Rehabilitation Science
2026, Vol. 11, No. 3, pp. 50–59
https://doi.org/10.11648/j.rs.20261103.12

SciencePG
Science Publishing Group

Research Article

Determinants of Preterm Birth Among Mothers Delivered Babies in Bale Zone Hospitals

Fedasa Tesfaye[1, *], **Firafnah Lelisa**[2]

[1]Department of Statistics, Wallaga University, Nekemte, Ethiopia
[2]Department of Statistics, Ambo University, Ambo, Ethiopia

Abstract

Background: Preterm birth is defined as the birth of a baby alive before 37 completed weeks of pregnancy. Preterm birth is an important public health problem because it is associated with increased risks of neonatal illness, disability, and mortality. Objective: The main objective of this study was to identify and prioritize significant risk factors associated with preterm birth among mothers who delivered babies in hospitals in Bale and East Bale Zones. Design: A case-control study was conducted to assess factors associated with preterm birth. Participants: A total of 533 selected mothers who delivered babies from January to December 2024 in hospitals located in Bale and East Bale Zones were included in the study. Main Outcome: The main outcome of the study was to identify significant risk factors associated with preterm birth. Results: Of the 533 mothers who participated in the study, 91 (17.1%) experienced preterm birth. Several factors were significantly associated with preterm birth, including maternal age, place of residence, antenatal care (ANC), previous history of preterm birth, hypertension (HTN), gestational hypertension, gestational diabetes mellitus (DM), cardiovascular disease (CVD), urinary tract infection (UTI), premature rupture of membranes (PROM), pregnancy type, child birth weight, birth outcomes, and pre-eclampsia. Conclusion: Residence in pastoralist communities, previous history of preterm birth, and gestational diabetes mellitus were among the strongest factors associated with preterm birth in the study population.

Keywords

Preterm Birth, Pastoralists, Non-Pastoralists, East Bale, Bale Zones, Case-control

1. Introduction

Born on a time is when mothers deliver babies at the final gestation time (after 37 weeks). Women may also be born alive babies too early before 37 weeks of pregnancy is completed, which is called preterm birth. It is the birth outcome that predicts the survival, development, and long-term health outcomes of newborns. Based on the gestational age, preterm can be sub-categorized as extremely preterm (< 28 weeks), very preterm (28 to 32 weeks) and moderate or late preterm (32 to 37 weeks) [1, 2]. Globally, about 15 million babies are born too early every year. Out of these, 1 million are dying due to the complications of prematurity. Sub-Saharan Africa and South Asia account for more than 60 percent of worldwide preterm births [2]. Prematurity is highly associated with short and long-term morbidity in neonates. The number of preterm

*Correspondence: FedasaTesfaye (fedasatesfaye@yahoo.com)

Received: 12 March 2026; **Accepted:** 25 March 2026; **Published:** 11 September 2026

birth outcomes is high in Ethiopia. Some hospital-based studies reported that the prevalence of preterm birth in Ethiopia is varied from place to place. It is about 4.4% in Gondar, Amhara region [3], 12.3% in Somali region [4], 13.3% in Tigray region [5], and 15.5% in Butajira [6], Southern Nation and Nationalities region, and about 33.2% in Jimma, Oromia region [10].

Degno et al.2021 [7] conducted a study on the adverse birth outcomes, which include stillbirth, preterm birth, low birth weight, and congenital abnormalities in 4 hospitals in Bale Zone. The study did not focus on the determinants of preterm births separately, and it has a limitation on specifically considering pastoralist mothers. To the best knowledge of researchers, we have not yet been able to find any else study conducted on determinants of preterm birth for mothers who live in the Bale Zones.However, some cross-sectional and case-control studies on determinants of preterm birth have been conducted in different areas of Ethiopia such as in Jimma, Oromia region, Sidama region, Gondar, Amhara region, and Tigrayregion [5, 7, 9, 11]. The result of these studies may not be representative for Bale zone mothers, especially for the pastoralist. Because pastoralist women have low antenatal care (ANC) follow-up, due to their mobile lifestyle from one place to another [10]. Therefore, this study aimed to identify the significant risk factors that determine a preterm birth among mothers who delivered babies in Bale hospitals.

2. Methodology

2.1. Study Area and Design

This study wasconducted in East Bale and Bale zone hospitals, which are located in the southern part of the Oromia region. In addition to Robe, Goba, and Ginnir city administration, there are 21 districts in both East Bale and Bale zone. Out of these, 9 are the pastoralist districts. Including 87 functional health centers, there are five hospitals in both East Bale and Bale zone known as Goba Referral Hospital, Robe General Hospital, Ginnir General Hospital, Dalo Mena General Hospital, and MaddaWalabu Primary Hospital. All these hospitals functioned to deliver comprehensive emergency, obstetric, and neonatal care services [16]. The capital of Bale zone, Robe, and East Bale zone, Ginnir is located at a distance of 430 and 550 Km from Addis Ababa, the capital of Ethiopia respectively. A report from the zonal office shows that there were more than 29, 121 births in 2023 in East Bale and Bale Zone. The study design conducted for this study was case-control, in which cases are mothers who experienced preterm births and controls are those who delivered babies on time.

2.2. Target Population

The target population of this study is the charts of all mothers who delivered babies in East Bale and Bale zone hospitals from January to December 2024.

2.3. Inclusion and Exclusion Criteria

Preterm births and term births whose charts are available, and have complete history recorded with a summary of delivery and procedures noted during the study period were included in this study. Preterm and term births chart with incomplete recorded information and not summarized history of delivery were excluded from this study.

2.4. Sampling Techniques and Sample Size Determination

Using January to December 2024 reports of all hospitals, charts of mothers were considered as cases and controls based on their preterm birth status. In the given time, there are more than 29,121 total births in East Bale and Bale zone. Out of these, about 12,875births were in hospitals. Therefore, the total population of this study was N = 12,875.

In general, the overall sample needed for this study was determined by assuming; the probability of preterm births $p = 33.2\%$, which was taken from a previous study conducted at Jimma University Medical Center, Southwest Ethiopia [7]; A 95% confidence level with $\alpha = 0.05$, $z_{\alpha/2} = 1.96$, and the margin error $d = 0.04$. Then the sample size n was given by:

$$n = \frac{z^2_{\alpha/2} * p(1-p)}{d^2} = 533$$

Then finally, the total sample size determined for this study was $n = 533$.This sample was proportionally allocated to each hospital, using the proportional allocation stratified sampling method. For each hospital, the sample size was determined using the formula,

$$n_i = \frac{n}{N} * N_i, \mathrm{i} = 1, 2, 3, 4, 5$$

Where 1= Ginnir, 2 = Robe, 3 = Goba, 4 = Dalo Buna and 5 = MaddaWalabu Hospitals and the total births at each hospital from January to December of 2024 is N1 = 3805, N2 = 2441, N3 = 4024, N4 = 1680, N5 = 925.

The general structure of sample size determination in this study looks:

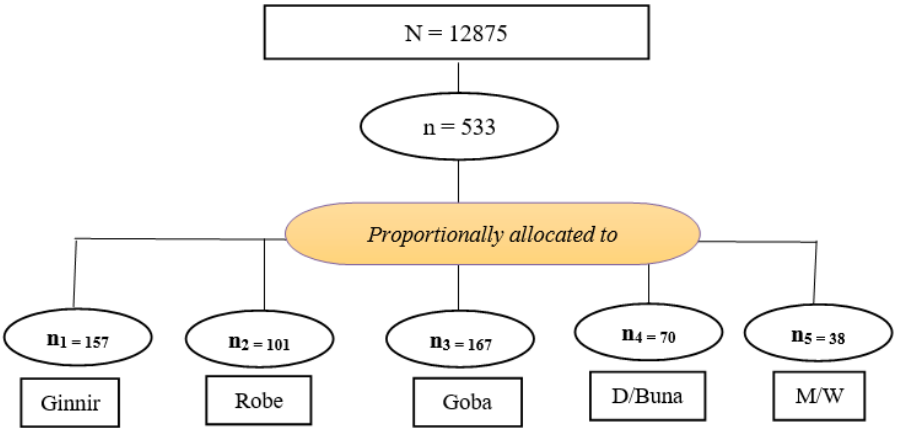

Figure 1. *Sampling procedure for sample size determination diagram.*

2.5. Variable of the study

The response variable of this study was the preterm birth status, which responses NO, for mothers who delivered babies completing the gestational age, and YES, for those who were born babies before 37 weeks of pregnancy. From the adopted different literature, the followings are independent variables that are considered in this study [1, 5, 8].

1) Socio-demographic factors: Age, Marital Status, Religion, Residence, Sex of the baby.
2) Behavioral and Lifestyle factors: Smoking cigarettes, Drinking alcohol, Chewing chat.
3) Maternal obstetric and nutritional factors: History of preterm birth, History of abortion, ANC status, Anemia status,
4) Pre-existing maternal illness and obstetric complications: Urinary tract infection (UTI), HIV, Chronic hypertension, Pre-pregnancy diabetes mellitus, Premature Rupture of Membrane (PROM), Pregnancy-induced hypertension (PIH), Antepartum Hemorrhage (APH), Gestational diabetes mellitus (GDM).
5) Fetal factors: Birth weight, multiple gestations, congenital malformations, birth outcomes.

2.6. Statistical Methods for Data Analysis

The collected data wereentered into Epi data version 3.1, and it wasanalyzed using R statistical software. For the analysis both descriptive statistics, to summarize the main features of the data, and inferential statistics, to generalize about the overall mothers using the selected sample of mothers were applied.

A binary logistic regression model is the statistical model used for predicting dichotomous or binary dependent variables (preterm status in this study). The model is given by:

$$\ln\left[\frac{p}{1-p}\right] = \alpha + \beta X \tag{2}$$

Where α is the intercept value at all values of regression, β is regression coefficients, and p is [17].

$$p = \frac{e^{(\alpha+\beta X)}}{1+e^{(\alpha+\beta X)}} \tag{3}$$

3. Results

3.1. Descriptive Analysis

3.1.1. Mother's Socio-demographic and Behavioral Characteristics

From (Table 1),one can observe that, out of the total 533 mothers who participated in this study, 210 (39.4%) were from the pastoralist communities with the majority 307 (57.6%) Muslim religion followers. Following 483 (90.6%) the married mothers, 22 (4.1%), 20 (3.8%), and 8 (1.5%) were single, divorced, and widowed respectively. Too small in number, 4 (0.8%), 5 (0.9%), and 53 (9.9%) were alcohol, cigarette, and Khat users respectively. During the delivery time, the majority, about 421 (79.0%) of mothers were stable, and only 3 (0.6%) of them died.

Table 1. *Socio-demographic and behavioral characteristics of mothers delivered babies in Bale zone Hospitals, from January to December 2024.*

		Prematurity status		
		Term birth (%)	**Preterm birth (%)**	**Total (%)**
Residence place	non-pastoralist	279 (63.1%)	44 (48.4%)	323 (60.6%)
	Pastoralist	163 (36.9%)	47 (51.6%)	210 (39.4%)
Religion of mothers	Muslim	261 (59.0%)	46 (50.5%)	307 (57.6%)
	Christian	181 (41.0%)	45 (49.5%)	226 (42.4%)
Marital Status	Single	19 (4.3%)	3 (3.3%)	22 (4.1%)
	Married	399 (90.3%)	84 (92.3%)	483 (90.6%)
	Divorced	16 (3.6%)	4 (4.4%)	20 (3.8%)
	Widowed	8 (1.8%)	-	8 (1.5%)
Mothers preference	Alcohol	2 (0.5%)	2 (2.2%)	4 (0.8%)
	Cigarette	5 (1.1%)	-	5 (0.9%)
	Khat	44 (10.0%)	9 (9.9%)	53 (9.9%)
	None	391 (88.5%)	80 (87.9%)	471 (88.4%)
Maternal Status	Stable	352 (79.6%)	69 (75.8%)	421 (79.0%)
	Unstable	87 (19.7%)	22 (24.2%)	109 (20.5%)
	Died	3 (0.7%)	-	3 (0.6%)
		442 (82.9%)	91 (17.1%)	-

3.1.2. Antenatal Care Service and Prematurity Status Comparison Among Pastoralists and Non-pastoralists

The aim is to make an antenatal care service and prematurity status-related comparison among mothers from pastoralist and non-pastoralist communities. From Figure 2(a), the bar for the non-pastoralist group is shorter than that of the pastoralists groups. This indicated that mothers from the pastoralist communities have no more access of ANC as compared to those who were from the non-pastoralist communities. Figure 2(b) also shows the largest bar of the pastoralist groups, which suggested that the maximum number of mothers complicated with prematurity is those who were the resident of pastoralist area.

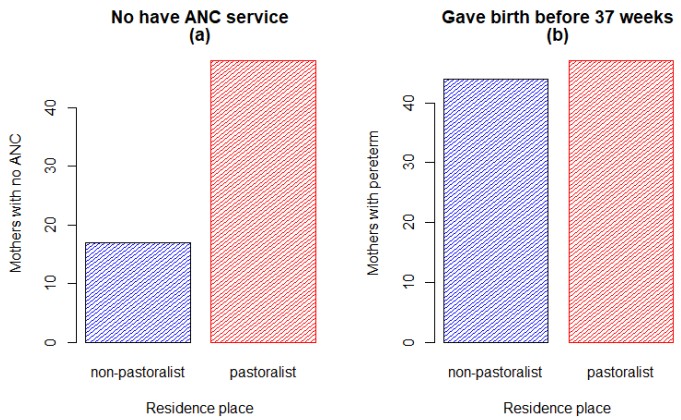

Figure 2. *Antenatal care service and prematurity status related comparison between pastoralists and non-pastoralists mothersObstetric and Nutritional Factors.*

From (Table 2),About 404 (91.4%) of mothers who participated in this study were visited by healthcare delivers for ANC, whereas 38 (8.6%) did not have any ANC services. Before this delivery, a small number of mothers had an abortion 75 (17.0%), stillbirth 53 (12.0%), and preterm 74 (16.7%) history. Most of the mothers, about 338 (76.5%) delivered their babies through a vaginal delivery without requiring to use of tools. However, about 39 (8.8%), 26 (5.9%), and 39 (8.8%) of them delivered their baby through cesarean section, forceps, and episiotomy respectively. Regarding the anemia status and different complications of this pregnancy, about 95 (21.5%), 60 (15.2%), 14 (3.5%), 39 (9.9%), and 61 (15.4%) of mothers were anemia, preeclampsia, eclampsia, APH, and PPH respectively.

Table 2. *Obstetric factors of mothers delivered babies in Bale zones hospitals.*

Variables	Categories	Prematurity status		Total (%)
		Term birth (%)	Preterm birth (%)	
ANC service	No	38 (8.6%)	27 (29.7%)	65 (12.2%)
	Yes	404 (91.4%)	64 (70.3%)	468 (87.8%)
Abortion history	No	367 (83.0%)	80 (87.9%)	447 (83.9%)
	Yes	75 (17.0%)	11 (12.1%)	86 (16.1%)
Stillbirth history	No	389 (88.0%)	71 (78.0%)	460 (86.3%)
	Yes	53 (12.0%)	20 (22.0%)	73 (13.7%)
Preterm history	No	368 (83.3%)	62 (68.1%)	430 (80.7%)
	Yes	74 (16.7%)	29 (31.9%)	103 (19.3%)
Mode of delivery	SVD	338 (76.5%)	75 (82.4%)	413 (77.5%)
	Caesarean	39 (8.8%)	3 (3.3%)	42 (7.9%)
	Forceps	26 (5.9%)	-	26 (4.9%)
	Episiotomy	39 (8.8%)	13 (14.3%)	52 (9.8%)
Anemia status	No	347 (78.5%)	59 (64.8%)	406 (76.2%)
	Yes	95 (21.5%)	32 (35.2%)	127 (23.8%)
Pre-eclapsia	No	337 (76.2%)	61 (67.0%)	398 (74.7%)
	Yes	58 (13.1%)	29 (31.9%)	87 (16.3%)
	Not known	47 (10.6%)	1 (1.1%)	48 (9.0%)
Eclapsia	No	381 (86.2%)	86 (94.5%)	467 (87.6%)
	Yes	14 (3.2%)	4 (4.4%)	18 (3.4%)
	Not known	47 (10.6%)	1 (1.1%)	48 (9.0%)
APH	No	356 (80.5%)	79 (86.8%)	435 (81.6%)
	Yes	39 (8.8%)	11 (12.1%)	50 (9.4%)
	Not known	47 (10.6%)	1 (1.1%)	48 (9.0%)

3.1.3. Pre-Existing Medical Disorders of Mothers

Of 14 (2.6%) mothers who had chronic HTN, the majority of 11 (12.1%) were those who have preterm delivery. Totally, 95 (17.8%) and 21 (3.9%) mothers had gestational HTN and DM, and of these, 22 (24.2%) and 12 (13.2%) mothers gave birth before 37 weeks of gestation, respectively. About 12 (2.3%), 44 (8.3%), and 40 (7.5%) of mothers who participated in this study had diabetes mellitus, CVD, and respiratory disease respectively. Of the total 99 (18.6%) of mothers with urinary tract infections, 20 (22%) of them were born babies before the completed gestational age. Only 3 (0.6%) of mothers

had epilepsy, 92 (17.3%) had a rapture of membrane and about 17 (3.2%) of mothers were positive for HIV.

Table 3. Pre-existing medical disorders of mothers delivered babies in Bale zones hospitals.

Variables	Categories	Prematurity status		Total (%)
		Term birth (%)	Preterm birth (%)	
Chronic HTN	No	435 (98.4%)	79 (86.8%)	514 (96.4%)
	Yes	3 (0.7%)	11 (12.1%)	14 (2.6%)
	Not known	4 (0.9%)	1 (1.1%)	5 (0.9%)
Gestational HTN	No	369 (83.5%)	69 (75.8%)	438 (82.2%)
	Yes	73 (16.5%)	22 (24.2%)	95 (17.8%)
Chronic DM	No	430 (97.3%)	84 (92.3%)	514 (96.4%)
	Yes	7 (1.6%)	5 (5.5%)	12 (2.3%)
	Not known	5 (1.1%)	2 (2.2%)	7 (1.3%)
Gestational DM	No	428 (96.8%)	78 (85.7%)	506 (94.9%)
	Yes	9 (2.0%)	12 (13.2%)	21 (3.9%)
	Not known	5 (1.1%)	1 (1.1%)	6 (1.1%)
Cardiac diseases	No	418 (94.6%)	78 (85.7%)	496 (93.1%)
	Yes	24 (5.4%)	13 (14.3%)	37 (6.9%)
Respiratory disease	No	410 (92.8%)	87 (95.6%)	49.7 (93.2%)
	Yes	32 (7.2%)	4 (4.4%)	36 (6.8%)
Urinary Tract Infection	No	366 (82.8%)	67 (73.6%)	433 (81.2%)
	Yes	76 (17.2%)	24 (26.4%)	100 (18.8%)
Epilepsy	No	436 (98.6%)	87 (95.6%)	523 (98.1%)
	Yes	2 (0.5%)	1 (1.1%)	3 (0.6%)
	Not known	4 (0.9%)	3 (3.3%)	7 (1.3%)
Rapture of membrane	No	356 (80.5%)	64 (70.3%)	420 (78.8%)
	Yes	68 (15.4%)	24 (26.4%)	92 (17.3%)
	Not known	18 (4.1%)	3 (3.3%)	21 (3.9%)
HIV status of mother	Negative	426 (96.4%)	90 (98.9%)	516 (96.8%)
	Positive	16 (3.6%)	1 (1.1%)	17 (3.2%)

3.1.4. Fetal characteristics

Of the total of mothers who participated in this study, about 270 (50.7%) of them were born female, and 263 (49.3%) of them were born male babies. About 513 (96.2%) of mothers were delivered with single babies, whereas 20 (3.8%) were delivered with multiple babies. A too-small number, 16 (3%) of babies had congenital malformation. About 476 (89.3%) of the child were alive, 17 (3.2%) were stillbirth, and 40 (7.5%) died after being born in the hospital.

Table 4. Fetal-related characteristics related factors of babies born in Bale zones hospitals.

Variables	Categories	Prematurity status		Total (%)
		Term birth (%)	Preterm birth (%)	
Child sex	Female	229 (51.8%)	39 (42.9%)	268 (50.3%)
	Male	213 (48.2%)	52 (57.1%)	265 (49.7%)
Pregnancy Type	Single	435 (98.4%)	78 (85.7%)	513 (96.2%)
	Twins	7 (1.6%)	13 (14.3%)	20 (3.8%)
congenital malformation	No	433 (98.0%)	84 (92.3%)	517 (97.0%)
	Yes	9 (2.0%)	7 (7.7%)	16 (3.0%)
Birth outcome	A live	432 (97.7%)	66 (72.5%)	498 (93.4%)
	Stillbirth	9 (2.0%%)	20 (22.0%)	29 (5.4%)
	Died after born	1 (0.2%)	5 (5.5%)	6 (1.1%)

3.2. Binary Logistic Regression Analysis of the Risk Factors

Univariable and multivariable binary logistic regression analysis was applied. Predictors like, marital status, maternal status at birth time, the total number of births, previous abortion history, respiratory disease, epilepsy, HIV status, eclampsia, and APH were not significantly associated with preterm birth status at a 20% level of significance, and were excluded from the multivariable model.

The multivariable binary logistic regression model was fitted using age, residence place, religion, mothers preference, ANC, stillbirth history, preterm history, delivery mode, anemia, HTN, gestational HTN, DM, gestational DM, cardiac diseases, UTI, PROM, pregnancy type, child sex, child weight, congenital anomalies, birth outcomes, and pre-eclampsia (Table 5). The coefficient for age is 0.064, and its AOR with 95% CI is 1.066 (1.004, 1.134), which is significant at a 0.05 level of significance. Holding others constant, an increase in one year of age of mothers increases the odds of delivering babies before 37 weeks of gestational age by 6.6%. Mothers from the pastoralist community have 2.746 times the odds of delivering babies before 37 weeks of pregnancy than those who were from the non-pastoralist communities. Considering other variables constant the odds of delivering babies before 37 weeks in mothers who have ANC service is about 0.355 times less likely than in those who didn't have ANC services. Mothers who have a history of stillbirth have odds of 2.907 times more likely to deliver babies before 37 weeks than those who didn't have previous stillbirth history. Compared to mothers who have no preterm history, the odds of having preterm birth in the mothers with a previous preterm history is about 2.721 times. Mothers with HTN have about 18.145 odds more likely to have a preterm birth as compared to those who have not HTN disease. Having gestational DM increases the odds of delivering babies before 37 weeks gestational age by 10.519 times. The odds of having preterm birth in women with CVD are about 3.204 times more likely than in those who have no CVD. Women who have urinary tract infections (UTI) have 2.599 times the odds of having preterm birth than those women who have no UTI. Mothers with premature rupture of membrane (PROM) have 3.903 times the odds of delivering preterm babies as compared to those who have no PROM. Compared to having a single pregnancy, having a twin pregnancy increases the odds of delivering babies before 37 weeks about 7.999 times more likely.

An increase in one unit weight of babies is associated with a decrease in the odds of preterm birth by 0.180 times. The odds of being preterm for the babies who died in hospital after born is about 12.510 times more likely than for those who are alive. Mothers who have pre-eclampsia have about 2.607 times the odds of having preterm birth as compared to those who have no pre-eclampsia.

Table 5. Multivariable analysis of preterm birth risk factors using binary logistic regression model.

Variables	B	SE	COR(95% CI)	AOR(95% CI)	p
Intercept	0.229	1.16	-	1.257 0.130 12.477	0.844

Variables	B	SE	COR(95% CI)	AOR(95% CI)	p
Age	0.065	0.031	1.072 (1.032, 1.114)	1.067 1.004 1.134	0.037
Residence					
Non-pastoralists	Ref.	-	1	1	-
Pastoralist	1.038	0.39	1.828 (1.161, 2.886)	2.825 1.322 6.139	0.008
ANC					
No	Ref	-	1	1	-
Yes	-1.031	0.449	0.223 (0.128, 0.392)	0.357 (0.148, 0.865)	0.022
Stillbirth history					
No	Ref	-	1	1	-
Yes	0.959	0.512	2.067 (1.145, 3.623)	2.608 (0.934, 7.042)	0.061
Preterm history					
No	Ref	-		1	
Yes	1.035	0.419	2.326 (1.389, 3.839)	2.814 (1.233, 6.423)	0.014
HTN					
No	Ref	-		1	
Yes	2.905	0.906	20.190 (6.144, 90.749)	18.259 (3.523, 138.838)	0.001
Not known	0.068	1.784	1.377 (0.070, 9.456)	1.070 (0.025, 35.257)	0.970
Gestational HTN					
No	Ref	-		1	
Yes	-0.674	0.45	1.612 (0.922, 2.737)	0.510 (0.204, 1.196)	0.134
Gestational DM					
No	Ref	-		1	
Yes	2.22	0.673	7.316 (2.998, 18.486)	9.204 (2.506, 35.870)	0.001
Not known	1.314	1.831	1.097 (0.057, 6.926)	3.722 (0.083, 103.219)	0.473
CVD					
No	Ref	-	1	1	-
Yes	1.206	0.578	2.903 (1.382, 5.864)	3.339 (1.044, 10.216)	0.037
Respiratory					
No	Ref	-	1	1	-
Yes	-1.529	0.881	0.589 (0.172, 1.532)	0.217 (0.032, 1.039)	0.083
UTI					
No	Ref	-	1	1	
Yes	0.896	0.447	1.725 (1.004, 2.895)	2.449 (1.012, 5.897)	0.045
MembrebeRapt					
No	Ref	-	1	1	
Yes	1.347	0.449	1.963 (1.134, 3.325)	3.846 (1.591, 9.346)	0.003
Not known	-0.874	0.861	0.927 (0.213, 2.839)	0.417 (0.065, 2.012)	0.310
Child Sex					
Female	Ref	-	1	1	

Variables	B	SE	COR(95% CI)	AOR(95% CI)	p
Male	0.666	0.365	1.433 (0.911, 2.270)	1.946 (0.959, 4.036)	0.068
Pregnancy type					
Single	Ref	-	1	1	
Twins	2.054	0.751	10.357 (4.109, 28.330)	7.795 (1.818, 35.438)	0.006
Child Weight	-1.727	0.258	0.201 (0.140, 0.282)	0.178 (0.105, 0.289)	<0.001
Birth outcome					
Live	Ref	-	1	1	
Stillbirth	1.183	0.602	14.545 (6.530, 34.874)	3.265 (1.012, 10.942)	0.050
Died in hospital	2.53	1.245	32.727 (5.174, 632.269)	12.558 (1.432, 286.044)	0.042
pre_eclapsia					
No	Ref	-	1	1	
Yes	0.928	0.41	2.762 (1.626, 4.639)	2.529 (1.118, 5.632)	0.024
Not known	-3.2	1.695	0.118 (0.007, 0.554)	0.041 (0.001, 0.557)	0.059

4. Discussions

This study was aimed to identify the determinants of preterm births among mothers who delivered babies in both Bale Zones Hospitals. The prevalence of preterm birth status was 17.1% with the majority of them were mothers from the pastoralist communities.

This finding shows that age of the women is significantly associated to the preterm births of mothers who delivered babies in East Bale and Bale Zone Hospitals. This is in line with the study conducted by Van Zijl, M.D., et al., 2016, which concluded as being older in age of mothers is directly associated to the prematurity [12]. Mothers from the pastoralist community have 2.746 times the odds of having preterm birth than those who were from the non-pastoralist communities, which showed that residence places have a significant effect on preterm births. and this study result is consistent with the findings of Wudie, F., et al., 2019 that was conducted in northern Ethiopia, central zone of Tigray [5].

This study also pinpointed that the odds of delivering babies before 37 weeks in mothers who have ANC service is about 0.355 times less likely than in those who didn't have ANC services. This is inline with finding of Axame et al., 2020 that was conducted in Ghana [1]. Mothers who have a history of stillbirth have odds of 2.907 times more likely to deliver babies before 37 weeks than those who didn't have previous stillbirth history. This inline with [5, 7] that was concluded that mothers with the precense of stillbirth history were more likely to experience prematurity than those who have no stillbirth history. Regarding to mothers who have no preterm history, the odds of having preterm birth in the mothers with a previous preterm history is about 2.721 times which is consistent with the study conducted in Jimma that revealed having the history of preterm increases the odds of having preterm births 6 times [7].

Mothers with HTN have about 18.145 odds more likely to have a preterm birth as compared to those who have not HTN disease. Having gestational DM increases the odds of delivering babies before 37 weeks gestational age by 10.519 times. The odds of having preterm birth in women with CVD are about 3.204 times more likely than in those who have no CVD. Women who have urinary tract infections (UTI) have2.599 times the odds of having preterm birth than those women who have no UTI which coincides with the study finding of [1, 13-15].

Mothers with premature rupture of membrane (PROM) have 3.903 times the odds of delivering preterm babies as compared to those who have no PROM. Compared to having a single pregnancy, having a twin pregnancy increases the odds of delivering babies before 37 weeks about 7.999 times more likely and An increase in one unit weight of babies is associated with a decrease in the odds of preterm birth by 0.180 times. The odds of being preterm for the babies who died in hospital after born is about 12.510 times more likely than for those who are alive which is consistent with the study finding [1, 13-15].

5. Conclusions

From mothers who participated in this study, about 17.1% of have a preterm birth outcome. Being from the pastoralist communities, not having the access of ANC service, having the previous preterm history, gestational diabetes mellitus and

having chronic hypertension were highly associated to the existence of prematurity. To address the needs of pastoralist communities, the government should consider establishing mobile ANC services that can move with the communities, ensuring continuous access to care.

6. Limitations

This study used the data recorded for hospital purposes. Therefore, there was a lack of relevant information for this study, and there was a limitation including more risk factors.

Abbreviations

ANC	Antenatal Care
APH	Antepartum Haemorrhage
GDM	Gestational Diabetes Mellitus
HIV	Human Immune Virus
IPV	Intimate Partner Violence
MUAC	mid-Upper Arm Circumference
PIH	Pregnancy-Induced Hypertension
PROM	Premature Rupture of Membrane
UTI	Urinary Tract Infection
WHO	World Health Organization

Acknowledgments

The authors gratefully acknowledge Bale Hospitals for the provision of the data.

Author Contributions

Fedasa Tesfaye: Conceptualization, Data curation, Formal Analysis, Methodology, Visualization, Writing – original draft

Firafnah Lelisa: Conceptualization, Methodology, Software, Supervision, Validation, Writing – review & editing

Conflicts of Interest

The authors declare that there was no conflict of interest in this study.

References

[1] Axame, W. K., F. N. Binka, and M. Kweku, Determinants of Low birthweight and Preterm Delivery in the Volta Region of Ghana: Evidence from birth records. 2020.

[2] World Health Organization. Preterm birth. 2018 [cited 18 July 2021]; Available from: https://www.who.int/news-room/fact-sheets/detail/preterm-birth

[3] Gebreslasie, K., Preterm birth and associated factors among mothers who gave birth in Gondar town health institutions. Advances in Nursing, 2016. 2016.

[4] Muhumed, I. I., J. Y. Kebira, and M. O. Mabalhin, Preterm Birth and Associated Factors Among Mothers Who Gave Birth in Fafen Zone Public Hospitals, Somali Regional State, Eastern Ethiopia. Research and Reports in Neonatology, 2021. 11: p. 23-33.

[5] Wudie, F., et al., Determinants of preterm delivery in the central zone of Tigray, northern Ethiopia: A case-control study. South African Journal of Child Health, 2019. 13(3): p. 108-114.

[6] Abdo, R. A., et al., Magnitude of Preterm Birth and Its Associated Factors: A Cross-Sectional Study at Butajira Hospital, Southern Nations, Nationalities, and People's Region, Ethiopia. International Journal of Pediatrics, 2020. 2020.

[7] Abaraya, M., S. S. Seid, and S. A. Ibro, Determinants of preterm birth at Jimma university medical center, Southwest Ethiopia. Pediatric health, medicine and therapeutics, 2018. 9: p. 101.

[8] Vogel, J. P., et al., The global epidemiology of preterm birth. Best Practice & Research Clinical Obstetrics & Gynaecology, 2018. 52: p. 3-12.

[9] Woday, A., M. D. Muluneh, and S. Sherif, Determinants of preterm birth among mothers who gave birth at public hospitals in the Amhara region, Ethiopia: A case-control study. PloS one, 2019. 14(11): p. e0225060.

[10] Degno, S., et al., Adverse birth outcomes and associated factors among mothers who delivered in Bale zone hospitals, Oromia Region, Southeast Ethiopia. Journal of International Medical Research, 2021. 49(5): p. 03000605211013209.

[11] Sifer, S., et al., Determinants of preterm birth in neonatal intensive care units at public hospitals in Sidama zone, South East Ethiopia; case control study. J Pediatr Neonatal Care, 2019. 9(6): p. 180-186.

[12] Van Zijl, M. D., et al., Prevention of preterm delivery: current challenges and future prospects. International journal of women's health, 2016. 8: p. 633.

[13] Abdelhady, A. S. and A. Abdelwahid, Rate and risk factors of preterm births in a secondary health care facility in Cairo. World Journal of Medical Sciences, 2015. 12(1): p. 9-16.

[14] Okube, O. T. and L. M. Sambu, Determinants of preterm birth at the postnatal ward of Kenyatta National Hospital, Nairobi, Kenya. Open Journal of Obstetrics and Gynecology, 2017. 7(09): p. 973.

[15] Deressa, A. T., et al., Factors associated with spontaneous preterm birth in Addis Ababa public hospitals, Ethiopia: cross sectional study. BMC pregnancy and childbirth, 2018. 18(1): p. 1-5.

[16] Dagne, H. M., A. T. Melku, and A. A. Abdi, Determinants of Stillbirth Among Deliveries Attended in Bale Zone Hospitals, Oromia Regional State, Southeast Ethiopia: A Case–Control Study. International Journal of Women's Health, 2021. 13: p. 51.

[17] Agresti, A., An introduction to categorical data analysis. (2007): John Wiley & Sons.