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FACTORS PREDISPOSING TO NEONATAL ASPHYXIA AMONG NEONATES DELIVERED AT ADJUMANI GENERAL HOSPITAL, ADJUMANI DISTRICT. A CROSS-SECTIONAL STUDY.

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ABSTRACT

Background

The purpose of the study was to assess the individual factors predisposing to neonatal asphyxia, to find out the community factors predisposing to neonatal asphyxia, and to determine the health-related factors predisposing to neonatal asphyxia.

Methodology

A descriptive cross-sectional study was employed to collect data from 50 respondents. A purposive sampling technique was used and data obtained was presented in tables and figures.

Results

The results of the study reported that individual factors predisposing to neonatal asphyxia were, the majority (82 %) of the respondents had attended antenatal care three times, more than half (52 %) of the respondents reported that they had been diagnosed with severe malaria during pregnancy, the majority (76 %) of the respondents reported to have experienced prolong labor for more than 8 hours.

The findings on the community factor showed that the majority (74 %) of the respondents delivered from the hospital, and most (46 %) of the respondents delivered from home by unskilled relatives.

Findings on health facility factors were, that 56 % of the respondents had nighttime deliveries, 46 % of the respondents had daytime deliveries, more than half (52 %) of the respondents had been delivered by medical interns alone and the majority (66 %) of the respondents reported that the hospital was less prepared for neonatal emergencies.

Conclusion

Poor antenatal care attendance, severe malaria, prolonged labor, night-time delivery, delivery by medical interns alone, and less preparedness of the hospital for neonatal emergencies were the factors predisposing to neonatal asphyxia.

Recommendation

Pregnant mothers should ensure complete attendance of antenatal care to promote successful pregnancy outcomes, proper guidance to be given to medical interns attending labor by experienced midwives to ensure better delivery outcomes, and health workers attending labor should always be prepared to handle neonatal emergencies.

Keywords: *Neonatal Asphyxia, Neonates, Adjumani General Hospital, Adjumani District*
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Background of study

WHO (World Health Organization) defines neonatal asphyxia as the failure of a newborn to establish its spontaneous respiration or delay in the establishment of normal respiration within one minute at birth. this leads to progressive hypoxia associated with carbon dioxide retention and significant metabolic acidosis. A diagnosis of neonatal asphyxia can be made when a newborn has an APGAR score of less than 7, an APGAR score value of 4 to 7 indicates moderate neonatal asphyxia while severe neonatal asphyxia is between 0 to 3 scores. Severe neonatal asphyxia can cause severe multi-organ damage resulting in brain damage, lung dysfunction, renal failure, hepatic failure, and necrotizing enterocolitis. Neonatal asphyxia is the primary cause of perinatal mortality and neurological morbidity, thus leading to brain damage among newborns with 80% of survivors suffering from lifelong health problems like developmental delays, intellectual disabilities, and behavioral problems.

Globally,2.3 million neonates died in the first month of life in 2021, with an approximate neonatal death of 6400 every day (*Neonatal Mortality*, 2021.). They were amounting to 44 % of all child deaths under the age of 5 years. The world has however made substantial progress in child survival since 1990 where globally, neonatal deaths declined from 5 million in 1990 to 2.3 million in 2021 (“Numbers,” 2021.). However, the decline in neonatal mortality rate from 1990 to 2021 has been slower than that of post-neonatal under-5

mortality rate. Currently, there is a global estimate of 900,000 deaths occurring annually due to neonatal asphyxia, which accounts for 13 deaths per 1000 live births.

Continentally, in Africa, neonatal asphyxia accounts for (24.0 %) of the neonatal deaths of which two-thirds of the incidence (15.9 %) occur in East and Central Africa. Neonatal mortality was highest in Sub-Saharan Africa with a neonatal mortality rate estimated at 27 deaths per 1000 live births, thus a child born in Sub-Saharan Africa is 10 times more likely to die within the first month

Regionally, In East Africa, there is no general information indicating the prevalence and the incidence rate of neonatal asphyxia, but studies from Tanzania and South Sudan show relatively high neonatal mortality rates mainly due to neonatal asphyxia. In Tanzania, neonatal deaths are estimated to be 25 deaths per 1000 live births and neonatal asphyxia accounts for 31% of the deaths (Joho et al., 2020). However, in South Sudan, the neonatal mortality rate is 36 per 1000 live births of which neonatal asphyxia accounts for 42 % of the deaths and has the under-5 mortality rate of 104 per 1000 live births.

Nationally, In Uganda, the average national incidence rate of neonatal asphyxia is 29 deaths per 1000 live births. it accounts for 28.9 % of all neonatal deaths. Regionally, Northern Uganda has the highest neonatal mortality rate of 32 deaths per 1000 live births.

The districts with the highest incidence rates of neonatal asphyxia were Bundibugyo, Iganga, and Mubende with a persistent rate of greater than 60 cases of neonatal asphyxia per 1000 deliveries. The least affected district was Kazo district, with 3 cases of neonatal asphyxia per 1000 deliveries.

The study aims to determine the factors predisposing to neonatal asphyxia among neonates delivered in Adjumani general hospital in Adjumani district.

RESEARCH METHODOLOGY

Study design

A descriptive cross-sectional study design was used to collect data from the respondents. It was descriptive because it detailed the information about the factors predisposing to neonatal asphyxia in neonates delivered in Adjumani General Hospital, Adjumani district. It was a cross–sectional study because data was collected at one point in time and a short period.

Study area

The research was conducted at Adjumani General Hospital in Adjumani district. It is located 8 meters away from Gulu highway in Adjumani town council, central(i) parish in Central(ii) village. The health services offered included the following; maternity, general OPD, Laboratory, dental, general medicine, major and minor surgeries, the facility has one wing for HIV/AIDS service. The health workers in Adjumani General Hospital are in the cadres of medical doctors, dentists, opticians, laboratory technicians, radiologists, medical clinical officers, nurses, and midwives. The study was concerned with the factors predisposing to neonatal asphyxia at Adjumani General Hospital in Adjumani district, the study took 2 months from Sept 2023 to Oct 2023 and the study was conducted at Adjumani General Hospital in Adjumani district.

Study population

The study consisted of all mothers with asphyxiated babies, midwives in the labor ward, and nurses in the pediatric ward. Mothers with asphyxiated babies were chosen because they can provide the individual factors predisposing to neonatal asphyxia. The midwives and nurses in the pediatric ward were selected because they were directly involved in the delivery of pregnant mothers and the management of neonatal asphyxia in Adjumani General Hospital.

Sampling Technique

A purposive sampling technique was used to select the respondents for the study. This was because the researcher judgementally sampled the respondents.

Inclusion criteria

The study included all mothers whose babies developed neonatal asphyxia during delivery and have consented to participate in the study. All midwives and pediatric nurses were present at the time of data collection working in Adjumani General Hospital.

Sample size determination

The sample size was determined by using Burton's formula of 1965 as described below S=2(PQ)R

Where;

S=Sample size required.

P=Number of days the researcher will spend while collecting data. Q= Maximum number of people per day.

R=Maximum time the interviewer will spend on each respondent, Therefore,

P=10 days

Q=5 respondents

R=50% of 1 hour is assumed to be used when the specific time to be taken is not known (0.5) S= 2(5x10)0.5hrs

S=50 Respondents.

Therefore, the sample size of the researcher will be 50 respondents.

Study variables

Independent variables

The independent variable in this study was the factors predisposing to neonatal asphyxia among neonates delivered at Adjumani General Hospital.

Dependent variables

The dependent variables were cases of neonatal asphyxia

among neonates delivered at Adjumani Hospital.

Data collection tool

The researcher administered questionnaires to gather relevant data. These questionnaires had both open and closed-ended questions. This tool was used because it was easy to administer, quick in collecting data, and less expensive when collecting data for analysis to address the research problem.

Data collecting procedure

A letter of introduction was obtained from the Kampala School of Health Sciences and was taken to the administration of Adjumani General Hospital which permitted me to carry out my study or research. The researcher consented to all the respondents and they were served with questionnaires, those who were not in a position to read and write were helped by explaining to them through translation, and their responses were recorded.

Data management and storage

The collected data were checked for completeness before leaving the respondents and data was locked in cupboards and laptops with passwords. This was to ensure confidentiality and data security. Before leaving the study site, the participants were requested to correct the mistakes or fill in the missing data. The questionnaire was coded for easy checking and also to prevent losses. Training and supervision of research assistants were done to ensure the collection of quality data. The generated data was stored in both soft and hard copy for future use

Data analysis and presentation

Data was analyzed manually by use of tally sheets, processed and analyzed using a simple electronic computer to compute frequencies and percentages; and then presented in terms of percentages, distribution tables, pie charts, and bar graphs for easy interpretation of the study findings.

Quality control

The questionnaires were formulated in the English language and were first presented to the research supervisor who examined them and assessed the relevance of the questions to the objectives of the study. After data collection, the researcher thoroughly edited the collected data to check for accuracy, completeness, and consistency thus minimizing errors and ensuring that data collected were valid, reliable, and relevant to the study.

PRESENTATION OF RESULTS

Results of the respondents according to demographic data

Table 1: Shows the distribution of the respondents according to demographic data. N=50

Variables.	Frequency (f)	Percentage (%)
Age (Years)		
18-24	09	18
25-44	27	54
Above 45	14	28
Total	50	100
Tribe		
Madi	26	52
Dinka	11	22
Lugabara	06	12
Others	07	14
Total	50	100
Level of education		
None	01	2
Primary	24	48
Secondary	18	36
Tertiary/ University	07	14
Total	50	100
Marital status		
Single	05	10
Married	36	72
Separated	09	18
Total	50	100

From the Table, more than half (54 %) of the respondents were in the age range of (25-44) while the least (18 %) were ranging between (18 -24) years.

Regarding the tribe of respondents, more than half (52%) of the respondents were Madi and the least (12%) belonged to the Lugbara tribe.

Regarding marital status, the majority (72%) of the respondents were married while a minority (10 %) of the respondents were single.

The study findings on the educational level of the respondents reported that most (48 %) of the respondents had at least reached the primary level of education while the least (2 %) never went to school.

Individual factors predisposing to neonatal asphyxia among neonates delivered at Adjumani General Hospital, Adjumani district

Table 2: Shows the distribution of the respondents according to several antenatal visits during pregnancy. N=50

No. of Antenatal visits	Frequency (f)	Percentage (%)
Never attended	02	4
Two times	7	14
Three times	22	44
Four times or more	19	28
Total	50	100

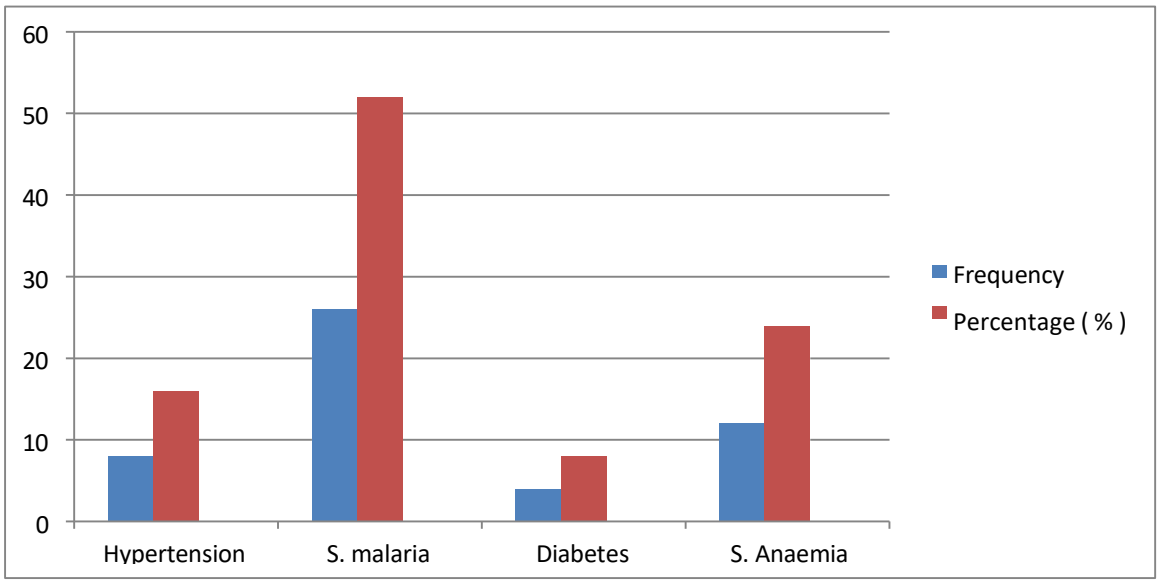
From Table 2, most (44 %) of the respondents had attended antenatal care three times while the least (4 %) had never attended.

Table 3: shows the distribution of respondents according to whether they were diagnosed with any severe illness during pregnancy. N=50

Response	Frequency (f)	Percentage (%)
Yes	49	98
No	1	2
Total	50	100

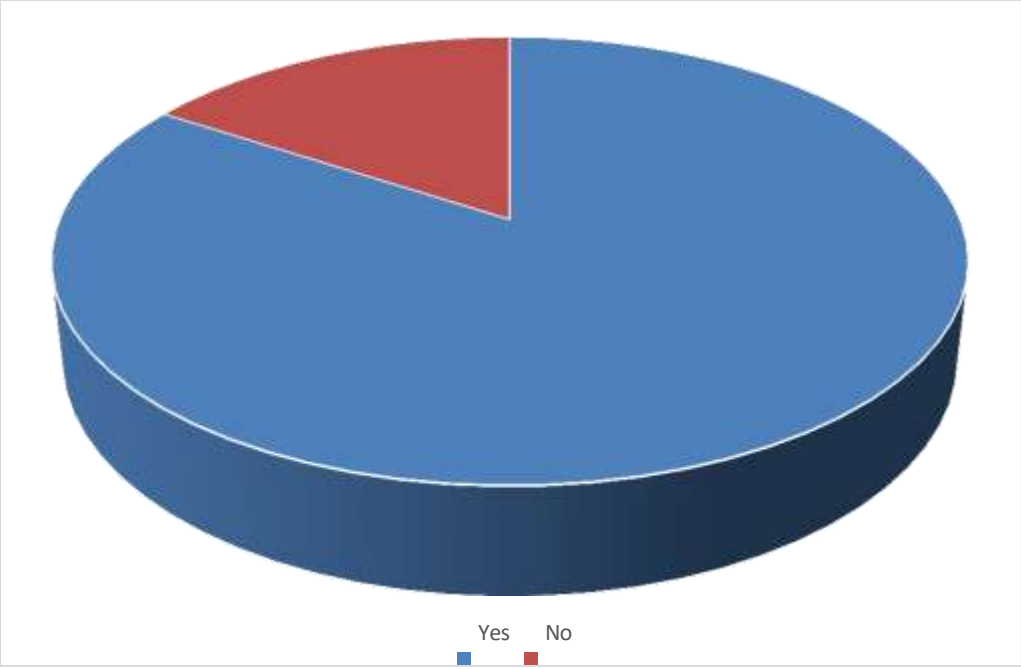
From Table 3, the majority (98 %) of the respondents reported having been diagnosed with severe illness during pregnancy while the minority (2 %) of the respondents reported to have not been diagnosed with a severe illness during pregnancy.

Figure 1: Shows the distribution of respondents according to severe illnesses diagnosed during pregnancy. N=50



From Figure 1, most (52 %) of the respondents were diagnosed with severe malaria while the least (4 %)of the respondents reported having been diagnosed with diabetes during their period of pregnancy.

Figure 2: Shows the distribution of the respondents according to whether they had experienced prolonged labor.



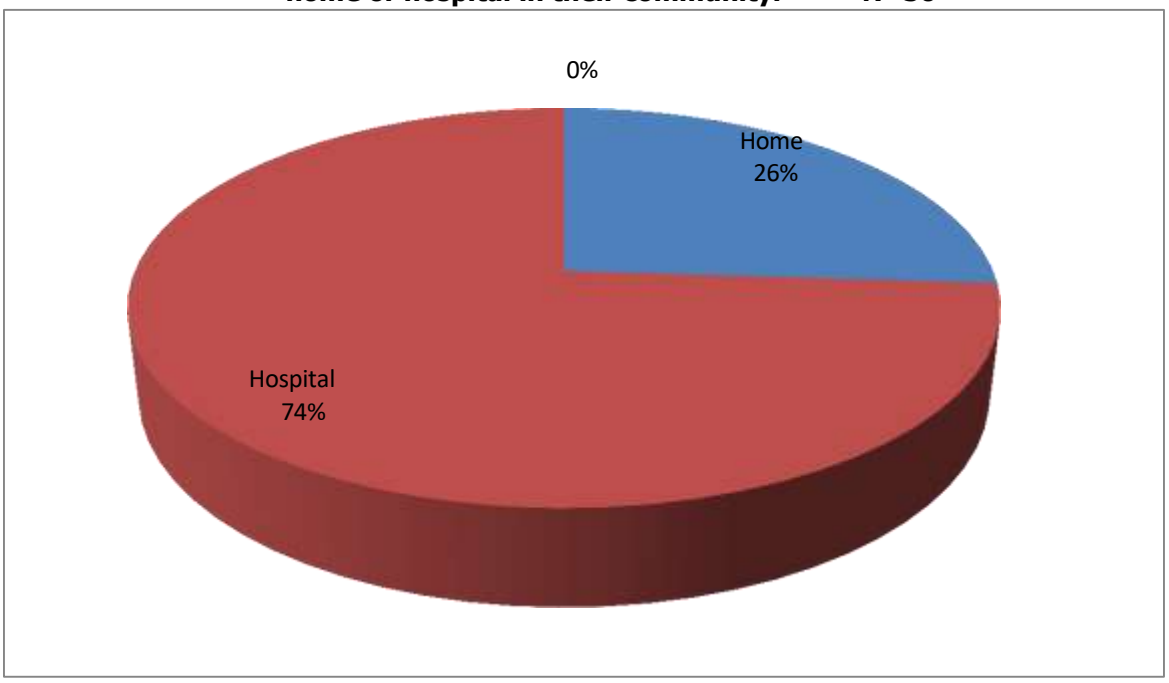
From Figure 2, the majority (84 %) reported having experienced prolonged labor while the minority (16 %) had not experienced prolonged labor.

Table 4: Shows the distribution of the respondents according to the duration of prolonged labor during delivery.N=50

Duration (hr.)	Frequency (f)	Percentage (%)
2 hours	2	5
4 hours	7	17
8 hours	21	50
24 hours	12	28
Total	42	100

From Table 4, most (50%) of the respondents reported having experienced prolonged labor for 8 hours while the least (5 %) of the respondents reported having experienced prolonged labor for 2 hours.

Figure 3: Shows the distribution of respondents according to whether women deliver from home or hospital in their community. N=50



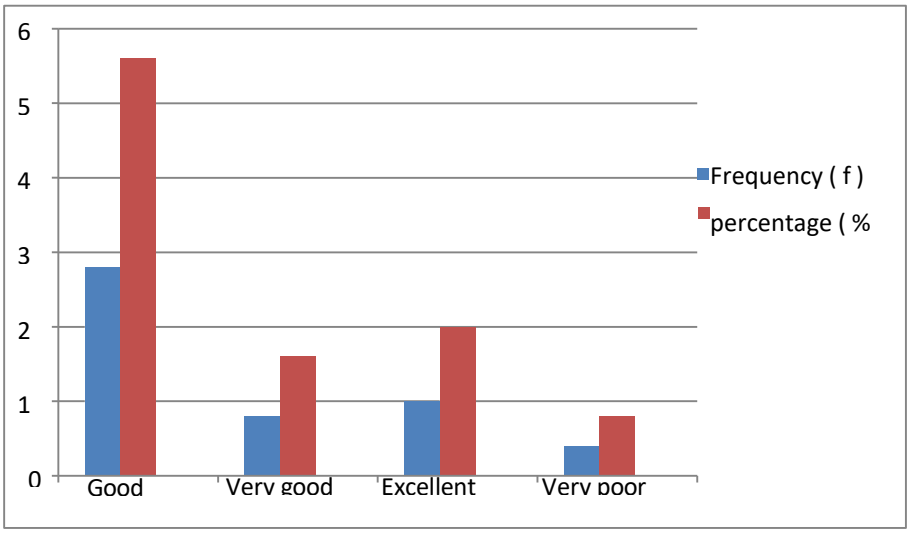
From Figure 3, the majority (74 %) of the respondents reported that women do deliver from the hospital while the minority (26 %) of the respondents reported that women do deliver from home in their community.

Table 5: Shows the distribution of respondents according to who attends to those women who deliver from home in their community. N=50

Respondents	Frequency (f)	Percentage (%)
Traditional Birth Attendant	4	31
Skilled health worker	2	15
Village Health Team	1	8
Unskilled relatives	6	46
Total	13	100

From Table 5, most (46 %) of the respondents who deliver from home reported to have been attended to by unskilled relatives while the least (8 %) were attended to by Village health teams.

Figure 4 shows the distribution of the respondents which aimed at accessing the attitudes of the community toward hospital delivery. N=50



From Figure 4, more than half (56 %) of the respondents reported that their community has a good attitude towards hospital delivery while the least (8 %) of the respondents reported that their community has a very poor attitude towards hospital delivery.

Table 6: Shows the distribution of respondents according to the distance from their homes to Adjumani General Hospital. N=50

Distance (Km)	Frequency (f)	Percentage (%)
Less than 1 Km	10	20
Between 1-5 Km	7	14
Between 6-10 Km	31	62
Above 10 km	2	4
Total	50	100

From Table 6, most (62 %) respondents reported that the distance from their home to the hospital is between 6-10 Km while the least (4 %) reported that the distance from their home to the hospital is above 10 Km.

Health facility-related factors predisposing to neonatal asphyxia among neonates delivered at Adjumani General Hospital, Adjumani district

Table 7: Shows the distribution of the respondents according to the attitudes of the healthcare providers during labor. N=50

Attitude	Frequency (f)	Percentage (%)
Fair	20	40
Good	23	46
Very good	4	8
Bad	3	6
Total	50	100

From Table 7, most (46 %) of the respondents reported that the health care providers had good attitudes during labor while the least (6%) of the respondents reported that the health care providers had bad attitudes during labor.

SJ Pediatrics and Child Health Africa
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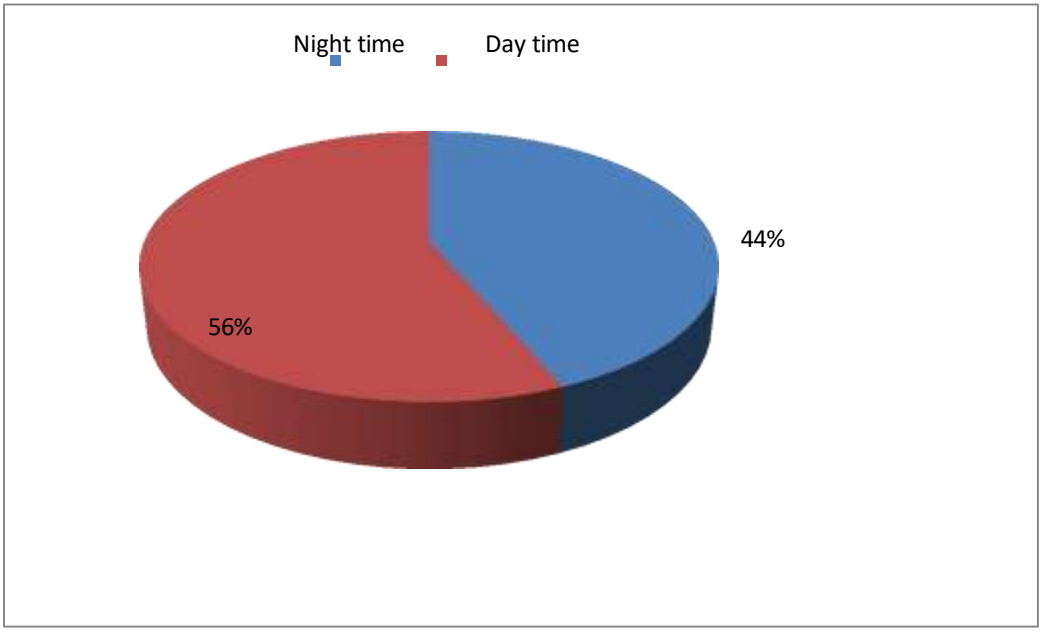
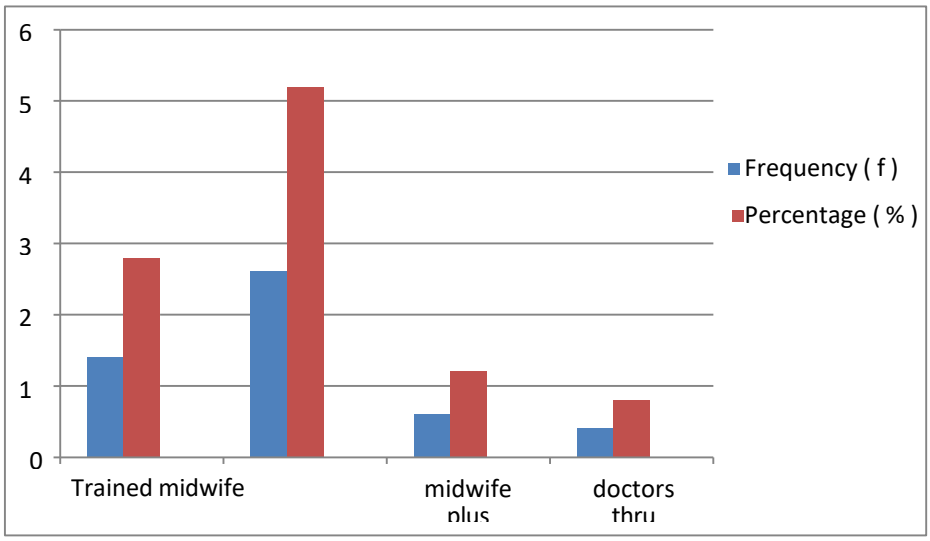
Figure 5: Shows the distribution of respondents based on the time they delivered their babies. N=50



From Figure 5, more than half (56 %) of the respondents reported that they had delivered their babies during night hours and less than half (44 %) of respondents reported that they had delivered their babies during day times.

Figure 6 shows the distribution of respondents according to who delivered them during labor N=50



From Figure 6, more than half (52%) of the respondents reported that medical interns attended to them during labor while the least (4%) reported that their babies were delivered by doctors through surgeries.

Table 8: A table showing the distribution of the respondents according to how prepared the hospital was in handling neonatal emergencies. N=50

Response	Frequency (f)	Percentage (%)
Very prepared	10	20
Less prepared	33	66
Not prepared	2	4
Others	5	10
Total	50	100

From Table 8, the majority (66%) of the respondents reported that the hospital was less prepared to handle neonatal emergencies while the minority (4%) of the respondents reported that the hospital was not prepared to handle neonatal emergencies.

DISCUSSION

Individual factors predisposing to neonatal asphyxia among

The current study findings on individual factors predisposing to neonatal asphyxia reported that most (44%) of the respondents have attended antenatal care visits three times. this finding implies that most of the respondents did not complete the expected antenatal care visits. This study finding is consistent with studies done by Jimma et al,(2022) and Bibi et al., (2022) where (97.1 %) and (57 %) of neonatal asphyxia were due to poor antenatal attendance respectively.

In regards to whether the respondents were diagnosed with severe illness during pregnancy, the majority (98 %) of respondents reported having been diagnosed with severe illnesses during pregnancy. This could be attributed to poor health-seeking behaviors of the mothers during pregnancy. This study is consistent with the study done in China by Liu et al., (2023) where the study showed that (89 %) of cases of neonatal asphyxia were associated with mothers diagnosed with severe illnesses during the period of pregnancy.

Furthermore, on the illnesses diagnosed during pregnancy, more than half (52 %) of respondents were diagnosed with severe malaria. This could be because they live in an area with a high prevalence of malaria cases, this study agrees with the study done by Bibi et al., (2022) which indicated that (64 %) of cases of neonatal asphyxia were due to severe medical conditions during the period of pregnancy.

The study also revealed that half (50 %) of the respondents reported having experienced prolonged labor for 8 hours. this could be due to obstructed labor and non-cephalic presentation of the baby. The study agrees with a study done on the risk factors for neonatal asphyxia in neonates in Ethiopia by Fitriana et al., (2021) which showed that (46.2 %) of neonatal asphyxia was due to prolonged labor.

Community factors predisposing to neonatal asphyxia

The current study findings on community factors predisposing to neonatal asphyxia reported that the majority (74 %) of the women deliver babies from the hospital in their community,

The study findings also reported that most (46 %) of the women were attended to by unskilled relatives, this could be because the unskilled relatives perform cultural rituals during and immediately after birth.

Health facility-related factors predisposing to neonatal asphyxia

The current study findings on health facility factors predisposing to neonatal asphyxia revealed that the majority (66 %) of the respondents reported that the hospital was less prepared to handle neonatal emergencies. this could be because the healthcare providers did not receive adequate neonatal resuscitation training. This finding of the study is not consistent with that conducted on preparedness for neonatal emergencies at birth in Ethiopia by Kebede et al.,(2021) which indicated that (60.1 %)of the healthcare providers were adequately prepared for neonatal emergencies.

In regards to whether the respondents delivered at day time or night time, more than half (56 %) of the respondents delivered at night. This result of the study agrees with the study done by Bayih et al., (2020) where night-time delivery was compared with day-time delivery. The results indicated that (60 %) of neonates were asphyxiated during nighttime delivery while (40 %} neonates were asphyxiated during daytime delivery.

In regards to who delivered the respondents, more than half (52%) of the respondents delivered by medical interns alone had their babies asphyxiated, the study agrees with a study done by Bayih et al., (2020), which aimed at comparing delivery by medical interns only and that of midwives, it showed that neonates delivered by medical interns alone were (28.7 %) asphyxiated while that of midwives was (24.2 %) asphyxiated.

Conclusions

The researcher concluded that the individual factors predisposing to neonatal asphyxia among neonates are poor antenatal care attendance (56 %), severe malaria (52 %), prolonged labor (96
%). In regards to community factors predisposing to neonatal asphyxia among neonates, the researcher concluded that (74 %) of the respondents delivered from the

hospital and (46%) of the home deliveries were attended to by unskilled relatives.
Regarding health-related factors predisposing to neonatal asphyxia among neonates, (56 %) were delivered during nighttime, (52 %) were delivered by medical interns alone, and (66 %) had less neonatal emergencies.

Recommendations

Based on the conclusions above, the following are my recommendations,
Pregnant mothers should complete attendance of antenatal care to promote a successful pregnancy outcome.
Pregnant mothers should routinely screen and treat severe illnesses diagnosed during the period of pregnancy.
Experienced midwives of Adjumani General Hospital should always be present to guide medical interns attending labor to promote better delivery outcomes.
The administration of Adjumani General Hospital should implement policies of continuous medical education of her health care providers on neonatal emergency responses.

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LIST OF ABBREVIATIONS

APGAR: Appearance, Pulse, Grimace, Activity, Respiration
MoH: Ministry of Health
UNICEF: United Nations International Child Emergency Fund.
UNIPH: Uganda National Institute of Public Health
WHO: World Health Organization

Source of funding

This study was not funded

Conflict of interest

The authors declare no conflict of interest.

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