Caspian J Reprod Med, 2022, 8 (1): 9- 14

Caspian Journal of Reproductive Medicine

Journal homepage: www.caspjrm.ir

Original article

Prevalence and determinants of stillbirth in attended deliveries in University Hospital, Eastern Ethiopia in 2021

Arif Hussen Jamie[1,*]

[1]Department of Pediatrics Nursing, Harar Health Science College, Ethiopia

Received: 25 Oct 2021 Accepted: 20 May 2022

Abstract

Background: Stillbirth is associated with a wide range of factors. The aim of study was to assay the prevalence of still birth at 28th week of gestation or later. In addition, it strove to identify the factors associated with stillbirth among women in Eastern Ethiopia in 2021.

Methods: The design of the study was cross-sectional, and it was conducted at a public hospital, Harar, in Ethiopia, from March 10 to May 10, 2021. A census sampling method was used to select 336 participants for the study. Information on socio-demographic status, maternal health, pregnancy, labor, and birth outcome was collected through a structured checklist. Bivariate and multivariate logistic regressions were used to identify factors associated with still birth.

Results: In this study, the prevalence of stillbirth was 12.6%. In bivariate analysis, mother age, place of residence, premature rupture of membranes, antepartum hemorrhage, gestational age, hypertensive disorder, congenital anomaly, partograph use during pregnancy, and the previous history of still birth among mothers were significantly associated with stillbirth. After adjusting confounder variables, significant factors associated with stillbirth were: high maternal age, rural residential areas, the use of partograph during labor and the previous history of still birth.

Conclusion: This finding of this study indicated that the high prevalence of stillbirth is a big health care concern in Hara, Eastern Ethiopia. Therefore, it is necessary to focus on it further in order to identify and mitigate issues related to advanced maternal age, rural residents, the previous history of stillbirth, and partograph plotting in labor factors.

Keywords: Delivery, Prevalence, Risk factors, Stillbirth, Ethiopia

Introduction

The description of still birth is different in developed versus developing countries. In some middle-income and high income countries, thresholds vary from 18 to 22 weeks, while it reaches up to 28 weeks in low income countries (1). So, for international comparability purpose, World Health Organization (WHO) defines stillbirth as a fetus born dead at 28th week of gestation or more with a birth weight of ≥1000g (2). Stillbirth can occur in either the antepartum period (before labor) or in the intra-partum period (during labor and before birth). Death after birth (and up to 28 days post-birth) is known as neonatal death (3). It is a strong indicator of the quality of antenatal and obstetric care (4). Every year, an estimated 2.6 million stillbirths occur worldwide, with up to 98% occurring in middle-income and low countries. While the average stillbirth rate in high-income countries is 3 per 1000 births, the rates observed in Southern Asia and many settings in sub-Saharan Africa are up to 10-fold higher (5). Ethiopia is among the countries with the highest stillbirth rate worldwide (6). According to the 2016 and 2019 Ethiopian Demographic and Health Survey (EDHS. 2016 and EDHS. 2019) report, the stillbirth ratio was 11 and 12 per 1000 live births (7, 8).

Factors associated with stillbirth were multidimensional and complex. They include: maternal factors, fetal medical conditions, environmental exposures, and psychosocial stressors (9). Stillbirth reports come from officially registered deaths; thus, they could be under reported due to low institutional delivery, high home delivery, the custom of

*Correspondence author: Arif Hussen Jamie, Department of Pediatrics Nursing, Harar Health Science College, Ethiopia
Babol, Iran Tel: +98-921843442 Email: arifhussen.ah@gmail.com

[Downloaded from caspjrm.ir on 2026-10-16]

community towards newborn death (they accept it as normal) , and the low utilization of vital registration in the country (10).

There is paucity in research regarding the prevalence and the determinants of stillbirth. Hence, this study aimed to assess the prevalence of stillbirth at 28th week of gestation or later. It also strove to identify the factors associated with stillbirth among women in Eastern Ethiopia in 2021. The findings of the study may help reduce some of the risk factors for stillbirth.

Materials & Methods

The design of the study was cross-sectional, and it was conducted at Hiwot Fana Specialized University Hospital in Harar, Ethiopia, from March 10 to May 10, 2021. The city is located east of Ethiopia, about 525 Km from Addis Ababa. Statistical calculation of sample size is based on estimated 8.6% in Negest Elene Mohammed Memorial General Hospital in Hosanna Town, SNNPR, Ethiopia. In order to determine the sample size with 95% significance level, the margin of error of 3%, and a 10% non-response rate were calculated through a single population proportion formula, and the estimated value was 370.

Ethical clearance was obtained from Harar Health Science College [Ref. no. HHSC-231/2021]. A census sampling method was used to select participants for the study. Consent was obtained from the administrative bodies of the hospital and from the participants. The data were collected through a pretest and a structured checklist, which was developed in English and was adapted from the literature related to stillbirth and was modified according to the local context. The questionnaire consists of information on socio-demographic status, maternal health, pregnancy, labor, and birth outcome. The questionnaire was administered by the interviewer. After data collection, the questionnaire was checked for completeness and then coded.

The data were entered into Epi-info version 3.5.3 and were then exported, cleaned and analyzed through SPSS version-21. Descriptive analyses were performed and bivariate analyses were used to find out the association between independent variables. Variables with a $p<0.05$ in the bivariate analysis were entered into multiple logistic regression, and variables with $p<0.05$ in the multivariate analysis were considered to have statistically significant associations.

Results

A total of 336 (98.9%) mothers participated in the study. Among them, 176 (52.4%) were between 18-24 years of age. Of the total, 167 (49.7%) were rural residents, and 284 (85.5%) of them were married (Table 1).

Table 1. Demographic characteristics of women attended deliveries in University Hospital, Eastern Ethiopia, 2021 (n=336)

Variable	Category	f	%
Age	18-24	176	52.4
	25-34	129	38.4
	>35	31	9.2
Marital status	Single	`13	3.87
	Married	284	84.52
	Divorced	33	9.82
	Widowed	6	1.79
Place of residence	Urban	169	50.3
	Rural	167	49.7

Of the total, the prevalence of stillbirth was 12.5%. Almost one-third of the women (33.3%) had chronic diseases (such as diabetes mellitus and cardiac disease). The history of abortion and stillbirth were 11.6% and 12.5%, respectively. Only six women (1.8%) were HIV/AIDS (Table 2).

Only 6 (1.8%) of neonates were born with congenital anomaly, 70 (20.8%) were low birth weight, and 216 (64.3%) of neonate were male (Table 3). In bivariate analysis, mother age, place of residence, premature rupture of membranes (PROM), antepartum hemorrhage (APH), gestational age, hypertensive disorder, congenital anomaly, partograph use during pregnancy, and the previous history of still birth among mothers were significantly associated with stillbirth. Nevertheless, the adjusted odds ratio showed no significant association between stillbirth with factors such as PROM, gestational age, hypertensive disorder, and APH. The adjusted OR for stillbirth in the women with the age over 35 was significantly higher in those women age group 18-24 years (AOR=3.20; 95% CI: 1.36–7.40, $p<0.041$). The risk of still birth for women in rural residential areas was found to be higher than those living in urban residential areas after adjusting potential factors (AOR=4.69; 95% CI: 3.36–11.20,

[Downloaded from caspjrm.ir on 2026-10-16]

p<0.022). The adjusted OR for still birth in women using partograph during pregnancy and the women with the previous history of stillbirth was higher compared with those women with no use partograph during labor or no previous history of stillbirth, respectively (AOR=2.84; 95% CI: 1.45–6.98, p<0.030), (AOR=7.24; 95% CI: 2.41–21.74, p<0.001) (Table 4).

Table 2. Obstetrics and medical characteristics of women attended deliveries in University Hospital, Eastern Ethiopia, 2021 (n=336

Variable	Category	f	%
Parity	Primiparous	127	37.8
	1-4	162	48.2
	≥5	47	14.0
Obstructed labor	Yes	8	2.4
	No	328	97.6
PROM*	Yes	21	6.3
	No	315	93.8
APH**	Yes	30	8.9
	No	306	91.1
Cord prolapsed	Yes	5	1.5
	No	331	98.5
History of abortion	Yes	39	11.6
	No	297	88.4
History of stillbirth	Yes	42	12.5
	No	294	87.5
Partograph use	Yes	287	85.4
	No	49	14.6
Labor onset	Spontaneous	306	91.1
	Induced	30	8.9
Onset of labor before admission	Yes	63	18.8
	No	273	81.3)
Gestational Age	Pre-term	30	8.9
	Term	301	89.6
	Post-term	5	1.5
Hypertensive disorder	Yes	49	14.6
	No	287	85.4
Chronic diseases (DM*** &Cardiac)	Yes	112	33.3
	No	224	66.7
HIV status of the mother	Reactive	6	1.8
	Non-reactive	330	98.2
Mode of delivery	SVD****	281	83.6
	Other	55	16.4
Birth outcome	Live birth	320	87.5

*PROM :pre rupture of membrane, **APH :ante partum hemorrhage, ***DM : diabetes mellitus,****SVD :spontaneous vaginal delivery

Table 3. Fetal and newborn factors characteristics of women attended deliveries in University Hospital, Eastern Ethiopia, 2021 (n=336)

Variables		f	%
Congenital anomaly	Yes	6	1.8
	No	330	98.2
Weight at birth≥2500 gr	Yes	266	79.2
	No	70	20.8
IUGR*	Yes	27	8.0
	No	309	92.0
Mal-presentation	Yes	24	7.1
	No	312	92.9
Sex of the Newborn	Male	216	64.3
	Female	210	35.7

*IUGR: intra uterine growth retardation

Discussion

In this study, the magnitude of stillbirth was 12.6%, which is in line with studies conducted in Nigeria (12.5%) (11) and Pakistan (12.52 %) (12), whereas it is higher than the results of studies done in Ethiopia, Hosana (8.6%) (13),Tanzania (3.6%) (14), Zambia (3.4%) (15), Malawi (3.6%) (16), and India (10%) (17). The discrepancy might be due to the methodological differences, the care provider competency, the available technology, topography, and the infrastructure of the study. Also, the health seeking behavior of pregnant mothers in the study area might not have been the sam

Mothers over 35 years of age were 4 times higher at risk of stillbirth than those in 15-24 age groups. This finding is in agreement with a study done in Taiwan, Ethiopia, Tanzania and Canadian (18-20). The reasons that stillbirth rates increase with maternal age are currently unclear. A possible explanation for this association could be chronic diseases. With advancing age, the prevalence of chronic diseases such as hypertension and diabetes mellitus increases (21, 22).

[Downloaded from caspjrm.ir on 2026-10-16]

Table 4. Bivariate and multivariate analysis of risk factors of stillbirth among women attended deliveries in University Hospital, Harar, Ethiopia, 021(n=336)

	Category	COR (95%CI)	AOR (95%CI)	P-value
Age of mother (year)	18-24	1	1	
	25-34	1.01(0.85-4.93)	2.01(0.85-7.93)	
	>35	4.72(1.36–7.40) *	3.20(1.36–7.40)**	0.041
Residency	Urban	1	1	
	Rural	3.20(2.36–7.40) *	4.69(3.36–11.20) **	0.022
Pre rupture of membrane	No	1	1	
	Yes	3.96(1.53-6.18) *	1.67(0.16-6.63)	0.980
Gestational age	Term	1	1	
	Per-term	3.17(2.53-10.0) *	3.65(0.01-7.79)	0.990
Hypertensive disorder	No	1	1	
	Yes	1.11(1.06-9.39) *	1.71(0.65-4.49)	0.900
Ante partum hemorrhage	No	1	1	
	Yes	6.13(2.07-10.37) *	3.16(0.10-9.04)	0.870
Congenital anomaly	No	1	1	
	Yes	2.00(1.12-8.33) *	2.01(0.85-7.93)	0.710
Partograph use	No	1	1	
	Yes	2.14(1.08-10.45) *	2.84(1.45-6.98)**	0.030
Previous history of stillbirth	No	1	1	
	Yes	4.07(1.05-7.11) *	7.24(2.41-21.74)**	0.001

COR: crudes odds ratio, AOR: adjusted odds ratio, CI: confidence interval

*: Significant at p-value < 0.05 in bivariate analysis, **: Significant at p-value < 0.05 in multivariate analysis

The findings of this study showed that women who resided in rural areas were 4.69 times more likely to suffer a still birth than those residing in urban areas. This finding is consistent with studies done in Nepal (23) and Ethiopia (20). This might be due to health care system or health seeking behavior and the life style of the mothers who live in rural areas.

This study also found that participants with no partograph use in labor were in higher odds of facing stillbirth than their counter parts. This finding was consistent with those of studies in Nigeria (24), in Uganda (25), in Nepal (26). Partograph is a chart used to follow up labor recommended by WHO, and the appropriate use of partograph can help health professionals to detect danger signs during labor earlier (27).

In addition, the current study showed that having stillbirth was 2.84-times higher among mothers who had a previous history of stillbirth compared with their counterparts. Similar results have been reported in, Amhara region referral hospitals, Ethiopia (16), and Nigeria (28), Bangladesh (29), Nepal (26), Haryana, (India) (30). This might be due to the fact that women who had experience of stillbirth in the preceding births were at higher risk of having recurrent stillbirths. Also, poor obstetrics histories are recurrent and the underlying causes are unknown (31).

This study was conducted within a single pubic hospital on a limited number of participants (small sample size). It does not include private hospitals. Thus, the generalization of results for the entire country is difficult. The study was carried out through cross-sectional method; therefore, it cannot show temporal relationships.

Conclusion

These findings of this study reflected the high prevalence of stillbirth in Hara, Eastern Ethiopia, which is a big health care concern. High maternal age, rural residential areas, the use of partograph during labor, and the previous history of still birth were found to be associated with stillbirth. The identified determinants of stillbirth are manageable and can be amenable to interventions. Therefore, appropriate

[Downloaded from caspjrm.ir on 2026-10-16]

prevention strategies during ante partum, intrapartum and newborn care should be applied in order to tackle the risk factors of stillbirth.

Acknowledgements

The author would like to thank the officials at Harar Health Science College, Hiwot Fana Specialized University Hospital, the data collectors, and the participants for their contributions.

Conflicts of Interest

The author declares that there is no conflict of interest in any aspect of the article.

References

1. Aminu M, Unkels R, Mdegela M, Utz B, Adaji S, van den Broek N. Causes of and factors associated with stillbirth in low- and middle-income countries: a systematic literature review. BJOG: an international journal of obstetrics and gynaecology. 2014 Sep; 121 Suppl 4:141-153.
2. WHO V. International Statistical Classification of Diseases and Related Health Problems: 10th Revision (ICD); 2019. 2020.
3. Hilder L, Li Z, Zeki R, Sullivan E. Stillbirths in Australia 1991–2009. Perinatal statistics. Series no 29. Cat. no. PER 63. 2014.
4. Frøen JF, Gordijn SJ, Abdel-Aleem H, Bergsjø P, Betran A, Duke CW, et al. Making stillbirths count, making numbers talk - issues in data collection for stillbirths. BMC pregnancy and childbirth. 2009 Dec 17; 9:58.
5. Lawn JE, Blencowe H, Waiswa P, Amouzou A, Mathers C, Hogan D, et al. Stillbirths: rates, risk factors, and acceleration towards 2030. Lancet (London, England). 2016 Feb 6; 387(10018):587-603.
6. Tesema GA, Gezie LD, Nigatu SG. Trends of stillbirth among reproductive-age women in Ethiopia based on Ethiopian demographic and health surveys: a multivariate decomposition analysis. BMC pregnancy and childbirth. 2020 Mar 30; 20(1):193.
7. Burstein R, Henry NJ, Collison ML, Marczak LB, Sligar A, Watson S, et al. Mapping 123 million neonatal, infant and child deaths between 2000 and 2017. Nature. 2019 Oct; 574(7778):353-358.
8. EPHI I. Ethiopia mini demographic and health survey 2019: key indicators. Rockville, Maryland, USA: EPHI and ICF. 2019.
9. Liu LC, Wang YC, Yu MH, Su HY. Major risk factors for stillbirth in different trimesters of pregnancy--a systematic review. Taiwanese journal of obstetrics & gynecology. 2014 Jun; 53(2):141-5.
10. Sisay MM, Yirgu R, Gobezayehu AG, Sibley LM. A qualitative study of attitudes and values surrounding stillbirth and neonatal mortality among grandmothers, mothers, and unmarried girls in rural Amhara and Oromiya regions, Ethiopia: unheard souls in the backyard. Journal of midwifery & women's health. 2014 Jan; 59 Suppl 1:S110-S117.
11. Dahiru T, Aliyu AA. Stillbirth in Nigeria: rates and risk factors based on 2013 Nigeria DHS. Open Access Library Journal. 2016; 3(8):1-12.
12. Afshan K, Narjis G, Mazhar Q. Risk factors and causes of stillbirths among pregnant women in Pakistan. African health sciences. 2019 Mar; 19(1):1507-1516.
13. Abdo R, Endalemaw T, Tesso F. Prevalence and associated factors of adverse birth outcomes among women attended maternity ward at Negest Elene Mohammed Memorial General Hospital in Hosanna Town, SNNPR, Ethiopia. J Women's Health Care. 2016; 5(4):324.
14. Lofwander M. Stillbirths and associations with maternal education. A registry study from a regional hospital in north eastern Tanzania. Epidemiology and Community Health. 2012; 66(7):240-6.
15. Turnbull E, Lembalemba MK, Guffey MB, Bolton-Moore C, Mubiana-Mbewe M, Chintu N, et al. Causes of stillbirth, neonatal death and early childhood death in rural Zambia by verbal autopsy assessments. Tropical medicine & international health: TM & IH. 2011 Jul; 16(7):894-901.
16. Liyew AD, Molla M, Azene ZN. Risk factors of stillbirth among women who gave birth in Amhara region referral hospitals, Ethiopia, in 2019: A Case-Control Study. International journal of women's health. 2021; 13:557-567.
17. Altijani N, Carson C, Choudhury SS, Rani A, Sarma UC, Knight M, et al. Stillbirth among women in nine states in India: rate and risk factors in study of 886,505 women from the annual health survey. BMJ open. 2018 Nov 8; 8(11):e022583.
18. Huang L, Sauve R, Birkett N, Fergusson D, van Walraven C. Maternal age and risk of stillbirth: a systematic review. CMAJ: Canadian Medical

[Downloaded from caspjrm.ir on 2026-10-16]

Association journal = journal de l'Association medicale canadienne. 2008 Jan 15; 178(2):165-172.
19. Chuwa FS, Mwanamsangu AH, Brown BG, Msuya SE, Senkoro EE, Mnali OP, et al. Maternal and fetal risk factors for stillbirth in Northern Tanzania: A registry-based retrospective cohort study. PloS one. 2017; 12(8):e0182250.
20. Berhie KA, Gebresilassie HG. Logistic regression analysis on the determinants of stillbirth in Ethiopia. Maternal health, neonatology and perinatology. 2016; 2:10.
21. Souza AC, Borges JW, Moreira TM. Quality of life and treatment adherence in hypertensive patients: systematic review with meta-analysis. Revista de saude publica. 2016 Dec 22; 50:71.
22. Roh EH. Analysis of multiple chronic disease characteristics in South Koreans by age groups using association rules analysis. Health informatics journal. 2022 Jan-Mar; 28(1):14604582211070208.
23. Bhusal M, Gautam N, Lim A, Tongkumchum P. Factors Associated With Stillbirth Among Pregnant Women in Nepal. Journal of preventive medicine and public health = Yebang Uihakhoe chi. 2019 May; 52(3):154-160.
24. Suleiman BM, Ibrahim HM, Abdulkarim N. Determinants of stillbirths in katsina, Nigeria: a hospital-based study. Pediatric reports. 2015 Feb 24; 7(1):5615.
25. Agaba E, Mugisha J, Atuhairwe C, Farjando Y, Ngonzi J. Factors associated with stillbirths at Mbarara regional referral hospital. J Health Med Nurs. 2016; 24.
26. Kc A, Wrammert J, Ewald U, Clark RB, Gautam J, Baral G, et al. Incidence of intrapartum stillbirth and associated risk factors in tertiary care setting of Nepal: a case-control study. Reproductive health. 2016 Aug 31; 13(1):103.
27. Meena R. Outcome of labour monitored by world health organization modified partograph and latent phase of partograph. BMR Med. 2016; 3(1):1-7.
28. Audu B, Alhaji M, Takai U, Bukar M. Risk factors for stillbirths at universty of Maiduguri teaching hospital, Maiduguri, Nigeria: a cross-sectional retrospective analysis. Nigerian Medical Journal. 2009; 50(2):42.
29. Nahar S, Rahman A, Nasreen HE. Factors influencing stillbirth in bangladesh: a case-control study. Paediatric and perinatal epidemiology. 2013 Mar; 27(2):158-164.
30. Neogi SB, Negandhi P, Chopra S, Das AM, Zodpey S, Gupta RK, et al. Risk Factors for Stillbirth: Findings from a Population-Based Case-Control Study, Haryana, India. Paediatric and perinatal epidemiology. 2016 Jan; 30(1):56-66.
31. Lamont K, Scott NW, Jones GT, Bhattacharya S. Risk of recurrent stillbirth: systematic review and meta-analysis. BMJ (Clinical research ed). 2015 Jun 24; 350:h3080.

[Downloaded from caspjrm.ir on 2026-10-16]