DETERMINANTS OF PERINATAL MORTALITY IN ARBA MINCH GENERAL HOSPITAL, GAMO ZONE, SOUTHERN ETHIOPIA

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ABSTRACT

BACKGROUND: Perinatal mortality is one of the major challenges for under-five mortality contributing three fourth of deaths in neonatal period. In Ethiopia the magnitude of perinatal mortality is among the highest in Sub Saharan Africa which ranges 66 to 124 per 1000 births. Factors affecting perinatal death varies among countries with related to the health care provided, therefore identifying this factors is important. The objective this study was to assess determinants of perinatal mortality in Arba Minch Hospital.

METHODS: A facility based case control study was conducted using a pre-tested check list on 821 documents (274 cases & 547 controls) reviewed from January 2017 to June 2017 in Arba Minch hospital. Descriptive statistics was used to describe the status of study population and multi-variable logistic regression used to establish predictors of perinatal mortality.

RESULT: A total of 821 (274 cases & 547 control) documents of included mothers were reviewed. The study indicated that majority of cases 218(79.6%) & controls 429(78.5%) age were (20-34). About 213(77.7%) for case & 490(89.6%) for the control had ANC follow up, 262(95.6%) cases and 106(19.4%) of the controls had at least one type of obstetric complication & 524(95.8%) of controls & 247(90.1%) of cases were cephalic. This study identifies obstetric complication (AOR178.941; 95%CI (70.052, 457.087)), use of partogaraph (AOR 8.970; 95%CI (4.801, 16.759); gestational age (AOR 0.507; 95% CI (0.261, 0.987)) and mode of delivery (AOR 0.167; 95% CI (0.084, 0.331)) as factors that determine perinatal mortality.

CONCLUSION & RECOMMENDATION: History of obstetric complications, use of partograph; gestational age and mode of delivery were factors associated with perinatal mortality. Therefore, hospital staffs particularly those working at MCH need to give particular emphasis on use of Partogaraph & identifying obstetric complication at the time of ANC follow up & delivery.

KEY WORDS: perinatal mortality, still birth, Case control, early neonatal death.

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INTRODUCTION

The perinatal mortality (PNM) is defined neonatal deaths of less than seven days of age and fetal deaths after 28 weeks of gestation for developing countries, where the survival rate of preterm newborns is very low, the numerator for PMR includes all fetal deaths with gestational age of 28 weeks and above and all neonatal deaths within 7 days of life1. Perinatal mortality is one of the global health problems even though variations in distribution among countries exist. Every year about 7.5million perinatal deaths occur across the worldwide, 3.5 million are stillbirths & the remaining early neonatal death2,3,4. Ninety seven percent of globally reported stillbirths and ninety eight percent of neonatal deaths occurred in developing countries[3].

Perinatal deaths in developed countries are falling & in average estimated to 10 per 1000 live births5. In Africa in particular east Africa, perinatal mortality estimated on average 58 per 1000 live births6,7. Ethiopia is among the top ten countries with high perinatal mortality rate contributing about 4% the world's neonatal deaths8. Hospital based study conducted in Ethiopia show that perinatal mortality rate ranges from 66 up to 124 per 1000 births[1,8].

Perinatal mortality is used as an indicator for the quality of care provided to mothers during pregnancy, delivery & the postnatal period and their babies3. About 75% of perinatal deaths are said to be avoidable & determinants vary by country. With the availability and quality of health care, therefore understanding perinatal mortality in relation to factors is crucial. Findings from studies conducted in different parts of the world reveal that perinatal mortality is associated with many factors including; socio-demographic, obstetric, newborn, medical & health care system factors[2,9].

In spite of many efforts by the government and other partners; non-significant decline in perinatal mortality has been achieved in the country as a whole. Particular to study area, important services as neonatal care is providing as strategy to reduce perinatal mortality. So conducting a study on determinants of perinatal mortality and coming up with some understanding of the underlying determinants which might be peculiar to women in study area helps to formulate strategies for prevention and addressing the identified challenges. Therefore, the aim of this study was to identify factors that are associated with perinatal mortality in Arba Minch General hospital that may be very crucial for improvement and effectiveness program.

METHODS & MATERIAL

Institution based unmatched case control study was carried out from January 2017 to June 2017 using a data of July 8/2011-July 7/2016 in Arba Minch hospital.

Study population for case consisted of selected still births or early neonatal deaths in Arba Minch Hospital during the specified period. Study population for control consisted of those selected births discharged alive from the hospital during the specified period. Those births in Arba Minch Hospital from July 8/2011-July 7/2016 were included & study units for which the card number stated in delivery book lost were excluded.

The sample size was determined using of Epi-Info stat-calc based on a study with the assumption that at least 76.5% of controls & 67.25% case used partogaraph, with odds ratio of 0.53, at 95% level of confidence, 80% power and alpha of 0.05 (1). The final sample size was 821(274 cases&547 controls). Population proportion to year allocated & cases were selected randomly with 2 controls for each delivered on the same day & discharged alive.

Data was collected using pretested data abstraction form which address variables including socio demographic, Obstetric, medical & new born. The data abstraction form was prepared in English language & translated to Amharic language and back to English to assure consistency of the tool. The data collectors and supervisors were trained for two days (a day before the pretest and a day after the pretest). After pretest discussion was carried out with the team and some corrections and changes were made on the questionnaires.

The dependent variable was perinatal mortality which stands for stillbirths (fetal loss after 28 weeks of gestation)

and neonatal deaths before discharge from the hospital. The completed questionnaire was checked for completeness, consistency and entered in to EPi- Data version 3.1 and exported to SPSS version 16 for analysis. Univariate analysis was done using frequency, percentage, tables & charts. An association between perinatal mortality and independent variables was assessed using logistic regression. Those variables associated at Bivariate logistic regression with significance level of p value < 0.25 was entered into multivariate logistic regression model to identify determinants after controlling possible confounding effects. Multi-variable analysis was done to assess individual effect of variables on perinatal mortality. Crude and adjusted odds ratio with 95% confidence interval was calculated using binary logistic regression; p-value less than 0.05 was considered as statistically significant.

Ethical clearance was obtained from Ethical Review committee of Arba Minch University College of Public Health and Medical Sciences. Permission was obtained from both Arba Minch town health department and Arba Minch hospital. Confidentiality of information and privacy of participants' interviewwas respected; the names of the informants were not included in the questionnaire.

RESULT

Socio demographic characteristics

A total of 821 (274 cases & 547 control) documents of included mothers were reviewed with the mean age of 26±5.25 & 24.29±4.88 for cases & controls respectively. Majority of cases 218(79.6%) & controls 429(78.5%) age was b/n 20-34. Table (1)

Table 1.Socio demographic characteristics of mothers with perinatal deaths (cases) and controls in Arba Minch hospital, Ethiopia.2017

Variables	Category	Cases	Controls
Marital age	<20yr	21(7.6%)	76(13.9%)
	20-34yr	218(79.6)	429(78.5%)
	>=35	34(12.4%)	35(6.4%)
	Not registered	1(0.4%)	7(1.2%)
Marital			
	Married	251(91.6%)	524(95.8%)
	Widowed	1(0.4%)	2(0.4%)
	Divorced	1(0.4%)	1(0.2%)
	Not registered	21(7.6%)	20(3.6%)

Obstetrics characteristics of respondents

Eighty-four (30.5%) cases & 270(49.2%) controls were prim-gravida. One third of cases and quarter of control were with parity b/n 2-4. About 213(77.7%) of case & 490(89.6%) for the control had ANC follow up. Majority of mothers were vaccinated with TT2 209(76.3%) case & 490(89.6%) control, SVD 200(72.9%) case & 412(75.3%) control, no history of abortion 245(89.4%) case & 497(90.9%) control. Fifty-one (6.2%) mothers had previous history of abortion, 28(10.2%) & 1(0.4%) cases & 18(3.3%) and 2(0.4%) of controls had previous history of stillbirth and early neonatal death respectively.

Medical factors

Seven hundred seventeen (87%) mothers were screened for HIV with majority 704(98.2%) being non-reactive and 13(1.6%) were reactive. Hemoglobin level was determined for 703(85.6%) of mothers during ANC follow up or before delivery. The minimum level of hemoglobin was 4.5gm/dl & maximum of 16gm/dl with mean value of 12.10±1.971 m/dl. Proportion of anemia was 71(30.4%) in cases and 14(14.9%) in controls. About 262(95.6%) mothers of the cases and 106(19.4%) of the controls had at least one type of obstetric complication. (Table 2)

Table 2. Obstetric complications of mother's with perinatal deaths (cases) and control in Arba Minch hospital, Ethiopia.2017

Variables	Category	Cases	Controls
Any obstetric complication	Yes	262(95.6%)	106(19.4%)
	No	11(4.0%)	438(80.1%)
	Unknown	1(0.4%)	3(0.5%)
Type of obstetric complication	APH	31(12.4%)	11(2.0%)
	Obstructed labor	18(7.2%)	4(0.8%)
	Hypertensive disorders of pregnancy	54(21.6%)	24(4.4%)
	Mal-presentation	8(3.2%)	0
	PROM	18(6.8%)	35(6.4%)
	Cord accident	9(3.3%)	4(0.7%)
	Congenital malformation	27(10.8%)	0
	Uterine rapture	15(5.5%)	0
	IUFD	95(38.0%)	0
	Other	12(4.8%)	7(1.4%)

Newborn related factors

Findings about presentation of child during delivery showed that 247(90.1%) of cases &524(95.8%) of controls were cephalic. Concerning the type of delivery 791(96.4%) of mothers delivered single newborn & 25(3.0%) delivered multiple newborns with comparable proportion between cases and controls. More than half of newborns (56.3%) reviewed were male. About 622(75.8%) of new born weight was found b/n 2.5-4kg. The mean birth weight of newborns was 3000±814 gm. with a minimum of 300 and maximum of 5000gm. Very low birth weight & low birth weight newborns were more common in cases representing 42(15.3%) &66(24.1%)respectively.

Health care factors

Partogaraph was used in 546(66.5%) of total study subjects during labour. The proportion of mothers who delivered without partogaraph follow up was 152(55.5%) in cases and 89(16.3%) in control groups. Among 259 stillbirths, 16(6.4%) of them were admitted to the hospital having positive fetal heart beat and later reported as stillbirth during the course of labor and delivery.

Factors associated with perinatal mortality

An association between perinatal mortality and independent variables was assessed using logistic regression. Those variables associated at Bivariate logistic regression with significance level of p value < 0.25 was entered into multivariate logistic regression model to identify determinants after controlling possible confounding effects. The effects of different independent variables were tested for perinatal mortality using multivariable logistic regression analysis. Among variables parity, age, number of abortion, ANC, place of ANC follows-up, history of chronic disease, TT vaccination, history still birth, the level of hemoglobin, mode of presentation & newborns weight were not statistically significant factors associated with perinatal mortality. However, history of obstetric complication, use of partogaraph, gestational age & mode of delivery were significantly associated with perinatal mortality.

This study has shown that mothers who have history of obstetric complications had 178.941 times higher risk of perinatal death in the perinatal period than mothers who had no history of obstetric complications with AOR 178.941;95% CI (70.052, 457.087). This study has shown that mother who doesn't have partogaraph follow up had 8.970 times higher risk of perinatal death in the perinatal period than those who followed using partogaraph with AOR 8.970; 95%CI (4.801,16.759). This study has shown that mother who deliver at term had 0.507 times lesser risk of perinatal death in the perinatal period than mother who deliver at pre-term with AOR 0.507; 95% CI (0.261, 0.987). This study has also shown that mother who deliver C/S had 0.167 times lesser risk of perinatal death in the perinatal period than to those who deliver by SVD with AOR 0.167; 95% CI (0.084, 0.331). (Table 3)

Table 3. The association between different factors and perinatal mortality, Arba Minch hospital, Ethiopia.2017

Variable	Category	Case	Control	p-value	Crude odd ratio(95%CI)	Adjusted odd ratio(95%CI)
Level of Hemoglobin	>=11	163(69.7%)	393(85.1%)		1	1
	8-10.9	54(23.1%)	61(13.2%)	0.884	2.134(1.418, 3.214)	1.354(0.651,2.817)
	<7	17(7.3%)	8(1.7%)	0.418	5.123(2.168,12.107)	0.920(0.299,2.826)
Gestational age	28-36wk	110(40.1%)	89(16.3%)		1	1
	37-42	115(42.0%)	374(68.4%)	0.046	0.249(0.176, 0.353)	0.507(0.261,0.987)*
	>42	49(17.9%)	84(15.4%)	0.032	0.472(0.301, 0.740)	0.387(0.162,0.923)*
Age	<20yr	21(7.7%)	76(14.1%)		1	1
	20-34yr	218(79.6)	429(79.4%)	0.775	1.839(1.104, 3.062)	0.623(0.081, 4.786)
	>=35	35(12.7%)	35(6.5%)	0.0.265	3.619(1.846, 7.094)	0.968(0.094, 9.996)
ANC	Yes	213(77.7%)	490(89.6%)		0.406(0.274, 0.603)	0.760(0.217,2.658)
	No	61(22.3%)	7(10.4%)		1	1
Mode of delivery	SVD	200(77.2%)	412(75.3%)		1	1
	Instrumental	5(1.9%)	28(5.1%)	0.823	0.368(0.140, 0.967)	1.184(0.269,5.209)
	CS	35(13.5%)	107(19.6%)	0.000	0.687(0.452, 1.043)	0.167(0.084,0.331)
Obstetric Complication	Yes	262(95.6%)	106(19.4%)	0.000	90.83(49.05,168.22)	178.941(70.052,457.09)*
	No	12(4.4%)	441(80.6%)		1	1
History of chronic	Yes	9(3.3%)	15(2.7%)	0.830	(0.348, 1.864)	0.668(0.122, 3.666)
illness	No	265(96.7%)	532(97.3%)		1	1
Partogaraph	Yes	91(33.2%)	455(83.2%)		1	1
	No	183(66.8%)	92(16.8%)	0.000	9.95(7.102, 13.93)	8.970; (4.801,16.759)*
Presentation	cephalic	247(90.1%)	524(95.8%)		1	1
	breech	14(5.1%)	19(3.5%)	0.588	1.563(0.771, 3.169)	1.387(0.425, 4.531)
	others	13(4.8%)	4(0.8%)	0.504	6.895(2.225, 21.361)	1.863(0.301, 11.540)

*shows significant association

DISCUSSION & CONCLUSION

The finding from this study revealed that history of obstetric complications, use of partograph; gestational age and mode of delivery were factors significantly associated with perinatal mortality.

Using partogaraph was associated with perinatal mortality in which 8.97 times higher among mother without partogaraph follow up compared to those who followed using partogaraph. This shows that partogaraph is significant tool decrease perinatal mortality. This is consistent with study in Addis Ababa & Uganda that showed use of partogaraph was protective factor for perinatal death by 65%2,10. Since partogaraph is labor follow-up chart recommended by WHO, appropriate use of partogaraph can help health professionals to pick any abnormalities during the course of labor. And best tool to help you detect whether labour is progressing normally or abnormally, and to warn as soon as possible if there are signs of fetal distress or if the mother's vital signs deviate from the normal range. Other research studies have shown that maternal and fetal complications due to prolonged labour were less common when the progress of labour was monitored by the birth attendant using a partogaraph3. Therefore, it can prevent perinatal loss that can be managed if early diagnosis is done. It also tells us the quality of intra partum care. This strengthens the recommendation consistent use of partogaraph for every delivery.

Perinatal mortality was higher among mothers with history of obstetric complications. This is consistent with studies done in AddisAbaba hospital that showed obstetric complication was strongly associated with

perinatal mortality with a case fatality rate of 73.5 %11. It was also consistent with a Study in Jimma & Democratic Republic of Congo that showed complications during labor & increased risk of obstetric complications were identified as determinants of perinatal mortality12,13. This might be due to in fact most mothers as in our country having obstetric complication visit health institution after long delays with developing events endangering newborn's life. This aware professionals & other concerned bodies on early identificationof complications seriously.

Based on the findings of this study, perinatal mortality were 0.507 times lesser among term newborns compared with preterm babies. This is true that prematurity one of the condition that expose newborns for a number of medical complications that rescues their life. This is similar with study done in Hawassa & Jimma indicating perinatal mortality was 3 times higher among preterm babies than term babies12. The finding also similar with study Democratic Republic of Congo & WHO multi-country study13,14. The association of preterm babies with perinatal mortality is mainly because of prematurity is one of the commonest causes of perinatal death is preterm birth and its complications. And low birth weight newborns had a risk for perinatal mortality than normal weight babies.

Another finding of this study, perinatal death were 0.167 times lesser among mothers who delivered by cesarean section than SVD. This result was contrary to expectations. This finding is supported by study in Addis Ababa that showed perinatal death were less likely among mothers who delivered by cesarean section than SVD2. The finding is not consistent with study in Zimbabwe that showed that normal SVD is a protective factor for perinatal death compared with instrumental delivery or cesarean section15. The association might be since this kind of delivery was commonly conducted might be selective cesarean sections which commonly end up with alive births or when there was an obstetric complication.

STRENGTH & LIMITATION

The type of study design used is strong to see an association of exposures towards the outcome variable and it is a better study design to look multiple exposures for perinatal mortality.

The main limitation of this study is it used secondary data as a source of information. Since this data was gathered for other purpose, it was difficult to gather all necessary variables like educational status, occupation, birth interval & residence which have association in literatures. The status of the live births that were discharged alive was unknown. Being a single hospital based study lacks of generalization to the community is another limitation to this study.

CONCLUSION

The study revealed that history of obstetric complications, use of partograph; gestational age and mode of delivery were factors associated with perinatal mortality.

From factors that are mentioned above, some of them can be prevented with early investigation of pregnant mothers up on their follow up to identify abnormalities and manage them accordingly. The other factor is poor quality of intra partum care, reflected by not using partograph for labor follow up which is one of the important determinant factors for perinatal loss.

RECOMMENDATION: We recommend supervision & support of health professionals on use of Partogaraph & identifying obstetric complication at the time of ANC follow up & delivery.

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