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Perinatal Death and Associated Factors in Wolaita Sodo Referral Hospital, Southern Ethiopia: a Facility Based Cross-Sectional Study

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Abstract

Background: Birth is a critical time for the mother and fetus. In Ethiopia rates of new born morbidity and mortality are among the highest in the world. Even though many African mothers including Ethiopian mothers' pregnancies are ending up in perinatal mortality, little was investigated to identify the associated factors.

Methodology: A facility based retrospective cross-sectional study was conducted in July, 2015 in Wolaita Sodo University teaching and referral Hospital by collecting data through record review of all women who gave birth at the hospital within the past one year preceding the survey. Systematic sampling technique was used to select 300 subjects. Epi-data version 1.4.4.0 and SPSS version 20 were used to enter and analyze data respectively. Proportions and means were used to describe the study population by explanatory variables whereas; Bivariate and multivariable logistic regression were used to identify the candidate and predictor variables respectively. All statistical tests were considered significant at alpha <0.05.

Result: Among the 300 mothers who delivered their index child at Wolaita Sodo University teaching and referral hospital, 52(17.3%) of them had a dead perinatal outcome. Antenatal care visit, obstructed labor, referral from other health facility, cord prolapse, preeclampsia and birth weight were identified as predictors of perinatal outcome.

Conclusion: Perinatal death in Wolaita Sodo referral hospital is tremendously high, which seeks a due attention. Hence, to avert the situation, improvement in antenatal care service (supported with ultrasound examination); improving obstetrics care; and early diagnosis and appropriate management of severely asphyxiated fetus at the time of delivery could reduce the prevalence. Easily accessible health facilities (which provide comprehensive essential and emergency obstetric services) could reduce perinatal death attributable to referral related causes. Besides, to have a safe delivery, health facilities should give due attention to the use of partograph.

Keywords: Perinatal death; Wolaita Sodo; Birth outcome; Southern Ethiopia; Still birth

Introduction

Birth is a critical time for the mother and fetus. However, an estimated 1.02 million intra-partum stillbirth and 0.9 million intra-partum related neonatal deaths occur annually. Around 42% of the 535900 maternal deaths each year, most of the burden (90%) occurs in lowest and middle income countries. Neonatal mortality rates are 25 fold higher in low income counties and stillbirth rates are up to 50 fold higher as compared to their counterparts; with more than three-quarters occurring in south Asia and sub-Saharan Africa [1].

In Sub Saharan Africa approximately 30 million women become pregnant in a year. Of those, about 1 million deliveries are still birth; at least 1million babies die in their first month of life and 0.5 million die on the first day. About 4 million low birth weight babies and others with neonatal complications may live but not reach their full potential. Africa accounts for 11% of world's population but more than 25% of the worlds' new born deaths. Of the 20 countries with the highest risk of neonatal death, 15(75%) are in Africa [2].

In Ethiopia rates of new born morbidity and mortality are among the highest in the world. The overall perinatal mortalities reported from ten hospital based studies in Ethiopia were in the range of 66 to 124 per 1000 births. The reports of the large scale community based perinatal mortalities were in the range of 37 to 52 per 1000 births. The proportion of stillbirths and early neonatal deaths reported from the hospital based and community based studies was very high (60-110 and 20-34/1000 births) [3].

The etiological factors for perinatal outcomes are different in developed and developing world. The primary obstetric causes identified and modified for developing world include ante-partum hemorrhage, hypertensive disorders, preterm labor, infections, obstructed labor, cord accidents, fetal abnormalities and unexplained deaths [4]. Similarly, the major causes of perinatal mortality in Ethiopia as compiled from hospital data are obstructed labor, mal-presentation, hypertensive disorder, infection, hemorrhage and prematurity [3].

The aim of safe delivery service is to have healthy mother and baby with a little intervention as possible. Proper medical attention and hygienic condition during delivery can reduce the risk of complication and infections that may cause the death or serious illness of the mother and the baby or both. Hence, an important component in the effort to reduce the risks of mothers and children is to increase the proportion of babies delivered in a safe and clean environment and under the supervision of health professional [5].

There are significant differences in the fetal outcome by their presentation. Neonates delivered vaginally for breech presentations had lower APGAR scores, greater admission rates to neonate intensive care unit (NICU) and higher neonatal death rates. Similarly, infants born by operative vaginal delivery and Caesarean section had increased risk of admission to NICU compared to normal vaginal delivery [6].

In developed countries, 10-25% of all stillbirths appear to be caused by a maternal/fetal infection. In developing countries, which often have far higher stillbirth rates, the relative contribution of infection is known to be greater. An infection in the uterus or elsewhere in the mother's body (such as a urinary tract infection) may precipitate pre-term labor, and there by contribute to a stillbirth. In developed countries, screening for many infectious organisms and subsequent rapid treatment has resulted in a significant reduction in this etiological component of still birth. However, in certain developing countries, the stillbirth rate remains quite high due to infection with modest hope as to achieving a substantial reduction in both [7].

Since this study reveals important determinants of perinatal mortality in Wolaita Sodo University teaching and referral hospital, the result can be utilized as a valuable evidence for determinants of perinatal mortality in similar settings of Ethiopia and other developing countries.

Methodology

A facility based retrospective cross-sectional study was conducted in Woliata Sodo University teaching and referral Hospital from, July 1-30/ 2015. The hospital is located in Sodo town, which is found 327 km south from Addis Ababa (the capital city of Ethiopia).

The hospital is expected to serve around two million people. The total number of beds in the hospital was 200, Out of which 60 beds were in obstetrics and gynecology department. The services delivered by these departments were pre-operative, post-operative, in patient, post abortion care, safe abortion services, labor, delivery, and others. Currently 257 health professionals serve permanently in the hospital including specialists, general practitioners, nurses, midwives, pharmacists and others [8]. This study covered a 12 month (July1/ 2014 to June, 30/ 2015) facility based retrospective cross-sectional study.

Data was collected by reviewing records of all women who gave birth at Wolaita Sodo university teaching and referral hospital within the time period between July1/ 2014 to June30/ 2015. The data was collected by preparing structured checklist and reviewing delivery registration books, operation theatre books and patients' charts.

Sample size was calculated using single population formula based on the following assumptions. Using 95% confidence interval, 5% precision, 26.3% estimation of perinatal death proportion [5], 10% probability of incomplete data and a population correction formula, the final sample size was calculated to be 300.

Systematic sampling technique was used to select representative study subjects by including every 11th mother from the whole 3320 mothers who gave birth at the hospital in the specified time period. A pretested structured checklist was used to collect data by four midwives.

One day training was given before data collection. Regular checkup was made on daily basis for its consistency and completeness.

Epi-data version 1.4.4.0 and SPSS version 20 were used to enter and analyze data respectively. Proportions and means were used to describe the study population by explanatory variables. Bivariate logistic regression was done to identify the differentials of perinatal outcome in the study population. The important predictor variables were determined using multivariable logistic regression model. Stepwise backward procedure was used for modeling by including variables with significant or marginally significant association in the bi-variate logistic regression. All statistical tests were considered significant at alpha <0.05.

As a secondary data analysis, ethical approval & clearance were obtained from Wolaita Sodo University College of medicine & health science ethical review committee. Permission was obtained from Wolaita Sodo university teaching and referral hospital. To keep the privacy of study subjects' information, their name was substituted by code number with respect to their chart.

Result

Socio-demography

All the 300 study subjects were addressed yielding 100% response rate. Majority of study subjects, i.e. 238(79.3%) were rural residents whereas 283(94.3%) were between age of 18-34 years. The lowest number 5(1.7%) of study subjects were under the age of 18 years.

Medical and health Care factors

Out of 300 mothers enrolled in the study 13(4.3%) were hypertensive and 13(4.3%) were diabetic. Nineteen (6.3%) mothers were diagnosed as having an infection of Chorioamnionitis. Nearly half (149) of study subjects didn't ever visit health facility for antenatal care service during their pregnancy period (Table 1).

Maternal and fetal factors

Maternal factors: About 123(41%) study participants were primi-para while their counterparts were multi-para. The onset of labor had begun before admission to hospital among 274(91.3%) mothers. Prolonged labor (the duration of labor beyond 12 hours) before admission was recorded in 74(27%) of mothers. The labor started spontaneously in 275(91.7%) of mothers whereas it started deliberately in hospital by induction on their counterparts. Thirty seven (12.3%) mothers had history of previous stillbirth and majority of deliveries 262(87.3%) were term while only 28(9.3%) and 10(3.3%) of mothers had a preterm and post term pregnancies respectively. Twenty four (8%) mothers were diagnosed with obstructed labor, whereas 18(6%) and 20(6.7%) had cord prolapsed and ante-partum hemorrhage, respectively (Table 2).

Fetal factors: Around 265(88.3) mothers gave birth to a normal birth weight, while 18(6%) and 10(3.3%) gave birth to underweight and overweight neonates. Majority of births 226(75.3%) were attended by integrated emergency surgeons. Forty one (13.7%) and 40 (13.3%) of infants had APGAR score of <4/10 in the 1st and 5th minutes respectively. Out of total deliveries, 6(2%) of them had congenital anomalies (Table 3).

Birth outcome of study participants: Among the 300 study participants who delivered their index child at Wolaita Sodo University teaching and referral hospital, 52(17.3%) of them had a dead perinatal outcome; whereas their counterparts gave birth to alive babies.

Predictors of perinatal outcome: Multivariable logistic regression

Variables		Frequency (percent)
Hypertension	Yes	13 (4.3)
	No	287 (95.7)
Diabetes Mellitus	Yes	13 (4.3)
	No	287 (95.7)
Chorio-amnionitis	Yes	19 (6.3)
	No	281 (93.7)
Antenatal Care	Booked	151 (50.3)
	Unbooked	149 (49.7)

Table 1: Distribution of medical and health related characteristics among mothers who gave birth at WSUTRH - Sodo, southern Ethiopia, 2015.

Variables		Frequency (percent)
Parity	Primi-para	123 (41)
	Multi para	177 (59)
Previous Still-birth	Yes	37 (12.3)
	No	263 (87.7)
Previous c/s scar	Yes	12 (4)
	No	288 (96)
GA at delivery	Term(37-42 weeks)	262 (87.3)
	Preterm (28–36 weeks)	28 (9.4)
	Post term (>42 weeks)	10 (3.3)
Obstructed Labor	Yes	24 (8)
	No	276 (92)
Cord Prolapsed	Yes	18 (6)
	No	282 (94)
Ante-partum hemorrhage	Yes	20 (6.7)
	No	280 (93.3)
Preeclampsia	Yes	21 (7)
	No	279 (93)
Eclampsia	Yes	5 (1.7)
	No	295 (98.3)
Come with referral	Yes	188 (62.7)
	No	112 (37.3)
Labor onset	Spontaneous	275 (91.7)
	Induced	25 (8.3)
Duration of labor	<20 h	200 (66.7)
	>20 h	74 (24.7)
Mode of Delivery	Vaginal	181 (60.3)
	Caesarean	87 (29)
	Instrumental	32 (10.7)
Episiotomy	Yes	106 (35.3)
	No	194 (64.7)

Table 2: Distribution of maternal factors among mothers who gave birth at WSUTRH, Southern Ethiopia, 2015.

Variables		Frequency (percent)
Fetal presentation	vertex	265 (88.3)
	Non-vertex	35 (11.7)
Birth weight	2.5-4.0 kg	272 (90.7)
	<2.5 kg	18 (6)
	> 4.0 kg	10 (3.3)
Fetal number	Single	289 (96.3)
	Twin	11 (3.7)
Sex of neonate	Male	188 (62.7)
	Female	112 (37.3)
APGAR score 1st min	<4/10	41 (13.7)
	4-6/10	84 (28)
	7-10/10	175 (58.3)
APGAR score 5th min	<4/10	40 (13.3)
	4-6/10	15 (5)
	7-10/10	245 (81.7)
Congenital anomaly	Yes	6 (2)
	No	294 (98)

Table 3: Distribution of fetal factors among mothers who gave birth at WSUTRH, Southern Ethiopia, 2015.

analysis revealed that antenatal care visit, obstructed labor, referral from other health facility, cord prolapse, preeclampsia and birth weight were significantly associated with perinatal death (Table 4).

Mothers with un-booked ANC were 4 times more likely to have perinatal death than those who booked [(AOR=3.950, 95% CI (1.546, 10.094)]. Similarly mothers with obstructed labor were 9 times more likely to have perinatal death as compared to their counterparts [(AOR=8.791, 95% CI (2.248, 34.381)]. Mothers presented with cord prolapse were 8 times more likely to have perinatal death than their counterparts [(AOR=8.041, 95% CI (1.951, 33.140)]. Similarly, mothers with preeclampsia were 8 times more likely to have perinatal death than those who had no history of preeclampsia [(AOR=7.600, 95% CI (1.739, 33.222)].

Mothers who gave birth to low birth weight were 9 times more likely to have perinatal death as compared to those who gave birth to a normal birth weight baby [(AOR= 8.8, 95% CI (2.1, 36.5)]. And mothers who came with referral to the hospital were 7 times more likely to end up in perinatal death as compared to mothers who came to hospital by themselves [(AOR =7.320, 95% CI (2.476, 21.637)] (Table 4).

Discussion

Overall, 17.3% of mothers gave birth to a dead fetus. This finding is significantly higher than the national prevalence of 4.6 as reported by Ethiopian Demographic and Health Survey [9]. This is also higher than a study conducted in Nigeria, in which the world's highest newborn mortality rate of 6.6% was reported [10]. This might be due to hospital related factors and institutional set up such as absence of well-equipped neonatal ward, suboptimal obstetric care during ante partum, intra-partum, postpartum and delay from client or service provider.

Backward stepwise multivariable logistic regression was done and revealed that mothers with unbooked ANC, referred mothers from other health facility, obstructed labor, mothers presented with cord prolapse, mothers with preeclampsia and those who gave birth to low birth weight baby were identified as significant predictors of perinatal death. Accordingly, mothers presented with unbooked ANC follow-up were 4 times more likely to experience perinatal death than the booked ones. This is consistent with a study done at Jos university teaching hospital 2006-2007, Niger, which suggests that unbooked study participants were more likely to end up in still birth as compared to their counterparts (X2 = 40.628; P<0.0003) [11].

Mothers who came with referral to the hospital were 7 times more likely to end up with perinatal death than those come with self-referred. And also those who had obstructed labor were 9 times more likely to end up in perinatal mortality than those with normal labor. This is in line with a cross sectional Study done in Jimma University Specialized Hospital which showed that most cases of perinatal death were referred from health centers, and delayed referral was the cause for 45.8% of dead fetal outcome [12].

Mothers presented with cord prolapse were 8 times more likely to have perinatal death than those who do not. This is similar with a cross sectional study done on maternal and fetal outcomes at Senegal and Mali, which showed umbilical cord accidents as an important cause of fetal death which accounts approximately 15% of all still births [7].

Mothers with preeclampsia were 8 times more likely to end up in perinatal death than those who did not have preeclampsia. This in

Variables	Dead	Alive	COR (95% CI)	AOR
Gestational age				
Term (37-42 weeks)	33	229	1	1
Preterm (28-36 weeks)	18	10	12.491 (5.313,29.366)*	18.623 (5.490,63.170)
Post term (>42 weeks)	1	9	0.771 (0.095,6.284)	0.370 (0.024,5.820)
Antenatal care visit				
Yes	10	142	1	1
No	42	107	5.535 (2.657, 11.531)**	3.950 (1.546, 10.094)**
Come with referral				
Yes	45	143	4.72 (2.048, 10.882)**	7.320 (2.476, 21.637)**
No	7	106	1	1
Obstructed labor				
Yes	15	9	10.766 (4.395, 26.374)**	8.791(2.248, 34.381)**
No	37	239	1	1
Cord prolapse				
Yes	11	7	9.237 (3.237, 25.204)**	8.041 (1.951, 33.140)**
No	41	242	1	1
Preeclampsia				
Yes	8	13	3.287 (1.287, 8.395)*	7.600 (1.739, 33.222)**
No	44	234	1	1
Fetal presentation				
vertex	39	226	1	1
Non vertex	13	22	3.424 (1.593, 7.361)*	0.350 (0.075, 1.627)
Episiotomy				
Yes	7	99	1	1
No	45	149	4.271 (1.852, 9.853)**	1.148 (0.373, 3.532)
APGAR score				
<4/10	39	2	833.625 (147.398, 4714.642)	
4-6/10	9	75	5.130 (1.532, 17.180)**	4.288 (0.934, 19.680)
7-10/10	4	170	1	1
Birth weight				
2.5-4.0 kg	36	237	1	1
<2.5 kg	13	5	17.044 (5.734, 50.664)**	8.767 (2.105, 36.522)**
>4.0 kg	3	7	2.810 (0.695, 11.362)	
Congenital anomaly				
Yes	4	2	10.250 (1.826,57.547)**	0.127 (0.010, 1.547)
No	48	246	1	1

*- p-value < 0.05, ** -p-value < 0.01

Table 4: Predictors of perinatal death among mothers who gave birth at WSUTRH -southern Ethiopia, 2015.

line with a study done on trend of mode of delivery in Australia over study period of 1998-2008, which revealed that women with maternal diabetes mellitus, gestational diabetes mellitus, maternal hypertension, and preeclampsia were significantly associated with perinatal death [14].

Mothers who gave birth to low birth weight baby were 9 times more likely to have dead fetal outcome as compared to those who gave birth to normal birth weight baby. This finding is similar with a cross sectional study done in Senegal and Mali from 2007-2008 which suggested that low birth weight was significantly associated with perinatal death [13].

Conclusion and recommendations

Perinatal death in Wolaita Sodo referral hospital is tremendously high, which seeks a due attention. Un-booked antenatal care visit, obstructed labor, preeclampsia, cord prolapse, referral from other health facility and low birth weight delivery were significant predictors of perinatal death. Hence, to avert the situation, improvement in antenatal care service (supported with ultrasound examination);

improving obstetrics care; and early diagnosis and appropriate management of severely asphyxiated fetus at the time of delivery could reduce the prevalence. Easily accessible health facilities (which provide comprehensive essential and emergency obstetric services) could reduce perinatal death attributable to referral related causes. Besides, to prevent adverse birth outcome and to have a safe delivery, health facilities should give due attention to the use of partograph.

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