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The Occurrence and Correlating Elements of Newborn Mortality in Jinja District, Uganda

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ABSTRACT

In Uganda, the neonatal mortality rate remains high, standing at 27 deaths per 1000 live births. However, there's a lack of comprehensive data concerning the prevalence and factors associated with neonatal mortality in Jinja district, Uganda. This study aimed to fill this gap by assessing the prevalence and identifying associated risk factors for neonatal mortality in the area. Using a pretested survey questionnaire, data from the electronic database of Jinja district on maternal and newborn interventions were collected, focusing on 245 women who had given birth within the past year, irrespective of birth outcomes. The collected data underwent analysis using SPSS version 25, employing chi-squared analysis at a significance level of p=0.05 to discern factors linked with neonatal mortality. The study revealed a neonatal mortality rate of 12.2%. Factors contributing to increased neonatal mortality included mothers with an education level below secondary, residing in rural areas, male infants, neonates aged 2-7 days, preterm birth, and low birth weight. Notably, the neonatal mortality rate observed in this study was lower than the national average. The findings suggest that employing community-based initiatives to educate and raise awareness within households about appropriate maternal and newborn care practices could significantly contribute to reducing neonatal mortality rates.
Keywords: Neonatal mortality, Newborn, Preterm birth, Mothers.

INTRODUCTION

The neonatal period is the most hazardous period in the child's life because the risk of dying is highest during this period [1]. Globally, it was estimated that in 2017, 6.3 million children and young adolescents died, mostly from preventable causes. Of these deaths, approximately 85% occurred in the first five years of life and nearly half (47%) of those under-five deaths occurred in the first month of life [2]. This brought the global prevalence of neonatal death in 2017 to 18 deaths per 1,000 live births. While there have been improvements in child mortality over the last two decades, the rates of neonatal mortality did not decline substantially in the same period. For instance, globally, the neonatal mortality rate fell by 51% from 37 deaths per 1000 live births in 1990 to 18 deaths per 1000 live births in 2017. However, the change in neonatal mortality was not as significant as the change in child mortality for children aged 1-59 months (63%) [3]. Africa contributed to one-third of the world's neonatal mortality burden. In this region, about 75% of deaths occurred during the first week of life, and almost half were within the first 24 hours [4-6]. Among the Sustainable Development Goals (SDG) regions, Sub-Saharan Africa had the highest neonatal mortality rate in 2017 at 27 deaths per 1000 live births [7]. According to the Uganda Demographic

Health Survey (UDHS), the neonatal mortality rate was 27 deaths per 1000 live births in 2016. In other words, in Uganda 1 in every 37 children dies within the first month. The UDHS 2016 report further shows that under-5 mortality rates have declined over time, from 116 deaths per 1,000 live births in 2006 to 64 deaths per 1,000 live births in 2016 [8]. The major causes of neonatal mortality in Uganda, like other Sub-Saharan African countries, include; birth asphyxia, prematurity, anemia, and sepsis [9, 10]. Neonatal mortality in Eastern Uganda is not well known due to the limited availability of data. However, a study to determine neonatal mortality and its risk factors in selected rural communities from districts of Kamuli, Pallisa, and Kibuku in Eastern Uganda in 2016 reported a prevalence of 34 deaths per 1000 live births, and factors associated with increased neonatal deaths were parity of 5+ (adj. RR =2.53, 95 % CI =1.14–5.65), newborn low birth weight (adj. RR = 3.10, 95 % CI = 1.47–6.56) and presence of newborn danger signs (adj. RR = 2.42, 95 % CI = 1.04–5.62) [10].

In the year 2000, 189 countries committed to reducing child mortality through Millennium Development Goals (MDGs) specifically goal number 4; where each country had to reduce child mortality by 2/3 by 2015 [7]. However, this goal to reduce the child mortality rate by two-thirds was not met by many countries including Uganda [11]. A global response adopted in 2015 by the United Nations (UN) set 17 new Sustainable Development Goals (SDGs). The SDGs were designed to maintain and improve upon what was achieved in the last fifteen years through the MDGs [12]. According to the UN, the third SDG target 3.2 is to end preventable deaths of newborns and children under five by the year 2030. Despite global efforts, neonatal mortality has remained on the rise in some countries. It is estimated that 2 million newborns die on the day they are born and 3 million more die within seven days of birth [13]. As with many health issues, the highest neonatal mortality (99%) occurs in low- and middle-income countries. Sub-Saharan Africa and Southeast Asia have had the least progress in reducing neonatal deaths [14, 15].

In Uganda, neonatal mortality is the number one cause of under-five mortality (Uganda Ministry of Health (MoH)). According to MoH; most neonatal deaths (72%) are due to avoidable causes like birth asphyxia, prematurity, and neonatal sepsis [16]. A study in Eastern Uganda reported a neonatal mortality of 34 which is higher than the national prevalence of 27 [10]. No study had been done in the Jinja district regarding neonatal mortality and results from studies elsewhere could not be assumed to be the same for the Jinja district. Thus, this study was aimed at determining neonatal mortality in the Jinja district and the factors associated with it.

METHODOLOGY

Study design

A cross-sectional descriptive retrospective and analytical study design was used for this study. Quantitative data was collected for this study.

Area of Study

This study was conducted in Jinja district using District health office to get data. Jinja district is located in Eastern Uganda, about 80km by road from Kampala, the Uganda's capital city.

Study Population

The study involved all newborns within Jinja district and those who were admitted in hospitals in the last year preceding this study.

Inclusion Criteria

Only neonates from the Jinja district were considered.

Exclusion Criteria

Neonates from outside the Jinja district were not considered.

Sample Size

The sample size required for the study was calculated based on the formula by Kish to estimate a single population proportion [17].

$$N = \frac{Z^2\, p(1-p)}{\delta^2}$$

Were,
N = estimated sample size
P = anticipated proportion of neonatal death, using the national prevalence of19.9% (UBOS, [8]), so P will be taken to be0.199.
Z = standard normal variation ant 95% confidence (1.96)
δ = margin of error (5%)
the calculated sample size was, $\frac{1.96^2\, x\, 0.199(1-0.199)}{0.05^2}$ = 245

Sampling Technique

Systematic random sampling was used to select 245 sample needed for the study. The district electronic register for the year 2020 was used whereby according to the register, neonates with even number in the register were taken if they met the inclusion until the required sample of 245 was reached.

Data collection methods

Data was collected using a pretested data collection tool designed by the researcher considering the objectives and research questions. In this study; maternal factors, Neonatal factors, and pregnancy and labor factors were considered to directly affect neonatal mortality, while Place of birth, quality of Services, and Staff motivation were considered confounding factors. Under maternal factors, the variables considered were Maternal; age, Education level, Knowledge of neonatal danger signs, Residence (rural or urban), Distance from health facility, parity, and co-morbidities (hypertension, Diabetes mellitus) Under neonatal factors, the variables which were considered in this study included: Gender of the neonate, Gestational age, Birth weight, Multiple Birth, IUGR, and danger signs. Whereas, Labor Duration, Mode of delivery, APGAR Score, PPROM, and ANC attendance were the variables considered under pregnancy and labor factors.

Data Processing and Analysis

Collected data were entered and analyzed in the computer using IBM SPSS software version 25. Categorical variables were presented in a table of frequencies for descriptive statistics. The chi-square test was computed to test for the factors associated with neonatal mortality. The point for statistical implication was a P-value of≤0.05, also, a Bivariate analysis of factors associated with neonatal mortality was done. The results of the analysis were presented in the form of tables and pie-charts, bar graphs then interpreted into usable information.

Quality control

The data collection tool was pre-tested to ensure that questions were clear and allowed the gathering of information needed for the study. The questions that showed ambiguity during pre-testing were revisited and modified as required.

Ethical Consideration

Clearance for the study was sought from faculty of clinical medicine and dentistry. Informed consent was obtained from the participants before data collection and the data collected was not used for any other unintended purposes.

RESULTS

Sociodemographic characteristics of participants

Table 1 shows the socio-demographic characteristics of respondents. The present study shows that more than half, 171 (69.8%) of the neonates were from rural backgrounds while the rest, 74 (30.2%) were urban dwellers. The majority of the neonates were males 144 (58.8%) and were aged 2-7 days 147 (60.0%). The majority of the mothers were married 171 (69.8%) and only 25 (10.2%) had completed tertiary education.

Table 1: Sociodemographic characteristics of participants

Characteristics	Frequency	Per cent
Mother's education level		
None	49	20.0
Primary	122	49.8
Secondary	49	20.0
Tertiary	25	10.2
Employment status		
Employed	49	20.0
Unemployed	98	40.0
Business	98	40.0
Marital status		
Married	171	69.8
Unmarried	74	30.2
Residence		
Urban	74	30.2
Rural	171	69.8
Mother's age		
< 18 years	73	29.8
18-34 years	123	50.2
≥35 years	49	20.0
Child's sex		
Female	101	41.2
Male	144	58.8
Child's age		
≤ 24 hours	73	29.8
2-7 days	147	60.0
≥ 8 days	25	10.2

Pregnancy and delivery characteristics

Results from the study shows that majority pregnancies were singleton 221 (90.2%), had delivered from a health facility 172 (70.2%), and most of the neonates (169, 69.0%) had a normal birth weight. However, most more than half of the mothers had inadequate ANC attendances 172 (70.2%). Table 2.

Table 2: Pregnancy and delivery characteristics

Characteristics	Frequency	Percent
Place of delivery		
Health facility	172	70.2
Home	73	29.8
Pregnancy type		
Singleton	221	90.2
Multiple	24	9.8
Birth interval		
< 24 months	74	30.2
≥ 24 months	171	69.8
ANC attendance		
Adequate	73	29.8
Inadequate	172	70.2
Gestational age at birth		
Preterm	74	30.2
Term	171	69.8
Birth weight		
LBW	51	20.8
NBW	169	69.0
Macrosomia	25	10.2

Prevalence of neonatal mortality

Results from the present study show that out of the total 245 neonates, 30 died representing 12.2%. The majority of the neonates 215 (87.8%) recovered well. Figure 1.

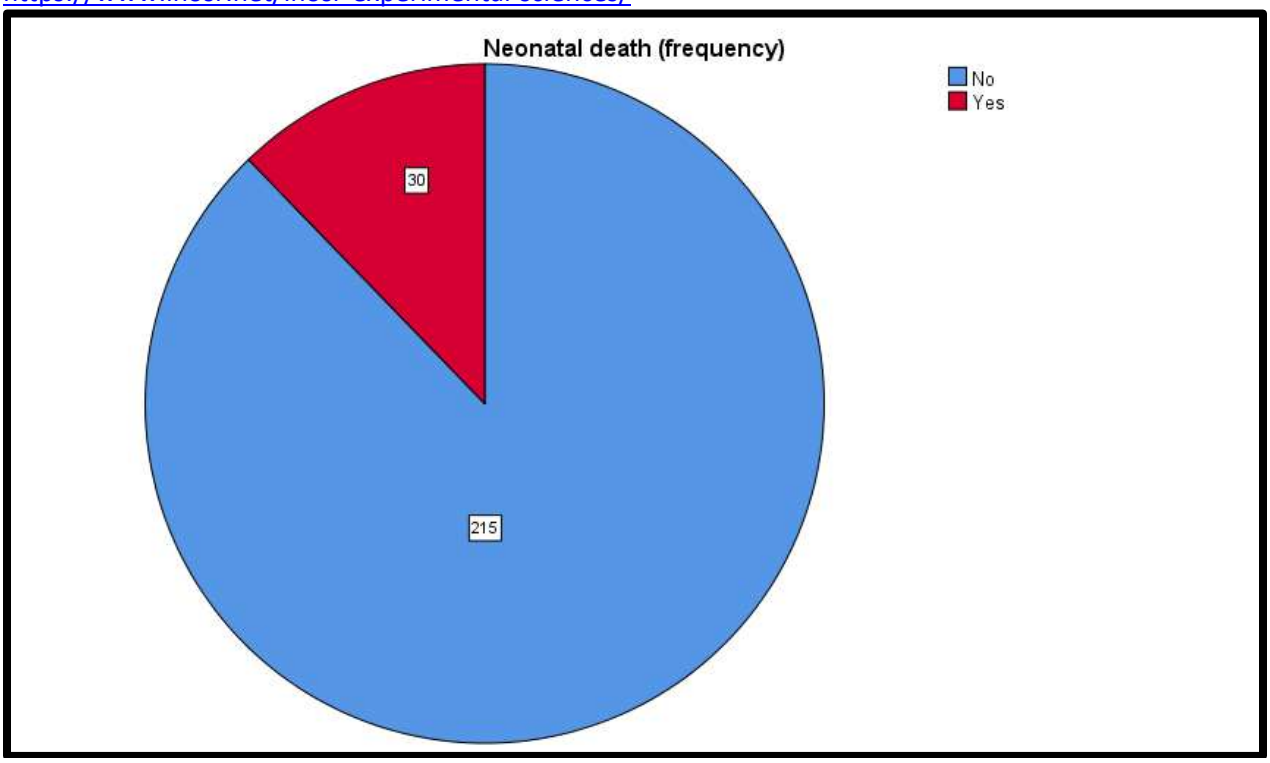

Figure 1: Prevalence of neonatal mortality

Bivariate analysis of factors associated with neonatal mortality

Analysis of results shows that mother's education level (X^2=55.84, P=<0.001), residence (X^2=21.56=<0.001), child's sex (X^2=6.89, P=0.009), child's age (X^2=8.57, P=0.014), maturity at birth (X^2=21.56, P=<0.001) and birth weight (X^2=26.29, P=<0.001) were statistically significant for neonatal mortality. Table 3.

Table 3: Bivariate analysis of factors associated with neonatal mortality

Variables	Neonatal death		Chi-square (X^2)	P value
	No	Yes		
Mother's education level			55.84	**<0.001***
None	44 (20.5%)	5 (16.7%)		
Primary	122 (56.7%)	0 (0.0%)		
Secondary	29 (13.5%)	20 (66.7%)		
Tertiary	20 (9.3%)	5 (16.7%)		
Residence			21.56	**<0.001***
Urban	54 (25.1%)	20 (66.7%)		
Rural	161 (74.9%)	10 (33.3%)		
Child's sex			6.89	**0.009***
Female	82 (38.1%)	19 (63.3%)		
Male	133 (61.9%)	11 (36.7%)		
Child's age			8.57	**0.014***
< 24 hours	68 (31.6%)	5 (16.7%)		
2-7 days	122 (56.7%)	25 (83.3%)		
> 8 days	25 (11.6%)	0 (0.0%)		
Pregnancy type			3.71	0.504
Singleton	191 (88.8%)	30 (100.0%)		
Multiple	24 (11.2%)	0 (0.0%)		
ANC attendance			0.21	0.651
Adequate	63 (29.3%)	10 (33.3%)		
Inadequate	152 (70.7%)	20 (66.7%)		
Maturity at birth			21.56	**<0.001***
Preterm	54 (25.1%)	20 (66.7%)		
Term	161 (74.9%)	10 (33.3%)		
Birth weight			26.29	**<0.001***
LBW	35 (16.3%)	16 (53.3%)		
NBW	160 (74.4%)	9 (30.0%)		
Macrosomia	20 (9.3%)	5 (16.7%)		

*Statistically significant.

DISCUSSION

According to the Ugandan Demographic Health Survey (UDHS) 2016, in Uganda 1 in every 37 children dies within the first month of birth [16]. The present study assessed the prevalence and associated factors of neonatal mortality in the Jinja district.

Prevalence of neonatal mortality

In the present study, the overall neonatal mortality rate was 12.2%. This finding is inconsistent with several studies carried out in Uganda and East Africa. The current finding is lower than the study conducted in Eastern Uganda [10] and the national prevalence reported by findings of UDHS in 2016 which was 34% and 27% respectively [16]. In addition, the finding in this study is significantly lower than the neonatal mortality rate reported by WHO in 2018 which was 40% [3] and also lower compared to studies conducted in Sub Saharan Africa [7]. The discrepancy in findings of the current study and previous ones could be attributed to poor

recording habits by health workers and poor health seeking behaviors in Uganda which could have led to miss some neonatal mortalities which happen in villages before going to hospitals. Similarly, the difference observed between the mortality rates estimated by several studies might be due to the difference in the distribution of skilled human resources and the socioeconomic status of countries and individuals.

Factors associated with neonatal mortality in Jinja district

In the bivariate analysis of the results from this study, it was shown that the mother's education, residence, child's sex, child's age, maturity at birth, and birth weight were identified as predictors of neonatal mortalities. Similar findings were observed in other previous studies conducted in Indonesia [18], Tanzania [19], and, the UK [20]. Some of these risk factors could be prevented by anticipating risky pregnancies and providing proper and on-time interventions. Furthermore, neonates who were from rural areas had an increased risk of mortality. This may be related to delay in making a decision to seek care and delay in reaching care due to the cost of transportation. It is also likely that most mothers and newborns are referred from lower health Centers after they have already developed complications and this could contribute significantly to loss of life during neonatal periods. In addition, prematurity and low birth weights of the newborn were associated with neonatal mortality. This is due to the fact that underweight and preterm newborns have poorly developed immune systems which leads newborns to disease susceptibility. This implies that anticipating high-risk newborn babies and early treatment would reduce the deaths of such physiologically and anatomically vulnerable neonates. Other possible explanations for this might also be due to delays in receiving adequate health care due to poorly equipped health facilities.

CONCLUSION

In conclusion, this study found that neonatal mortality was lower compared to many other previous studies. Factors which were associated with neonatal mortality were; lower education level, male sex, preterm birth, and low birth weight.

Recommendations

Based on the findings of this study, the researcher recommends that early detection and anticipating high-risk pregnancies and high-risk newborns and the provision of timely and appropriate intervention could reduce neonatal mortalities. Furthermore, it is important that further studies be conducted on a larger scale to broaden the understanding obtained from this study.

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