonate	-.094	.115	-.139	-.815	.420	-.327	.139

a. Dependent Variable: temperature >37.7 c or < 35.5 c

Model – SPSS allows you to specify multiple models in a single **regression** command. This tells you the number of the model being reported and **B** – stands for the values of the regression equation for predicting the dependent variable from the independent variable

According to the table above it shows that mothers' age of respondents has the coefficient of -0.011. So for every unit increase in mothers' age of respondents, a 0.011 unit increase in neonatal sepsis is predicted, holding all other variables constant. The Occupation of respondents

showed that for every unit increase in occupation, we expect a 0.006 unit increase in the neonatal sepsis, holding all other variables constant. The education level of respondents had the coefficient -0.047 showing that for every unit increase in marital status, we expect a -0.047 unit decrease in the neonatal, holding all other variables constant. Age of the neonate had a coefficient of -0.008 showed that for every unit increase in occupation, we expect a -0.008 unit decrease in the neonatal, holding all other variables constant. Sex of the neonate also indicated that for every unit change in sex i.e. from female to male, we expect a -0.094 unit decrease in the neonatal sepsis, holding all other variables constant.

Std. Error – These are the standard errors associated with the coefficients.

Beta – These are the standardized coefficients. These are the coefficients that you would obtain if you standardized all of the variables in the regression, including the dependent and all of the independent variables, and ran the regression. By standardizing the variables before running the regression, you have put all of the variables on the same scale, and you can compare the magnitude of the coefficients to see which one has more of an effect. You will also notice that the larger betas are associated with the larger t-values and lower p-values.

t and **Sig**. – These are the t-statistics and their associated 2-tailed p-values used in testing whether a given coefficient is significantly different from zero. Using an alpha of 0.05:

The coefficient for mothers' age of respondents (0.011) is not significantly different from 0 because its p-value is 0.292, which is larger than 0.05.

The coefficient for occupation of respondents (0.006) is not significantly different from 0 because its p-value is 0.823, which is larger than 0.05.

Similarly to all other P > 0.05 this implies that they are not significantly different from 0 because its p-value is 0.526, which is larger than 0.05.

The intercept is significantly different from 0 at the 0.05 alpha level.

95% Confidence Limit for B Lower Bound and **Upper Bound** – These are the 95% confidence intervals for the coefficients. The confidence intervals are related to the p-values and the coefficient was not statistically significant because the confidence interval does not includes 0. These confidence intervals helped the researcher to put the estimate from the coefficient into perspective by seeing how much the value could vary.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

Introduction

The findings were discussed basing on the results as presented in the previous chapter. The findings were discussed in relation with other literature from different authors.

5.1 Discussion of the results

5.1.1 Demographic findings

The study conducted in rural districts of eastern Uganda showed that the mother interviewed were aged between 16 to 44 years (mean 26 and SD 6). The majority (66.1%) of the mothers had attained only primary education. The main occupation for majority mothers was subsistence farming (73%). The newborns were aged from 1 to 27 days (mean 12days and SD 7). There were more female newborns (59.2) than males. There was 21.8% newborns confined by blood culture to have sepsis (Bua, 2013). Some of these finding agrees with the one in this study such as majority of the respondents where for primary level with 58.1, majority neonates were females with 55.8% and male with 44.2% and the aged from 15-35 years. There was a high proportion of laboratory confirmed newborns sepsis cases among mothers in 20-29 years group, with only 7 years of education and farming occupation. Differences among these groups were however not statically significant which are agree with this study (Bua, 2013).

A maximum number of mothers was in the age range of 21 to 25 years in both case and control groups, i.e. 50% and 45.4% respectively, followed by age-group range of 26 to 30 years, i.e. 35.8% and 42.9% respectively. The effect of socio-economic status on the birth-weight of newborns. Maximum number of mothers belonged to low-socio economic group (group V), as per Modified Udai-Pareek's classification), 8 both in the case and control group. Percentage of Low birth weight newborn was more (42.5%) in case-group than in control group (40.0%), but this difference was not statistically significant (p-0.961). It was also observed that maximum number of mothers in both the cases and control groups (96.7% and 89.6%,

respectively) belonged to Hindu religion. It was showed 70% of LBW newborns belonged to the mothers who were labor by occupation and they had 7.14 times (OR 7.14) higher chances of getting LBW newborns as compared to service class. The difference was found to be highly significant ($p<0.001$) (Shahnawaz et al, 2014).

In the study on risk Factors for Neonatal Sepsis in Public Hospitals of Mekelle City, North Ethiopia, 2015: Unmatched Case Control Study, a total of 78 neonates who had sepsis (cases) with their index mothers and 156 neonates who had no sepsis (controls) with their index mothers were included making a response rate of 100%. The mean (±SD) age of mothers was 26.38 ±5. 52 years range from 18 to 40 years. Twenty one (26.9%) of cases and 28 (17.9%) controls were living in rural areas. Regarding to marital status, 68 (87.2%) cases and 142 (91.0%) of controls were married. Forty eight (61.5%) of cases and 92 (59.0%) of controls were house wives by occupation and 29 (37.2%) cases and 37 (23.7%) of controls had not attended formal education. Concerning to neonates' socio demographic characteristics, 60 (76.8%) of the cases and 149 (95.5%) controls were found under the age of 7 days. The proportion of male neonates were higher in the cases 56 (71.8%) than controls 86 (55.1%). some of these findings agreed with our study.

5.1.2 Health related factors.

561 neonate-mother pairs were included in the study. Early-onset neonatal health-care associated infection was diagnosed in 283 neonates (51%), an incidence rate of 43.5/1000 live births. Neonates whose mothers had less than six antenatal visits were under risk significantly higher for early-onset neonatal healthcare associated infection (OR = 1.69, 95% CI = 1.11-2.57), after adjusting for birth weight, membranes ruptured for >18 h, maternal complications during delivery, maternal infection at admission, and hospital where patients received care (Braz, 2015). In this study majority of the mother visited health facilities ANC accounting to 95.3% of the respondents. In addition to this majority of the mother delivered by spontaneous vaginal delivery with 58.1%, Caesarean section was 34.9% and instrumental vaginal delivery was 4.7%. Whereas 2.3% didn't specify. Most of the neonates had reduced movements 72.1%, those with no reduced neonates' was 27.9%.

Accordingly, place of delivery showed significant association with the risk of onset of neonatal sepsis. The odds of having neonates with sepsis among mothers who gave birth at health center

was 5.7 times higher compared to those who gave birth in hospitals [AOR = 5. 70; 95% CI (1.71, 19.00)]. History of UTI/STI during the index pregnancy also showed a statistical significant association with neonatal sepsis. This study showed that, neonates born to mothers who had UTI/STI during the index pregnancy had 5 times higher odds of developing sepsis compared to those neonates born to mothers who did not have a UTI / STI during the index pregnancy [AOR = 5. 23; 95% CI (1.82, 15.04)]. Prolonged rupture of membrane (PROM) and intrapartum fever had significant association with risk of neonatal sepsis. The odds of neonatal sepsis among mothers who gave birth after 18 hours of rupture of membrane was 7.4 times higher than those mothers who gave birth before 18 hours of rupture of membrane [AOR = 7.43; 95% CI (2.04, 27.71)]. Similarly, those neonates who were born to mothers who had fever during labor had 6 times higher odds developing sepsis compared to those neonates whose mothers did not have intrapartum fever [AOR = 6. 08; 95% CI (1.29, 28.31)]. APGAR score at 5^{th} minute and immediate cry after birth were also significantly associated with risk of neonatal sepsis in the multivariable analysis. Neonates who had APGAR score <7 at 5^{th} minute had higher odds of developing sepsis compared to neonates who had APGAR score ≥7 [AOR = 68. 9; 95% CI (3.63, 1307.90]. Similarly, neonates who cried immediately at birth were 99% less likely to develop sepsis as compared to neonates who did not cry immediately [AOR = 0. 01; 95% CI (0.00, 0.16)] (Destaalem , 2015).

In this study According to the study the average gestation age was approximately 37 weeks, the average birth weight of neonate was 2.7Kgs, the APGAR score averagely was approximating to 0.7 at 1 minute and at 5 minutes approximated to 0.9. Majority of these had no bleeding accounting to 46.5%, PPH was 23.3%, APH was 20.9, and 9.3% had no bleeding.

5.2 Conclusion

In conclusion, this study has found that both maternal and neonatal factors had contributed to the risk of neonatal sepsis. History of maternal UTI/STI, place of delivery, low APGAR score at 5^{th} minute and not crying immediately at birth were identified as possible independent risk factors of neonatal sepsis. On the other hand; Residence, parity, ANC service utilization, mode of delivery, foul smelling liquor, prematurity and low birth weight were not found to be statistically associated with risk of neonatal sepsis. This study has also observed that the onset of neonatal sepsis was higher in the first week of neonate's life. Strengthening of antenatal screening of

mothers, perinatal care of newborns and interventions of babies born with complications are recommended

REFERENCES

1) (Luoto, Holmberg, Ruuskanen, & Lehtonen, 2014) Neonatal sepsis is one of the most common cause of neonatal morbidity and mortality. It is estimated to cause 26% of all neonatal deaths worldwide (Lawn. (2009), 1–35.
2) Ekambaram, M., Vishnu Bhat, B., & Ahamed, M. A. P. (2010). Knowledge, attitiude and practice of breastfeeding among postnatal mothers. *Current Pediatric Research*, *14*(2), 119–124. https://doi.org/10.1016/j.midw.2014.03.002
3) Jabiri, A., Wella, H. L., Semiono, A., Sariah, A., & Protas, J. (2016). Prevalence and factors associated with neonatal sepsis among neonates in Temeke and Mwananyamala Hospitals in Dar es Salaam , Tanzania, *18*(4), 1–7. https://doi.org/10.4314/thrb.v18i4.4
4) Luoto, R., Holmberg, K., Ruuskanen, O., & Lehtonen, L. (2014). [Neonatal sepsis]. *Duodecim; Lääketieteellinen Aikakauskirja*, *130*(7), 675–82. https://doi.org/10.7363/030273
5) Partnership, D. (2016). EXPERT MEETING Developing new antibiotic GLOBAL ANTIBIOTIC RESEARCH AND, (June), 0–22.
6) Raquel, J., Souza, S., Machado, R. C., & Souza, N. L. De. (2016). Risk Factors for Neonatal Sepsis in Neonatal Intensive Care Unit : Evidence Study, *21*(2), 1–9.
7) Seale, A. C., Blencowe, H., Zaidi, A., Ganatra, H., Syed, S., Engmann, C., … Lawn, J. E. (2013). Neonatal severe bacterial infection impairment estimates in South Asia, sub-Saharan Africa, and Latin America for 2010. *Pediatric Research, 74 Suppl 1*(December), 73–85. https://doi.org/10.1038/pr.2013.207
8) World Health Organization. (2015). Uganda Neonatal and Child Health Profile.
9) Partnership, D. (2016). EXPERT MEETING Developing new antibiotic GLOBAL ANTIBIOTIC RESEARCH AND, (June), 0–22.
10) Seale, A. C., Blencowe, H., Zaidi, A., Ganatra, H., Syed, S., Engmann, C., … Lawn, J. E. (2013). Neonatal severe bacterial infection impairment estimates in South Asia, sub-Saharan Africa, and Latin America for 2010. *Pediatric Research, 74 Suppl 1*(December), 73–85. https://doi.org/10.1038/pr.2013.207
11) (“CHAPTER 1: BACKGROUND Neonatal sepsis is one of the most common cause of

neonatal morbidity and mortality. It is estimated to cause 26% of all neonatal deaths worldwide (Lawn," 2009)(Seale et al., 2013)

12) ("Establishing Incidence of Health Provider Absenteeism in Bushenyi District By Uganda National Health Users '/ Consumers ' Organization (UNHCO)," 2010)

13) Na ti onal Popula ti on and Housing Census 2014 Subcounty Report – western Region. (2014).

14) Av, O., & Agwu, E. (2015). Uptake of hospital based delivery services and associated infection control in Bushenyi district , of Uganda ., *1*(1).

15) Establishing Incidence of Health Provider Absenteeism in Bushenyi District By Uganda National Health Users '/ Consumers ' Organization (UNHCO). (2010), (May), 1–28.

16) Gebremedhin, D., Berhe, H., & Gebrekirstos, K. (2016). Risk factors for neonatal sepsis in public hospitals of Mekelle City, North Ethiopia, 2015: Unmatched case control study. *PLoS ONE*, *11*(5), 1–10. https://doi.org/10.1371/journal.pone.0154798

17) (Jabiri, Wella, Semiono, Sariah, & Protas, 2016)(Raquel, Souza, Machado, & Souza, 2016)(Jabiri et al., 2016)

18) Risk factors and practises contributing to newborn sepsis in rural districts of eastern uganda, august 2013, a cross section study by Bua John, Mukanga David, Lwanga Mathias, and Nabiwemba Elizabeth.

19) Shahnawaz K, Choudhary SK, Sarker G, Das P, Pal R, Kumar L. Association between maternal socio-demographic factors and low birth weight newborn in a rural area of Bihar , India. 2014;4(1):30–4.

20) Braz J Infect Dis vol.19 no.3 Salvador May/June 2015 http://dx.doi.org/10.1016/j.bjid.2015.02.003

21) Risk Factors for Neonatal Sepsis in Public Hospitals of Mekelle City, North Ethiopia, 2015: Unmatched Case Control Study by Destaalem Gebremedhin,[1,*] Haftu Berhe,[#2] and Kahsu Gebrekirstos[#]

APPENDIX I: QUESTIONAIRECONSENT FORM AND INTRODUCTION

I am SENKUMBA AKILEO, a student of Kampala International University pursuing a Diploma in Clinical Medicine and Community Health, doing a research to assess the factors influencing neonatal sepsis, is inviting you to take part in this study but before we discuss more about the study, I would like request you to reflect on whether you accept to participate in the study. In case you do not understand some words, I will explain them to you, and feel free to ask me any questions as we go along.

I have read the foregoing information. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate in this research.

CODE ……..

Signature/Thumbprint of the participant……

Date…… (Day/Month/Year)

Signature……

Date……

Note: Encircle from the given option and write if any other idea or answer is given

PART I. Socio-demographic characteristics of mothers with their index neonates (age 0-28 days)

No.	Question	Response	Skip
100	Mother's age	_____(in years)	
101	Marital status	1. Single ☐ 2. Married ☐ 3. Widow ☐ 4. Divorced ☐ 5. Separated ☐ 6. Cohabitated ☐	
102	What is your religion?	1. Orthodox ☐ 2. Muslim ☐ 3. Catholic ☐ 4. Protestant ☐ 5. Other (specify)_____	
103	Ethnicity	1. Munyankole ☐ 2. Mukiga ☐ 3. Other (specify) _____	
104	Residence	1. Urban ☐ 2. Rural ☐	
105	Maternal education	1. No education ☐ 2. Primary ☐ 3.Secondary ☐ 4. college and higher ☐	
		1. Housewife ☐ 2. Civil servants ☐	

106	Occupation of mother	3. Business woman ☐ 4. Private Organization ☐ 5. Daily laborer ☐ 6. Student ☐	
107	Monthly income of the household	_____ Uganda shillings	
108	Neonate's age	_____in days	
109	Neonate's sex	Male ☐ Female ☐	
PART II. Maternal health related factors			
110	Parity	_____ in number	
111	Did you visit health facility for ANC during your pregnancy for this neonate?	1. Yes ☐ 2. No ☐	If 'no' skip to 114
112	If yes, how many times did you receive antenatal care during your time of pregnancy for this neonate	_____ times	
113	Where did you give birth to this neonate /Place of delivery	1. Home ☐ 2. Hospital ☐ 3. Health center ☐ 4. Other (specify)___	If in 'home', skip to 116
114	If the place of delivery is in hospital Or health center, what was the type of delivery?	1. Spontaneous Vaginal delivery ☐ 2. Instrumental vaginal delivery ☐ 3. Caesarean section ☐	

115	Who helped you during delivery?	1. TBA ☐ 2. HEW ☐ 3. Health professional ☐ 4. Relatives ☐ 5. Other (specify)_____	
116	What was the duration of labor	_____ in hours	
117	How many times did the birth attendant performs vaginal examination	_____ times	
118	Did you have any fever during the time of this labor	Yes ☐ No ☐ Specify _____	
119	Did the amniotic fluid was foul smelling	Yes ☐ No ☐	
120	Did you have pregnancy related hypertension PIH/ Eclampsia during the pregnancy of this neonate?	Yes ☐ No ☐ Specify _____	
121	Did you have any bleeding during the pregnancy of this neonate?/ APH	Yes ☐ No ☐ Specify _____	
122	Did you have any UTI/STI during the pregnancy of this neonate?	Yes ☐ No ☐ Specify _____	
123	How many doses of tetanus toxoid (TT) did you receive during antenatal visits?	One ☐ More than two ☐ Specify_____	
124	At what time did membranes rupture?	Before onset of labor ☐ After onset of labor ☐	

		Specify_____	
125	How many doses of IPT did you receive?	One ☐ Two ☐ Specify_____	
126	Did you notice any sickness during this pregnancy?	YES ☐ NO ☐	

A checklist on neonatal health related factors

127	Birth order	……th
128	Gestational age	_____ in weeks
129	APGAR score	At 1st minute ☐ At 5th minute ☐
130	Birth Weight at birth	_____ in kilograms
131	Did the neonate cries immediately after birth?	Yes ☐ No ☐
132	Did the neonate resuscitated at birth?	Yes ☐ No ☐
Integrated Management of Childhood Illnesses (IMNCI) clinical criteria for diagnosis of neonatal sepsis		

133	Convulsions	Yes ☐ No ☐
134	Respiratory rate > 60 breaths/min	Yes ☐ No ☐
135	Severe chest in drawing	Yes ☐ No ☐
136	Nasal flaring	Yes ☐ No ☐
137	Grunting	Yes ☐ No ☐
138	Bulging fontanels	Yes ☐ No ☐
139	Pus draining from the ear	Yes ☐ No ☐
140	Redness around umbilicus extending to the skin	Yes ☐ No ☐
141	Temperature >37.7^{o}C or <35.5^{o}C	Yes ☐ No ☐
142	Lethargic or unconscious	Yes ☐ No ☐
143	Reduced movements	Yes ☐ No ☐
144	Not able to feed	Yes ☐ No ☐
145	Not attaching to breast	Yes ☐ No ☐
146	No sucking at all	Yes ☐ No ☐

THANKS FOR YOUR TIME MAY THE GOOD LORD PROTECT YOU

APPENDIX II: MAP OF UGANDA SHOWING BUSHENYI DISTRICT

APPENDIX III; MAP OF BUSHENYI DISTRICT SHOWING LOCATION OF

APPENDIX III

BUDGET ESTIMATE

Item	Unit cost	Number of units	Amount
Transport	14000	7	98000
Internet	1500	35	52500
Printing	10000	6	60000
Type setting	2000	24	48000
Ream of paper	17000	2	34000
Meals	5000	14	70000
Rent	25000	7	175000
Miscellaneous			250000
Total	**74500**	**95**	**787500=**

APPENDIX IV

WORK PLAN

ACTIVITY	**MONTHS**					
	Aug-Sept	September	October	November	December	December
Proposal writing						
Approval of research proposal						
Data collection						
Data analysis						
Dissertation write up						
Report submission						