Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Preterm birth and associated factors among mothers who gave birth at public hospitals in Addis Ababa, Ethiopia : a facility based cross-sectional study

Mekdes Ambisa Gudeta
mekdesambisa8@gmail.com

Gandhi Memorial Hospital

Tigist Shiferaw Mekuria
Gandhi Memorial Hospital

Marew Abebaw Anley
Gandhi Memorial Hospital

Yordanos Bekele Akalewold
Gandhi Memorial Hospital

Befikad Assefa Seifu
St Peter Specialaized hospital

Getinet Tilahun Simeneh
Gandhi Memorial Hospital

Research Article

Keywords: preterm birth, neonate, public health facilities, Addis Ababa, Ethiopia

Posted Date: July 23rd, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10339880/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Background

Preterm birth remains a significant public health issue worldwide. It accounts about a million neonatal deaths and is the second cause of both neonatal and under-five child mortality. Neonatal mortality accounts around half of under-five child mortality in Ethiopia. In low-income countries, such as Ethiopia, where access to quality antenatal care and skilled birth attendance is limited, preterm birth is a major contributor to neonatal morbidity and mortality. Despite its immense consequences, there is limited research available on preterm birth and associated factors in Ethiopian public hospitals.

Methods

Facility based cross sectional study was carried out in four public hospitals of Addis Ababa using Systematic sampling method to include 316 women who had given birth at four Hospitals from August 1 to 30, 2024. Data was collected using a structured face-to-face interview questionnaire and was entered into epi data 3.1, then it was analyzed by Statistical Package for Social Science (SPSS) Versions 25. Descriptive statistics such as frequency, percentage, means and standard deviation were employed to summarize the data and Bi-variable and multivariable analysis were performed using logistic regression model to identify factors for preterm birth. Statistical significance was declared at p-value < 0.05.

Result

Fifty six (17.7%) with 95% CI (13.88, 21.52) mothers had a preterm birth. Premature rupture of membrane (AOR = 4.26; 95% CI 1.94, 6.8), Ante-partum hemorrhage (AOR = 3.23, 95% CI (2.61, 6.87), Pregnancy induced hypertension (AOR = 6.46, 95% CI (3.12, 14.17), and Urinary tract infection (AOR=4.71, 95% CI (3.08, 7.82) were found to be significantly associated with preterm birth.

Conclusion

The magnitude of PTB was high as nearly one out of six of women giving birth prematurely; stakeholders need to develop interventions that consider all the risk factors for PTB.

INTRODUCTION

According to the World health organization (WHO), preterm birth(PTB) is defined as a live birth which occurs before 37 completed weeks of gestation (1). It is further cathegorized into three groups: extremely preterm (< 28 weeks), very preterm (28 to < 32 weeks), and moderate to late preterm (32 to < 37 weeks) (2). Similarly newborns are classified by weight as low birth weight(LBW) if less than 2500mg, very low birth weight (VLBW) if less than1500gm and extremely low birth weight (ELBW) if less than 1000gm (3). PTB can also be spontaneous when labor begins naturally before 37 weeks or induced, when labor is medically initiated for maternal or fetal indications before term (4)(5).

Globally, 13.4 million infants are born prematurely every year (6). South Asia and sub-Saharan Africa account for approximatelly half of global births and contribute for more than 60% of PTBs and over 80% of neonatal deaths related to prematurity complications (7). In Ethiopia, an estimated 320,000 babies are born preterm annually (8).

Preterm infants are at significantly higher risk of health complications due to immature organ systems (9). These include respiratory distress, gastrointestinal disorders, neurodevelopmental impairments, and other long and short-term health issues such as cerebral palsy, learning difficulties, and visual or hearing impairments. Survivors of PTB often face lifelong disabilities and reduced quality of life (10)(11)(12).

While socio-economic factors like maternal education and income levels are known to affect birth outcomes, specific environmental and household factors such as housing quality, biomass fuel use, and tobacco exposure remain under-researched in low-income settings. Additionally, lack of adequate prenatal care, poor nutritional status, HIV infection, obstetric history, and cesarean deliveries are major contributors to PTB in developing countries (13).

Neonatal mortality continues to be a pressing global health concern, claiming over one million lives every year, with prematurity being the leading cause of these deaths. In Ethiopia, around 24,400 under-five deaths are directly attributed to PTB (14)(15). While care for preterm infants has improved significantly over the last two decades, prevention strategies for PTB remain underdeveloped, particularly in low-income settings like Ethiopia. The burden is further intensified by poor-quality data and inconsistent health records (16)(17).

The Sustainable Development Goal (SDG 3) highlights the need to address health inequalities, including maternal and neonatal health, to achieve broader development goals (18).Addressing PTB not only reduces child mortality but also reduces emotional and economic burdens on families and the healthcare system (19).

Although several studies have examined PTB in Ethiopia, most were conducted outside Addis Ababa, involved limited populations, or were conducted several years ago. Consequently, there is insufficient recent evidence regarding the magnitude and determinants of PTB in public hospitals in Addis Ababa. Given variations in socioeconomic conditions, healthcare access, and maternal characteristics across regions, updated local evidence is required to inform targeted interventions and policy decisions (20)(21).

Prematurity remains the leading cause of neonatal mortality and the second leading cause of death among children under five globally. Despite its public health importance, recent evidence on the prevalence and determinants of PTB in Addis Ababa is limited (9). Given the regional variability and limited current data, this study aims to estimate the prevalence of PTB and identify its associated factors among mothers who deliver in selected public hospitals in Addis Ababa.The findings will provide context-specific evidence to support the development of effective maternal and newborn health interventions and contribute to efforts aimed at reducing neonatal morbidity and mortality.

METHODS

Study design and setting

A facility-based cross-sectional study design was employed among mothers who delivered in four selected public hospitals in Addis Ababa. The source population included all women who gave birth in public hospitals within the city, while the study population consisted of mothers who delivered in the selected hospitals during the study period. Mothers who knew their last normal menstrual period (LNMP) or had an ultrasound examination before 14 weeks of gestation were included. Women unable to communicate due to conditions such as coma or hearing and speech impairments were excluded.

The study was conducted in Addis Ababa, the capital city of Ethiopia. The city covers approximately 527 km² and is administratively divided into 11 sub-cities. Addis Ababa has an extensive health-care infrastructure, including 12 public hospitals, 102 health centers, and numerous private health facilities. Maternal and newborn health services are provided through both public and private institutions. Approximately 200,000 births occur annually within the city (22)(23).

Study population and Sample size

All women who gave birth at the four selected public hospitals in Addis Ababa from 1–30 August, 2024.

The sample size was calculated for both the prevalence of preterm birth and associated factors, with the larger sample adopted for the study. For the first objective, a single population proportion formula was used based on a preterm birth prevalence of 24.9% (12), a 95% confidence interval, and a 5% margin of error. After adding a 10% non-response rate, the final sample size became 316 participants. For the second objective, factors associated with preterm birth such as antepartum hemorrhage (APH), premature rupture of membranes (PROM), and birth interval were considered using OpenEpi software.

i.e: Sample size (n) = $Z_{\alpha/2}^2 * P (1-P)/ d^2$

Where p- proportion of preterm birth

q- Proportion of birth which is not preterm

d- Margin of error.

Associated factors for preterm birth calculated by open epi by taking some variables from previous studies (Table 1)

Table 1
Sample size determination for identifying factors associated to preterm birth in selected public hospitals of Addis Ababa, 2024

Variables	Ratio	Proportion	Power	Odds Ratio	CI	Sample size	Total sample size after 10% non-response	Reference
APH	1:1	21.6%	80%	5.9	95%	214	230	(9)
PROM	1:1	21.5%	80%	3.83	95%	214	230	(24)
Birth interval	1:1	19.3%	80%	3.151	95%	172	189	(24)

Finally, the large sample size is 288 plus 10% for nonresponse rate (28) i.e. a total of 316 women were considered for the study from Sample size determination for the 1st objective, which is maximum sample size.

Sampling procedure

There are twelve public hospitals in Addis Ababa. With the exception of Amanuel Mental Hospital, all other hospitals provide Labor and delivery services.

A systematic sampling technique was used to recruit participants. Four public hospitals Gandhi Memorial Hospital, Abebech Gobena Hospital, Menelik Comprehensive Specialized Hospital, and Zewditu Memorial Hospital were selected randomly from the 12 public hospitals in the city. Two-month average base line number of preterm delivery was taken from HMIS report of each selected hospital. The needed sample size (n = 316) was proportionally allocated to the four hospitals selected to be included in the study. Based on the data the average number of delivery in GMH, AGH, MCSH and ZMH was 784, 942, 348 and 532 respectively. To get samples from each hospital the proportional allocation formula was used, (which is, sample size/population size x stratum size, where, sample size = 316, population size is addition of all stratum = 2606). To select study participants from each hospitals Systematic random sampling was used using every k interval, the value of K was calculated for each hospital and it was approximated to 8 for all. The first mother was randomly selected, and then consecutive mothers were selected at a regular interval of 8 until the proportion in the hospital was met.

Operational defination

Preterm birth- a delivery at less than 37 completed weeks of gestation (25).

Term Birth- a delivery occurring after 37 completed weeks of gestation and less than 42 completed weeks of gestation (26).

Last Menstrual Period- The date of the starting of last menstruation the women had to the index pregnancy (27).

Data collection tools and procedures

Data were collected through face-to-face interviews using a structured and pretested questionnaire adapted from WHO guidelines on reducing low birth weight and related literature, with modifications based on the study objectives (28). The questionnaire was initially prepared in English, translated into Amharic, and translated back into English to ensure consistency. It included questions on socio-demographic characteristics, obstetric and medical history, and behavioral factors. Data collection was conducted by five BSc nurses and supservised by three BSc midwives. Information on socio-demographic and reproductive health characteristics was obtained through interviewer-administered interviews, while selected clinical variables and maternal outcomes were extracted from medical records using a checklist. Data were collected at discharge from postnatal wards to enhance participants' openness and cooperation.

Data quality assurance

Data quality was ensured through training of data collectors and supervisors before data collection. A pretest was conducted on 5% of the sample (16 mothers) at Ras Desta Damtew Hospital, which was not included in the study area. Necessary modifications were made based on the pretest findings. Supervisors closely monitored the data collection process, and regular discussions were held between data collectors and the principal investigator to address challenges and maintain consistency. All completed questionnaires were checked daily for completeness, accuracy, and consistency before, during, and after data collection. The collected data were further reviewed before data entry.

Data processing and Analysis

Data were cleaned, coded, entered into EpiData version 3.1, and exported to SPSS version 25 for analysis. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the data. Binary logistic regression was performed to assess the association between independent and dependent variables. Variables with p-values < 0.25 in the bivariable analysis were included in the multivariable logistic regression model to control for confounding effects. Statistical significance was declared at $p < 0.05$ with 95% confidence intervals. Model fitness was assessed using the Hosmer–Lemeshow goodness-of-fit test, while multicollinearity was checked using variance inflation factors (VIF < 5). Results were presented using tables, graphs, and text.

Ethical consideration

Ethical clearance was obtained from the Institutional Review Board of Yekatit 12 Hospital Medical College, School of Public Health, IRB approval number: RPO/743/24. A formal letter of cooperation was submitted to the Addis Ababa City Administration Health Bureau and participating health facilities. Informed consent was obtained from each participant after a clear explanation of the study objectives, procedures, potential benefits, and their rights. Confidentiality and privacy of the participants were maintained throughout the study.

RESULTS

Socio-Demographic Characteristics of Study Populations

A total of 316 mothers, with response rate of 100%, participated in this study. The majority of the respondents 234 (74.1%) were in the age group of 25–34 years with the mean age of 29.5 (± 4.44 SD) years with a minimum and maximum of 19 and 42 years respectively. About 286 (90.5%) of mothers were married and 18 (5.7%) of mothers are single. Approximatelly three quarters (75.3%) of participants were urban dwellers. Among the participants 114 (39.4%) had secondary and above education and only 3 (0.9%) had no formal education. Meanwhile most of the participants were housewives 125 (39.9%) (Table 2)

Table 2

Socio-demographic characteristics of women who gave birth at public hospitals of Addis Ababa city administration, Addis Ababa, Ethiopia, Oct 2024: (n = 316).

Characteristics (n = 316)	Category	Frequency	Percent
Age	15–24 years	67	21.2%
	25–34 years	234	74.1%
	>=35 years	15	4.7%
Residence	Urban	238	75.3%
	Rural	78	24.7%
Marital status	Single	18	5.7%
	Married	286	90.5%
	Other*	12	3.8%
Educational status	No formal education	3	0.9%
	Able to read and write	16	5.1%
	Primary education	113	35.8%
	Secondary and above	184	58.2%
Husband's educational status	Able to read and write	8	25%
	Primary education	56	17.7%
	Secondary and above	240	75.9%
Occupation	House wife	125	39.95%
	Private employee	81	25.6%
	Government employee	69	21.8%
	Other**	41	13.0%

Note: - *=Divorced and widowed, **= merchant, student and daily laborer

Obstetric characteristics participants

From the respondents, 169 (53.5%) index mothers of this study had ANC follow up > 4 times. A total of 132 (41.8%) mothers were multiparous. The study showed that 293 (92.7%) had single pregnancy type. The study also showed that 66 (20.9%) of the study participants had PROM while more than half 214 (67.7%) of the neonates were born via spontaneous vaginal delivery (Table 3).

Table 3
Obstetric characteristics of mothers who gave birth at public hospitals of Addis Ababa city administration, Addis Ababa, Ethiopia, Oct 2024: (n = 316).

Characteristics (n = 316)	Category	Frequency	Percent
Number of ANC follow up	No ANC contact	35	11.1%
	<= 4 times	112	35.4%
	> 4 times	169	53.5%
VDRL	Reactive	9	2.8%
	Non-reactive	269	85.1%
	Unknown	38	12.0%
GA	28–31^{+}6 wks	12	3.85
	32–36^{+}6 wks	45	14.2%
	>= 37 wks	259	82.0%
Parity	Primi-parous	167	52.8%
	Multi-parous	132	41.8%
	Grand multiparous	17	5.4%
Birth interval	< 2 years	58	27.3%
	2–4 years	85	40.12%
	>= 5 years	6	1.9%
Type of pregnancy	Singleton	293	92.7%
	Multiple	23	7.3%
Any OBS complication	Yes	107	33.9%
	No	209	66.1%
PROM	Yes	66	20.9%
	No	250	79.1%
APH	Yes	23	7.3%
	No	293	92.7%
PIH	Yes	17	5.4%
	No	299	94.6%
Oligohydraminos	Yes	11	3.5%

Characteristics (n = 316)	Category	Frequency	Percent
	No	305	96.5%
Polihydraminos	Yes	7	2.2%
	No	309	97.8%
H/O preterm	Yes	30	9.5%
	No	286	90.5%
H/O abortion	Yes	72	22.2%
	No	244	76.9%
Mode of delivery	SVD	214	67.7%
	Instrumental delivery	11	3.5%
	C/S	91	28.8%
Labor onset	Spontaneous	226	71.5%
	Induced	90	28.5%

Socio-behavioral characteristics

From the total respondents, 21 (6.6%) drink alcohol, while only 3 (0.9%) smoke cigarette. Twelve (3.8%) of them claimed to be violated during pregnancy (Table 4).

Table 4
socio behavioral factors of mothers who gave birth at public hospitals of Addis Ababa city administration, Addis Ababa, Ethiopia, Oct 2024: (n = 316).

Characteristics (n = 316)	Category	Frequency	Percent
Cigarette smoking	Yes	3	0.9%
	No	313	99.1%
Alcohol drinking	Yes	21	6.6%
	No	295	93.4%
Violence	Yes	12	3.8%
	No	304	96.2%
Antenatal depression	Yes	66	20.95
	No	250	79.1%

Medical illness and nutritious characteristics

Thirty-eight (12.0%) participants had at least one medical condition, with anemia (9.2%) and urinary tract infection (3.8%) being the most commonly reported conditions (Table 5).

Table 5
medical illness factors of mothers who gave birth at public hospitals of Addis Ababa city administration, Addis Ababa, Ethiopia, Oct 2024: (n = 316).

Characteristics (n = 316)	Category	Frequency	Percent
Any medical illness	Yes	38	12.0%
	No	278	88.0%
HIV	Yes	1	0.3%
	No	315	99.7%
Anemia	Yes	29	9.2%
	No	287	90.8%
Malnutrition	Yes	11	3.5%
	No	305	96.5%
UTI	Yes	12	3.8%
	No	304	96.2%

Infant related characteristics

From the total respondents, 83 (26.3%) have a weight of between 2000-2499gm while 30 (9.5%) have less than 2000gm. 14 (4.4%) of the babies have congenital anomaly (Table 6).

Table 6
infant related factors of mothers who gave birth at public hospitals of Addis Ababa city administration, Addis Ababa, Ethiopia, Oct 2024: (n = 316).

Characteristics (n = 316)	Category	Frequency	Percent
Sex of baby	Male	144	45.6%
	Female	172	54.4%
Weight of baby	< 2000 gram	30	9.5%
	2000–2499 gram	83	26.3%
	2500–3999 gram	194	61.4%
	> 3900 gram	9	2.8%
Congenital anomaly	Yes	14	4.4%
	No	302	95.6%

Magnitude of preterm birth

Among 316 interviewed mothers, 56 (17.7%) with 95% CI (13.88, 21.52) had a PTB (Fig. 1).

Factors associated with preterm

In the bi-variable analysis; Permanent residence, husband's level of education, number of ANC, Obstetric complication, PROM, APH, PIH, UTI, H/O preterm were associated with Preterm birth at a p-value of less than 0.25. Thereafter, in multivariable logistic regression, a total of 9 explanatory variables having P-value < 0.25 in bivariate logistic regression analysis were regressed against Preterm birth. As a result, in the multivariable logistic regression analysis; 4 variables (PROM, APH, PIH and UTI) were significantly associated with Preterm birth at P-value of < 0.05.

Accordingly, mothers who had premature rupture of membrane (PROM) were 4.26 times more likely to have preterm birth as compared to those who had no PROM [AOR = 4.26; 95% CI 1.94, 6.8); p = 0.00].

Mothers who had APH were 3.23 times more likely to report preterm birth than their counterparts [AOR = 3.23, 95% CI (2.61, 6.87); P = 0.002]

The odds of preterm birth among mothers who had hypertensive disorder during pregnancy were 6.46 times higher than those mothers who had normal blood pressure [AOR = 6.46, 95% CI (3.12, 14.17); P = 0.001]; and mothers who had UTI were 4.71 more likely to have preterm delivery as compared to those who don't have UTI [AOR = 0.01, 95% CI (3.08, 7.82); P = 0.001]. (Table 7)

Table 7

Factors associated with Preterm birth among mothers who gave birth birth at public hospitals of Addis Ababa city administration, Addis Ababa, Ethiopia, Oct 2024: (n = 316).

Variables		Preterm birth		COR with 95% CI	AOR with 95% CI
		Yes N (%)	No N (%)		
Residency	Urban	26 (8.2%)	212 (67.1%)	5.09 (2.76, 9.39)	5.06 (0.98, 12.9)
	Rural	30 (9.5%)	48 (15.2%)	Ref.	Ref.
Husband's Educational status	Able to read and write	4 (1.3%)	4 (1.3%)	6.273 (4.9, 26.3)	8.27 (0.9,17.3)
	Primary education	14 (4.6%)	42 (13.8%)	2.09 (1.03, 4.24)	3.41 (0.20, 9.63)
	Secondary and above	33 (10.9%)	207 (68.1%)	Ref.	Ref.
Number of ANC	No ANC contact	12 (3.8%)	23 (7.3%)	4.119 (1.76, 9.59)	6.86 (1.6, 28.5)
	< 4	25 (7.9%)	87 (27.5%)	2.26 (1.18,4.35)	3.33 (1.29,8.58)
	>=4	19 (6.0%)	150 (47.5%)	Ref.	Ref.
OBS complication	Yes	36 (11.4%)	71 (22.5%)	4.79 (2.1,10.3)	5.37 (2.95,12.34)
	No	20 (6.3%)	189 (58.8%)	Ref.	Ref.
PROM	yes	33 (10.4%)	33 (10.4%)	9.87 (5.17,18.82)	4.26 (1.94,6.8)***
	No	23 (7.3%)	227 (71.8%)	Ref.	Ref.
APH	Yes	11 (3.5%)	12 (3.8%)	5.05 (2.1,12.15)	3.23 (2.16,6.87)**
	no	45 (14.2%)	248 (78.5)	Ref.	Ref.
PIH	Yes	7(2.2%)	10(3.2%)	3.57 (1.29,9.83)	6.46 (3.12,14.17)**
	No	49(15.5)	250(79.1%)	Ref.	Ref.

Note: *- Ref. = Reference, PROM=premature rupture of membrane, APH ante-partum hemorrhage, PIH=pregnancy induced hypertension, UTI= urinary tract infection, p-value: *< .05, **<.01 and *** p < 0.001*

H/O preterm	yes	13 (4.1%)	17 (5.4%)	4.32 (1.95,9.53)	2.75 (0.73,10.38)
	no	43 (13.6%)	243 (76.9%)	Ref.	Ref.
UTI	yes	5 (1.6%)	7 (2.2%)	3.54 (1.08,11.60)	4.71 (3.08,7.82)**
	no	51 (1.6%)	253 (80.1%)	Ref.	Ref.

Note: *- Ref. = Reference, PROM=premature rupture of membrane, APH ante-partum hemorrhage, PIH=pregnancy induced hypertension, UTI= urinary tract infection, p-value: *< .05, **<.01 and *** p < 0.001*

DISCUSSION

This study was aimed to assess preterm birth and its associated factors among women who gave birth in selected health institutions. The study showed a high magnitude of PTB as nearly one out of six [(17.7%) with 95% CI (13.88, 21.52)] of women who participated reported having PTB. In this study, PTB was significantly associated with PROM, APH, PIH and UTI. The magnitude of PTB in the current study is similar to other studies done in Ethiopia such as Butajira(15.5%) (8), and Addis Ababa(16.15%) (3). However, the magnitude of PTB in this study is higher than a previous estimated global network's preterm population magnitude (9·9%) (17), and a study conducted in high-income countries such as Greece (11·6%) and USA (29). It is also higher than the Demographic and Health Survey datasets of 36 SSA countries (5.33%), Central Africa (2.06%), South Africa region (11.19%) (30) and Gahini hospital, Rwanda (9.6%) (31).

This study is also higher than the overall pooled magnitude of PTB in Ethiopia (10.48%) with a Sub-group analysis by region of (11.24) in Amhara, (10.92%) in Tigray, (9.12%) in SNNP, (2.8%) in Oromia (32) (13.3%) in Axum and Adwa (20), in east Gojam zone (13.2%) (9) and in Somali Regional State (12.3%) (33). This difference might be due to variations in the types of data collection methods, study settings, and sample size. Unlike the current study settings (tertiary level), which had high case flow and many complicated referral situations, the majority of the aforementioned studies were conducted in low-level settings with limited client flow.

In contrast, the prevalence of PTB in this study is lower than a study conducted in Jimma 25.9% (34) and Tanzania, which has been reported to be among the top 10 countries with the highest magnitude of PTB 39.1% (35). The study conducted in Jimma found that the high prevalence of alcohol and substance intake during pregnancy which was a greater contributing factor to increased preterm birth magnitudes in their study area, but this was not the case in our study.

Regarding factors of preterm birth, mothers who had PROM were more likely to have preterm birth than their counterparts. This is similar to a study conducted in Pakistan (36), Kenya (16) and Uganda (37). It was also similar to a study conducted in Debremarkos (38), woldya and bahirdar (5) and Wachamo (1),

Ethiopia. This could have occurred because endogenous prostaglandins, which trigger uterine contractions and cause premature birth are released during membrane rupture (31). PROM may also increase the fetal plasma interleukin-6 that will activate the spontaneous preterm labor. Furthermore, this might be explained by the influence of the membrane rupturing on uterine contraction (15).

Mothers who had history of Ante partum hemorrhage during current pregnancy were 3.2 times more likely to have preterm birth compared to their counterparts. This value is similar to a study conducted in China (39), Harar (12) and East Gojam (9). This might be due to consequence of anemia following bleeding; predisposing to low oxygen and decreased placental blood flow, impacting the mother- fetus exchange of nutrients and oxygen. As a result, fetal growth would be slowed, and the chance of PTB would be increased (15).

PTB was six times more likely to occur in mothers with preeclampsia in comparison to their counterparts. This was similar to a study conducted in butajira (8), Gondar (40), Somali regional state (33) and Assela (4), Ethiopia. This could be due to, PIH can cause vascular damage to the placenta causing abruption placenta which results in PTB. Also, uteroplacental ischemia is a plausible explanation for the PTB associated with PIH. When the blood pressure becomes uncontrollable, the quickest means of emptying the uterus become the choice accounting for the preterm delivery (41). In addition, elevated blood pressure in pregnancy compromises perfusion to the fetus and has a medical risk of cardiovascular complication for the mother (19). Various Studies have shown preeclampsia/eclampsia to be a major cause of medically induced preterm delivery (37)

On further notice, Mothers who have experienced UTIs were 4.7 times more likely to have PTB than mothers who haven't experienced UTIs. This is similar to a study conducted in Jimma (34) and sidama regional state (24), Ethiopia. This might be due to morphological and functional changes that occur in pregnancy. Stasis of urine favors Like other infections, UTI stimulate production of cytokines which may induce preterm labor through release of prostaglandins (16). UTI can weaken the membranes of the amniotic sac around the baby. This could lead to PROM and preterm labor (7).

Limitation of the study

UTI, Anemia and Malnutrition in pregnancy were partly based on mothers' self-report of symptoms and habits and not on laboratory confirmation and therefore over-reporting were likely. The study failed to assess hypertension disorders during pregnancy separately as preeclampsia, eclampsia, gestational hypertension, and superimposed preeclampsia.

Conclusion

PTB is still significant public health problem. PROM, PIH, APH and UTI are independent and significant determinants of preterm birth.

Recommendations

As preterm birth remains a significant public health problem, efforts should focus on strengthening the quality of antenatal care through early identification and appropriate management of PROM, PIH, APH, and UTI. Healthcare providers should enhance routine screening and follow-up for these conditions, while policymakers should support interventions that improve access to timely maternal healthcare services. Such measures may contribute to reducing the incidence of preterm birth and improving maternal and neonatal health outcomes. Furthermore, additional studies using mixed-method or other research approaches in different settings are recommended to generate broader evidence on preterm birth and its determinants.

Abbreviations

WHO, World Health Organization; AACAHB, Addis Ababa City Administration Health Bureau; PROM, Premature Rupture of Membrane; PIH, Pregnancy Induced Hypertention; APH, Antepartum Hemmhorage; PTB, Preterm Birth

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the Institutional Review Board of Yekatit 12 Hospital Medical College, School of Public Health (Protocol No. 20130/24). Written informed consent was obtained from all participants before data collection. Participation in the study was voluntary, and participants were informed of their right to withdraw from the study at any time without any consequences. Confidentiality was maintained by removing personal identifiers and anonymizing the data. No participants younger than 16 years of age were enrolled in this study. All procedures were conducted in accordance with the ethical principles of the Declaration of Helsinki(42).

Informed consent

Verbal informed consent was obtained from legally authorized representatives before the study.

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests.

Funding

The researcher was not supported by any fund grant.

Author Contribution

Mekdes Ambisa Gudeta conceived and designed the study, coordinated data collection, performed data analysis and interpretation, and drafted the manuscript.Tigist Shiferaw Mekuriya and Marew Abebaw contributed to the study design, supervised data collection, participated in data analysis and interpretation, and critically revised the manuscript.Yordanos Bekele Akalewold contributed to data analysis, interpretation of findings, and critical revision of the manuscript.Befkad Assefa Seyfu contributed to the study design, interpretation of results, and manuscript revision.Getnet Tilahun Semeneh contributed to the study conception and methodology, supervised the research process, reviewed the analysis, and critically revised the manuscript for important intellectual content.All authors read and approved the final manuscript.

Acknowledgment

Above all, we acknowledge the Yekatit 12 Hospital Medical Colledge, School of Public Health, for facilitating ethical clearance and the AACAHB for granting permission. We also express our sincere appreciation to the data collectors, supervisors, and study participants.

Data Availability

I was actively involved in generating and using research data for this study. My responsibilities included designing the data collection process, overseeing data collection, ensuring data quality, managing and analyzing the data, interpreting the findings, and contributing to the preparation of the manuscript. I adhered to ethical research standards throughout the study to ensure the accuracy, confidentiality, and integrity of the data.

References

1. Gejo NG, W/mariam MT, Kebede BA, Abdo RA, Anshebo AA, Halil HM, et al. Factors associated with preterm birth at Wachemo University Nigist Eleni Mohammed memorial hospital, southern Ethiopia: case-control study. BMC Pregnancy Childbirth. 2021;21(1):1–9.
2. Zhang J, Sun K, Zhang Y. The rising preterm birth rate in China: a cause for concern. Lancet Glob Heal [Internet]. 2021;9(9):e1179–80. Available from: http://dx.doi.org/10.1016/S2214-109X(21)00337-5
3. Deressa AT, Cherie A, Belihu TM, Tasisa GG. Factors associated with spontaneous preterm birth in Addis Ababa public hospitals, Ethiopia: Cross sectional study. BMC Pregnancy Childbirth. 2018;18(1):1–5.
4. Tuji TS, Wake AD, Adere GB, Wedajo AB, Obole BD, Jenka DT et al. Magnitude of spontaneous preterm birth and its associated factors among preterm birth in NICU wards in Asella Teaching and

Referral Hospital, Asella, Oromia, Ethiopia. J Int Med Res. 2021;49(8).
5. Sendeku FW, Beyene FY, Tesfu AA, Bante SA, Azeze GG. Preterm birth and its associated factors in ethiopia: A systematic review and meta-analysis. Afr Health Sci. 2021;21(3):1321–33.
6. Reddy M, McGannon C, Mol BW. Looking back on preterm birth – The successes and failures. Acta Obstet Gynecol Scand. 2024;103(3):410–2.
7. Laelago T, Yohannes T, Tsige G. Determinants of preterm birth among mothers who gave birth in East Africa: Systematic review and meta-analysis. Ital J Pediatr. 2020;46(1):1–14.
8. Abdo RA, Halil HM, Muhammed MA, Karebo MS. Magnitude of Preterm Birth and Its Associated Factors: A Cross-Sectional Study at Butajira Hospital, Southern Nations, Nationalities, and People's Region, Ethiopia. Int J Pediatr (United Kingdom). 2020;2020.
9. Ayele TB, Moyehodie YA. Prevalence of preterm birth and associated factors among mothers who gave birth in public hospitals of east Gojjam zone, Ethiopia. BMC Pregnancy Childbirth. 2023;23(1):1–11.
10. Chang YK, Tseng YT, Chen KT. The epidemiologic characteristics and associated risk factors of preterm birth from 2004 to 2013 in Taiwan. BMC Pregnancy Childbirth. 2020;20(1):1–7.
11. Woldeyohannes D, Kene C, Gomora D, Seyoum K, Assefa T. Factors Associated with Preterm Birth among Mothers who gave Birth in Dodola Town Hospitals, Southeast Ethiopia: Institutional Based Cross Sectional Study. Clin Mother Child Heal. 2019;16(2):1–6.
12. Zewde GT. Preterm Birth and Associated Factors Among Mother Who Gave Birth in Public Health Hospitals in Harar Town Eastern Ethiopia 2019. OSP J Heal Care Med. 2020;1:103–11.
13. Jeena PM, Asharam K, Mitku AA, Naidoo P, Naidoo RN. Maternal demographic and antenatal factors, low birth weight and preterm birth: findings from the mother and child in the environment (MACE) birth cohort, Durban, South Africa. BMC Pregnancy Childbirth. 2020;20(1):1–11.
14. Farrant BM, White SW, Shepherd CCJ. Trends and predictors of extreme preterm birth: Western Australian population-based cohort study. PLoS ONE. 2019;14(3):1–16.
15. Adugna DG. Prevalence and associated risk factors of preterm birth among neonates in referral hospitals of Amhara Region, Ethiopia. PLoS One [Internet]. 2022;17(10 October):1–12. Available from: http://dx.doi.org/10.1371/journal.pone.0276793
16. Wagura PM, Wansuna A, Laving A, Wamalwa D. Ng'ang'a P. Prevalence and Factors Associated With Preterm Birth AtPr. BMC Pregnancy Childbirth. 2018;18(107):2–9.
17. World Health Organization. Acceleration towards the Sustainable Development Goal targets for maternal health and child mortality Report by the Director-General. 2023;(December):1–6. Available from: https://apps.who.int/gb/ebwha/pdf_files/EB154/B154_12-en.pdf
18. Nations U, Programme D. Good health and well-being: Ensure healthy lives and promote well-being for all at all ages. Atlas Sustain Dev Goals 2017 World Dev Indic. 2017;14–9.
19. Abadiga M, Wakuma B, Oluma A, Fekadu G, Hiko N, Mosisa G. Determinants of preterm birth among women delivered in public hospitals of Western Ethiopia, 2020: Unmatched case-control study. PLoS

One [Internet]. 2021;16(1 January):1–16. Available from: http://dx.doi.org/10.1371/journal.pone.0245825

20. Aregawi G, Assefa N, Mesfin F, Tekulu F, Adhena T, Mulugeta M et al. Preterm births and associated factors among mothers who gave birth in Axum and Adwa Town public hospitals, Northern Ethiopia, 2018. BMC Res Notes [Internet]. 2019;12(1):4–9. Available from: https://doi.org/10.1186/s13104-019-4650-0
21. Granese R, Gitto E, D'Angelo G, Falsaperla R, Corsello G, Amadore D, et al. Preterm birth: Seven-year retrospective study in a single centre population. Ital J Pediatr. 2019;45(1):1–6.
22. Woldeamanuel MG. Urban Issues in Rapidly Growing Cities. Urban Issues in Rapidly Growing Cities. 2020.
23. Ethiopian Public Health Institute (EPHI), ICF. Ethiopia Mini Demographic and Health Survey 2019: Final Report [Internet]. 2021. 1–207 p. Available from: https://dhsprogram.com/pubs/pdf/FR363/FR363.pdf
24. Fetene G, Tesfaye T, Negesse Y, Dulla D. Factors associated with preterm birth among mothers who gave birth at public Hospitals in Sidama regional state, Southeast Ethiopia: Unmatched case-control study. PLoS One [Internet]. 2022;17(4 April):1–13. Available from: http://dx.doi.org/10.1371/journal.pone.0265594
25. Taha Z, Hassan AA, Wikkeling-Scott L, Papandreou D. Factors associated with preterm birth and low birth weight in Abu Dhabi, The United Arab Emirates. Int J Environ Res Public Health. 2020;17(4).
26. Kalengo NH, Sanga LA, Philemon RN, Obure J, Mahande MJ. Recurrence rate of preterm birth and associated factors among women who delivered at Kilimanjaro Christian Medical Centre in Northern Tanzania: A registry based cohort study. PLoS One [Internet]. 2020;15(9):e0239037. Available from: http://dx.doi.org/10.1371/journal.pone.0239037
27. Hoh JK, Lappas M, Liu C, Qiao C, Pallavi K, Takeda J, et al. Preterm birth rate and dilemma of preterm labor treatment in Asia. Placenta. 2019;79(December 2018):68–71.
28. Stevens LM, Lynm C, Glass RM. Low birth weight. JAMA. 2002;287(2):270.
29. Tingleff T, Vikanes, Räisänen S, Sandvik L, Murzakanova G, Laine K. Risk of preterm birth in relation to history of preterm birth: a population-based registry study of 213 335 women in Norway. BJOG Int J Obstet Gynaecol. 2022;129(6):900–7.
30. Alamneh TS, Teshale AB, Worku MG, Tessema ZT, Yeshaw Y, Tesema GA et al. Preterm birth and its associated factors among reproductive aged women in sub-Saharan Africa: evidence from the recent demographic and health surveys of sub-Sharan African countries. BMC Pregnancy Childbirth [Internet]. 2021;21(1):1–11. Available from: https://doi.org/10.1186/s12884-021-04233-2
31. Hakizimana C, Ogendi J, Habtu M. Preterm Births and Associated Factors among Women who Delivered in a District Hospital in Eastern Province, Rwanda: A retrospective study. Rwanda J Med Heal Sci. 2023;6(3):269–79.
32. Muchie KF, Lakew AM, Teshome DF, Yenit MK, Sisay MM, Mekonnen FA, et al. Epidemiology of preterm birth in Ethiopia: Systematic review and meta-analysis. BMC Pregnancy Childbirth.

2020;20(1):1–12.

33. Muhumed II, Kebira JY, Mabalhin MO. Preterm Birth and Associated Factors Among Mothers Who Gave Birth in Fafen Zone Public Hospitals, Somali Regional State, Eastern Ethiopia. Res Rep Neonatol. 2021;11:23–33.
34. I B, T D, K D. Prevalence of Preterm Birth and its Associated Factors among Mothers Delivered in Jimma University Specialized Teaching and Referral Hospital, Jimma Zone, Oromia Regional State, South West Ethiopia. J Women's Heal Care. 2017;06(01).
35. Mawolle GG, Moshi FV. The prevalence and factors associated with premature birth among post-delivery women in the Mbeya region: An analytical cross-sectional study. BMJ. 2022;16.
36. Hanif A, Ashraf T, Pervaiz MK, Guler N. Prevalence and risk factors of preterm birth in Pakistan. J Pak Med Assoc. 2020;70(4):577–82.
37. Ayebare E, Ntuyo P, Malande OO, Nalwadda G. Maternal, reproductive and obstetric factors associated with preterm births in Mulago hospital, Kampala, Uganda: A case control study. Pan Afr Med J. 2018;30:1–8.
38. Mekonen DG, Yismaw AE, Nigussie TS, Ambaw WM. Proportion of Preterm birth and associated factors among mothers who gave birth in Debretabor town health institutions, northwest, Ethiopia. BMC Res Notes [Internet]. 2019;12(1):10–5. Available from: https://doi.org/10.1186/s13104-018-4037-7
39. Jiang M, Mishu MM, Lu D, Yin X. A case control study of risk factors and neonatal outcomes of preterm birth. Taiwan J Obstet Gynecol [Internet]. 2018;57(6):814–8. Available from: https://doi.org/10.1016/j.tjog.2018.10.008
40. Gebreslasie K. Preterm Birth and Associated Factors among Mothers Who Gave Birth in Gondar Town Health Institutions. Adv Nurs. 2016;2016:1–5.
41. Tellapragada C, Eshwara VK, Bhat P, Acharya S, Kamath A, Bhat S, et al. Risk factors for preterm birth and low birth weight among pregnant Indian women: A hospital-based prospective study. J Prev Med Public Heal. 2016;49(3):165–75.
42. Review C, Communication S, Principles G. World Medical Association Declaration of Helsinki Ethical Principles for Medical Research Involving Human Subjects. 2015;2013–6.

Figures

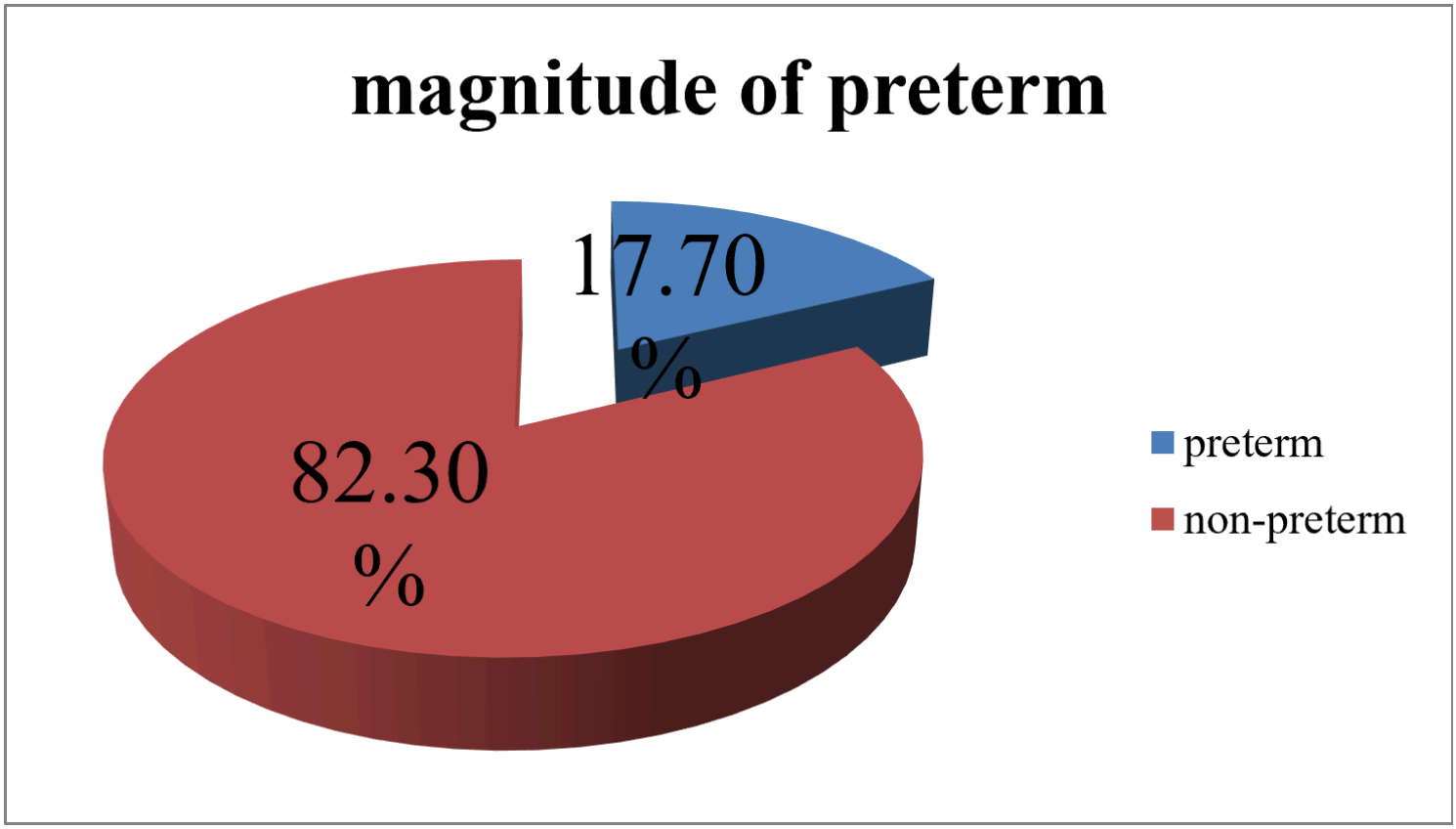


Figure 1

Magnitude of preterm among mothers who gave birth at public hospitals of Addis Ababa city administration, Addis Ababa, Ethiopia, Oct 2023: (n=316).