ORIGINAL RESEARCH

Preterm Birth and Associated Factors Among Mothers Who Gave Birth in Fafen Zone Public Hospitals, Somali Regional State, Eastern Ethiopia

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Background: The burden of preterm birth is a serious public health concern contributing substantially to neonatal death and a significant cause of long-term loss of human potential. Despite the majority of preterm births have no clear risk factors, identifying factors shown to have an increased risk of preterm birth may have paramount importance in designing an effective intervention strategy. Therefore, the objective of this study was to determine the prevalence of preterm birth and associated factors among mothers who gave birth in public hospitals of Fafen Zone, Somali region, Eastern Ethiopia.

Methods: Facility-based cross-sectional study was conducted in public hospitals of Fafen Zone, Somali regional state, Eastern Ethiopia, from March 1st to April 1st, 2019. Systematic sampling technique has been used to select 607 immediate postnatal mothers with newborn. Data were collected by face-to-face interviewers using a structured and pretested questionnaire and reviewing the mother's profile card. The outcome measure of interest was preterm birth. Bivariate and multivariate logistic regression analyses had been performed using SPSS version 20. Statistically significant association of variables had been claimed based on the Adjusted Odds Ratio (AOR) with its 95% CI and P-value <0.05.

Results: This study showed that 74 (12.3%) of a total of 600 Mothers gave preterm birth. Being a rural resident [(AOR=4.48, 95% CI: (1.39–14.44)], having a history of abortion [(AOR=5.01, 95% CI: (1.86–13.45)], having hypertensive disorder of pregnancy [(AOR=3.32, 95% CI: (1.08–-10.20)], being female sex [(AOR=8.32, 95% CI: (4.56–17.05)], and being low birth weight of newborn [(AOR=3.80, 95% CI: (1.55–9.82)] were found to be significantly associated with preterm birth.

Conclusion: The prevalence of preterm birth in the study area was 12.3%. Different prenatal and newborn care intervention strategies shall consider the factors associated to improve pregnancy outcome and thereby reducing preterm related death in the study area.

Keywords: preterm birth, prevalence, associated factors, Fafen, Somali, Ethiopia

Introduction

Preterm birth is defined as any birth before 37 completed weeks of gestation, or less than 259 days since the first day of women's last normal menstrual period.[1] Based on gestational age, preterm can be divided as: extremely preterm (<28 weeks), very preterm (28-<32 weeks), moderately preterm (32-<34 weeks), and late preterm (34-<37 completed weeks of gestation).[2] Preterm birth can be further classified as spontaneous preterm birth or provider-initiated preterm birth.[3]

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From the 135 million world's live births in 2010, nearly 14.9 million (11.1% of all live births) were born preterm birth.[2] Worldwide, there is a significant disparity in the prevalence rates of preterm birth depending on the method of gestational age assessment and the perceived fetal age of viability.[4] Rates of preterm birth ranged from 5% in northern European countries to 18% in Malawi in 2010. More than 60% of all preterm births worldwide occur in low income and lower-middle income (low resource, high fertility) countries of South Asia and Sub-Saharan Africa.[2,5]

The prevalence of preterm births in Sub Saharan Africa countries has been reported to be high: 23.7% in Nigeria,[6] 18.3% in Kenya,[7] and 16.3% in Malawi.[8] In Ethiopia, 320,000 babies are born to soon each year.[9] However, there are significant regional disparities regarding the prevalence of preterm birth: 4.4% in Gonder, Amhara region,[10] 15.5% in Butajira, Southern Nation and Nationalities region and 13.3% in Central Zone, Tigray Regional State,[11] Ethiopia.

The burden of preterm birth is a serious public health concern contributing substantially to death and a significant cause of long-term loss of human potential amongst survivors all around the world.[12,13] Of the estimated 5.94 million children under five who died in 2015 worldwide,17.8% (1.055 million, uncertainty range 0.935–1.179 million) were due to complications of preterm birth.[14] Consequently, complications of preterm birth were accounted for approximately 35% of deaths among neonates globally in 2016; it is the leading cause of death amongst neonates and was the leading cause of death in children under five years of age.[15] Moreover, preterm neonates who survived would remain vulnerable to long-term complications that may persist all over their lives.[16,17] This added dimension of lifelong disability exacts a high toll on individuals born preterm, their families, and the communities in which they live.[18]

Ethiopia has made considerable progress in reducing the under-five mortality rate by two-thirds under Millennium Development Goals program. However, still it is one of the top five countries contributing more than half of the neonatal deaths globally.[15] Prematurity related complications are the leading cause of neonatal deaths.[19] Although regional disparity remains across Ethiopian's administrative regions, prematurity accounted for 52.5% of neonatal deaths in Ethiopian Somali regional state,[20] thus implicating many remains to be done to prevent and halt the impacts of prematurity.

Despite the majority of preterm births have no clear risk factors,[21] identifying factors shown to have an increased risk of preterm birth has a vital role in preventing and halting the sequel of preterm births. In line with this, different studies conducted in different settings have reported several factors were found to be significantly associated with preterm birth. Some of these were: history of previous preterm births;[7,11,22,23] Advanced maternal age or less than 20;[7,22] pregnancy-induced hypertension;[7,10,24] HIV positive condition;[10,24,25] Lack of antenatal care;[7,25,26] History of Abortion[25,27,28] and Low birth weight.[27,29,30]

In line with the above scenario, providing relevant data and identifying the factors shown to have increased the risk of preterm birth have a paramount importance in designing an effective intervention strategy. Therefore, this study aimed to identify the prevalence of preterm birth and its associated factors and use the findings as an input to improve the neonatal health outcomes in the study area.

Methods
Study Area and Period
The study was conducted in public hospitals of Fafen Zone which is found in Somali regional state from March 1st to April 1st, 2019. Somali Regional State has 11 Zone Administration. Fafen is one of the Somali regional state zone administration located at 635 km far from Addis Abeba, the capital city of Ethiopia to the east. It has two public hospitals; Sheik Hassan Yabare Referral Hospital and Karamardha General Hospital. Sheik Hassan Yabare Referral Hospital is the largest and modern referral hospital in Somali region inaugurated in January, 2017. It serves as a teaching center for Jigjiga University and provides state-of-the-art and wide-ranging services under one roof. It has four obstetrics and gynecologic Specialist doctors and 88 degree and diploma midwifery health professionals. Both Sheik Hassan Yabare Referral and Karamardha General Hospital have a neonatal intensive care unit (NICU), which offers specialized neonatal care in Somali region. The NICU of Karamardha General Hospital has three rooms: one room for Neonatal Intensive Care Unit, one for kangaroo mother care, and another for septic neonates. In March month of 2019, over 1218 deliveries were registered in the maternity unit of both hospitals.

Study Design and Population

Facility-based cross-sectional study was applied for this study. The study population was all mothers who gave birth in public hospitals of Fafen Zone at the time of the data collection period and their newborns. Thus, a total of 607 immediate postnatal mothers who met the eligibility criteria (live birth, certain last menstrual period, and early ultrasound evidences) were enrolled into the study, whereas mothers who had stillbirth, neither a certain last menstrual period nor early ultrasound evidences, had been excluded.

Sample Size and Sampling Procedure

The sample size for this study was calculated by a single population proportion formula considering the following assumption:

$$N = \frac{(Z\alpha/2)^2 P(1-P)}{d^2}$$

Where n= minimum sample size of study subjects

Z= Standardized normal distribution value for the 95% confidence level (1.96)

d=Margin of error tolerated (3%)

P=Prevalence of preterm birth (16.15%), taken from a previous similar study conducted in Addis Abeba, Ethiopia.[24] Based on the above assumption, considering 5% of none response rate, the final sample size of the study becomes 607.

To distribute the sample size proportionally to each hospital, an average delivery report for a month prior to the actual data collection period was estimated for each hospital by reviewing the client's registration book. Next, the sample size had been distributed proportionally to each hospital. Finally, the immediate postnatal mother with her newborn baby had been selected every two intervals by a systematic sampling technique.

Data Collection Tools, Procedure and Quality Control

Data were collected using face-to-face interviewer-administered questionnaires. In addition, the postpartum mother's profile card has been reviewed to retrieve anthropometric, medical, and laboratory information that cannot be captured by interview. A total of 11personel, nine data collectors and two supervisors had been participated in the data collection process. Questionnaires had been pretested to 5% of the sample size before actual data collection

commencement. Strict follow-up and supervision had been undertaken throughout the data collection period and the collected data had been checked for completeness and clarity daily.

Data Processing and Analysis

Collected data were entered into Epi Data version 3.1 and exported into SPSS version 20 for analysis. Both Descriptive and analytical statistics have been done. Descriptive statistics like mean, frequency, and percentage were used to describe the characteristics of participants using graphs, tables, and text. Both bivariable and multivariable logistic regression analyses were carried out to identify factors associated with preterm birth. In bivariate logistic regression analysis, variables with p-value less than or equal to 25% were entered to multivariate logistic regression analysis to control for potential confounding variables that affect preterm birth. Finally, a statistically significant association of variables has been claimed based on the Adjusted Odds Ratio (AOR) with its 95% CI and P-value <0.05.

Results
Socio-Demographic Characteristics of Respondents

A total of 600 mothers were participated in the study, giving a response rate of 98.8%. The mean age of the participants was 28.96 with a standard deviation[31] of 3.58. Twenty-one years was the minimum age of participants and 40 years was the maximum age of study participants. The majority of participants 560 (93.3%) were in union with their spouse. About 508 (84.6%) of the participants were Muslim in religion. More than half 348 (58%) of the participants were attending formal education. About 440 (73.3%) of the study participants were Somali in ethnicity (**Table 1**).

Obstetric History and Medical Condition of Study Participants

The majority of study participants 528 (88%) and 515 (85.5%) were multigravida and multipara, respectively. More than half, 353 (58.8%) of the participants had antenatal care follow-up and two hundred eight-six (81%) of them had less than four time visits. Nearly, half 292 (48.5%) of the participants had a history of Urinary tract infection. About 70.2% of participants had greater than or equal to 11 g/dl haemoglobin level. The majority of participants 556 (92.7%) had spontaneous onset of labour. Regarding the mode of

Table 1 Socio-Demographic Characteristics of Mothers Who Gave Birth in Fafen Zone Public Hospitals, Somali Region, Eastern Ethiopia, 2019 (N=600)

Characteristics	Frequency	Percentages
Age (in year)		
15–35	561	93.5
>35	39	6.5
Current marital status		
Married with spouse	560	93.3
Not with spouse	40	6.7
Religion		
Muslim	508	84.6
Non-Muslim	92	15.5
Educational status		
Formal education	348	58
No formal education	252	42
Occupational status		
Employed	104	17.3
Unemployed	496	82.7
Ethnicity		
Somali	440	73.3
Oromo	66	11
Amhara	58	9.7
Others	36	6
Residence area		
Urban	472	78.7
Rural	128	21.3
Family monthly in come		
<1000 Birr	42	7
≥1000 Birr	558	93

delivery, seventy-three percent of participants had delivered via spontaneous vaginal delivery. Five hundred ninety-three (98.8%) of the participants had singleton delivery. More than half, 321 (53.5%) of new-born babies were females in sex. Fourteen percent of newborn babies had low birth weight <2500 grams (**Table 2**).

Prevalence of Preterm Birth

The prevalence of preterm birth in this study was 12.3% [95% CI (9.7%-14.9%)].

Factors Associated with Preterm Birth
Bivariable Analysis of Factors Associated with Preterm Birth

All independent variables were analyzed using bivariate logistic regression. Accordingly, in bivariable analyses,

socio-demographic factors like age of mother, marital status, educational status, residence area, and occupational status were significantly associated with preterm birth. In addition, obstetric and medical factors like parity, ANC, history of abortion, history of UTI, hypertensive disorders of pregnancy, hemoglobin level, history of preterm birth, sex of newborn as well as birth weight of newborn were significantly associated with preterm birth at 95% CI (**Table 3**).

Multivariable Analysis of Factors Associated with Preterm Birth

Variables with p-value ≤0.05% in bivariate logistic regression were fitted to run a multivariate logistic regression model. In the final multivariable logistic regression analysis, rural resident [(AOR=4.48,95% CI (1.39–14.44)], history of previous abortion [(AOR=5.01, 95% CI (1.86–13.45)], hypertensive disorder of pregnancy [(AOR=3.32,95% CI (1.08–10.20)], being female sex [(AOR=8.32, 95% CI (4.56–17.05)] and low birth weight [(AOR=3.80,95% CI (1.55–9.82)] were found to be significantly associated with preterm birth (P –value<0.05) (**Table 4**).

Discussion

This study assessed the prevalence of preterm birth and associated factors. The prevalence of preterm birth was 12.3% in the study setting. After controlling for potential confounding, multivariate logistic regression analysis revealed that place of residence, hypertensive disorder of pregnancy, history of abortion, sex of newborn, and low birth weight were significantly associated with preterm birth.

The prevalence of preterm birth in the current study was consistent with the previous findings in Brazil 11.5%,[22] North West Ethiopia 12.8%[25] and Northern Ethiopia 13.3%.[11] This similarity might be due to the implementation of the same maternal health strategy under the health sector transformation plan and the services provided for mothers are almost uniform throughout the different regions of the country.

On the other side, the prevalence of preterm birth in the current finding is higher than the finding of studies conducted in China 7.1%,[2] Iran 5.1%,[32] Tigray 8.1%,[9] Gonder 4.4%.[10] The discrepancy might be due to socio-demographic and economic variations. The current study was conducted in the region with low access to quality health care compared to the previous one that claimed for

Table 2 Obstetrics and Medical Characteristics of Mothers Who Gave Birth in Fafen Zone Public Hospitals, Somali Region, Eastern Ethiopia, 2019 (N=600)

Characteristics	Frequency	Percentages
Parity		
Primi para	85	14.2
Multipara	515	85.8
ANC attendance		
Yes	353	58.8
No	247	42.2
Number of ANC Visit		
< 4 Time	286	81
≥4 Times	67	19
History of abortion		
Yes	81	13.5
No	519	86.5
History of UTI		
Yes	291	48.5
No	309	51.5
Hypertensive disorder of pregnancy		
Yes	62	10.3
No	538	89.7
History of Gestational DM		
Yes	37	6.2
No	563	93.8
Hemoglobin level(g/dl)		
<11 g/dl	179	29.8
≥11 g/dl	421	70.2
History of PROM		
Yes	43	7.2
No	557	92.8
History of preterm birth		
Yes	58	9.7
No	542	90.3
Onset of labor		
Spontaneous	556	92.7
Induced	44	7.3
Mode of delivery		
Spontaneous Vaginal delivery	433	72.2
Others	167	27.8
Pregnancy interval		
≥24 months	455	75.8
<24 months	145	24.2

(*Continued*)

Table 2 (Continued).

Characteristics	Frequency	Percentages
Pregnancy outcome		
Singleton	593	98.8
Twins or more	7	1.2
Sex of newborn		
Male	279	46.5
Female	321	53.5
Birth weight		
<2500 gram	85	14.2
≥2500 gram	515	85.8

Abbreviations: ANC, antenatal care; UTI, urinary tract infection; gl/dl, gram per deciliter; DM, diabetic mellitus; PROM, premature rupture of membrane.

an increased risk of preterm birth. In contrast, this study found a lower prevalence of preterm birth compared to the findings of other studies conducted in Bangladeshi 22.3%,[26] Kenya 18.3%,[7] Malawi 16.3%,[8] Nigeria 16.9%[33] and Jimma 25.9%.[34] This difference might be due to the difference in the design used and study settings.

The current study indicated that the mother's place of residence was significantly associated with preterm birth. Being a rural residency increased the risk of preterm birth by 4.5 fold compared to urban residents [(AOR=4.48, 95% CI (1.39–14.44)]. This finding is compatible with the findings in Beijing,[35] Kenya[7] and Ethiopia,[11] which reported urban dwellers were less likely to have preterm birth than their counterparts. The explanation for such discrepancy may be attributable to better availability and accessibility to maternal health services in urban areas. Social disadvantage and the complexity of their interaction have long been known to contribute to poor perinatal outcomes including preterm birth.[36] It is generally acceptable that the majority of rural women in Somali region are the most socio-economically disadvantaged group in the country.[37] While social and economic issues are difficult to address by a health service in isolation, accessing maternal health services targeted to rural women could improve prenatal outcomes including the risk of preterm birth.

Hypertensive disorder of pregnancy was significantly associated with preterm birth in the current study. Mothers who had hypertensive disorder of pregnancy were 3.3 [(AOR=3.32, 95% CI (1.08–10.20)] times more likely to

Table 3 Bivariate Analysis of Factors Associated with Preterm Birth Among Mothers Who Gave Birth in Fafen Zone Public Hospitals, Somali Region, Eastern Ethiopia, 2019 (N=600)

Variables	Preterm Birth		COR (95% CI)	P value
	Yes, n (%)	No, n (%)		
Age (in year)				
15–35	61(10.9%)	500(89.1%)	I	
>35	13(33.3%)	26(66.7%)	4.10(2.001–8.39)	0.000
Current marital status				
Married with spouse	61(10.9%)	499(89.1%)	I	
Not with spouse	13(32.5%)	27(67.5%)	3.94(1.93–8.04)	0.000
Education status				
No formal education	48(19.0%)	204(81.0%)	2.91(1.75–4.85)	0.000
Formal education	26(7.5%)	322(92.5%)	I	
Residence area				
Urban	35(7.4%)	437(92.6%)	I	
Rural	39(30.5%)	89(69.5%)	5.5(3.29–9.1)	0.000
Occupation status				
Employed	6(5.8%)	98(94.2%)	I	
Unemployed	68(13.7%)	428(86.3%)	2.6(1.095–6.151)	0.030
Average monthly income				
<1000Birr	7(16.7%)	35(83.3%)	1.5(0.626–3.432)	0.378
≥1000Birr	67(12.0%)	491(88.0%)	I	
Parity				
Primi para	6(7.1%)	79(92.9%)	I	
Multipara	68(13.2%)	447(86.8%)	2.0(0.841–4.773)	0.117
ANC attendance				
Yes	20(5.7%)	333(94.3%)	I	0.000
No	54(21.9%)	193(78.1%)	4.7(2.71–8.02)	
History of abortion				
Yes	39(48.1%)	42(51.9%)	12.8(7.37–22.36)	0.000
No	35(6.7%)	484(93.3%)	I	
History of UTI				
Yes	64(22.0%)	227(78.0%)	8.43(4.24–16.78)	0.000
No	10(3.2%)	299(96.8%)	I	
Hypertensive disorder				
Yes	36(58.1%)	26(41.9%)	18.22(9.97–33.29)	0.000
No	38(7.1%)	500(92.9%)	I	
History of Gestational DM				
Yes	6(16.2%)	31(83.8%)	1.4(0.567–3.501)	0.460
No	68(12.1%)	495(87.9%)	I	
Hemoglobin level(g/dl)				
<11 g/dl	51(28.5%)	128(71.5%)	6.9(4.05–11.73)	0.000
≥11 g/dl	23(5.5%)	398(94.5%)	I	

(*Continued*)

Table 3 (Continued).

Variables	Preterm Birth		COR (95% CI)	P value
	Yes, n (%)	No, n (%)		
History of PROM				
Yes	7(16.3%)	36(83.7%)	1.4(0.608–3.324)	0.416
No	67(12.0%)	490(88.0%)	1	
History of preterm birth				
Yes	34(58.6%)	24(41.4%)	17.8(9.62–32.85)	0.000
No	40(7.4%)	502(92.6%)	1	
Onset of labor				
Spontaneous	67(12.1%)	489(87.9%)	1	
Induced	7(15.9%)	37(84.1%)	1.4(0.592–3.222)	0.455
Pregnancy interval				
≥24 months	55(12.1%)	400(87.9%)	0.912(0.522–1.59)	0.746
<24 months	19(13.1%)	126(86.9%)	1	
Sex of newborn				
Male	9(3.2%)	270(96.8%)	1	
Female	65(20.2%)	256(79.8%)	7.62(3.72–15.61)	0.000
Birth weight				
<2500 grams	62(72.9%)	23(27.1%)	51.7(26.97–99.07)	0.000
≥2500 grams	12(2.3%)	503(97.7%)	1	

Abbreviations: ANC, antenatal care; UTI, urinary tract infection; gl/dl, gram per deciliter; DM, diabetic mellitus; PROM, premature rupture of membrane.

have preterm birth than mothers with no hypertensive disorder of pregnancy. This finding is in consistent with the results of the study conducted in Nairobi,[7] Gondar,[10] and Addis Abeba[24] which reported that mothers who had hypertension disorder in pregnancy were 7.8, 5.4 and 0.9 times more likely to have premature birth than their counterparts, respectively. Although the pathophysiology of this condition remains poorly understood, uteroplacental ischemia is a plausible explanation for the poor pregnancy outcomes associated with hypertensive disorders during pregnancy, including preterm delivery. In the current study, mothers with hypertensive disorders of pregnancy are at high risk of preterm birth. Thus, meticulous screening for hypertensive disorders of pregnancy is important in antenatal care delivery for pregnant women and improved screening may contribute to reducing preterm birth.

In the present study, another significant factor associated with preterm birth was a history of previous abortion. Compared with mothers with no history of abortion, Mothers who had one or more history of abortion were about 5 [(AOR=5.01, 95% CI (1.86–13.45)] times higher risk of having preterm birth. This finding is in line with the study conducted in Brazil, which reported that mothers

with a history of abortion were 1.39 [(AOR=1.39, 95% CI (1.08–1.78)] times more likely to have preterm birth compared with mothers with no history of abortion.[38] The biological mechanism responsible for this association may be possibly due to the risk of infection related to recurrent abortion. It is suggested that women with a history of abortion have an increased risk of intra-amniotic infection.[39] Intra-amniotic infection is a known risk factor for preterm birth.[40] In the immediate future, the health services in the study area, especially the prenatal care program, must maintain compliance with infection screening protocols. In addition, women and health care professionals should be informed of this potential risk of abortion to preterm birth.

Another important finding in the current study was a significant association between the sex of the newborn and preterm birth. A female newborn was 8.3 [(AOR=8.32, 95% CI (1.55–9.84)] times more likely to be delivered preterm than a male sex newborn. This finding is in contrast with a study done in a rural Bangladeshi which showed a female newborn was 9% [(RR=0.91, 95% CI (0.88–0.95)] less likely to be premature birth than a male newborn.[26] The reason female

Table 4 Multivariate Analysis of Factors Associated with Preterm Birth Among Mothers Who Gave Birth in Fafen Zone Public Hospitals, Somali Region, Eastern Ethiopia, 2019 (N=600)

Variables	Preterm Birth		COR (95% CI)	AOR (95% CI)
	Yes, n (%)	No, n (%)		
Age (in year)				
15–35	61(10.9%)	500(89.1%)	I	I
>35	13(33.3%)	26(66.7%)	4.10(2.001–8.39)	0.37(0.08–1.64)
Current marital status				
Married with spouse	61(10.9%)	499(89.1%)	I	I
Not with spouse	13(32.5%)	27(67.5%)	3.94(1.93–8.04)	0.61(0.15–2.49)
Education status				
No formal education	48(19.0%)	204(81.0%)	2.91(1.75–4.85)	0.64(0.16–2.67)
Formal education	26(7.5%)	322(92.5%)	I	I
Residence area				
Urban	35(7.4%)	437(92.6%)	I	I
Rural	39(30.5%)	89(69.5%)	5.5(3.29–9.1)	4.48(1.39–14.4)*
Occupation Status				
Employed	6(5.8%)	98(94.2%)	I	I
Unemployed	68(13.7%)	428(86.3%)	2.6(1.095–6.151)	0.90(0.19–4.31)
Parity				
Primi para	6(7.1%)	79(92.9%)	I	I
Multipara	68(13.2%)	447(86.8%)	2.0(0.841–4.773)	0.64(0.14–3.05)
ANC attendance				
Yes	20(5.7%)	333(94.3%)	I	I
No	54(21.9%)	193(78.1%)	4.7(2.71–8.02)	1.59(0.37–6.78)
History of abortion				
Yes	39(48.1%)	42(51.9%)	12.8(7.37–22.36)	5.1(1.86–13.5)**
No	35(6.7%)	484(93.3%)	I	I
History of UTI				
Yes	64(22.0%)	227(78.0%)	8.43(4.24–16.78)	1.86(0.55–6.26)
No	10(3.2%)	299(96.8%)	I	I
Hypertensive disorder				
Yes	36(58.1%)	26(41.9%)	18.22(9.97–33.29)	3.3(1.08–10.20)*
No	38(7.1%)	500(92.9%)	I	I
Hemoglobin level(g/dl)				
<11 g/dl	51(28.5%)	128(71.5%)	6.9(4.05–11.73)	0.714(0.25–2.01)
≥11 g/dl	23(5.5%)	398(94.5%)	I	I
History of preterm birth				
Yes	34(58.6%)	24(41.4%)	17.8(9.62–32.85)	1.944(0.64–5.87)
No	40(7.4%)	502(92.6%)	I	I
Sex of newborn				
Male	9(3.2%)	270(96.8%)	I	I
Female	65(20.2%)	256(79.8%)	7.62(3.72–15.61)	8.3(4.56–17.05)*
Birth weight				
<2500 gram	62(72.9%)	23(27.1%)	51.7(26.97–99.07)	3.80(1.55–9.84)*
≥2500 gram	12(2.3%)	503(97.7%)	I	I

Notes: Significant at **P<0.01; *P<0.05.
Abbreviations: ANC, antenatal care; UTI, urinary tract infection; gl/dl, gram per deciliter.

sex newborn was associated with an increased risk of preterm birth is not clear, but may be related to the prevalence of sex preference discrimination that happens during pregnancy among Somali societies.[37] It is important that pregnancy outcome improvement strategies in the study area shall consider the sex preference discrimination that happens during pregnancy.

Another significant associated factor with preterm in the current study was low birth weight. Newborns with birth weight less than 2500 grams were 3.78 [(AOR=3.78, 95% CI (1.55–9.84)] times more likely to be delivered preterm than a baby with birth weight greater than or equal to 2500 grams. This finding is consistent with the results from Jimma University Specialized Teaching and Referral Hospital,[34] Iran[41] and Ethiopia.[29] Approximately half of low birth weight infants are preterm.[28] The possible explanation might be due to the fact that several organ systems of the fetus usually become mature by the end of 37 weeks of gestation. Premature birth before 37 weeks of gestation leads to interruption of fetal organ maturation that in turn causes low birth weight.

Limitations

Being a cross-sectional study design, this study does not establish a possible relation of cause and effect.

Conclusion

The study identified the prevalence and important risk factors associated with preterm birth in the study area. The prevalence of preterm birth in the study area was 12.3%. Being a rural resident, hypertensive disorder of pregnancy, history of abortion, sex of newborn, and low birth weight were significantly associated with preterm birth. Therefore, prenatal and newborn care interventions shall consider the factors associated to improve pregnancy outcomes.

Abbreviations

SPSS, statistical package for social science; CI, confidence interval; AOR, adjusted odds ratio; RR, relative Risk; ANC, antenatal care; g/dl, grams per deciliter; HIV, human immune deficiency; SD, standard deviation; PROM, premature rupture of the membrane; SVD, spontaneous vaginal delivery; NICU, neonatal intensive care unit.

Ethics Approval and Consent to Participate

The study was conducted according to the principles of the Declaration of Helsinki and fulfilled the requirements of Ethiopian National Health Research and Ethics Guideline. Moreover, the study received ethical approval from Haramaya University, College of Health and Medical Sciences Research Ethics Review Committee. Written Informed consent was obtained from the study participants. Information obtained from the respondent was kept confidential. Data confidentiality was maintained through anonymity by avoiding any personal identifiers.

Author Contributions

All authors made a significant contribution to the conception and design, acquisition of data, analysis, and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

Disclosure

The authors declare that they have no conflict of interests.

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