

Magnitude of postpartum morbidity and associated factors in southeast Ethiopia, 2022: A facility-based cross-sectional study

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Feisal Hussein Hasen¹, Solomon Seyife Alemu¹ , Derese Eshetu²,
Bedria Mohammed³, Eden Nebi⁴, Hana Israel⁵, Yomilan Geneti⁶ ,
Lema Fikadu Wedajo⁷ and Woiynshet Gebretsadik⁸

Abstract

Objective: Maternal mortality in Ethiopia is estimated to be 205 per 100,000 live births, with postpartum morbidities expected to surpass maternal mortality substantially. Beside this, there is a lack of information on postpartum morbidities in the study area. Thus, the purpose of this study was to assess the magnitude of postpartum morbidities and associated factors in Bale Robe Town, southeast Ethiopia.

Method: An institution-based cross-sectional study was employed among 371 from 1 April to 30 May 2022 among postpartum women attending postnatal care service in the Bale-Robe Town public health facilities. A face-to-face interviewer administered a structured questionnaire, and the participants were selected through a systematic random sampling technique. A bivariate analysis was performed to see the association between each independent variable and dependent variable, and variables with *p*-values less than 0.25 in the bivariate analysis were retrieved for multivariable analyses. A *p*-value of less than 0.05 indicated a 95% confidence interval as the level of statistical significance.

Result: A total of 366 participants were involved in the study, giving us a response rate of 98.6%. The magnitude of postpartum morbidities among mothers was found to be 102 (27.9%), with a confidence interval of 95% CI: 23.3, 32.8. Women who hadn't had antenatal care follow-up (AOR=2.47, 95% CI: 1.36, 4.50), instrumental delivery (AOR=2.69, 95% CI: 1.16, 6.26), unskilled birth attendant (AOR=3.35, 95% CI: 1.06, 10.63), rural residence (AOR=2.21, 95% CI: 1.26, 3.89), and current pregnancy-related morbidity or abnormality (AOR=3.81, 95% CI: 2.00, 7.25) were significantly associated factors.

Conclusion: This study revealed that the occurrence of postpartum morbidity in Bale Robe is a great health concern. Therefore, we recommend health professionals and health extension workers strengthen early detection and management of intrapartum abnormalities, give attention during instrumental deliveries, and strengthen skilled birth attendants.

Keywords

Postpartum period, maternal morbidity, Bale robe, Ethiopia

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Introduction

Postpartum morbidity refers to a disease or complications that happen after the placenta has been expelled from 1 h to 6 weeks after.¹ It's complicated, with many origins, varying durations from acute to chronic, and severity levels ranging from transitory to permanent, as well as a variety of diagnoses and treatment choices.^{2–5} Pregnancy, childbirth, and postpartum complications can result in death or persistent morbidities that impact a woman's health for different periods of time, either during or after delivery.⁴ The World Health Organization (WHO) describes the postnatal period as the most critical, and yet the most neglected phase in the lives of mothers and babies; most maternal and newborn deaths occur during this period.^{6,7}

¹Department of Midwifery, Madda Walabu University, Shashamanne Campus, Shashamanne, Ethiopia

²Department of Midwifery, Madda Walabu University, Robe, Ethiopia

³Midwifery Department, College of Medicine and Health Sciences, Arbaminch University, Arbaminch, Ethiopia

⁴Department of Midwifery, Hawassa University, Hawassa, Ethiopia

⁵Department of Midwifery, Jimma University, Jimma, Ethiopia

⁶Department of Midwifery, Dire Dawa University, Dire Dawa, Ethiopia

⁷Department of Midwifery, Wollaga University Institute of Health Sciences, Nekemte, Ethiopia

⁸Nursing Department, College of Medicine and Health Sciences, Arbaminch University, Arbaminch, Ethiopia

Corresponding author:

Feisal Hussein Hasen, Department of Midwifery, Madda Walabu University, Shashamanne Campus, Shashamanne, P. O. Box 247, Bale-Robe, Oromiya Regional state, Ethiopia.

Email: feisalh706@gmail.com



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Globally, maternal mortality declined by more than a third from 2000 to 2017. Yet, tragically, an estimated 810 women continue to die each day due to complications of pregnancy and childbirth, mostly from preventable or treatable causes such as complications during or after pregnancy and childbirth.⁸ Over 54 million women in developing countries are estimated to suffer acute morbidities yearly, with over 20 million considered so serious as to warrant referral care, and around 30 million women suffer from short- or long-term illnesses related to childbirth that adversely affect the quality of their lives and those of their families.⁸ In a similar context, in developing nations, 15–20 million women develop disabilities each year as a result of childbirth complications, and in sub-Saharan countries, the magnitude of maternal morbidities varies from 20 to 920 per 100,000 live births.⁹

The highest burden of severe postpartum maternal morbidity is in sub-Saharan Africa, where estimates of morbidity are as high as 198 per 1000 live births, hemorrhage and hypertensive disorders are the leading conditions contributing to severe maternal morbidities across all regions.¹⁰ Ethiopia has one of the highest estimated numbers of maternal deaths, estimated to be 205 per 100,000 live births in the 2019 Ethiopian Demographic Health Survey (EDHS), where the first 48 h following childbirth account for a substantial share of maternal and newborn deaths.¹¹ Additionally, according to this report, approximately 200,000 Ethiopian women and girls are deprived of access to expert medical care during pregnancy, childbirth, and the postpartum period. Furthermore, a pocket of studies in Ethiopia revealed that postpartum morbidity ranged from 23.6% to 32.8%.^{12–14}

In low-income countries, including Ethiopia, postpartum maternal morbidity is widespread and underrecognized. Aside from this, how frequently these issues occur and when women seek medical help are not well recorded.¹² Particularly, poor women commonly suffer from maternal morbidity because they either die or develop debilitating health problems such as fistulas, pelvic inflammatory disease (PID), and infertility for the rest of their lives.^{2–5}

Previously, different studies showed that place of residence, marital status, antenatal care (ANC) service, maternal education, parity, iron supplementation during pregnancy, maternal Human Immune Deficiency (HIV) status, abnormal labor, mode of delivery, postpartum visit, severe anemia, low socioeconomic status, and parity were found to be determinants of postpartum morbidity.^{1,8,15}

Maternal and child care during conception, pregnancy, labor, delivery, and the postpartum period is generally highly prioritized in many countries.¹⁶ Unfortunately, there is an unacceptably significant possibility of dying, particularly in countries with poor infrastructure like Ethiopia. To overcome this global community expert plan by 2030, they aim to decrease maternal mortality to 70 per 100,000 and neonatal mortality to 12 per 1000.¹⁷ A certain approach is to refocus efforts on addressing the health complications that affect

these women rather than just focusing on lowering maternal mortality rates. Programs like the Initiatives toward Ending Preventable Maternal Mortality (EPMM) are a good instance of this matter.^{18–20} Even though maternal and newborn mortality is receiving a lot of attention around the world, the topic of maternal health concerns following delivery has gotten a lot less attention.^{13,21,22} Postpartum morbidity is a severe maternal health issue with several contributing factors, yet very little is known about its extent and affecting factors in Bale Robe town. As a result, the purpose of this research is to assess the extent of and identify contributing factors in Bale Robe town to fill an information vacuum.

Methods and materials

Study setting and period

A facility-based cross-sectional study design was employed from 1 April to 30 May 2022, among postpartum women attending postnatal care (PNC) service in the Bale-Robe Town public health facilities. Bale-Robe town is the capital of the Bale zone and is located 430 km from Addis Ababa, the capital of Ethiopia. According to the town administrative health office, the total population of the town was 148,089 in the year 2019, of whom 72,860 (49.2%) are females. The town is found at an altitude of 2492 m above sea level, and there is one general public hospital, one public health center, and twelve private clinics in the town. Postnatal care is available at the town's public health facilities, whereas private clinics do not offer delivery or postnatal services.

Source population

All postpartum women who were visiting postnatal care services at public health facilities in Bale Robe Town were our source population.

Study population

Mothers who were visiting postnatal care services during the data collection period at public health facilities in Bale Robe Town.

Eligibility criteria

Postpartum women who visited postnatal care services during the study period were included, while postpartum women whose medical records contained incomplete information were excluded.

Sample size determination

The sample size required for this study was calculated using a single population formula with the assumptions of a 95% confidence level ($Z_{\alpha/2} = 1.96$), 5% margin of error ($d = 0.05$),

and the proportion of postpartum morbidity taken from a study done in Debre Markos, Northern Ethiopia was 32.8.¹³ Considering a 10% nonresponse rate, the final sample size required for this study was found to be 371 postnatal mothers.

Sampling procedures

The study was conducted among postnatal women who arrived at public health facilities found in Bale Robe town for a postnatal visit. According to the town health office report, the town has two public health facilities that provide PNC, namely Bale Robe Hospital and Baha Biftu Health Center. Initially, for our study, we selected both public health facilities found in town. Then, to know the average postpartum mothers flow, we took a sample of data 6 months prior to the study. The average postnatal woman flow in 6 months at Bale Robe Hospital was 3312, and similarly, the six-month client flow at Baha Biftu Health Center was 966. By having this, we calculate the monthly postnatal mothers flow since our data collection period was in the month. From this, we got 552 and 161 the average monthly postnatal mothers flow in Bale Robe Hospital and Baha Biftu Health, respectively. Then, proportional allocations were made for the respective health facilities. By using this, we calculated the interval (K) for which we could select the women. Thus, the interval (K) was calculated by dividing the total number of mothers by the total number of proportionally allocated numbers respective to each public health facility, and therefore we obtained $K=1.92-2$. Lastly, the first client was selected by the lottery method, and then the rest were selected by the systematic random sampling method at every K interval.

Data collection method

Data collection tool

A structured, interviewer-administered questionnaire and check list for document-reviewed data collection were used for this study. Data was collected by check list items containing items to assess outcome variables postpartum morbidity, sociodemographic characteristics of the study participants, obstetric characteristics of the study participants, and medical-related factors. To assess postpartum morbidity, a validated WHO guideline check list that was used in both developing and developed countries was used, a tool also used in previously published articles in Ethiopia. The questionnaires to assess sociodemographic status, obstetrics, and health services-related factors were adapted from similar previously published literature.^{17,19,20}

Data collection process

Detail training was given for data collectors and supervisors on the contents of the data abstraction tool and how to collect

data from selected mothers, review medical records, and postnatal log books for 2 days before the data collection period by the principal investigator. The data collection formats were made ready for use, then the data were collected by face-to-face exit interviews using questionnaires for sociodemographic factors, and a checklist was used to review mother's charts, delivery records of labor wards, and reporting logbooks. During actual data collection, data collectors were supervised, and the questionnaire was checked for completeness daily. Data collectors were midwives and nurses, and two experienced supervisors were allocated.

Study variables

Dependent variable. Postpartum morbidity.

Independent variable. Sociodemographic factors include age of the women, marital status, educational status of women, residence, occupation, the households monthly income; and obstetrics factors include gravidity, parity, gestational age, place of delivery, mode of delivery, clinical comorbidity, pregnancy-related Morbidity, and person attended labor (skilled or unskilled). Lastly, medical factors such as anemia, HIV/AIDS, diabetic mellitus, heart disease, and tuberculosis.

Operational definitions

- **Maternal morbidity:** Any health condition attributed to and/or complicating pregnancy and childbirth that has a negative impact on the woman's well-being and/or functioning.²⁴
- **Postpartum morbidities:** Postpartum morbidity encompasses diseases or complications occurring from 1 h to 6 weeks after childbirth, following the expulsion of the placenta.² For the purposes of this study, a mother diagnosed with any morbidity, including conditions such as postpartum hemorrhage, preeclampsia, sepsis, and others, was classified as experiencing postpartum morbidity.

Data quality control

To assure the quality of the data, close supervision was maintained by the principal investigator. Any ambiguities or unclear ideas during the data collection process were resolved by having a discussion with data collectors, supervisors, and the principal investigator. Every day, the investigator participated in the evaluation of the data gathering process and made necessary corrections before the next day's activities. The English version of this questionnaire was translated by language experts to Amharic and Afaan Oromo and back to English to check for consistency. A pre-test was done at Goba Hospital, which was found in a different town, 2 weeks before the actual data collection period,

Table 1. Sociodemographic status of mothers on postpartum morbidities in health facilities found in Bale robe town, 2022.

Variables	Category	Frequency	Percentage
Age of the respondents	18–22	18	4.9
	23–27	106	29.0
	28–32	83	22.7
	33–37	100	27.3
	≥38	59	16.1
Residence	Robe town	262	71.6
	Outside of robe town	104	28.4
Educational status	No formal education	66	18.0
	Primary school	71	19.4
	Secondary school	132	36.1
	Collage and above	97	26.5
Marital status	Married	309	84.4
	Unmarried	33	9.0
	Divorced/Widowed	24	6.6
Occupation of the mother	Government	78	21.3
	Private	101	27.6
	Housewives	158	43.2
	Unemployed	29	7.9

with 5% to assure clarity, logical sequence, and feasibility of measuring important variables.

Data analysis

The collected data were coded, entered, checked, and cleaned by Epi-data 3.1 and exported to a statistical software package, SPSS 25, for data analysis. The proportion of postpartum morbidity (PPM) was computed by running descriptive statistics, followed by bivariate and multivariable analysis to determine the statistical association between independent and dependent variables. The model's fitness was tested by Hosmer and Lemshow at a significant value of less than 0.05. Variables that were <0.25 significance level in the bivariate logistic regression analysis were considered for multivariable logistic regression analysis. The presence and degree of association between outcome and independent variables were computed through an odds ratio with a 95% confidence interval (CI) and a p -value < 0.05. Then, the result was presented using tables, figures, and narratives.

Results

Sociodemographic characteristics of the respondents

A total of 366 participants were involved in the study, yielding a response rate of 98.6%. The mean age of the participants was 28.69 (\pm SD 6.07) years, with a range of 18–44 years, and 106 (29.0%) were between the ages of 20 and 24. Most of the respondents were married women, 309 (84.4%). 132 (36.1%) of the respondents had secondary school education, followed by college and above education

(97 (26.5%)). The respondents comprised 158 (43.2%) housewives and 262 (71.6%) residents of Robe town, respectively (Table 1).

Obstetrics history of the mother

Most of the mothers, 301 (82.2%), were multipara, and 296 (80.9%) had antenatal care follow-up. More than half of the mothers, 229 (61.2%), were delivered by spontaneous vaginal delivery; less than 10%, 35 (9.3%), gave birth by instrumental assisted moreover, 349 (95.3%) of the mothers were delivered with the support of skilled health professionals. About 308 (84.2%) had a term pregnancy. Around 59 (13.9%) mothers had pregnancy-related morbidity at the time of their current pregnancy (Table 2).

The magnitude of postpartum morbidities

Out of the 366 maternal charts examined, 102 (27.9%) had postpartum, of which 48 (13.1%) had two or more morbidities. Major morbidities include postpartum hemorrhage (9.3%), preeclampsia/eclampsia (6.3%), anemia (4.6%), cesarean section (6%), and problems related to the episiotomy such as wound dehiscence and episiotomy breakdown (6.0%) (Figures 1 and 2).

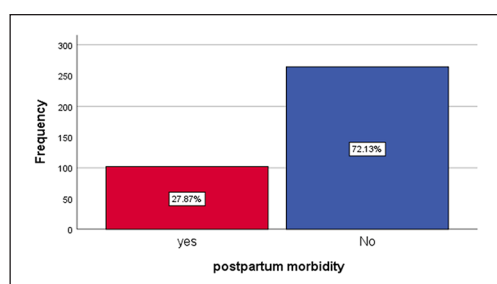
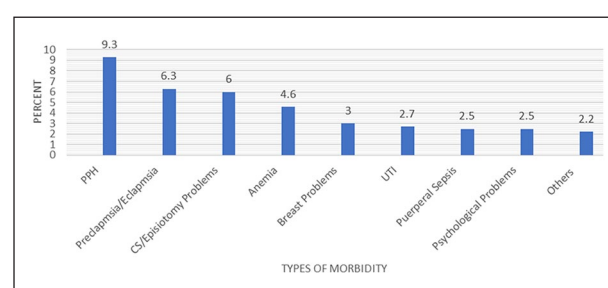
Factors associated with postpartum morbidities

In bivariate analysis, variables such as residence, occupation of a mother, marital status, mode of delivery, place of delivery, pregnancy-related morbidity in a current pregnancy, antenatal care follow-up, and delivery attended were statistically significant at a p -value less than 0.25. In the multivariable analysis,

Table 2. Obstetrics and medical status of mothers on postpartum morbidities in health facilities found in Bale robe town, 2022.

Variables	Category	Frequency	Percentage
Gravidity	Primigravida	42	11.5
	2–4	278	76.0
	≥5	46	12.6
Parity	Primipara	65	17.8
	2–4	268	73.2
	≥5	33	9.0
ANC follow up	Yes	296	80.9
	No	70	19.1
Mode of delivery	SVD	229	62.6
	SVD with episiotomy	71	19.4
	SVD with instrument	35	9.6
	CS	31	8.5
Delivery attended by	Midwife	219	59.8
	Nurse/HO	71	19.4
	Doctor	60	16.4
	Unskilled birth attendant	16	4.4
PNC visits times	1	43	11.7
	2	180	49.2
	≥3	143	39.1
Pregnancy-related morbidity of past pregnancy	Yes	41	11.3
	No	325	88.7
Place of delivery	Hospital	261	71.3
	Health center	89	24.3
	Home	16	4.4
Pregnancy-related morbidity in the current pregnancy	Yes	59	16.1
	No	307	83.9
Medical illness in a current pregnancy	Yes	20	5.5
	No	246	67.5
Gestational age	37–42 weeks	329	89.9
	<37 weeks	12	3.3
	>42 weeks	25	6.8
Iron and folic acid supplementation during this pregnancy	Yes	285	77.9
	No	81	22.1

ANC: ante natal care; PNC: post-natal care; Parity: number of deliveries; Gravidity: number of pregnancies.

**Figure 1.** Magnitude of postpartum morbidities found in public health facilities in Bale, Robe town, Oromia region, southeast Ethiopia, 2022.**Figure 2.** Types of postpartum morbidities found at public health facilities in Bale Robe town, southeast Ethiopia, 2022. PPH: postpartum hemorrhage; CS: cesarean section; UTI: urinary tract infection.

five variables—antenatal care follow-up, mode of delivery, residence, delivery attended by, and current pregnancy-related morbidity showed a significant association with a p -value of <0.05 . Mothers who have current pregnancy-related morbidity are 3.8

times more likely to develop postpartum morbidity compared to those who have no current pregnancy-related complications, as indicated by an adjusted odds ratio (AOR) of 3.81 (95% CI (2.0,

Table 3. Factors associated with postpartum morbidity among women who gave birth at public health facilities in Bale Robe town, Oromia, southeast Ethiopia, 2022.

Variable	Category	Postpartum morbidity		COR (95% CI)	AOR (95% CI)
		No, N (%)	Yes, N (%)		
Residence	Robe town	202 (77.1)	60 (22.9)	1	1
	Out of robe town	62 (59.6)	42 (40.4)	2.28 (1.40, 3.70)*	2.20 (1.26, 3.89)**
Occupation of the mother	Government	62 (79.5)	16 (20.5)	1	1
	Private	75 (74.3)	26 (25.7)	1.34 (0.662, 2.726)	1.15 (0.52, 2.55)
	Housewife	107 (67.7)	51 (32.3)	1.84 (0.971, 3.513)	1.51 (0.72, 3.18)
	Other	20 (69)	9 (31)	1.74 (0.668, 4.553)	1.08 (0.37, 3.32)
Marital status	Married	224 (72.5)	85 (27.5)	1	1
	Unmarried	23 (69.7)	10 (30.3)	1.14 (0.524, 2.508)	2.07 (0.77, 5.28)
	Widowed/Divorced	17 (70.8)	7 (29.2)	1.08 (0.435, 2.709)	1.35 (0.45, 3.48)
Mode of delivery	SVD	179 (78.2)	50 (21.8)	1	1
	SVD + Episiotomy	49 (69)	22 (31)	1.607 (0.889, 2.907)	1.60 (0.82, 3.11)
	SVD + Instrumental	20 (57.1)	15 (42.9)	2.685 (1.282, 5.623)*	2.69 (1.16, 6.24)**
	CS	16 (51.6)	15 (48.4)	3.356 (1.552, 7.256)*	2.56 (0.81, 8.04)
Delivery attended by	Midwife	172 (78.5)	47 (21.5)	1	1
	Nurse/HO	48 (67.6)	23 (32.4)	1.754 (0.970, 3.171)	1.24 (0.61, 2.48)
	Doctor	35 (58.3)	25 (41.7)	2.614 (1.426, 4.793)*	1.53 (0.64, 3.87)
	Unskilled birth attendant	9 (56.3)	7 (43.7)	2.846 (1.007, 8.045)*	3.35 (1.06, 10.63)**
Place of delivery	Hospital	189 (72.4)	72 (27.6)	1	1
	Health center	66 (74.2)	23 (25.8)	0.915 (0.530, 1.580)	0.88 (0.46, 1.68)
	Home	9 (56.3)	7 (43.7)	2.042 (0.733, 5.687)	3.73 (1.22, 11.42)
Pregnancy-related morbidity in a current pregnancy	Yes	25 (42.4)	34 (57.6)	4.780 (2.670, 8.558)*	3.81 (2.00, 7.25)**
	No	239 (77.9)	68 (22.1)	1	1
Parity category	I	51 (78.5)	14 (21.5)	1	1
	2–4	186 (69.4)	82 (30.6)	1.606 (0.842, 3.064)	1.62 (0.75, 3.48)
	≥5	27 (81.8)	6 (18.2)	0.810 (0.279, 2.346)	0.62 (0.18, 2.10)
ANC visits	Yes	225 (76.0)	71 (24.0)	1	1
	No	39 (55.7)	31 (44.3)	2.519 (1.465, 4.331) *	2.47 (1.36, 4.50)**

Key: *p-value ≤ 0.05 in bivariate analysis; **p-value ≤ 0.05 in multivariable analysis. 1-Reference group.

7.25)). Additionally, not having antenatal care follow-up makes it 2.4 times more likely to develop postpartum morbidity, with an adjusted odds ratio (AOR) of 2.50 (95% CI (1.36, 4.50)). Women delivered by unskilled birth attendants have a 3.3 times greater likelihood of experiencing postpartum morbidity compared to those delivered by skilled birth attendants, as indicated by an AOR of 3.35 (95% CI (1.06, 10.63)).

The other significant factor is the mode of delivery. Mothers whose deliveries are instrumentally assisted are 2.6 times more likely to develop postpartum morbidity as compared to mothers who delivered by spontaneous vaginal delivery, with an AOR of 2.70 (95% CI (1.16, 6.24)). Residence is also the other significant factor in the model. Mothers who live outside of Robe town had a 2.2-fold higher likelihood of having postpartum morbidity than those who live inside Robe town, as evidenced by an adjusted odds ratio (AOR) of 2.20 (95% CI (1.26, 3.89)). The study showed that factors such as marital status, the mother's work, the attendant during delivery, and the location of delivery had no significant association with postpartum morbidity. This implies

that these characteristics do not have a substantial impact on their likelihood of having postpartum problems (Table 3).

Discussion

This research was conducted in Bale Robe town's public health facilities to determine the prevalence of postpartum morbidity and pinpoint risk factors for it. According to our study, postpartum morbidity was at a proportion of 27.9%, which is congruent with the studies conducted in Gondar (23.6%) and DebreMarkos, Ethiopia (32.8%).^{12,13} This might be due to studies carried out in the same nation under analogous circumstances, which suggest that the health care system there is probably comparable.

The finding of our study was greater than those of the studies conducted in Brazil (21.2%), Morocco (13.1%), Pakistan (4%), and Nepal (2.96%). The difference between our study and the former study conducted in Brazil might be due to the variations in sample size, the research setting, and the factors affecting maternal health issues.²³ Additionally,

our research's finding was comparatively high compared to the study's in Morocco, which might be a result of variations in the study population and the healthcare services provided.¹⁸ In contrast to our study, the results of a study carried out in Pakistan, which solely involved rural people and severe postpartum maternal illness, also differ in sample size. Comparably, the results of this study were higher than those of the study carried out in Nepal. Our study covers all women who seek postpartum health care services, regardless of whether they were hospitalized or not, which is the key difference between it and the Nepalese study.^{2,24} Furthermore, the disparity may be due to the differences in the health care system in terms of infrastructure, quality of health care, and policy among different countries. Specifically, compared to studies conducted in Brazil, Pakistan, and Nepal, our study was conducted in low-income countries, which affect the health systems of one nation.

Our study's finding was lower than those of studies conducted in Morocco (44%), the Democratic Republic of the Congo (64.5%), and India (39.5 %), this may be related to the size of the sample used, the duration of the study, and the fact that the Morocco study included self-reported morbidities in addition to those that were actually diagnosed. Furthermore, the variability might be the difference in health care delivery system, distribution of risk factors among the studied group, and regional variability (Democratic Republic of the Congo). Moreover, variations in study populations, research methodologies, and self-reported morbidity may account for these studies' discrepancies (India).^{22,25,26}

The findings of this study have shown important health risks for pregnant and postpartum mothers. The most common cause of morbidity was postpartum hemorrhage (9.3%), which was followed by preeclampsia/eclampsia-related complications (6.3%), problems from cesarean sections and episiotomies (6%), and anemia (4.6%).

According to this study, there is a statistically significant correlation between receiving ANC services throughout a woman's pregnancy and the development of postpartum morbidity. Agreed to this study is a studies done in Gamo Gofa Zone, and Debre Markos reported not having prenatal care as a risk for postpartum morbidity.^{13,27} This is because women benefit from early case detection and management when they receive ANC follow-up. Furthermore, since the majority of obstetric difficulties are predicted, healthcare professionals rigorously monitor perinatal care and separate high-risk women during ANC follow-ups.

A substantial positive link exists between postpartum maternal morbidity and mothers who currently had a pregnancy-related complication or problem. The research from Gondar, Debre Markos, and Bangladesh supports this study by stating that women's who experience abnormal labor are more likely to experience postpartum morbidity.^{12,13,21} This is because the majority of obstetric problems continue from pregnancy into the postpartum phase. Similarly, some obstetric complications might also be risk factors for the occurrence of others.

Maternal morbidity and delivery methods have a strong relationship. Women who give birth with instrumental assistance have a 2.6 times higher risk of developing postpartum morbidity than mothers who give birth spontaneously. This result agrees with a study conducted in Canada and Felege Hiwot Comprehensive Specialized Hospital. Consequently, there is a significant connection between the delivery attendant and postpartum morbidity. Women who deliver with an unskilled birth attendant have a 3.3 times greater likelihood of experiencing postpartum morbidity than women who deliver with a trained birth attendant. This is due to the fact that providing skilled birth might decrease three-fold maternal morbidity.

The aforementioned conclusion is consistent with the findings of Debre Markos' investigation, which found that women delivered by doctors are around 89% less likely to experience postpartum problems than those delivered by untrained birth attendants. Moreover, women in rural areas have a twofold increased risk of experiencing postpartum morbidity compared to their counterparts in urban areas, owing to the lack of infrastructure such as roads, nearby health centers, and transportation.^{13,28}

Limitations and strengths

This study includes all public health facilities in Bale Robe town, and our study used both primary and secondary data, thereby improving the quality of the data. In addition to this, the result of this study might be used in the future to investigate the health-seeking behavior of mothers for postpartum morbidity and knowledge about postpartum morbidities in the community. However, this study does not measure self-reported complaints or morbidities, which might underestimate the magnitude of postpartum morbidities in a community.

Conclusion and recommendation

Conclusion

This study revealed that the occurrence of postpartum morbidity is a great health concern. Women who didn't have antenatal care services, a complication in current pregnancy, instrumental delivery, women delivered by unskilled birth attendants, and rural residents were factors associated with maternal postpartum morbidity. Therefore, we should focus on access to prenatal care services, early detection and management of intrapartum abnormalities, educating mothers on the benefits of institutional delivery by a skilled birth attendant, and giving great attention while using instrumental deliveries.

Recommendation

We recommend that health professionals strengthen maternal health education on the benefits of antenatal care, provide

special follow-up for mothers who have pregnancy-related problems as well as labor abnormalities, give a great deal of attention while using instruments during delivery, or reduce instrumental deliveries as much as possible. In addition, it is recommended that maternal health care providers educate and sensitize all pregnant women to give birth in the health institution and work on reducing unskilled birth attendants. Furthermore, educate the mothers on the prevention of complications and early recognition of postpartum morbidity and danger signs.

Second, in general, in order to reduce postpartum morbidities, health extension workers, together with professionals from health institutions, should prioritize creating awareness, antenatal care follow-up, place delivery, and birth preparedness plans. Additionally, woreda officers and programmers should be strengthening the monitoring and evaluation system of obstetrics care. Furthermore, it is expected to expand infrastructure like maternal waiting homes and other infrastructure for rural residents. Finally, we recommend the researchers do further studies on community-based research to increase the representativeness of the study.

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Authors' contributions

Feisal Hussein Hasen and Solomon Seyife have contributed equally to the proposal development, development of the tools, data collection process, and analysis. The authors have revised the final version of the manuscript and given their approval for publication. Conceptualization: Feisal Hussein Hasen, Woynshet Gebretsadik. Data Curation: Feisal Hussein Hasen, Solomon Seyife Alemu, Derese Eshetu, Bedria Mohammed, Eden Nebi, Hana Israel, Yomilan Geneti, Lema Fikadu Wedajo, Woynshet Gebretsadik. Formal analysis: Feisal Hussein Hasen, Solomon Seyife Alemu, Derese Eshetu, Bedria Mohammed, Eden Nebi, Hana Israel, Yomilan Geneti, Lema Fikadu Wedajo, and Woynshet Gebretsadik. Investigation: Feisal Hussein Hasen and Woynshet Gebretsadik. Methodology: Feisal Hussein Hasen, Solomon Seyife Alemu, Derese Eshetu, Bedria Mohammed, Eden Nebi, Hana Israel, Yomilan Geneti, Lema Fikadu Wedajo, and Woynshet Gebretsadik. Project administration: Feisal Hussein Hasen. Resources: Feisal Hussein Hasen, Solomon Seyife Alemu, Derese Eshetu, Bedria Mohammed, Eden Nebi, Hana Israel, Yomilan Geneti, Lema Fikadu Wedajo, and Woynshet Gebretsadik. Software: Feisal Hussein Hasen and Woynshet Gebretsadik. Validation: Feisal Hussein Hasen, Solomon Seyife Alemu, Derese Eshetu, Bedria Mohammed, Eden Nebi, Hana Israel, Yomilan Geneti, Lema Fikadu Wedajo, and Woynshet Gebretsadik. Visualization: Feisal Hussein Hasen, Solomon Seyife Alemu, Derese Eshetu, Bedria Mohammed,

Eden Nebi, Hana Israel, Yomilan Geneti, Lema Fikadu Wedajo, and Woynshet Gebretsadik. Writing: original draft: Feisal Hussein Hasen, Solomon Seyife Alemu, Derese Eshetu, Bedria Mohammed, Eden Nebi, Hana Israel, Yomilan Geneti, Lema Fikadu Wedajo, and Woynshet Gebretsadik. Writing: review and editing: Feisal Hussein Hasen, Solomon Seyife Alemu, and Woynshet Gebretsadik.

Availability of data and materials

The data used in this study is available upon reasonable request upon the corresponding author at any time if required. Therefore, any person who need data it can obtain it from principal investigator through contact address (e-mail: feisalh706@gmail.com) at any time.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Ethics approval and consent to participate

Ethical clearance was obtained from the Arba Minch University College of Health Sciences and Medicine Institutional Research Ethical Review Board (IRRB) with reference number IRB/1217/2022. Written permission to support the research was obtained from the medical director of the hospital and health center from which the data were collected. Written and informed consent was obtained from participants after their willingness to participate in the study and after explaining all the objectives, risks, and benefits of being involved in the study. We did not seek written informed consent from the legally authorized representatives of minor subjects because all participants in our study were over the age of 18. Furthermore, in this study, even though some study participants have no formal education, they are able to read and write because they have received informal education from adult education programs, religious institutions, and other sources. Hence, all study participants participated after they gave written consent. The right of respondents not to participate in the study or withdraw from the study at any time was respected. All the information obtained from the mothers and their charts was held with confidentiality and used only for the intended purpose.

Consent for publication

Not applicable.

Informed consent


Written informed consent was obtained from all study participants. In this study, even though some study participants have no formal education, they are able to read and write because they have received informal education from adult education programs, religious institutions, and other sources. Hence, all study participants participated after they gave written consent.

Trial registration

Not applicable.

ORCID iDs

Solomon Seyife Alemu  <https://orcid.org/0000-0001-6096-1055>

Yomilan Geneti  <https://orcid.org/0000-0002-9249-0283>

Lema Fikadu Wedajo  <https://orcid.org/0000-0002-9309-6472>

Supplemental material

Supplemental material for this article is available online.

References

1. Semasaka JPS, Krantz G, Nzayirambaho M, et al. Self-reported pregnancy-related health problems and self-rated health status in Rwandan women postpartum: a population-based cross-sectional study. *BMC Pregnancy Childbirth* 2016; 16(1): 340.
2. World Health Organization Division of Reproductive Health, World Health Organization G. *Safe motherhood -postpartum care of the mother and newborn: a practical guide*. Geneva: World Health Organization Division of Reproductive Health, World Health Organization, 1998.
3. Souza JP, Cecatti JG, Haddad SM, et al. The WHO maternal near-miss approach and the maternal severity index model (MSI): tools for assessing the management of severe maternal morbidity. *PLoS One* 2012; 7(8): e44129.
4. Shrestha P, Mahato V and Karmacharya SS. Postpartum maternal morbidity requiring hospital admission in a teaching hospital: a descriptive cross-sectional study. *J Nepal Med Assoc* 2020; 58(229): 686–689.
5. Latin American and Caribbean Regional Task Force for the reduction of maternal mortality: overview of the situation of maternal morbidity and mortality. *ASHA Lead* 2017; 22(12): 24–26.
6. World Health Organization (WHO). Postnatal care of the mother and newborn 2013. Geneva: World Health Organization, 2013, pp. 1–72, http://apps.who.int/iris/bitstream/10665/97603/1/9789241506649_eng.pdf
7. Vyas N, Kamath R, Pattanshetty S, et al. Postpartum related morbidities among women visiting government health facilities in Udipi Taluk, Karnataka, India. *J Fam Med Prim Care* 2016; 5(2): 320.
8. Vallely L, Ahmed Y and Murray SF. Postpartum maternal morbidity requiring hospital admission in Lusaka, Zambia—a descriptive study. *BMC Pregnancy Childbirth* 2013; 5: 3–8.
9. Mekonnen W, Hailemariam D and Gebremariam A. Causes of maternal death in Ethiopia between 1990 and 2016. *Ethiop J Health Develop* 2019; 32(4): 18.
10. Geller SE, Koch AR, Garland CE, et al. A global view of severe maternal morbidity: moving beyond maternal mortality. *Reprod Health* 2018; 15(Suppl 1): 98.
11. CSA/EDHS. Federal Democratic Republic Of Ethiopia demographic and health survey, 2016, pp. 1–59.
12. Abate T and Kebede B. Prospective study on birth outcome and prevalence of postpartum morbidity among pregnant women who attended for antenatal care in Gondar Town, North West Ethiopia. *Androl Open Access* 2014; 03(02).
13. Talie A, Yekoye A, Alemu M, et al. Magnitude and associated factors of postpartum morbidity in public health institutions of Debre Markos town, North West Ethiopia. *Matern Heal Neonatol Perinatol* 2018; 4(1): 19.
14. Ethiopian Public Health Institute Addis Ababa. Ethiopia mini demographic and health survey. Federal Democratic Republic of Ethiopia, 2019.
15. Maria R, Madeira S, Augusto M, et al. Factors associated with maternal near miss in childbirth and the postpartum period: findings from the birth in Brazil National Survey, 2011–2012. *Reprod Health* 2016; 13(Suppl 3): 115.
16. Elkhoudri N, Amor H and Baali A. Self-reported postpartum morbidity: prevalence and determinants among women in Marrakesh, Morocco. *Reprod Health* 2015; 12: 75.
17. FMOH. Ethiopian Health Sector Transformation Plan 2015/16–2019/20. *Fed Democr Repub Ethiop Minist Heal* 2015; 20: 50.
18. Machiyama K, Hirose A, Cresswell JA, et al. Consequences of maternal morbidity on health-related functioning: a systematic scoping review. *BMJ Open* 2017; 7(6): e013903.
19. Alemu FM, Fuchs MC, Vitale TM, et al. Severe maternal morbidity (Near-miss) and its correlates in the world's newest nation: South Sudan. *Int J Womens Health* 2019; 11: 177–190.
20. Say L, Chou D, Barbours K, et al. Maternal morbidity: time for reflection, recognition, and action. *Int J Gynecol Obstet* 2018; 141: 1–3.
21. Ferdous J, Ahmed A, Dasgupta SK, et al. Occurrence and determinants of postpartum maternal morbidities and disabilities among women in Matlab, Bangladesh. *J Heal Popul Nutr* 2012; 30(2): 143–158.
22. Singh A and Kumar A. Factors associated with seeking treatment for postpartum morbidities in rural India. *Epidemiol Health* 2014; 36: e2014026.
23. Rosendo TS, Roncalli AG and de Azevedo GD. Prevalência da morbidade materna e sua associação com fatores socioeconômicos: Estudo de base populacional em uma capital do nordeste brasileiro. *Rev Bras Ginecol e Obstet* 2017; 39(11): 587–595.
24. Chou D, Tunçalp Ö, Firoz T, et al. Constructing maternal morbidity—towards a standard tool to measure and monitor maternal health beyond mortality. *BMC Pregnancy Childbirth* 2016; 16(1): 1–10.
25. Lee H, So AY, Mansianga P, et al. Factors associated with postpartum health problems among married women of reproductive age in the democratic republic of the Congo: a cross-sectional study in Kenge city. *Afr J Reprod Health* 2019; 23(3): 30–41.
26. Assarag B, Dubourg D, Maaroufi A, et al. Maternal postpartum morbidity in Marrakech: what women feel what doctors diagnose? *BMC Pregnancy Childbirth* 2013; 13: 225.
27. Kebede TT, Godana W, Utaile MM, et al. Effects of antenatal care service utilization on maternal near miss in Gamo Gofa zone, southern Ethiopia: retrospective cohort study. *BMC Pregnancy Childbirth* 2021; 21(1): 1–9.
28. Borde MT, Loha E and Lindtjörn B. Incidence of postpartum and neonatal illnesses and utilization of healthcare services in rural communities in southern Ethiopia: a prospective cohort study. *PLoS One* 2020; 15: e0237852.