Global Scientific JOURNALS
GSJ: Volume 10, Issue 6, June 2022, Online: ISSN 2320-9186
www.globalscientificjournal.com

ASSESSING FACTORS ASSOCIATED WITH NEONATAL DEATHS IN BUSIA DISTRICT; CASE STUDY OF MASAFU, DABANI AND BUSIA HEALTH FACILITIES

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ABSTRACT

Background

Uganda is one of the fifty countries with highest burden of neonatal deaths, which has stagnated at 27 deaths per 1000 live births with 30 deaths per 1000 live births in urban and 31deaths per 1000 live births in rural areas. According to the Busia District Health Information, system II, neonatal death stands at 81 deaths per 532 pre-term births. This study aimed to assess factors associated with neonatal deaths with special focus on Busia district, Uganda.

Methodology; This study employed retrospective cross sectional study design to assess the association between predictor factors and neonatal deaths as an outcome of interest using past data from three randomly selected facilities in Busia district. A total of 230 records were randomly selected and used in the study. Data was analyzed in form of graphs and tests. Univariate analysis, bivariate analysis and multivariate regression analysis were used to analyze the data. To test the statistical significance of the association of factors on neonatal deaths, chi-squares tests were used at 95% level of confidence. Odds ratios were also run to show the likelihood occurrence of neonatal deaths as a result of the predictor factors.

Results; The study finding revealed that 31.3% of the respondents (neonates) had died while 68.7% survived. Out of those that died (31.3%), 14.8% died within the first six days of life while 16.5% lost life between the eight to 28 day of life. The factors associated with neonatal death included; Neonates born to mothers of ages 15 to 25 years and those 26 to 35 years registered higher chances of deaths (OR=3.669;95%CI:1.065 to 16.139; p=0.001) and (OR=4.44;95%CI:1.326 to 14.86; p=0.016) respectively. Respondents, born to mothers that had had less than two births (parity) had higher chances of neonatal death unlike those who had more than two births (OR=2.845;95%CI:1.348 to 6.001; p=0.006). Respondents whose mothers had started attending antenatal care services at more than four months of pregnancy had increased chances of neonatal deaths as compared to those who started at less than four months (OR=2.939;95%CI:1.402 to 6.159; p=0.003). However, the study established significantly higher chances of neonatal deaths among respondents whose last age at birth was 18 to 25 years and 26 to 35 years (OR=6.228;95%CI:1.879 to 20.642; p=0.003) and (OR=5.263;95%CI:1.489 to 18.599; p=0.01). Baby's that suffered from any illness had reduced chances of neonatal death (OR=0.279;95%CI:0.153 to 0.509, p<0.001). In addition, neonates that had red and swollen eyes, difficult breathing, poor sucking and convulsion had reduced chances of neonatal deaths.

Conclusion and recommendations: prevalence of neonatal death was found high among neonates born to mothers of age 15 to 25years, those whose mother had had less than two births and those whose mothers started attending antenatal care services at more than four months of

pregnancy. Thus Community health workers should be identified in villages to help referring mothers for early focused antenatal care, maternity and neonatal services at health facilities.

Background to the Study

Globally, neonatal deaths pose a major global public health challenge among children and the risk of dying in the first month of life is 17 deaths per 1000 live births in 2019 (UNICEF DATA 2020). In addition, about 6700 neonatal deaths occur every day with about a third of all neonatal occurring within the first day after birth and close to three-quarters occurring within the first week of life UNICEF Sept. 2020. More so, about 7000 neonatal deaths occur every day, and over two million five hundred (2.5 million) children die in the first month of life in UN 2018 report. About one third of neonates die on the first day of birth while close to three quarter die within first week of life (UN, 2019).

Approximately three million infants do not survive the first 28 days of life every year. Ninety-nine (99%) of the deaths occur in low- and middle-income countries, (Tanja A.J & Houweling, 2019) and (Lawn J.E, 2014). For examples, countries like India, Bangladesh showing about 35 to 65 babies in 1000 live births die during the neonatal period (Tanja & Houweling, 2019).

Sub-Saharan African countries significantly contributes to half of the global under five mortalities due to the infectious diseases, (Amanuel Kidane Andegiorgish1, 2020). In addition, a child born in this region is 10 times more likely to die in the first month of life as compared to a child born in high-income countries (UNICEF, 2017). Sub-Saharan Africa alone reported neonatal mortality at a 31 per 1000 live births, compared to 20 per 1000 live births globally (Tesfalidet, 2019) and (UNICEF, 2013).

Uganda's neonatal mortality rate is high at 19 deaths per 1000 live births (UN, 2020) and the situation is even worse in rural areas at 30 deaths per 1000 live births and urban 31 deaths per 1000 live births in (UDHS, 2011). Health Sciences report indicates that birth eight, gestational age are the contributing factors to high neonatal mortality due to limited resources in countries like Uganda due to increasing rates of health facility delivery. The underlying causes of neonatal deaths are related to poor access and utilization of health services during pregnancy and childbirth; newborn deaths occur at home among the rural poor (Kananura, 2016). Consequently, Uganda remains among the Sub-Saharan African countries with high neonatal

mortality despite the availability of evidence based and low-cost interventions to reduce these deaths. Thus, this study seeks to assess factors associated with neonatal deaths in Busia district.

Study Design

A retrospective cross sectional study design was conducted among neonates born at the health facilities of Masafu, Dabani and Busia Health Centre IV to assess the factors associated with neonatal deaths using the data in the selected facilities in Busia district. The retrospective cross-sectional design was adopted because the study was carried out at one point in time from various sample elements in the population and data of both the independent variable and dependent variable in the facilities (Schmidt, and Kohlmann, 2008). The unit of enrollment was neonates (0-28 days) born at the health facilities of Masafu, Dabani and Busia Health Centre IV. The researcher used quantitative data collection approach to review previous medical records of maternal deliveries and their outcomes.

Study Area

The study was conducted in Busia district; Masafu hospital, Dabani hospital and Busia Municipal HC IV, the district has 14 sub-counties, and 1 town council divided in two divisions West and Eastern, 58 parishes, 474 villages and approximately 45500 households. The district has a population of 351571 people scattered over a land area of 743 km2 with about 90% residing in rural areas. In this district, ten health facilities offer maternity services to mothers. Estimated 60% of the population live within 5km of health Centres offering maternity services. Approximately, 20% of all pregnant mothers deliver in health facilities (Anguzu J, 2007).

Data Management and Analysis

Univariate Analysis. Quantitative data was cleaned and entered in Microsoft excel then exported to SPSS version 20.0 for analysis to generate statistics. Analysis was done both at descriptive and inferential levels. For objective 1, 2 and 3, descriptive analysis was generated to get frequencies after which frequency tables were generated.

Bivariate and Multivariate Analysis. For objectives 1, 2 and 3 both bivariate and multivariate tests were conducted. In bivariate analysis, Chi-square tests were used to analyze bivariate data to identify statistically significant association between the factors and the outcome (Neonatal deaths) which later were analyzed by the logistic linear regression for both bivariate and multivariate logistic regression to generate odds ratios. This is because; the outcome variable is categorical nominal. At bivariate analysis level, factors with a P-value of <0.05 were considered

to be statistically significant. All variables with P-values >0.05 were reported as being non-significant.

Results

The study finding revealed that 72(31.3%) of the respondents agreed that they lost their baby's while 158(68.7%) of them had never. The evidence revealed that 34(14.8%) of the respondents lost their neonates within first six days of life while 38(16.5%) of them lost between eight to 28 days of life.

Table 1; ***bivariate analysis of demographic characteristics and neonatal deaths***

Variables	Category	Child died			χ^2	P-value
		Yes	No	Total		
Maternal age	15-25 years	33(45.8%)	97(61.4%)	130(56.5%)	**16.139**	**<0.001**
	26-35 years	26(36.1%)	56(35.4%)	82(35.7%)		
	36-45 years	13(18.1%)	5(3.2%)	18(7.8%)		
Marital status	Single	8(11.1%)	13(8.2%)	21(9.1%)	**7.712**	**0.045***
	Married	53(73.6%)	134(84.8%)	187(81.3%)		
	Separated	3(4.2%)	7(4.4%)	10(4.3%)		
	Widow	8(11.1%)	4(2.5%)	12(5.2%)		
Religion	Catholic	15(20.8%)	42(26.6%)	57(24.8%)	**12.041**	**0.013***
	Protestant	22(30.6%)	60(38.0%)	82(35.7%)		
	Born again	19(26.4%)	46(29.1%)	65(28.3%)		
	Muslim	15(20.8%)	9(5.7%)	24(10.4%)		
	Others	1(1.4%)	1(0.6%)	2(0.9%)		
Place of residence	Rural	49(68.1%)	129(81.6%)	178(77.4%)	**5.221**	**0.022***
	Urban	23(31.9%)	29(18.4%)	52(22.6%)		
Level of education	Primary	21(29.2%)	72(45.6%)	93(40.4%)	5.961	0.109
	Secondary	31(43.1%)	56(35.4%)	87(37.8%)		
	Tertiary	7(9.7%)	9(5.7%)	16(7.0%)		
Non-formal education		13(18.1%)	21(13.3%)	34(14.8%)		
Mothers employment						
	Self-employed	33(45.8%)	45(28.5%)	78(33.9%)	**8.798**	**0.032**
	Government	7(9.7%)	10(6.3%)	17(7.4%)		
	NGO	2(2.8%)	7(4.4%)	9(3.9%)		
	Unemployed	30(41.7%)	96(60.8%)	126(54.8%)		
Mothers occupation	Housewife	28(38.9%)	79(50.0%)	107(46.5%)	6.837	0.138
Agricultural farmer		17(23.6%)	30(19.0%)	47(20.4%)		
	Trader	21(29.2%)	31(19.6%)	52(22.6%)		
Public servant		2(2.8%)	13(8.2%)	15(6.5%)		
	Civil servant	4(5.6%)	5(3.2%)	9(3.9%)		

Parity	< 2	23(31.9%)	93(58.9%)	116(50.4%)	**14.335**	**<0.001***
	>2	49(68.1%)	65(41.1%)	114(49.6%)		
Total		72(100%)	158(100%)	230(100%)		

*Source primary field data 2021 * statistically significant P<0.05*

The demographic factors that were associated with neonatal death included; maternal age (p<0.001), marital status (p=0.045), religion (p=0.013), place of residence (p=0.022), mother's employment (p=0.032), and parity (p<0.001).

T*able 2;bivariate analysis of maternal factors and neonatal deaths*

Variables	Category	Child died			χ^2	P-value
		Yes	No	Total		
Number ANC attendance	Never	2(2.8%)	17(10.8%)	19(8.3%)	4.587	0.104
	< 4 times	43(59.7%)	81(51.3%)	124(53.9%)		
	> 4 times	27(37.5%)	60(38.0%)	87(37.8%)		
Age at start of ANC	Not attended	2(2.8%)	18(11.4%)	20(8.7%)	**12.069**	**0.002***
	< 4 months	45(62.5%)	114(72.2%)	159(69.1%)		
	>4 months	25(34.7%)	26(16.5%)	51(22.2%)		
Place of delivery	Hospital	47(65.3%)	121(76.6%)	168(73.0%)	**9.828**	**0.014***
	Health facility	21(29.2%)	20(12.7%)	41(17.8%)		
	Private facility	3(4.2%)	15(9.5%)	18(7.8%)		
	Home	1(1.4%)	2(1.3%)	3(1.3%)		
Age at last birth	18-25 years	39(54.2%)	115(72.8%)	154(67.0%)	**16.666**	**<0.001***
	26-35 years	19(26.4%)	37(23.4%)	56(24.3%)		
	36-45 years	14(19.4%)	6(3.8%)	20(8.7%)		
Household education level						
	Primary	11(15.3%)	32(20.3%)	43(18.7%)	4.298	0.231
	Secondary	34(47.2%)	84(53.2%)	118(51.3%)		
	Tertiary	18(25.0%)	33(20.9%)	51(22.2%)		
	Non -formal	9(12.5%)	9(5.7%)	18(7.8%)		
Sickness during pregnancy						
	Yes	56(77.8%)	101(63.9%)	157(68.3%)	**4.382**	**0.036***
	No	16(22.2%)	57(36.1%)	73(31.7%)		
Chronic disease	Yes	10(13.9%)	7(4.4%)	17(7.4%)	**6.464**	**0.011***
	No	62(86.1%)	151(95.6%)	213(92.6%)		
Type of chronic disease	Hypertension	0(0.0%)	5(3.2%)	5(2.2%)	**14.148**	**0.001***
	Diabetes	7(9.7%)	2(1.3%)	9(3.9%)		
	HIV	2(2.8%)	1(0.6%)	3(1.3%)		
	Cancer	1(1.4%)	0(0.0%)	1(0.4%)		
	Not applicable	62(86.1%)	150(94.9%)	212(92.2%)		
Red/ swollen	Yes	28(38.9%)	89(56.3%)	117(50.9%)	**6.019**	**0.014***
	No	44(61.1%)	69(43.7%)	113(49.1%)		
Total		72(100%)	158(100%)	230(100%)		

Source primary field data 2021 * statistically significant P<0.05

The maternal factors found associated with neonatal death included the following; age start of ANC (p=0.002), place of delivery (p=0.014), age at last birth (p<0.001), experiencing sickness during pregnancy (p=0.036), having been with chronic diseases (p=0.011), type of chronic diseases (p=0.001) and being knowledgeable about danger signs such as red and swollen eyes (p=0.001).

Table 3; Table 4;bivariate analysis of neonatal related factors and neonatal deaths

Variables	Category	Child died				
		Yes	No	Total	χ2	P-value
Child sex	Male	37(51.4%)	75(47.5%)	112(48.7%)	0.304	0.581
	Female	35(48.6%)	83(52.5%)	118(51.3%)		
Birth weight	< 2.5 kg	19(26.4%)	40(25.3%)	59(25.7%)	0.03	0.863
	>2.5kg	53(73.6%)	118(7.7%)	171(74.3%)		
Birth interval	< 2.5 years	24(33.3%)	67(42.4%)	91(39.6%)	1.702	0.192
	> 2.5 years	48(66.7%)	91(57.6%)	139(60.4%)		
Birth order	First	18(25.0%)	44(27.8%)	62(27.0%)	**14.301**	**0.014***
	Second	16(22.2%)	61(38.6%)	77(33.5%)		
	Third	15(20.8%)	25(15.8%)	40(17.4%)		
	Fourth	8(11.1%)	17(10.8%)	25(10.9%)		
	Fifth	9(12.5%)	4(2.5%)	13(5.7%)		
	Six and above	6(8.3%)	7(4.4%)	13(5.7%)		
Gestational age at birth						
	36 weeks below	35(48.6%)	68(43.0%)	103(44.8%)	0.621	0.431
	37 weeks and above	37(51.4%)	90(57.0%)	127(55.2%)		
Baby suffer illness	Yes	35(48.6%)	33(20.9%)	68(29.6%)	**18.257**	**<0.001**
	No	37(51.4%)	125(79.1%)	162(70.4%)		
Swollen eyes	Yes	9(12.5%)	5(3.2%)	14(6.1%)	**7.541**	**0.006**
	No	63(87.5%)	153(96.8%)	216(93.9%)		
Pus and bleeding	Yes	5(6.9%)	0(0.0%)	5(2.2%)	**11.216**	**0.001**
	No	67(93.1%)	158(100.0%)	225(97.8%)		
Breathing	Yes	15(20.8%)	12(7.6%)	27(11.7%)	**8.366**	**0.004**
	No	57(79.2%)	146(92.4%)	203(88.3%)		
Poor sucking	Yes	17(23.6%)	16(10.1%)	33(14.3%)	**7.318**	**0.007**
	No	55(76.4%)	142(89.9%)	197(85.7%)		
Convulsion	Yes	7(9.7%)	5(3.2%)	12(5.2%)	**4.301**	**0.038**
	No	65(90.3%)	153(96.8%)	218(94.8%)		
Unconsciousness	Yes	6(8.3%)	0(0.0%)	6(2.6%)	**13.519**	**<0.001**

	No	66(91.7%)	158(100.0%)	224(97.4%)		
Total		**72(100%)**	**158(100%)**	**230(100%)**		

Source primary field data 2021 * statistically significant at P<0.05

The neonatal related factors associated with neonatal deaths were birth order (p=0.014), baby having suffered from illness (p<0.001), swollen eyes (p=0.006), pus and bleeding (p=0.004), difficult breathing (p=0.004), poor sucking and feeding (p=0.007), convulsion (p=0.038), unconsciousness (p<0.001).

Table 5;model summary of factors associated with neonatal deaths

Variables	Wald	P-value	Odds Ratio	95% C.I.for Odds Ratio Lower	Upper
Demographic factors					
Maternal age	5.867	0.053			
18-25 years	4.242	0.039*	3.669	1.065	12.640
26-35 years	5.848	0.016*	4.440	1.326	14.860
36-45 years					
Marital status	6.076	0.108			
Single	1.889	0.169	3.917	0.559	27.463
Married	4.768	0.029*	6.289	1.207	32.764
Separated	4.377	0.036*	11.006	1.163	104.103
Religion	7.685	0.104			
Catholic	0.093	0.761	0.615	0.027	14.073
Protestants	0.250	0.617	0.453	0.020	10.082
Born again	0.162	0.687	0.528	0.024	11.814
Muslims	1.475	0.225	0.139	0.006	3.361
Mothers employment	5.202	0.158			
Self employed	2.172	0.141	0.590	0.293	1.190
Government	0.204	0.652	0.736	0.195	2.781
NGO employee	1.896	0.169	4.478	0.530	37.829
Parity					
<2	7.533	0.006*	2.845	1.348	6.001
>2			Reference	1	
Maternal factors					
Age start ANC	8.454	0.015			
<4 months	1.024	0.311	Reference	1	
> 4months	8.155	0.004*	2.939	1.402	6.159
Age at last birth	9.014	0.011			
18-25 years	8.950	0.003*	6.228	1.879	20.642
26-35 years	6.648	0.010*	5.263	1.489	18.599
36- 45 years			Reference	1	
Child related factors					

Type of sickness	2.275	0.685			
Baby suffer illness					
Yes	17.346	<0.001*	0.279	0.153	0.509
No			Reference	1	
Type of sickness					
Swollen					
Yes	4.424	0.035*	0.280	0.086	0.917
No			Reference	1	
Difficult breathing					
Yes	7.765	0.005*	0.312	0.138	0.708
No			Reference	1	
Poor sucking and feeding					
Yes	6.949	0.008*	0.365	0.172	0.772
No			Reference	1	
Convulsion					
Yes	3.899	0.048*	0.303	0.093	0.991
No			Reference	1	
Constant	33.431	0.000	2.354		

*Source primary field data 2021 *statistically significant P<0.05*

According to the multivariate analysis result, the chances of having neonatal death s increases with increases in maternal age. The study evidenced that mother aged 18 to 25 years and those 26 to 35 years had higher chances of neonatal death (OR=3.669;95%CI:1.065 to 12.64; p=0.039) and (OR=4.44;95%CI:1.326 to 14.86; p=0.016) respectively. In addition, the study result showed that respondents that had less than two births (parity) had higher chances of neonatal death unlike those who had more than two births (OR=2.845;95%CI:1.348 to 6.001; p=0.006).

Furthermore, the study finding also revealed that respondents that started attending antenatal care services at more than months had increased chances of neonatal deaths as compared to those who started at less than four months (OR=2.939;95%CI:1.402 to 6.159; p=0.003). However, the study established significantly higher chances of neonatal deaths among respondents whose last age at birth was 18 to 25 years and 26 to 35 years (OR=6.228;95%CI:1.879 to 20.642; p=0.003) and (OR=5.263;95%CI:1.489 to 18.599; p=0.01). The child related factors established revealed that chances of neonatal deaths was found reduced among respondents whose baby's had following health conditions. Having baby's that suffered from any illness had reduced chances of neonatal death (OR=0.279;95%CI:0.153 to 0.509, p<0.001).

In addition, respondents whose baby's had red and swollen eyes, difficult breathing, poor sucking and convulsion had reduced chances of neonatal deaths.

Discussions

Prevalence of neonatal deaths

Our study finding indicated that 31.3% of the respondents had experienced neonatal deaths as compared to 68.7% that never lost. However, most of the neonatal deaths occurred between eight to 28 days and compared to the lowest that occurred within first six days of life (16.5% vs.14.8%). Our study finding is contrary to the prevalence (51.8%) of neonatal deaths that occurred in Ghana and of which 53.9% occurred within first four days and 31.3% occurred within two weeks and 14.8% occurred in first 28 days (Annan and Asiedu, 2018). This was attributed to low birth weight, infections, parity, gestational period and sex of the baby. Similarly, a study conducted in democratic republic of Congo revealed higher prevalence (47%) of neonatal deaths due to gestational age less than 36 weeks, pregnancy malaria; caesarean section delivery and ANC visit (Mamba et al., 2018). On the contrary, a retrospective cohort study conducted in Ethiopia revealed very low prevalence (8.8%) of neonatal deaths due to rural place of residence, birth order greater than five, home delivery, very low birth weight and low birth weight (Roro et al., 2019). The slightly low prevalence of neonatal death obtained in our study is attributed to well established structure of neonatal units in the three health facility, Masafu, Dabani and Busina. In addition, the mothers also had health education session on neonatal care including identifying danger signs, early initiation of antenatal care attendance and majority had less than two children which could have contributed to prevention of neonatal deaths.

Maternal factors associated with neonatal death

In addition, the study result showed that respondents that had less than two births (parity) had higher chances of neonatal death unlike those who had more than two births. Our study finding contradicts with result from a study done in Rwanda revealed that the risk of Newborn death increase significantly with mother's parity of 5 and above compared those of 4 and below. In addition, a hospital based observational case control study established that neonatal mortality

was highly associated with grand multi gravida (Ndayisenga, 2016). More so, a community based cross sectional survey conducted among mothers in eastern Uganda found that parity was a significant predictor of neonatal deaths (Rornald M. Kananura1 et. Al, 2016).

Authors noted that having more than five children increases neonatal deaths by 2.5 times compared to less than four children. Our study finding is attributed to the fact that most mothers had experienced sickness during pregnancy such as preeclampsia, hypertension, diabetes and HIV which increased their risk of losing neonates. Thus, early screening of the pregnant mothers for the above disease is recommended for the health care workers for early diagnosis, treatment and prevention.

Furthermore, the study finding also revealed that respondents that started attending antenatal care services at more than four months had increased chances of neonatal deaths as compared to those who started at less than four months. Newborn mortality remains an urgent concern and is an important indicator of child health, development and wellbeing (Tesfalidet Tekelab et. al 2019). In a meta-analysis study to determine the pooled effect of antenatal care on neonatal mortality in Sub-Saharan Africa, the pooled risk ratio of neonatal death was less for neonates born to women who had received at least one antenatal care visit by a skilled provider compared to women who did not receive antenatal care. Similarly, a retrospective cross-sectional study conducted in Uganda by Musana, 2019, revealed that Attending ANC less than four times during pregnancy increased the odds of neonatal deaths by 1.57 times. Attending antenatal care services reduced risks of neonatal mortality by 2.4 times (Machio, 2017) a study to investigate effects of antenatal and skilled delivery care services on neonatal mortality in Kenya. Furthermore, Garcia LP et. al, 2018 in their study of Risk factors for neonatal death in the capital city with the lowest infant mortality rate in Brazil noted that insufficient prenatal consultations showed an OR of 3.25 (95% CI: 1.70---6.48) for neonatal deaths. Our study is attributed to the fact that mothers that started attending antenatal care services after months of pregnancy missed various health education session which could have helped them to identify danger signs of neonatal deaths. Thus, health care workers in collaboration with village health teams need to encourage pregnant mothers in the community to seek for antenatal care services within first trimesters for early detection and treatment of pregnancy induced health conditions.

Similarly, our study also established significantly higher chances of neonatal deaths among respondents whose last age at birth was 18 to 25 years and 26 to 35 years unlike those gave birth

at 36 years and above. Similarly, a study done in Mauritania using hospital based cross sectional revealed that maternal age at birth determines neonatal mortality (Abdellahi Weddih1, 2019).

For example, findings indicated that neonates born from mothers aged less than 20 years were more likely to die as newborns than those whose mothers were aged 20 to 35 years. In addition, Robert Moshiro et al, (2010) revealed the Potential causes of early death among admitted newborns in a rural Tanzanian hospital, such as prematurity and presumed sepsis were the leading causes of death. Prematurity n = 213 (32%), respiratory issues n = 209 (31%), meconium-stained amniotic fluid with respiratory issues n = 115 (17%) and observation for < 24 hours' n = 97 (14%). Death occurred in 124 infants. Presumed causes were birth asphyxia (BA) n = 59 (48%), prematurity n = 19 (15%), presumed sepsis n = 19 (15%), meconium aspiration syndrome (MAS) n = 13 (10%) and congenital abnormalities n = 14 (11%). More so, newborns who died versus survivors had oxygen saturation <60% on admission respectively. Moderate hypothermia on admission was common i.e., deaths 35.1 (34.6-36.0) vs. survivors 35.5 (35.0-36.0) °C ($p \leq 0.001$). The above study findings are attributed to late initiation of antenatal care services mostly at four months and above which hinders health care workers from screening mothers for risk pregnancy status, chronic and pregnancy induced illness. In addition, some of the respondents had suffered from chronic disease like HIV as pregnancy induced hypertension which increased risk of neonatal death.

Child related factors associated with neonatal death

The study assessed the relationship between child related factors and experience of neonatal deaths. The result showed respondents whose babies had experienced health conditions such as red and swollen eyes, difficult breathing, poor sucking and feeding and convulsions. Our study finding contradicts with results from Nigeria which revealed that the leading causes of neonatal death were severe perinatal asphyxia (79.4%), low birth weight (55.9%) and infections (41.2%) (Anthony O. Adetola a, 2011). In addition, a health facility based prospective conducted among neonates admitted to intensive care units of public hospitals of eastern Ethiopia found out that the common causes of neonatal deaths were complications of preterm birth (28.58%), birth asphyxia (22.45%), neonatal infection (18.36%), meconium aspiration syndrome (9.18%), respiratory distress syndrome (7.14%), and congenital malformation (4.08%). Similarly, Assefa Desalew et. al, 2020, in a relatedly, a prospective cohort study conducted among 9366 live births

revealed that the risk of neonatal deaths included moderate/severe respiratory distress at 10 minutes and congenital malformations.

Lastly, Juan C. Lona Reyes, 2018 in her study conducted, among 3276 neonates admitted at the neonatal ICU of Jimma medical Centre Ethiopia also revealed that respiratory distress, prematurity perinatal asphyxia and congenital malformations were significantly associated with neonatal mortality.

The variation in our study to other studies is attributed to good quality of neonatal services, good patient provider relationship that contributed to appropriate treatment of the neonates that presented with the above health conditions. More so, majority of the babies were born at gestational age 37 weeks and above with normal birth weight and mothers were knowledgeable about danger signs in their babies which influenced them seek for appropriate health care treatment.

Conclusions

This study aimed to identify predictors of neonatal deaths in Busia district and it utilized maternal health data from there randomly selected health facilities in Busia district. A total of records of 230 mothers from age 15-45 years were included in the study. Most of the mothers were living in rural areas and majority were housewives without any income source. The prevalence of neonatal deaths found in this study was 31.3% and of which 14.8% occurred within first six days and 16.5% occurred between eight to 28 days.

Maternal factors associated with started attending antenatal care services at more than months, having last age at birth was 18 to 25 years and 26 to 35 years, maternal age 18 to 25 years and those 26 to 35 years, respondents that had less than two births (parity) had higher chances of neonatal death unlike those who had more than two births. The child related factors established revealed that chances of neonatal deaths was found reduced among respondents whose baby's had following health conditions. Having baby's that suffered from any illness such as red and swollen eyes, difficult breathing, poor sucking and convulsion had reduced chances of neonatal deaths.

Recommendations

Community health workers should be identified in villages to help in identifying mother who need maternal and neonatal services and refer them to the nearest heath facilities for early initiation of pregnant mothers on ANC.

Health education and awareness campaigns should be conducted at health facilities and in communities to encourage mothers to antenatal visit and deliver from health facilities. Mothers should also be educated about the danger signs in pregnancy and neonatal illness and were to get health care in case they get such cases.

Health care workers in collaboration with village health teams need to encourage pregnant mothers in the community to seek for antenatal care services within first trimesters for early detection and treatment of pregnancy induced health conditions.

Since majority of our neonatal deaths occurred after first six days, mothers should also be educated about the danger signs during postnatal periods to identify neonatal illness when they are at home.

Our study established higher chances of neonatal deaths among respondents aged 35 years and below implying health educations should be organized by health care workers targeting this age group on ways of prevention neonatal infections.

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