

Understanding the Drivers Behind Neonatal Sepsis Rates among Immunized and Outpatient Neonates at Hoima Regional Referral Hospital, Western Uganda

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ABSTRACT

Neonatal sepsis is a major cause of neonatal mortality in developing countries, accounting for a significant portion of annual infant deaths. This study investigated the determinants influencing the occurrence of neonatal sepsis among infants at Hoima Regional Referral Hospital in Western Uganda. The study revealed an overall neonatal sepsis prevalence of 12.5%, with 65% and 35% of cases classified as early-onset and late-onset sepsis, respectively. Factors significantly associated with neonatal sepsis included neonatal age, maternal history of fever, dysuria, and maternal/caretaker hygiene. The study emphasizes the importance of caretaker/mother's age, maternal fever history, dysuria, and hygiene in contributing to neonatal sepsis. Prevention strategies should prioritize addressing these risk factors rather than solely focusing on post-occurrence treatment. Proactive measures are advocated to mitigate the incidence of neonatal sepsis.

Keywords: Neonatal sepsis, Immunization, Childhood mortality, Maternal/caretaker's hygiene, maternal history of fever.

INTRODUCTION

According to [1], neonatal sepsis affects more than 3.0 million people worldwide annually and potentially leads to more neonatal deaths. Global rates of sepsis are growing rapidly, particularly in low and middle-income countries. At the 70th World Health Assembly in May 2017, member states adopted a resolution (WAA 70.7) on improving the prevention, diagnosis and treatment of sepsis to reduce on the burden of sepsis and support countries to obtain the necessary infrastructure, laboratory capacity, strategies and tools to address sepsis. This is done by improving access to quality, safe, efficacious and affordable treatments for sepsis and tools for infection prevention control (I.P.C) including immunization particularly in developing countries. According to [2], neonatal accounted for 18.2% of all neonatal mortality that is 3 deaths per

1000 live births in Uganda. According to [3], globally neonatal sepsis accounted for 2,202 per 100,000 live births accounting for 3.1 million deaths in 2018. Neonatal sepsis is a clinical syndrome characterized by the bloodstream infection of neonates and the inflammatory response mounted by the neonate. It usually presents as septicemia, pneumonia, meningitis and rarely as arthritis, osteomyelitis and U.T.I according to [2]. Some of the risk factors associated with neonatal sepsis include prematurity, low birth weight, premature rupture of membranes, maternal infection, bottle feeding, maternal hygiene, accessibility to healthcare facilities, and availability of equipment, drugs and healthcare professionals in these units, according to [2]. The government of Uganda has employed different innervations including safe

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delivery campaigns and parental education about newborn care, providing more health centres, and supplying more health workers and equipment to these health centres. However, despite all these efforts, neonatal sepsis is still among the leading causes of morbidity and mortality among Ugandan neonates [4, 5, 6, 7]. However, our knowledge of the specific risk factors that are associated with neonatal sepsis from the population to be used in the study in the Hoima district and understanding how to reduce them will greatly reduce the prevalence of neonatal sepsis in Hoima. According to [8], estimated that more than 1 million deaths (10% of those under 5 years) are due to neonatal sepsis and that 42% of these occur in the first week of life. According to [9], NEONATAL sepsis accounted for 6.9 million deaths worldwide of which 2.6 million deaths occurred in sub-Saharan Africa. [10], documented that neonatal sepsis contributes to more than 2 million morbidity and 1.6 million deaths annually in developing countries. In Uganda, according to [2], neonatal sepsis accounted for 18.2% of neonatal deaths. According to [9], neonatal sepsis accounted for 29 deaths per 1000 live births. The majority of these die from intrapartum-related complications.

Neonatal sepsis affects more than 3 million neonates worldwide with a mortality rate of 2.4 million in 2020, [11]. The burden of neonatal sepsis in Sub-Saharan Africa is 29 per 1000 live births mortality rate [12]. The value of statistical life estimates predicts an annual economic burden ranging from 10 billion

Study Design

A cross sectional study design analytical in nature will be used to determine the factors associated with neonatal sepsis and the prevalence of neonatal sepsis. Quantitative and qualitative techniques will be applied in data collection, analysis and presentation [16].

Area of Study

The study will be conducted at Hoima Regional Referral Hospital located in Hoima district, Western Region-Uganda.

to 469 billion dollars in loss on neonatal sepsis in sub-Saharan Africa [13]. The pooled prevalence of neonatal sepsis in East Africa was 29.765% [14]. In Uganda, sepsis carries 19 deaths per 1000 live births claiming 18.2% [15]. Guidelines on prevention, early diagnosis and management of neonatal sepsis exist and are very clear, but unfortunately, implementation is limited due to various health system constraints, including poor newborn care practices, insufficient and late identification of cases at community and facility levels, limited availability of neonatal health services, poor surveillance systems, low turn up numbers of mothers who attend antenatal care, seeking skilled care during delivery, and unhygienic places of delivery. There is a significant challenge which occurs in the diagnosis of neonatal sepsis due to the non-specific nature of the clinical presentation. Blood culture which is the gold standard for a definitive diagnosis takes at least 48 -72 hours as reported by which time the infection may have progressed with consequences on the morbidity and mortality of the neonates in cases where the empirical treatment of first-line drugs fails (ampicillin and gentamycin) and there is a need for organism eradication after culture and sensitivity test. Therefore, improved prevention, early case detection and management of sepsis strategies are needed. However, this study will determine the prevalence of neonatal sepsis among neonates attending immunization and outpatient departments at Hoima Regional Referral Hospital.

METHODOLOGY

H.R.R.H is a government hospital located in Hoima district, Western Uganda. It is a health Centre VI. It is a practicing hospital for both undergraduates and post-graduates in nursing, medical laboratory, medicine surgery etc. It has six Wards as well as specialized clinics including pediatric outpatient and immunization clinics among others. The hospital handles an average of 200 cases of immunization on a weekly basis.

Sample Size Determination

The sample size was determined using [17] formula as shown below;

$$n = \frac{Z^2 X P(1-P)}{d^2}$$

Where;

n=desired sample size

Standard deviation at the required degree of accuracy

P=prevalence=11.0% using a study about neonatal sepsis that was done by Mugalu et al in Kampala central Uganda 2018.

. Therefore $P = \frac{11}{100} = 0.11$

d= is the proportion of the error the researcher is able to accept

$$n = \frac{1.96^2 \times 0.11 \times (1-0.11)}{0.05^2}$$

$$n = 150.4371$$

Therefore, n=150 children

Study Population

According to this study, a sample size of 150 children is to be enrolled on the study at HRRH according to the selection criteria I.e., Inclusion and Exclusion criteria.

Inclusion Criteria

All mothers of infants below six months attend immunization and outpatient clinics at HRRH.

Exclusion Criteria

All mothers to infants above six months. All neonates to mothers who are mentally ill. Neonates brought by caretakers lacking enough information about the neonate. Mothers who failed to consent.

Sampling Method

Simple random sampling will be used.

Dependent Variables

The dependent variable for this study will be neonatal sepsis.

Independent Variables

Socio-demographic and Economic Factors

- Income
- Occupation
- Cultural practices

Maternal factors

- Age
- Hygiene
- Prolonged rupture of membranes
- Knowledge and attitude

Hospital related factors

- Distance
- Availability of services
- Number of health workers

Data Collection Methods

Primary data will be collected by using a structured questionnaire which will be designed in line with the specific objectives of the study and secondary data will be collected from hospital pediatric wards, immunization units and outpatient departments.

Data Edition

This involves manual checking for errors and omissions in the filled tools to ensure consistency, competency, validity, relevancy, and accuracy of the data collected and this will be done every day after data collection [18].

Data Analysis and Presentation

Data collected will be sorted and coded to facilitate the process of analysis and interpretation entered using Microsoft Excel 2010 and imported into and analyzed using SPSS Version 19. Descriptive analysis was done in terms of percentages using tables and pie charts.

Data Quality Control

First, the entire team to collect data will be trained fully on the different aspects of the questionnaires and on how to approach respondents. The questionnaires will be pre-tested first at H.R.R.H. and checked for completeness. Data Results will be presented in the form of tables as well as simple statements.

Ethical Consideration

Approval was obtained from the Institutional Research and Ethics Committee of Kampala International University and Hoima Regional Referral Hospital. Written informed consent was sought from all the parents/caretakers of the participants. The permission to carry out the study will be obtained from the Administrators of HRRH and guidance will be sought from eligible staff of the Hospital throughout the whole exercise. Strict confidentiality will be observed throughout the entire study process [20]. No individual health information will be released to any unauthorized persons without written prior approval from the Institutional Research and Ethics Committee. Findings of the study will be availed to the inpatient, immunization and outpatient departments of HRRH for

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the improvement of services offered to children.

Limitations of the Study

Since the study will be based at the facility, newborns with symptoms of sepsis and not brought to the health facility for medical care could be missed resulting in low external validity. The

study due to limited resources will not perform more advanced tests on bacterial isolates. These include non-automated blood culture methods and sensitivity, Hippurate hydrolysis, CAMP tests, triple sugar iron agar reaction, indole, urease and Voges Proskauer Test to confirm the diagnosis.

RESULTS

Social Demographic Characteristics of the Mother/ Caretaker with Their Index Findings

Results show that a total of 150 mothers/caretakers of neonates attending Hoima Regional Referral Hospital in Hoima district were interviewed. The majority 123(82%) of the mothers/caretakers were between the age group 12-35 and followed by the age group 36-50 which accounts for 15.3% and

only 2.7% were above 50 years of age. Additionally, the majority of the women were less educated with 10% for illiterates and 50% who stopped in primary education. About thirty-four percent of the women stopped in secondary where as 4.7% had tertiary education and a few respondents had studied up to university level which accounts for 0.7% as shown in Table 1.

Table 1: Social demographics of mothers/caretakers

Variable	Frequency	Percentage (%)
Age(years)		
12-35	123	82%
36-50	23	15.3%
Above 50	4	2.7%
Level of education		
Illiterate	15	10%
Primary	75	50%
Secondary	52	34.7%
Tertiary	7	4.7%
University	1	0.7%

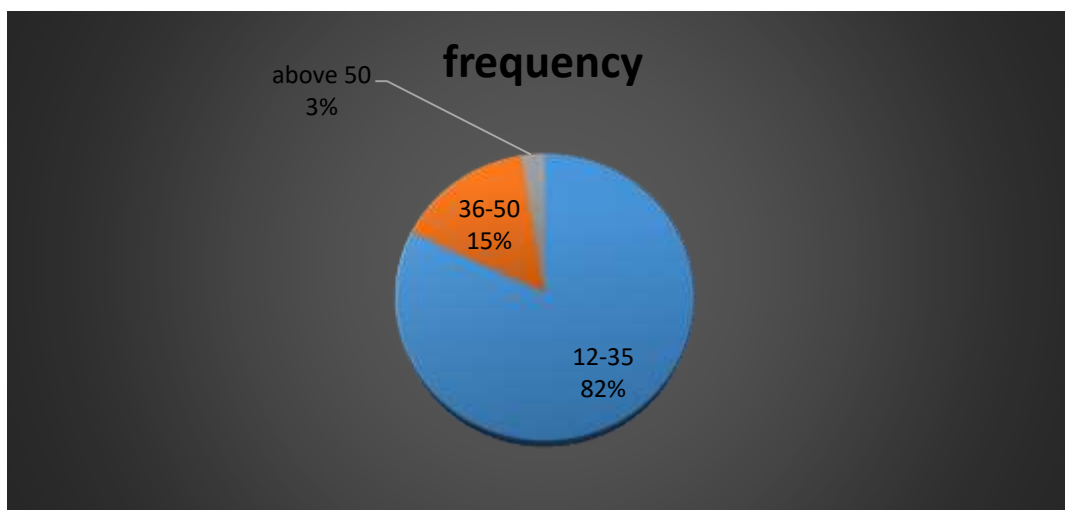


Figure 1: showing maternal/caretaker's age in years

Table 2: Showing Mothers Occupation and Marital Status

Marital Status	Frequency(n)	Percentage (%)
Married	134	89.3
Divorced	14	9.3
Widowed	2	1.4

Table 2 above Concerning the marital status, most of the respondents were married amounting to 89.3% then the

divorced and the widowed had 9.3% and 1.4% respectively.

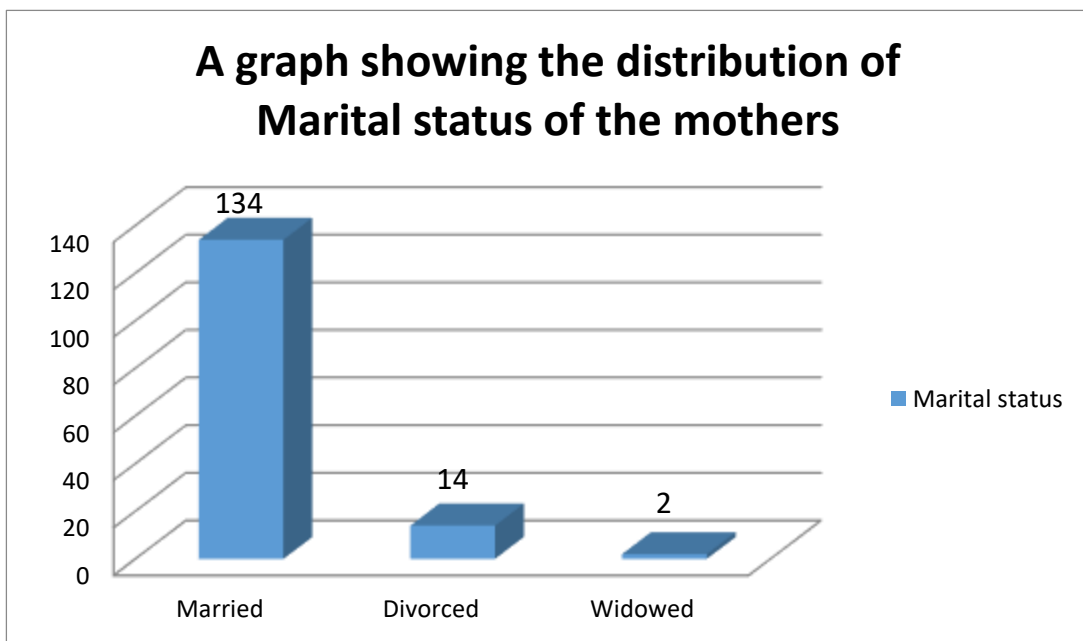


Figure 2: Distribution of mothers/caretakers' marital status

Table 3: shows maternal factors including prolonged rupture of membranes, mode of delivery, history of fever, history of dysuria and delivery from home.

Maternal factors	Frequency(n)	Percentage (%)
Rupture of membranes		
<4 hours	106	70.7
5-12 hours	29	19.3
12-24 hours	10	6.7
>24 hours	5	3.3
History of Dysuria		
No	93	62
Yes	57	38
Fever before Delivery		
No	117	78
Yes	33	22
Delivery from home		
No	147	98
Yes	3	2
Mode of delivery		
Svd	102	68
c/s	48	32

From Table 3, most mothers to neonates had their membranes ruptured <4 hours 106 (70.7%). This was followed by 5-12 hours, 12-24 hours, >24 hours with percentages of 19.3, 6.7 and 3.3 respectively. Most mothers had no history of dysuria 93 (62%), and less than 57 (38%) had a history of dysuria. Most

mothers had no history of fever 117 (78%) and fewer mothers 33 (22%) had a history of fever. Most mothers delivered from home 147 (98%) and those who delivered from home were 3 (2%). Most mothers delivered by svd 102 (68%) and those who delivered from home were 48(32%).

Table 4: maternal factors associated with neonatal sepsis

Variable	Frequency	Percentage
History of dysuria in late pregnancy		
Yes	54	36%
No	96	64%
History of fever in late pregnancy		
Yes	53	35.3%
No	97	64.7%

The majority of the mothers of the neonates never reported a history of dysuria in late pregnancy compared to those who experienced dysuria [96(64%) Vs. 54(36%)] respectively. Additionally,

over sixty per cent of the mothers never reported any history of fever during late pregnancy compared to 53(35.3%) who reported a history of fever in late pregnancy (table 4).

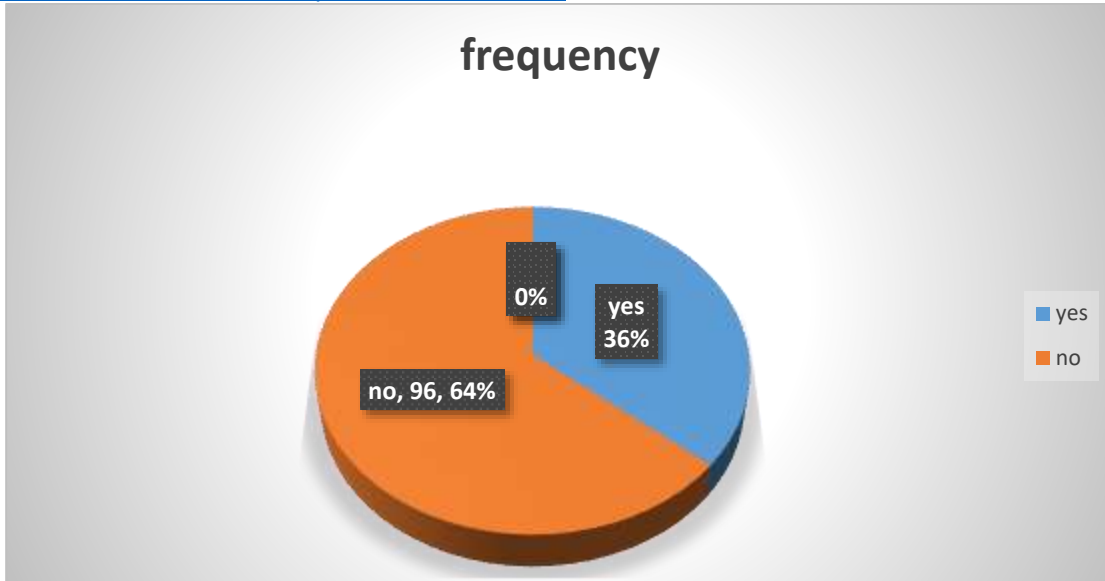


Figure 3: pie chart showing the history of dysuria

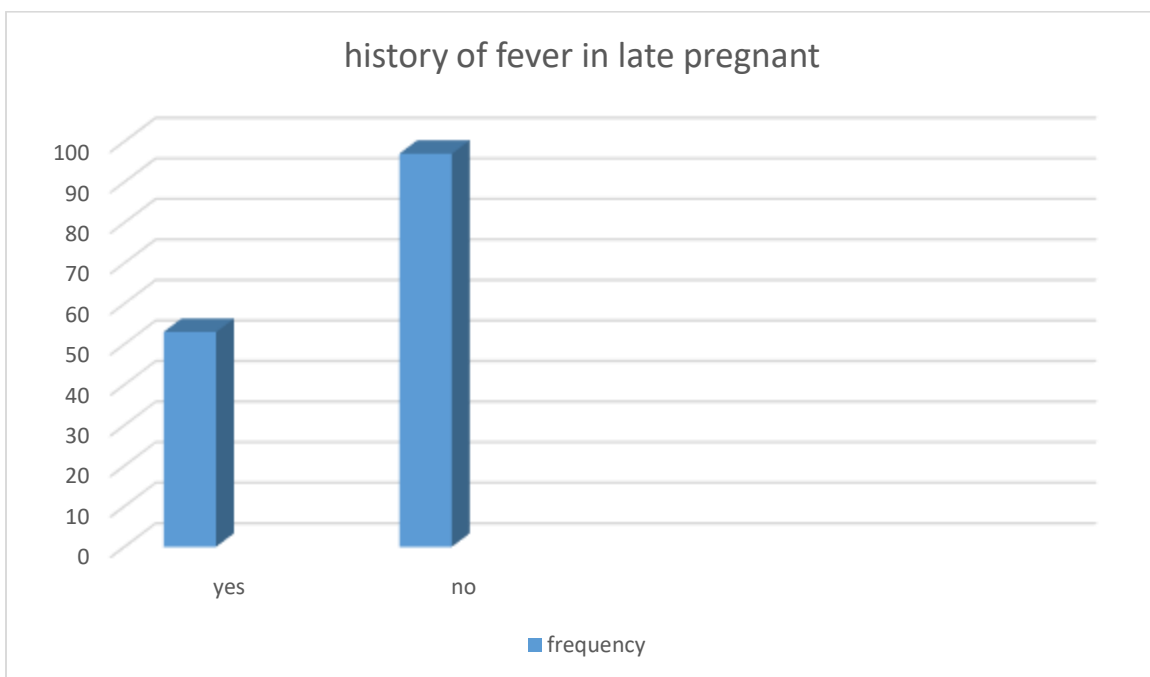


Figure 4: is a bar graph showing the history of fever in late pregnancy

Table: 5 Showing Maternal Factors Related to Hygiene

Factor	Frequency(n)	Percentage (%)
Share basin with neonate		
Yes	53	35.3
No	97	64.7
What was used to clean the cord?		
A piece of clean gauze	3	2
A piece of clean cotton	17	11.3
Any cloth	130	86.7
I don't clean the cord	0	0
What was used to cut the cord		
Sterile scissors	30	20
Unsterile Scissors	2	1.3
new razor blades	94	62.7
Number of times the cord was washed		
None	14	9.3
Once	24	16
Twice	42	28
>Twice	70	46.7
What was applied on the cord after cleaning		
Baby's powder	37	24.7
Vaseline	4	2.6
Cow dug	1	0.7
None	108	72

Most neonates were not sharing basins with the household of 97 (64.7%) and those who were sharing with house members were 53 (35.3%). Most mothers used any cloth to clean the umbilical cord 130 (86.7%), and those that used clean gauze and cotton were 2% and 11% respectively. Most cords were cut by new razor blades accounting for 94 (62.7%),

followed by sterile scissors 20% and lastly, unsterile scissors accounting for 1.3%. Most neonates' umbilical cords were cleaned more than twice a day accounting for 70 (46.7%), followed by twice a day (28%), then once a day (16%) and lastly not cleaned throughout the day accounting for 9.3%.

Table 6: shows what was used to clean the cord.

What was used to clean the cord?		
A piece of clean gauze	3	2
A piece of clean cotton	17	11.3
Any cloth	130	86.7
I don't clean the cord	0	0

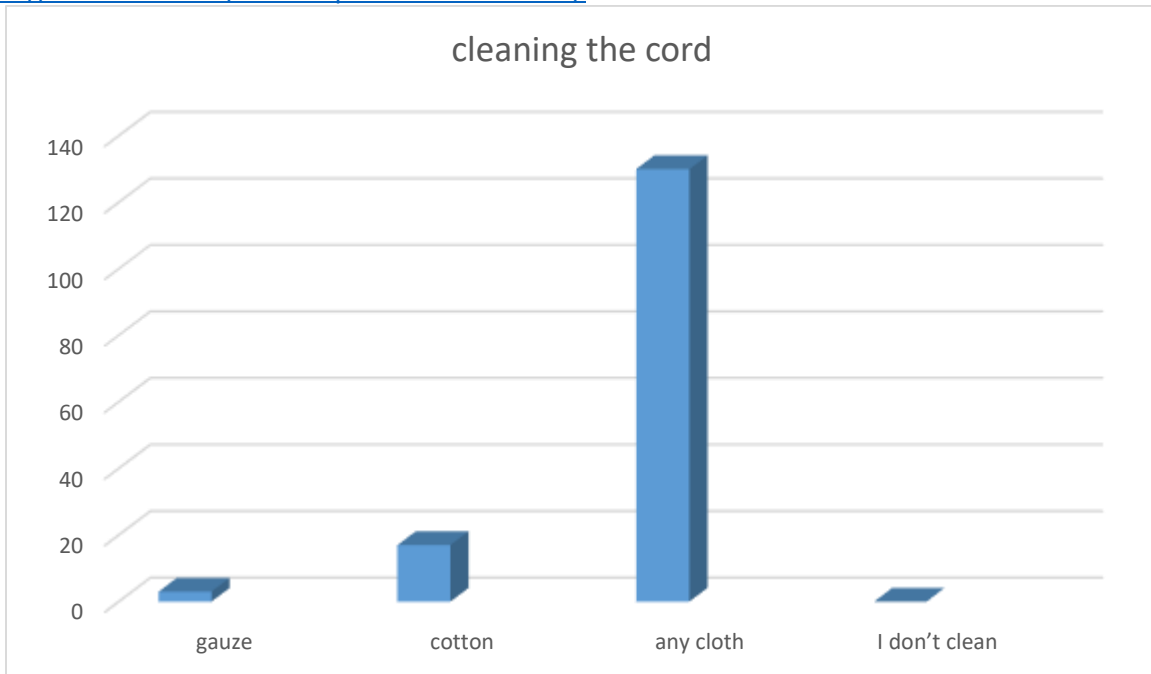


Figure 5: is a graph showing what was used to clean the cord.

Most mothers used any cloth to clean the umbilical cord 130 (86.7%). This was followed by those that used clean cotton

accounted for 11.3 % (17) and gauze was 2% (3).

Table 7: showing what was used to cut the cord

Factor	Frequency(n)	Percentage (%)
What was used to cut the cord		
Sterile scissors	30	20
Unsterile Scissors	2	1.3
new razor blades	94	62.7

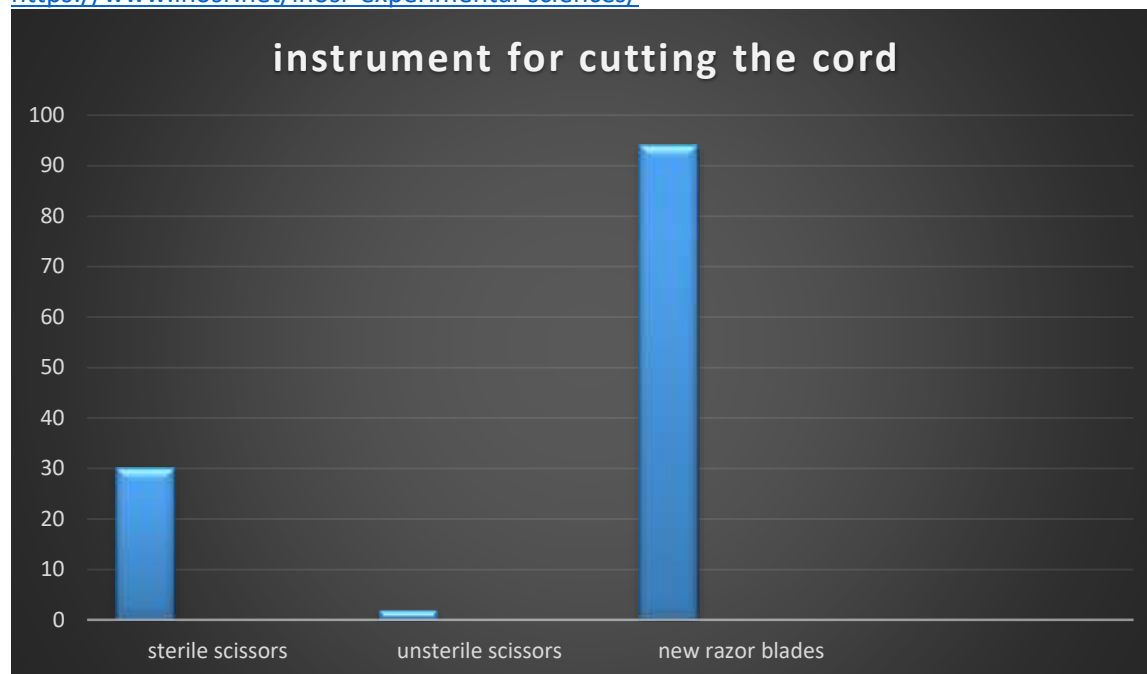


Figure 6: a graph representing instruments that were used to cut the cord

Most cords were cut by new razor blades accounting for 94 (62.7%), followed by

sterile scissors 20% and lastly, unsterile scissors accounting for 1.3%.

Table 8: Binary analysis of maternal factors associated with neonatal sepsis

Variable		Mothers Education Level				P-value
		Illiterate	Primary	Secondary	Tertiary	
Washing hands before handling baby	Yes	11(33.3%)	71(94.7%)	52 (100%)	8 (100%)	0.002
	No	4 (26.3%)	4(5.3%)	0 (00%)	0 (00%)	
Sharing basin with baby	Yes	15(100%)	7(9.3%)	0 (00%)	0 (00%)	<0.001
	No	0 (00%)	68(90.7%)	52 (100%)	8 (100%)	
History of fever during pregnancy	Yes	15 (100%)	30 (40%)	8(15.4%)	0(00%)	<0.001
	No	0 (00%)	45 (60%)	44(84.6%)	8(100%)	
History of fever during pregnancy	Yes	15(100%)	32(42.7%)	7(13.5%)	0(00%)	<0.001
	No	0(00%)	43(57.3%)	45(86.5%)	8(100%)	

Educated mothers are more likely to wash their hands with soap before handling the baby compared to less educated or illiterate mothers [Tertiary 8 (100%) & Secondary 52(100%) Vs illiterate 11(33.3%) 71]. This was statistically significant at a

95% confidence level with a P-value of 0.002. Additionally, illiterate or less educated mothers are more likely to share a basin with their babies compared to educated mothers and this is statistically significant with a P-value< 0.001.

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Regarding infections during pregnancy, educated mothers were less likely to experience malaria and dysuria during

pregnancy and this was statistically significant at a 95% confidence level with P-Value <0.001.

Table 9: Binary analysis of maternal factors associated with neonatal sepsis

Variable	Mothers Age group			P-value
	12-35 year	36-50 years	Above 50 year	
Number of times code cleaned per day	None	16 (13.0%)	0 (00%)	<0.001
	1 times a day	22 (17.9%)	0 (00%)	
	2 times a day	40 (32%)	0 (00%)	
	More than 2 times a day	45 (35.6%)	23(100%)	
What is used to clean the code	Clean Cotton	4 (3.3%)	0 (00%)	0.688
	Clean Cloth	18 (14.6%)	2 (8.7%)	
	Any cloth	101 (82.1%)	21(91.3%)	

Older mothers (above 36 years) or caretakers are more likely to clean the baby's code at least two times a day compared to young mothers below 35 years. This is statistically significant at a 95% confidence level with a P-value <0.001. However, older mothers (above 36

years) or caretakers are more likely to use any cloth in cleaning the baby's code compared to young mothers below 35 years, though this was statistically not significant at 95% confidence level P-value= 0.688.

Table 10: shows the mother's occupation

Occupation	Frequency	Percentage
Housewife	37	24.7
Farmer	47	31.3
Trader	23	15.3
Other	43	29

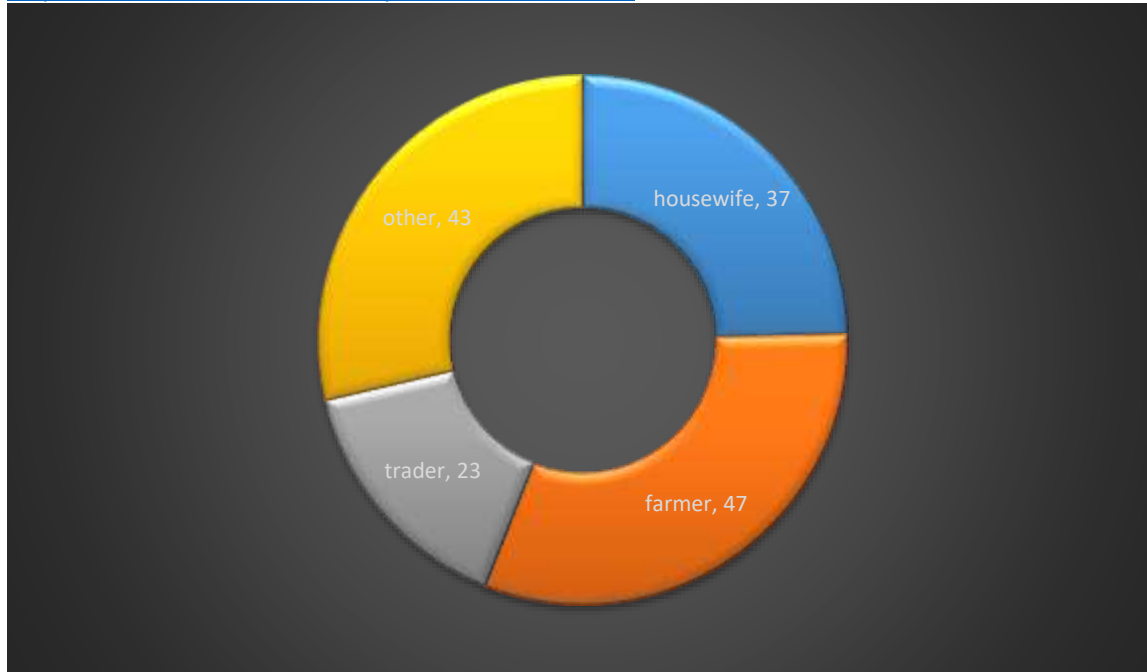


Figure 7: a graph showing the mother's occupation

Table 10 above represents the occupation and the marital statuses of the several respondents who were contacted in this study. Most were farmers who were 47

(31.3%) % then others were 43 (28.7%) housewives and traders 24.7% and 15.3% respectively.

Table 11: shows how often the mother/caretaker earn

How often mother/caretaker earn	Frequency (n)	Percentage (%)
Daily	60	40
Weekly	11	7
Monthly	67	45
I don't earn	12	8



Figure 8: a graph showing how often the mother/caretaker earn

From Table 11, most mothers/caretakers were earning monthly accounting for 45% (67 respondents), followed by those that

earn daily accounting for 40%. Those that earn weekly and those that don't earn included 7 and 8% respectively.

Table 12: shows how much the mother/caretaker earns on average monthly

How much does the mother/caretaker earn monthly	Frequency (n)	Percentage (%)
<100,000	97	65
100,000-150,000	50	33
300,000-500,000	2	1
>500,000	1	1

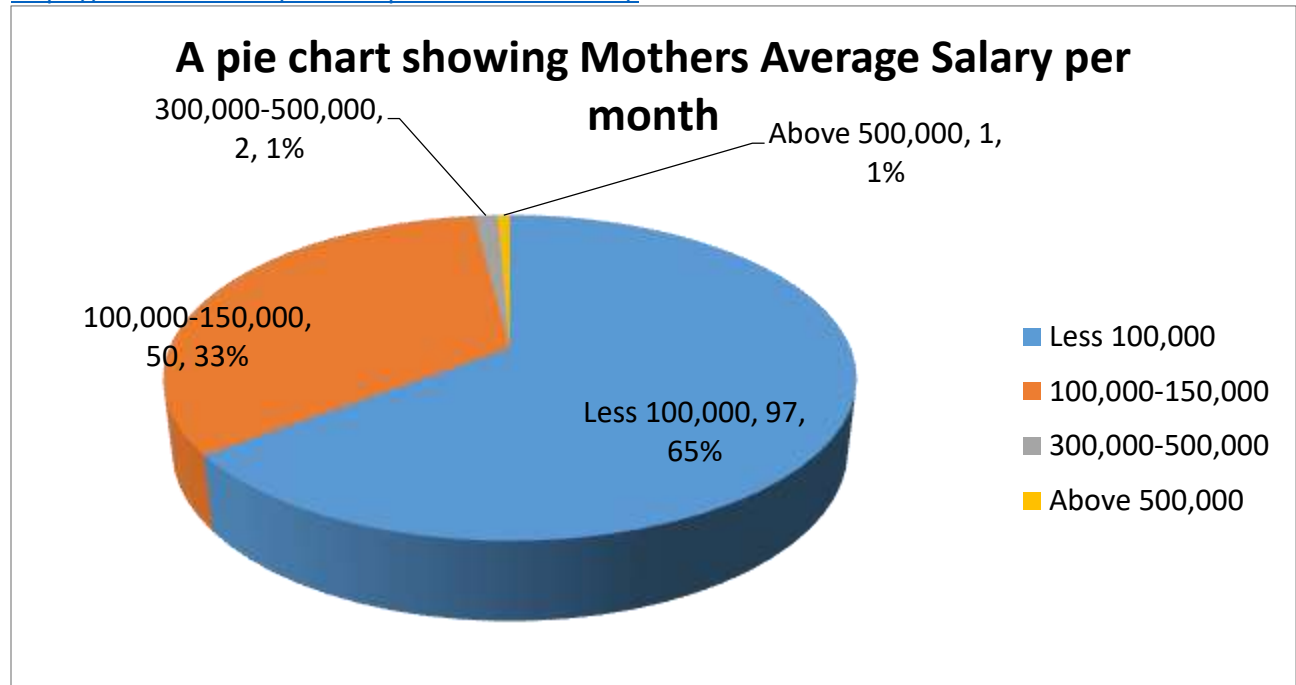


Figure 9 is a graph showing how much the mother/caretaker earns on average monthly

From Table 12, most mothers/caretakers were earning below 100,000 accounting for 97 respondents (65%), followed by those earning between 100,000-150,000 with 50 respondents accounting for 33%.

Those that were earning between 300,000 and 500,000 were 2 with 1% and only 1 respondent earning above 500,000 accounting for 1%.

Table 13: shows distance from the hospital/health Centre

Distance from hospital/health Centre	Frequency (n)	Percentage (%)
<1 kilometer	51	34
1-10 kilometer	87	58
>10 kilometers	12	8

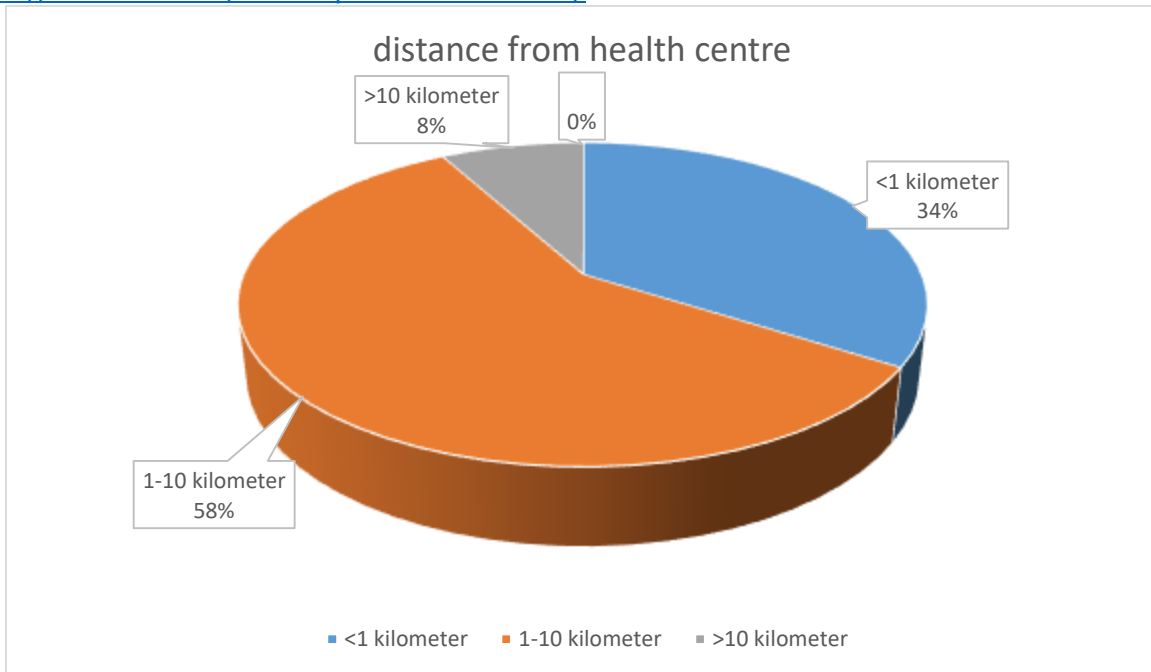


Figure 10: a pie chart showing distance from the mother/care taker's home to health facility

From Table 13, the majority of the mothers/caretakers were living between 1-10 kilometres from the health facility accounting for 87 respondents (58%).

Those that lived <1 kilometer were 51 respondents accounting for 34%. Those that lived >10 kilometres were 12 (8%).

Table 14: showing the number of health workers attending to delivering mothers

Number of health workers	Frequency (n)	Percentage (%)
None	2	1.3
One	8	5.3
Two	136	90.7
More than two	4	2.7

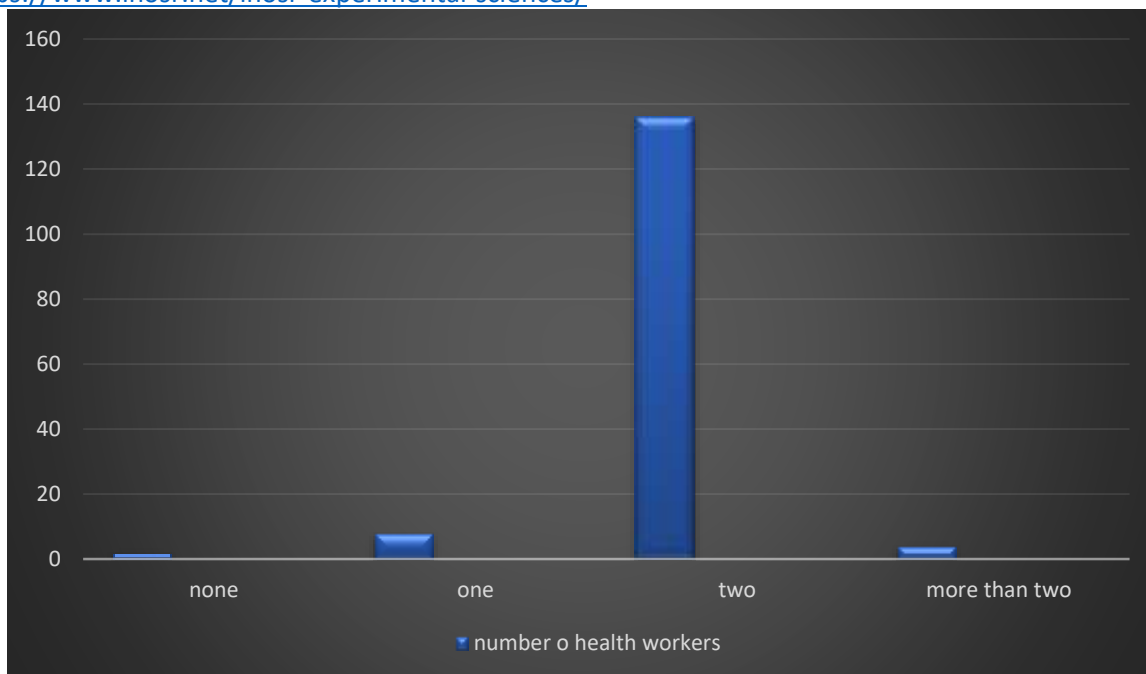


Figure 11: a graph showing the number of health workers attending to delivering mothers

From Table 15, the majority of the mothers had 2 health workers attending to them at the time of delivery that is 136 (90.7%). This was followed by those that 1 health worker attending to them

accounting for 5.3 % (8). Those that were attended to by more than 2 health workers were 4 (2.7%) whereas 2 mothers (1.3%) did not find any health worker at the health facility.

Table 15: shows the sex of the child and the availability of equipment

Factor	Frequency (n)	Percentage (%)
Sex		
Male	93	62
Female	57	38
Did they offer the equipment needed for delivery?		
Yes	33	22
No	117	78

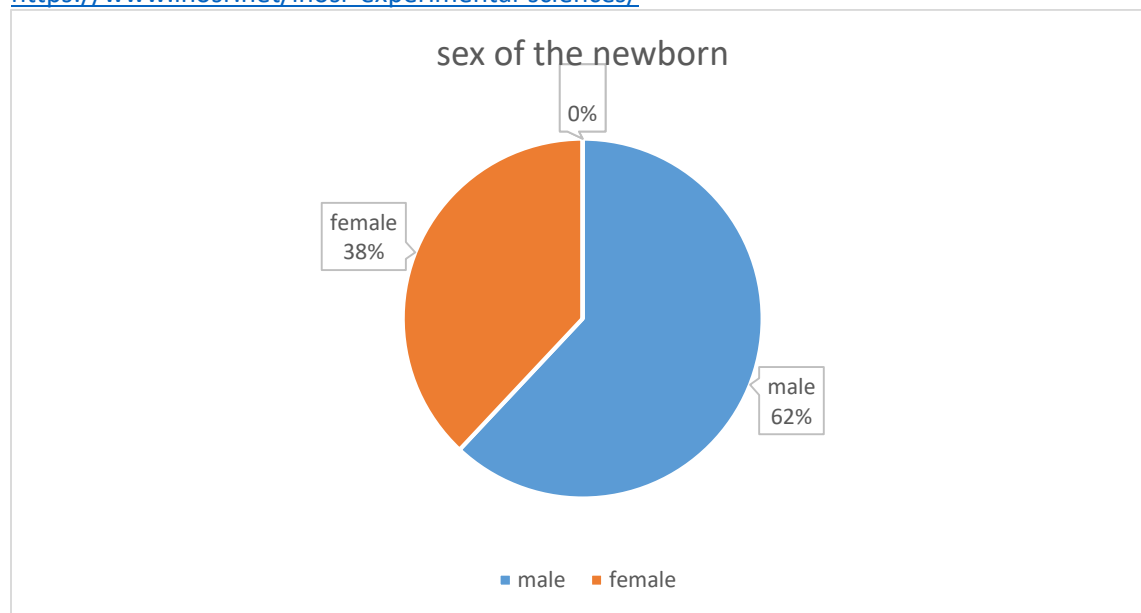


Figure 12: shows of the sex child

From Table 15 above, the majority of the neonates were males accounting for 93

respondents with a percentage of 62. Females were 57 with a percentage of 38.

Table 16: Shows IMCI Clinical Criteria for the Diagnosis of Neonatal Sepsis.

Parameters	Frequency(n)	Percentage (%)
Convulsions		
No	142	94.7
Yes	8	5.3
Grunting		
No	132	88
Yes	18	12
Fever		
No	122	81.3
Yes	28	18.7
Reduced Movements		
No	142	94.7
Yes	8	5.3
Not Able to breastfeed		
No	118	78.7
Yes	32	21.3
Total yes	94	12.5
Total no	656	87.5

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From Table 16 above, a total of 150 respondents with Clinical signs and symptoms of neonatal sepsis out of 142 (94.7%) had no convulsions, and 8 (5.3%) of respondents had convulsions. The majority of 132 (88%) were not grunting whereas 18(12%) had Grunting. fever

Prevalence of Neonatal Sepsis

In this study, the overall prevalence of neonatal sepsis was 12.5%. The study conducted in Kampala central Uganda by Mugalu et al showed that the prevalence of neonatal sepsis was 11.0%. This shows a slight difference in the prevalence of neonatal sepsis between the central and western regions of Uganda. This difference could be due to a smaller sample size and difference in the social-demographic status of the population as well as accessibility of health facilities and differences in the definition of neonatal sepsis among the studies. The study conducted in Kenya showed that the prevalence of neonatal sepsis was 15.8%, [21]. A study conducted by [22] showed the prevalence of neonatal sepsis in East Africa was 29.765%. These differences are due to the small sample size, area of study and the difference in parameters used to assess the prevalence. Although other studies in Egypt reported that the prevalence of neonatal sepsis was 40.7%, this difference could be due to the fact that they use confirmed laboratory results based on blood culture. In addition, the other possible reason might be that the area and the community are far from the Centre of the country and from health facilities which in turn decreases the population and increases the risk of harmful traditional practices on children.

Age of mother/caretaker

For the parent/caretaker factors, the majority of the cases of neonatal sepsis were found among neonates whose parents/caretakers were aged between 12-35 years 122 (2%). This is in line with a similar study by [23] in a specialist hospital in Ghana which also found maternal age to be having a significant influence on the prevalence of neonatal sepsis. However, the age bracket with the

responded as, 122(81.3%) had fever whereas 28(18.7%) had no fever. Neonates who were unable to breastfeed 32(21.3%) while 118(78.7%) were able to breastfeed. The prevalence of neonatal sepsis was 12.5%.

DISCUSSION

majority of neonatal sepsis for this study was different (20-29 years, 60.2%) from mine which was 12-35 years. This could be due to teenage pregnancies who have less experience in caring for the newborn and so the poor hygiene predisposes these babies to neonatal sepsis. Proper, teaching of this age group during antenatal care about hygiene and proper handling of the neonate could reduce the prevalence of neonatal sepsis.

Level of education

Considering Educational level, neonatal sepsis cases were found among neonates whose mothers had up to primary level education with 75 (50%) implying that maternal level of education had an impact on the prevalence of neonatal sepsis. This study is consistent with the same study by [24] in Nigeria which found that a relatively high proportion of mothers to neonates with sepsis primary level education contributed 41.1%. This could probably be due to less knowledge at the primary education level with a basis of only basic primary health care, however with advanced education more with hygiene and disease transmission is taught and so mothers know how to prevent infection in their newborns. This can be improved by enhancing universal secondary education and spreading it throughout the country. Furthermore, girl child education should be emphasized more at all levels so that women can get more educated.

History of dysuria

Most mothers had no history of dysuria 97 (64.7%), and less than 53 (35.3%) had a history of dysuria. However, [25], showed that a history of dysuria contributed to up to 16.7% of neonatal sepsis signifying it's a major risk factor. Dysuria signifies urinary tract infection, and so they keep ascending and even colonize the mother's bloodstream, to the fetus and so it's born

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with an infection and hence neonatal sepsis. This can be improved by improving antenatal investigations more so urinalysis so that urinary tract infections are diagnosed in time and treated promptly to prevent neonatal sepsis.

History of fever

Considering maternal history of fever in late pregnancy, most mothers had no history of fever 96 (64%) and fewer mothers 54 (36%) had a history of fever. However, a study that was done in southern Ethiopia in 2018 by [25] showed a higher percentage of 38.2%. Fever signifies bacterial colonization of blood, and so TORCHES can move across the placenta and infect the fetus hence neonatal sepsis. This can be improved by encouraging complete blood count during antenatal visits in the face of accessing for anaemia in pregnancy. Complete blood count can show early infection and also distinguish bacterial from viral and hence proper management hence reducing the prevalence of neonatal sepsis.

Occupation of mother/caretaker

Most were farmers who were 47 (31.3%) % then others were 43 (28.7%) housewives and traders 24.7% and 15.3% respectively. However according to [23] in specialist hospital in Ghana found out that most mothers were traders accounting for 59.7%. This difference was due to major sources of income between the two regions of Africa, Ghana being trade and western Uganda being farming. Farmers, tend to work for long hours and also work in a dirty environment that is soil which contains numerous organisms. These mothers carry these infections home, infect their newborns and hence neonatal sepsis. Proper, teaching of this age group during antenatal care about hygiene and proper handling of the neonate could reduce the prevalence of neonatal sepsis.

How much the mother/caretaker earn on average monthly

Most mothers/caretakers were earning below 100,000 accounting for 97 respondents (65%), followed by those earning between 100,000-150,000 with 50

respondents accounting for 33%. Those that were earning 300,000-500,000 were 2 with 1% and only 1 respondent earning above 500,000 accounting for 1%. The study that was done by [25] in southern Ethiopia, showed that up to 33.5% of mothers with neonatal sepsis were earning less and hence income was pointed out as one of the major risk factors for neonatal sepsis. Earning less than 100,000 shillings per month means the mother has less to spend, and so even taking the neonate for a checkup becomes hard, and so early diagnosis and treatment of neonatal infection before it becomes sepsis is hindered and so increasing the prevalence of neonatal sepsis. This can be improved by availing more government-free health facilities closer to people with equipment and also improving the people's standard of living.

Sex of neonate

The majority of the neonates were males accounting for 93 respondents with a percentage of 62. Females were 57 with a percentage of 38. Similarly, a study by [24] in Nigeria found that 54.9% of neonatal sepsis cases were males and 45.1% were females and hence male gender had a contribution to neonatal sepsis. Why the male gender is more predisposed to neonatal sepsis is largely unknown.

Distance to Health Facility

The majority of the mothers/caretakers were living between 1-10 kilometers from the health facility accounting for 87 respondents (58%). Those that lived <1 kilometer was 51 respondents accounting for 34%. Those that lived >10 kilometres were 12 (8%). The more health facilities are put closer to the people the more the distance to health facilities is reduced and hence mothers can easily access the facilities, cases are detected early and those at risk of neonatal sepsis are treated in time and hence the prevalence of neonatal sepsis will be reduced. This can be improved by availing more government-free health facilities closer to people with equipment and also improving the people's standard of living.

CONCLUSION

The study demonstrates the prevalence of neonatal sepsis among neonates attending Hoima Regional Referral Hospital with mother's/caretaker factors ranking highest among the risk factors while institutional factors were less considered to be contributory factors. The research was more focused on the prevalence of neonatal with attempts to establish the related associated causative factors.

Prevalence of neonatal sepsis

The findings of this study showed that approximately 1 out of 10 neonates attending Hoima Regional Referral Hospital in Hoima district had neonatal sepsis. This prevalence is due to Age, Hygiene, Level of education, Income, Occupation, Frequency of earning, Distance, Availability of services, and number of health workers.

Maternal factors

Age of mother/caretaker (12-35 years %), Level of education (primary level-50%), History of dysuria (36%), History of fever (35.3%). These in the study were pointed out as the major contributors to neonatal sepsis.

Socio-Economic Factors

- Occupation of mother/caretaker; Most were farmers who were 47 (31.3%) %.
- How much the mother/caretaker earns on average monthly; most mothers/caretakers were earning below 100,000 accounting for 102 respondents (68%). These were the major socio-economic factors that contributed to neonatal sepsis in the study.

Health Care Related Factors

- Sex of neonate; The Majority of the neonates were males accounting

for 93 respondents with a percentage of 62.

- Distance to health facility; The Majority of the mothers/caretakers were living between 1-10 kilometers from the health facility accounting for 87 respondents (58%).

Recommendation

Policy measures on family planning should be enacted to ensure birth control among vulnerable mothers is always provided free of charge and accessible. Health education programs with local translations be directed towards enlightening mothers about the risks of neonatal sepsis. Standardization of obstetrical guidelines on the management of febrile illnesses (u.t.i) for expectant mothers should be streamlined across all departments handling these mothers to minimize risks of infection. Special wards fully equipped with clean beddings should be established to cater for maternal hygiene. Infrastructural improvement should be improved with infection control measures instituted. Medicines prescribed by obstetricians should be availed to all mothers free of charge. Antenatal care/maternity areas should effectively identify and refer at-risk mothers to bigger health facilities with specialists. Utilize statistics/research in informing decisions at the planning level. School health services should be strengthened to reduce teenage pregnancies. Establishment of more health facilities in order to reduce the distance to near health centres for early diagnosis and treatment.

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