

# Prevalence of Stillbirth and Associated Factors among Immediate Postpartum Mothers at Bahir Dar, Felegehiwot Hospital, Northwest Ethiopia: Cross-sectional Study

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**Abstract:** Background: Stillbirth rates are among the indicators of maternal and child health care quality in the countries. However, the majority of neonatal deaths and almost all stillbirths were underreported in Ethiopia. Therefore, this study aimed to determine the prevalence of stillbirth and associated factors among immediate postpartum mothers in the study area. Methods: An institution-based cross-sectional study was employed at Felegehiwot comprehensive specialized hospital from March to May 2016 (n=310). A pretested structured interviewer-administered questionnaire and medical chart reviews were used to collect data from immediate postpartum mothers. Data were entered into Epi Info version 7 and analyzed using SPSS version 20. The binary logistic regression model fitted to identify stillbirth; adjusted odds ratio (AOR) with a 95% confidence interval (CI) was computed to assess the strength of association. Variables having less than 0.05 p-value of in the multivariable considered as factors associated with stillbirths. Result: The prevalence of stillbirth was 8.7% (95%CI: 5.8, 12.4). Rural dwelling (AOR=2.86, 95%CI: 1.10 7.47), twin pregnancy (AOR=6.69, 95% CI: 1.77, 25.2), medical or obstetrical illnesses during pregnancy (AOR=5.54, 95%CI: 1.71 17.94) and complications during labor and delivery (AOR=4.96, 95%CI: 1.48 16.58) were factors associated with stillbirths. Conclusion: This study revealed that the magnitude of stillbirth was high in rural dwelling, twin pregnancy, medical or obstetrical illnesses during pregnancy, and complicated labor were associated with increased occurrences of stillbirth. This finding suggests that particular emphasis on rural dwellers and strengthening quality of Maternal in pregnancy and labor delivery service and proper following during labor attending process are mandatory to reduce stillbirth.

**Keywords:** Stillbirth, Immediate Postpartum Mothers, Felegehiwot Referral Hospital

## 1. Introduction

The World Health Organization (WHO) defines stillbirth as a baby born with no signs of life at or after the age of viability (after 28 weeks of gestation) [1]. Stillbirths are the highest rates of all the adverse pregnancy outcomes and most common in developing countries [2]. Globally, about 4million stillbirths occurred every year, of which half-million stillbirths happened at the time of labor, of which also most cases occurred in developing countries [3]. In Sub-Saharan

Africa, stillbirths accounted for more than 3% of all deliveries annually [4]. According to recent shreds of evidence, the average stillbirth rate in developing countries was found to be 26 per 1000 births, which is five times higher than in developed countries [5, 6]. Stillbirths occurred during the period of perinatal, of which half of all stillbirths occurred in the intrapartum period of labor and delivery [7]. Stillbirth rates are among the indicators of antenatal and obstetric care quality at health facilities' [8].

Reports of stillbirths and mortality usually came from

officially registered deaths; however, most of the cases remained under reported and majority of stillbirths registered as intrauterine deaths. Low institutional delivery and poor health information system are the main reasons for the underreporting of still birth and neonatal mortality in developing countries [9-11]. Moreover, isolation of mother and newborn during the postpartum period, the norm of acceptance to newborn death as normal in the community, and low utilization of vital registration in the country were also factors responsible for low reporting of stillbirth [12].

Characteristics like age, marital status, occupation and residence, parity, previous stillbirths, obstetrical infections, fetal presentations, and obstetric complications were determinants [13-15]. Health service factors (prenatal and intrapartum labor management) are also associated with stillbirth and other adverse birth outcomes [10]. Interventions like focused antenatal care (ANC), enhancing institutional delivery, and providing MCH services free of charge were designed to reduce stillbirth incidence and occurrence. Though different studies conducted to assess the rate of stillbirth [17], there is scarcity of information in the study area regarding the magnitude and determinants of stillbirths.

Hence, this study is important to reduce adverse birth outcomes through evidence-based interventions in the health care system.

## 2. Methods

### 2.1. Study Setting

The study was conducted in Bahir Dar town Amhara regional state, northwest Ethiopia. It is the capital city of Amhara regional state and is located 565 Km from Addis Ababa in northwest Ethiopia. According to the Amhara Bureau of finance and economic development 2016 projection, the town hosts 277,566. There are six governmental health centers, one comprehensive specialized hospital, and five higher private clinics in this town. Regarding maternal health services of Felegehiwot comprehensive specialized hospital has obstetrics, high risk, and gynecology wards used for pregnant women admission and treatment. It serves more than five million people in the catchment area and neighboring regions, and according to the hospital statistics office report, on average, about 6000 deliveries reported annually.

### 2.2. Study Design and Period

A facility-based cross-sectional study design was employed at Bahir Dar Felegehiwot comprehensive specialized hospital from March 10 to May 10, 2016.

### 2.3. Population and Sample

All participants who gave birth after 28 weeks of age completed at Felegehiwot comprehensive specialized hospital were the source the population for this study.

The participants were determined using a single population proportion formula. The following assumptions of the

percentage of stillbirth from previous studies were 7.1% ( $P=0.071$ ) [16], 3%= $0.03$ ) margin of error, 95% confidence interval (CI) and took a 10% no-response rate. The final 310 study participants selected by systematic random sampling technique.

### 2.4. Data Collection Procedure

Initially, the survey was prepared in English, and then translated to the local language (Amharic) and back to English by a language expert to check its consistency. Data about maternal socio- demographic, clinical, and obstetrical attributes collected through interviewer-administered structured questionnaire and chart reviews. Three midwives for data collection and supervision were recruited, and one-day training was given on how the study's objective and how to collect it from immediate postpartum mothers in stable conditions after delivery and before leaving the maternity room. Daily, the principal investigator and supervisor checked completeness and consistency of collected questionnaires.

### 2.5. Operational Definitions

Obstetric labor complications are difficulty or abnormality that arises during labor and delivery [17] Medical or obstetrical illnesses: when medical diseases or obstetrical illnesses occurred during pregnancy time.

Low birth weight: when a newborn weight is below 2500 grams.

Preterm: when a birth takes place before the expected due date that 36 weeks of gestational age.

### 2.6. Data Processing and Analysis

Data were coded and entered into Epi Info version 7 and exported to SPSS version 20 for further processing and analysis. Descriptive statistics such as mean, median, proportions were carried out, and text, graph, and tables were used to present the data. The binary logistic regression model was fitted to identify factors associated with stillbirth. Crude and Adjusted Odds ratio with 95% CI were used to describe the strength of association between outcome and predictor variables.

Variables with a p-value of less than 0.05 in the multivariable model considered as statistically significantly associated with stillbirth.

### 2.7. Ethical Considerations

Ethical approval was obtained from the ethical committee of the College of Medicine and Health Sciences, Bahir Dar University. A letter of permission was also obtained from Amhara Regional State Health Bureau and Felegehiwot Comprehensive Referral Hospital. Verbal consent was used because of the low literacy level in the community as well as some participants are uncomfortable to sign form. Similarly; the participants were informed about the purpose of the study. Participants were also informed on data confidentiality issues, on a voluntary basis and they can refuse from the study at

any time if they are not comfortable on the questionnaire at any steps.

### 3. Results

#### 3.1. Socio-demographic Characteristics

A total of 310 immediate postpartum mothers were

included with the response rate of 100%. The mean (SD) age of mothers was 26.6 ( $\pm 5$ ) years, most (94.5%) of them were married, 60.6% were urban dwellers, and 68.1% of mothers were housewives. More than one-third (38.4%) of respondents had no formal educational status, and the majority (87.1%) were Christians (Table 1).

**Table 1.** Socio-demographic characteristic of mothers who gave birth at Bahir Dar Felegehiwot Referral Hospital, 2016 (n=310).

Characteristics	Frequency	Percentages
Age		
<20	15	4.8
20-34	261	84.8
>35+	34	11
Marital status		
Married	274	88.4
Single	36	11.6
Residence		
Rural	122	39.4
Urban	188	60.6
Educational status		
No formal education	119	38.4
Primary and secondary school	105	33.9
College and above	86	27.7
Income level in ETB		
<1500	167	53.9
1500-2500	80	25.8
>2500	63	20.3
Religion		
Orthodox	270	87.1
Muslim	37	11.9
Others	3	0.9
Occupation		
Housewife	214	68.9
Employed	90	29.1
Other	6	2.2

#### 3.2. Obstetrics Related Characteristics

More than half (56.5%) of mothers were multiparous, most (84.6%) had inter parity interval of  $\geq 2$  years, 91% had at least one ANC follow-up, and 89% of pregnancies were also wanted, planned and supported. Nearly half (47.4%) of mothers had at least one confirmed medical or obstetrical illnesses of which, 26.5%, 15.4%, 12.8%, and 12.1% were pregnancy-induced hypertension, ante partum hemorrhage, Rh-immunization, and premature rupture of membrane (PROM), respectively. In addition, nearly three-fourth (72.5%) of the mothers were delivered at term (after completed 37 weeks), 16.2% were preterm, and the remaining were post-term gestational age at delivery. Historically, 11% of women experienced a stillbirth in the past births (Table 2).

Status of labor, delivery and birth outcomes

The majority (89.0%) of labor initiated spontaneously, of which 53.5% mothers gave birth through spontaneous vaginal delivery, 38.4% were cesarean section mode, 93.9%

were single, and 63.2% were newborns were males. Two-third (67.7%) of laborers were followed by using Partograph, and more than half (52.5%) had one or more labor complications. Non reassuring fetal heart rate patterns, prolonged labor, and mal-presentation were the most commonly identified complications, and 23.5% of newborns had low birth weight. This study showed that 30.6% of mothers had an adverse birth outcome, of which low birth weight (23.5%), prematurity (15.8%), and the remaining were stillbirths.

This study showed that stillbirth's magnitude was 8.7% with (95%CI: 5.8% to 12.4%). The rates of stillbirth concerning vaginal and cesarean section were 7.8% and 10.1%, respectively. Also, there is a significant difference in the stillbirth rate about maternal age, of whom the rate of stillbirth was 24.3% among women aged above 35 years ( $P < 0.0001$ ). Of total stillbirths, about 59.7% had a preceding positive heartbeat at admission and subsequently ended up with fetal death (Table 3).

**Table 2.** Obstetrics and related characteristics of mothers who gave birth at Bahir Dar Felegehiwot comprehensive specialized hospital, 2016 (n=310).

Characteristics	Frequency	Percentages
Condition of current Pregnancy		
Planned, wanted and supported	264	85.2
Unplanned	46	14.8
Current pregnancy birth interval (n=175)		
<2 years	27	15.4
≥2 years	148	84.6
Parity		
1	140	45.2
2-4	138	44.5
>5+	32	10.3
Previous history of stillbirth		
Yes	34	11.0
No	276	89.0
Gestational age in weeks		
Term	225	72.5
Preterm term	49	16.2
Post-term	36	11.6
ANC follow up		
Yes	282	91.0
No	28	9.0
Obstetric complications		
No	163	52.6
Yes	147	47.4
Obstetric and medical illness (n=147)		
Pregnant induced Hypertension	38	26.2
Hydrations	13	7.4
Gestational diabetes mellitus	5	3.4
Ante partum haemorrhage	20	15.4
RH-factor	19	12.8
HIV	13	8.8
A nemia	9	5.4
PROM	18	12.1
Previous caesarean section	9	6.0
Others*	11	4.0

Note: Others\* chorioaminitis, IUGR (intrauterine growth restriction)

**Table 3.** Labor and delivery related characteristics of mothers and birth outcome at Bahir Dar Felegehiwot Comprehensive Specialized Hospital, 2016.

Characteristics	Frequency	Percentage
Labour complications		
Yes	163	52.6
No	147	47.4
Labor complications (n=163)		
Non reassuring fetal heart rate pattern	50	15.5
Prolonged labour	48	16.1
Mal presentation	25	8.1
Obstructed labour	11	3.5
Malposition	8	2.6
Uterus rupture	10	3.2
Others*	11	3.6
Status of labour		
Spontaneous	276	89.0
Induced /augmented	34	11.0
Sex of newborn		
Male	196	63.9
Female	114	42.1
Mode of delivery		
Caesarean section	119	38.4
Instrumental	25	8.1
Spontaneous vaginal delivery	166	53.5
Weight of newborn		
<2500 gram	73	23.5
25000-4000 gram	224	72.3
≥4000 gram	13	4.2

Note: others\*. Cord prolapsed, chorioaminitis.

### 3.3. Factors Associated with Stillbirth

From the binary logistic regression analysis factors like rural dwelling, multiple pregnancies, illness during pregnancy, labor complications were significantly associated with a stillbirth at 0.05 p-value in the multivariable analysis. Thus, women who were rural dwelling, the odds of stillbirth were 2.86 times higher than those in urban dwellers (AOR=2.86, 95%CI: 1.10 7.47).

Those mothers who had confirmed medical or obstetrical

illnesses during pregnancies found the odds of stillbirth were 5.54 times higher than those who had no such history (AOR=5.54, 95% CI: 1.71-17.94). Similarly, women who had twin pregnancies, the odds of Stillbirths were 6.69 times higher than those who had singleton (AOR=6.69, 95%CI: 1.77 25.2). Moreover, those who had complications during labor and delivery, the odds of stillbirth were 4.96 times higher than those who had no such events (AOR=4.96, 95%CI: 1.48 16.58) (Table 4).

**Table 4.** Bi-variable and multivariable logistic regressions on different variables towards stillbirth in postpartum mother who gave birth at Felegehiwot Referral Hospital, 2016 (n=310).

Variables	Stillbirth		Crud OR (95% CI)	Adjusted OR (95%CI)
	Yes	No		
Age of mother				
18-34	18	255	1	1
35+	9	28	4.55 (1.86 11.05)	3.27 (0.92 11.61)
Sex of newborn				
Male	21	175	1	1
Female	6	108	0.46 (0.18 1.18)	0.44 (0.15 1.29)
Residence				
urban	9	179	1	1
Rural	18	104	3.44 (1.49 7.94)	2.86 (1.10 7.47)*
Mode of delivery				
Vaginal	15	176	1	1
Cesarean section	12	102	1.34 (0.59 2.91)	0.41 (0.13 1.27)
Illness during pregnancy				
No	5	158	1	1
Yes	22	128	5.56 (2.04 15.10)	5.54 (1.71 17.94)*
Type of pregnancy				
Single	21	270	1	1
Twin	6	13	5.93 (2.04 17.20)	6.69 (1.77 25.2)*
Parity				
Primiparous	9	131	1	1
Multiparous	13	125	1.51 (0.62 3.66)	1.24 (0.43 3.51)
Grand multiparous	5	27	2.69 (0.83 8.67)	0.51 (0.09 2.85)
Labor complications				
No	6	138	1	1
Yes	21	145	3.33 (1.30 8.49)	4.96 (1.48 16.58)*
History of stillbirth				
No	20	255	1	1
Yes	7	28	3.18 (1.23 8.20)	1.98 (0.54 7.23)

\* Showed statistical significance at 0.05 p-value

## 4. Discussion

The prevalence of stillbirth in this study was 8.7%, with (95% CI: 5.8% 12.4%). This finding was consistent with the results from hospitals in Ethiopia ranged from 6% to 7.72% [8, 9, 12, 18]. However, this finding was higher than results from Tanzania (3.6%) [19], Zambia (3.4%) [14], Ghana (2.39%) [20], Malawi (3.6%) [21], Nigeria (2.34%) [22], and Gamo Gofa, Southern Ethiopia (1.9%) [23]. Also, this finding was higher than the EDHS 2011 report of 1.8%, 11.7 per 1000 births EDHS 2016 [24], and different systematic reviews from sub-Saharan A African countries of the prevalence of stillbirth ranged from 2.1 to 3.3% [3, 25]. The possible explanations for the observed variations might be the quality of health services, socio-cultural factors, and health-seeking behavior. Besides, there were methodological

differences between studies where a community- based study underestimated the prevalence and was often characterized by under-reporting of stillbirth in the community. Furthermore, most of the referral and specialized hospitals' deliveries are complicated and transferred from other primary health facilities that might increase the probabilities of stillbirths. Despite, better health services and highly skilled professionals in the hospitals, delays from mother's health-seeking behaviors and poor referral systems in the lower health facilities contributed to the increased rate of stillbirth in the health facilities.

This study also revealed that the magnitude of adverse birth outcomes was 30.6%, and the rate of cesarean section mode of delivery was 38.4%, which is higher than the WHO recommendation of 5-15%. The magnitude of adverse birth outcomes was consistent with those findings in Wollo,

Ethiopia (27.5%) [12]. However, this study result was higher than previous studies of 24.5% Hosanna [22] and 23% in Gondar, Ethiopia [16]. These could be due to socio-demographic variations, health-seeking behaviors, and clinicians' professional expertise for managing labor and delivery at health facilities.

This study also revealed that rural dwelling, medical or obstetrical illnesses, multiple pregnancies, and obstetric complications during labor and delivery were predictors of stillbirth. Thus, those mothers who came from rural areas had a three times higher probability of stillbirth than urban residents. This finding was consistent with those studies from Zimbabwe [26] and Ghana [20]. Rural areas are often associated with low quality of health services, including and maternal health care. Besides, most mothers were referred from remote areas with inadequate monitoring of labor during ambulance travel.

Women who had confirmed medical or obstetrical illnesses during pregnancy were associated with stillbirth occurrence compared to those who had no such history. This finding was in line with previous studies in Nigeria and Ethiopia [16, 22, 27]. These could be because of diseases such as infections of HIV, anemia, and APH are often associated with increased stillbirth.

On top of that, complications during labor and delivery associated with increased stillbirth occurrence compared to those women who had normal labor and delivery. This finding was also comparable with the study done in Mekelle, Ethiopia [9].

Complications during labor and delivery might induce intra-uterine oxygen inadequacy, which leads to fetal distress, which leads to stillbirth. This finding was in line with another result in India, and Gambia [28, 29].

About 59.7% stillbirths occurred during the intrapartum period, which can be prevented through appropriate intrapartum care during labor and prompt treatment of complications like preterm labor, the prolonged second stage of labor, and mechanical factors. In addition, non reassuring fetal heart rate had a significant association with stillbirth outcomes. These results are supported by a systematic review done from sixteen hospitals and community based prenatal mortality studied in Ethiopia [3, 6] and agrees with other reports [11, 30, 31]. Therefore, identification and management of the complications and provision of care by skilled healthcare providers avail ability and utilization of comprehensive emergency obstetric care may improve and keys to reducing stillbirths.

Consequently, there is a need to reinforce and strengthen health workers' abilities to accurately monitor women in labor at all levels of care for early identification and management of complications. This includes early referral if a woman is at a health center has complications during antenatal follow up and labor delivery process.

Likewise, this study also revealed that multiple pregnancies were associated with an increased stillbirth occurrence compared to singleton birth. The reason could be intrauterine growth restrictions and congenital disabilities

and mechanical factors that are common in multiple pregnancies, which increases the vulnerability of stillbirth. In addition, multiple pregnancies require particular medical interventions, and providing quality of health service that are more accessible and available in our study area. This result is in agreement with findings in northwest Ethiopia [13] and other studies [8, 9, 18].

## 5. Limitations

Firstly, since it was based on an institutional study, it is difficult to generalize the community as the study was in a referral hospital. It may overestimate the stillbirth rate and not show the real picture of these stillbirth outcomes areas. Secondly, this study also shared the limitations of cross-sectional studies and hence may not be possible to establish a cause-effect relationship between stillbirth and explanatory variables.

## 6. Conclusions

The magnitude of stillbirth in this study was high. Rural dwelling, twin pregnancy, medical or obstetrical illnesses during pregnancy, and complicated labor associated with increased stillbirth. This finding suggests that particular emphasis on rural dwellers and strengthening quality of MCH service and proper management of labor is mandatory to reduce stillbirth.

## Declarations

### Abbreviations

ANC: Antenatal Care, AOR: Adjusted Odds Ratio, CI: Confidence Interval, EDHS, Ethiopia Demography and Health Survey, IUFD: Intra-Uterine Fetal Death, PROM: Premature Rupture of Membrane, SD Standard Deviation, and SPSS: Statistical Package for Social Science, WHO: World Health Organization

### Consent for Publication

Not applicable.

### Availability of Data and Material

Data will be shared upon reasonable request from the corresponding author.

### Authors' Contributions

AM conceived the study. AM, and MA, equally participated in the design, data collection, statistical analysis and writing-up of the manuscript. All authors read and approved the final manuscript

### Opposed Reviewers

There is no opposed reviewer for this manuscript except the authors of it: Agerie Mengistie (MSc), Lecturer, Teda

Health Science College, Gondar, Ethiopia; and Mulusew Andualem Asemahagn (PHD), Lecturer, School of Public Health, College of Medicine and Health Science, Bahir Dar University, Bahir Dar, Ethiopia.

### Study's Contributions

Prevalence of stillbirth and determinates factors is still challenge and has not reduced, in Ethiopia. As result it needs, credible evidence on the status of Prevalence of stillbirth and its associated factors. Hence, institutional based researches on immediate postpartum mothers are very important to generate baseline information for policies makers in the health systems and inform researchers for further study. Moreover, findings of cross-sectional studies are important for new design approach for providing maternal and child health services. Therefore, this study was aimed to assess the prevalence of stillbirth and associated factors among immediate postpartum mothers at Felegehiwot comprehensive specialized hospital, northwest, Ethiopia.

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### Competing Interest

The authors declared that they have no competing interests.

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