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# Timely initiation of breastfeeding and its associated factors among immediate postpartum mother-newborn pairs in Debre Tabor comprehensive specialized hospital, South Gondar Zone, North West, Ethiopia

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## Abstract

**Background** Initiation of breast feeding within one hour of birth is the easiest and most cost-effective intervention to reduce the risk of neonatal morbidity and mortality. Conducting studies immediately after an hour of birth for the timely initiation of breastfeeding has the significance of initiating breastfeeding and acting immediately. However, there was a paucity of information in the region as well as in the country at large. Therefore, the aim of this study was to assess the magnitude of timely initiation of breastfeeding and its associated factors among immediate postpartum mother-newborn pairs in Debre Tabor comprehensive specialized hospital, northwest Ethiopia, in 2024.

**Method** An institutional-based cross-sectional study was conducted from October 25, 2023, to January 25, 2024, at Debre Tabor Comprehensive Specialized Hospital. A total of 478 immediate postpartum mothers were selected at birth using systematic random sampling techniques. Data were collected using chart reviews, interviewer-administered questionnaires, and through observation. Data entry and analysis was performed by Epi-Data version 4.6.02 and Statistical Package for Social Sciences version 25 (SPSS) software respectively. Descriptive statistics were computed to determine the frequency of variables. After doing a binary logistic regression analysis, a *p*-value less than 0.25 indicated a potential candidate for multivariable analysis aimed at identifying statistically relevant factors. Both crude and adjusted odds ratios (AOR) were computed, and the levels of significance were declared based on the AOR with a 95% confidence interval (CI) at a *p*-value < 0.05.

**Results** In this study, the prevalence of timely initiation of breastfeeding was 73.7% with a 95% CI (69.65%, 77.67%). Being multiparous (AOR: 2.25, 95% CI: 1.32, 3.84), receiving counseling immediately after delivery (AOR: 4.19, 95% CI: 2.20, 7.98), receiving support and guidance from health care providers (AOR: 1.95, 95% CI: 1.01, 3.77), having no obstetric complications during and immediately after delivery (AOR: 4.44, 95% CI: 2.34, 8.42), and practicing rooming-in (AOR: 3.65, 95% CI: 2.05, 6.51) were significantly associated variables with timely initiation of breast feeding.

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**Conclusion** The overall timely initiation of breastfeeding in this study was lower than the World Health Organization's recommendations. Therefore, interventions need to focus on mothers who developed obstetric complications, primiparous mothers, improper rooming-in, a lack of advice immediately after delivery, and the support and guidance of mothers on the timely initiation of breastfeeding to improve the timely initiation of breastfeeding practice.

**Keywords** Breastfeeding, Ethiopia, The timely initiation of breastfeeding, Mother-newborn pair

## Introduction

Timely initiation of breastfeeding (TIBF) is defined as putting the newborn immediately after delivery in skin-to-skin contact and initiating breastfeeding within one hour of life [1]. Delayed initiation of breastfeeding is defined as the mother not initiating breastfeeding within one hour of delivery [2].

Globally, every year, over 2.4 million babies die in their first month of life, with up to 62.5% of those deaths occurring during the first 24 h of life, and almost all are caused by treatable conditions like diarrhea, sepsis, meningitis, and pneumonia due to delayed initiation of breastfeeding [3]. Despite significant evidence stating many advantages of the timely initiation of breastfeeding, there has been little global enhancement in its adoption. In a review of data from UNICEF in 2017, only 45% of newborns in the world had initiated breastfeeding within one hour of birth [4]. According to a WHO report for 2020, Sub-Saharan Africa had the highest neonatal mortality rates in the world (27/1000 live births), with 43% of global newborn deaths (17/1000 live births) [5]. In Sub-Saharan African countries, the practice of timely initiation of breast feeding was 57%, with the highest proportion in Burundi (86%) and the lowest proportion in Congo Brazzaville (24%) [6].

Newborns who are not put to the breast within the first hour of life face a higher risk of morbidity and mortality [7]. There is a dose–response relationship; that is, the longer the newborn waits to initiate breastfeeding, the greater the risk of neonatal mortality [8]. Evidence indicated that newborns who initiated breastfeeding after one hour of birth had a 33% higher risk of neonatal mortality, and if they continued for more than 24 h, they had double the risk of neonatal mortality [9].

In Ethiopia, neonatal mortality showed progress from 37 in 2011 to 29 in 2016 per 1000 live births, yet it has risen again to 33 deaths per 1000 live births in 2019, and the Amhara region had the 2nd highest neonatal mortality, which was 46% in 2019 [10]. However, the second health sector transformation plan (HSTP-II) targets that neonatal mortality could be reduced from 33 to 21 per 1000 live births by 2025; this can be achieved by practicing timely initiation of breast feeding [11].

Timely initiation of breastfeeding is necessary for stimulating milk production and establishing maternal

breast milk supply, which lowers the risk of neonatal mortality throughout the neonatal period and beyond [12]. It is the most effective intervention and prevents over 800,000 neonatal deaths annually, increases cognitive development, boosts the immune system, and prevents sepsis, diarrhea, and respiratory disease [13]. Furthermore, it decreases the risk of stunting in under-five children by 31.1% and averts neonatal mortality by 22% by serving as the baby's first “immunization” against infection and disease [14].

In Ethiopia, the timely initiation of breastfeeding practice varies from time to time. According to the Ethiopian demographic health survey report, the practice of timely initiation of breast feeding was 73% in 2016 and 72% in 2019, and the Amhara region was the 2nd lowest region in the practice of TIBF, which was 66% in 2016 and 61.2% in 2019 [10].

Timely initiation of breastfeeding has a significant contribution to the reduction of newborn mortality and morbidity [15], yet a variety of factors have been found to affect TIBF. Sociodemographic factors such as male-sex children, maternal age less than 20 years old, and rural residence hindered the timely initiation of breast feeding [16, 17]. On the other hand, factors like secondary and higher education, first birth order, counseling about TIBF during the antenatal visit and immediately after delivery, immediate skin-to-skin contact, multiparty antenatal follow-up, exposure to media, and planned pregnancy facilitate the timely initiation of breastfeeding practice [18, 19].

In light of the numerous advantages breastfeeding offers the baby, mother, and community, various efforts have been launched to enhance the prompt commencement of breastfeeding. Some of these initiatives are the international code of marketing of breast milk substitutes [20], the baby-friendly hospital initiative [12], the national nutrition program-II, and the Sustainable Development Goals (SDG) [21]. The Ethiopian government has endorsed and implemented the above mentioned policies and programmers' to reduce infant and child mortality and morbidity related to inappropriate breastfeeding practices in the country since 2004 [22]. Subsequently, community health extension workers and other healthcare providers have provided various

interventions, such as breastfeeding promotions at health facilities and in the community.

However, the rate at which the timely initiation of breastfeeding has failed to achieve the national health sector transformation plan and WHO global target [23, 24]. This may be the result of initiatives that lack systematic evidence on the level of current practice and scientific prospective primary data and also because there is limited study within one-hour initiation of breastfeeding in Ethiopia and particularly the study area. Furthermore, there is variation in the prevalence and related factors of timely initiation of breastfeeding in various parts of Ethiopia in previous studies due to the fact that information was not collected at a logical time, which leads to an information gap regarding the prevalence and related factors of timely initiation of breastfeeding. Additionally, no prior research has been done in any of our study regions, particularly in south Gondar, thus in order to address this, we would like to choose the most representative location. Since the current study was conducted on immediate postpartum mothers, data were collected immediately after one hour of delivery, which could provide a better understanding of factors that contribute to the initiation of breastfeeding and also provide information for delivery and prompt action.

Knowing the practice of timely initiation of breastfeeding within hours of birth allows researchers to identify factors that can be targeted for intervention and are important for the implementation of the SDG and HSTP-II. Therefore, this study aimed to minimize this gap and find out intervention areas that need improvement by assessing the timely initiation of breastfeeding and its associated factors among immediate postpartum mother-newborn pairs in Debre Tabor Comprehensive Specialized Hospital, South Gondar Zone, Northwest Ethiopia, 2024.

## Methods and materials

### Study design, setting, and period

An institutional based cross-sectional study was conducted at the Debre Tabor comprehensive specialized hospital in Debre Tabor town, northwest Ethiopia, from October 25, 2023, to January 25, 2024. Debre Tabor is the administrative town of the South Gondar zone, which is located 666 km away from Addis Ababa. The

hospital currently serves approximately 3.5 million people in its catchment area and is used as a teaching hospital for different disciplines of medical and health sciences students at Debre Tabor University. The hospital employed around 434 workers, with 296 of them being technical and 138 being supportive. The hospital has six admission wards (medical, surgical, gynecology and obstetrics, pediatrics, neonatal, and psychiatric) [25]. The department of obstetrics and gynecology has maternity, high-risk, and labor wards. The labor ward provides services for approximately three hundred twenty deliveries per month. According to the average annual delivery report, 3900 mothers give birth in the hospital every year.

### Source population, study population, eligible

All immediate postpartum mother-newborn pairs in the Debre Tabor comprehensive specialized hospital were the source population. All immediate postpartum mother-newborn pairs in the Debre Tabor comprehensive specialized hospital who were available during the data collection period were the study population. All immediate postpartum mother-newborn pairs in the Debre Tabor comprehensive specialized hospital who were available during the data collection period were included. Mothers admitted to the intensive care unit immediately after they gave birth or were unconscious, mothers who gave birth by caesarean section (C/S), and newborns admitted to the neonatal intensive care unit immediately after delivery were excluded.

### Sample size determination

The sample size for this study was determined by using a single population proportion formula for the first objective by considering the following assumptions: a 75.4% proportion of timely initiation of breastfeeding from a previous cross-sectional study at Bahir Dar town, Ethiopia [26], a 95% level of confidence, and a 5% margin of error.

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

Where  $n$  = required sample size

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$Z_{\alpha/2}$  = Confidence level of the study = 1.96 at standard normal distribution curve value for 95% confidence level

$P$  = proportion of TIBF

$d$  = margin of error

$$n = \frac{(1.96)^2 \cdot 0.754(1 - 0.754)}{(0.05)^2} = \frac{3.84 \times 0.1855}{0.0025}$$

$n = 284.93 \sim 285$

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Finally, by considering a 10% non-response rate, the final sample size was 314.

The sample size for the second specific objective was also calculated by taking statistical assumption 95%CI, 80% power and using the computer software Epi-Info Version 7.2.4.5 for factors associated with TIBF then after determining the first and second objective sample sizes, a big sample size is selected, and an additional 10% non-response rate is added (supplement file 1).

### Sampling technique

The sampling technique was based on an estimate of the hospital's prior monthly delivery service and an average of 320 deliveries per month from hospital data. According to the previous three-month data survey, there were 960 mothers who gave birth in the Debre Tabor comprehensive specialized hospital. Eligible study participants were selected immediately after they gave birth by a systematic random sampling technique using a delivery registration book as an order. By considering this, the K (interval) value was  $= >N/n = >960 / 478 \rightarrow 2$ . The lottery method was used to select the first mother then the selection proceeded with every two mother's intervals until the required sample size was obtained.

### Study variables

The dependent variable was timely initiation of breastfeeding (yes/no) and socio-demographic related factors: maternal age, marital status, educational status of mother and husband, occupational status of mother, religion and place of residence, Obstetric and health service related factors: pregnancy intendedness, parity, birth order, ANC follow-up, place of ANC follow-up, number of antenatal visits, counseling on TIBF during ANC, gestational age at birth, time of delivery, mode of delivery, type of birth, counseling on TIBF immediately after delivery, delayed cord clamping, newborn cry immediately, skin-to-skin contact, and obstetric complications.

Social communication exposure related factors: participation in pregnant women's conferences or forums; mass media exposure about TIBF. provider-related factors: support and guidance provided by health care providers on TIBF, rooming-in practice, and birth attendants. maternal health and newborn-related factors: sex of the newborn, Apgar score, birth weight, maternal HIV status, and breast diseases (supplement file 2).

### Operational definitions

Timely initiation of breastfeeding: refers to a mother who put her baby to breast and initiated breastfeeding within one hour of birth [27].

Media exposure: refers to the mother listening to the radio or watching a television program about the timely initiation of breastfeeding [28].

Rooming-in: Keep the mother and newborn together to facilitate breastfeeding [12].

Health care provider guidance and support: health care professionals who assist the mother and newborn for proper attachment and positioning to initiate breastfeeding within one hour of birth [29].

Family support: any attendant who encourages, assists, and shares experience with the mother to initiate breastfeeding within one hour [26].

Delayed cord clamping is defined as waiting for 1–3 min after newborn birth [30].

Obstetric complications: defined as at least one of the obstetric problems that occurred during and immediately after delivery [31].

### Data collection tool and procedure

#### Data collection tool

A structured interviewer-administered questionnaire, a chart review, and observational checklist tools were used to collect data. The tool was adapted from previous literature [27, 28, 32–37] and it consists of five parts. The first part contains information about the socio-demographic characteristics of the respondent. The second, third, fourth, and fifth contain obstetric and health service-related factors, social and behavioral change communication exposure, newborn-related factors, and provider-related factors, respectively.

#### Data collection procedure

Data were collected through face-to-face interviews, observation, and chart reviews. Amharic versions of the questionnaire were used after forward and backward translation by two different personnel. Four non-employed graduate midwives were recruited as data collectors and one MSc midwife as supervisor. Mothers were recorded right at birth, and then data collection was started immediately after one hour of birth. The interview data collection method was used to determine the outcome variable immediately after one hour of birth, and observational and chart reviews were used to collect other information. The variables collected by observation were the time of birth, newborns immediately crying, and delayed cord clamping. The observation was a non-participatory observational type, and sampled mothers were observed at birth. After finishing data collection, data collectors counseled each mother on good attachments, positioning of breast feeding, and exclusive breastfeeding, and if the newborns did not initiate

breastfeeding, the data collectors encouraged the mother to initiate breastfeeding.

#### Data quality control

To assure data quality, the questionnaire was first prepared in English, then translated to the local language (the Amharic), and again translated back to English by experts to check its consistency. The Amharic version of the questionnaire was used for actual data collection. A pre-test was done on 5% of the sample size before the actual data collection at Felege Hiwot Referral Hospital to assess the clarity of the questionnaire by study participants, language clarity, and appropriateness of the questionnaire. Then modifications were made accordingly. Training was given to the data collectors and supervisor by the principal investigator for two days about the aim of the study, the data collection tool, how to obtain information from study participants, sampling technique, data handling, ethical consent, and the quality of data collection. Each data collector checked the questionnaires for completeness immediately after collecting the data and each questionnaire was reviewed daily by the supervisor to check for its completeness, and early corrections of the data were made.

#### Data processing and analysis

Collected data were checked, coded, and entered into Epi-Data version 4.6.0.2, then exported to the statistical package for social sciences (SPSS) version 25 for analysis. Both descriptive and analytical statistical procedures were utilized. Descriptive statistics were computed, like mean, frequency, and percentage, and the results were presented using text, table, and figure based on the data type. The assumptions of the Chi-square test were checked for each categorical independent variable. The model goodness of fit was checked using the Hosmer-Lemeshow goodness of fit test ( $p$ -value = 0.506), and multicollinearity was checked using the variance inflation factor. We utilize a cut of point  $> 10$  to declare multicollinearity, however there is none in our data. A binary logistic regression model was performed to assess the association between the dependent and independent variables. All variables with a  $p$ -value less than 0.25 in bivariable analysis were entered into multivariable analysis. Finally, in multivariable analysis, the results of the final model were expressed in terms of the adjusted odds ratio (AOR) with 95% confidence intervals (CI), and  $P$ -values of less than 0.05 were used to declare the association and statistically significant factors of the outcome variable.

**Table 1** Socio-demographic characteristics of study participants in Debre Tabor comprehensive specialized hospital, northwest, Ethiopia 2024 ( $n = 467$ )

Variables	Categories	Frequency	Percentage (%)
Age of the mother	15–24	58	12.4%
	25–34	361	77.3%
	$\geq 35$	48	10.3%
Residence	Rural	131	28.1%
	Urban	336	71.9%
Marital status	Married	411	88.0%
	Unmarried	56	12.0%
Religion of the mother	Orthodox Christian	331	70.9%
	Muslim	117	25.0%
	Protestant	19	4.1%
Occupation of the mother	House wife	268	57.4%
	Government employee	84	18.0%
	Private/NGO employee	47	10.1%
	Merchant	46	9.9%
	Others <sup>a</sup>	22	4.7%
Educational status of the mother	No formal education	53	11.3%
	Primary school	79	16.9%
	Secondary school	100	21.4%
	college and above	235	50.3%
Husband educational status	No formal education	34	7.3%
	Primary school	41	8.8%
	Secondary school	114	24.4%
	college and above	278	59.5%

<sup>a</sup> student, daily labor

## Results

### Socio-demographic characteristics

Among 478 eligible mothers in this study, 467 mothers participated in the study, making the response rate 97.7%. The mean age of the mothers was 29 (SD  $\pm$  4.27) years. More than three-fourths (77.3%) of mothers were within the age group of 25–34 years. About 336 (71.9%) of the study participants were from urban areas, and the majority (88.0%) of the mothers were married (Table 1).

### Obstetrics and health service, provider related characteristics

In this study, most (92.9%) of the study participants had a history of ANC follow-up in the current pregnancy and nearly four-fifths (77.9%) of the study participants had greater than or equal to four ANC contacts. More than half (54.6%) of mothers reported that they received counseling services about the timely initiation of breastfeeding during their ANC visits. Most (94.0%) of the mothers had completed 37 weeks of gestation at the time of delivery, with an average gestational age of 39 weeks (SD  $\pm$  1.426), and one-third of them (32.8%) gave birth for the first time (primiparous). In terms of mode of delivery, about 412 (88.2%) mothers gave birth through spontaneous vaginal delivery, and around two-thirds (65.1%) of the mothers received counseling immediately after delivery about the timely initiation of breastfeeding. From the total, 74 (15.8%) of mothers developed obstetric complications during and immediately after delivery (Table 2).

### Maternal and newborn health-related related factors

In this study, Majority (96.4%) of the study participants knew their HIV status and 456 (97.6%) of mothers had no breast problems. More than half (55%) of newborns were female, and 420 (89.9%) of newborns had a normal activity, pulse, grimace, appearance, and respiration score (Apgar score  $\geq$  7) at the first minute of birth, whereas all newborns had a normal Apgar score (Apgar score  $\geq$  7) at the fifth minute of birth, and 438 (93.8%) of the newborn babies had a normal birth weight (2500 g to 4000 g) (Table 3).

### Communication exposure and social-behavior change information related factors

In this study, 66 (14.1%) of mothers were exposed to mass media and of them, almost two-thirds (65.2%) of moms saw or heard about TIBF in the media once a week. About 36 (7.7%) mothers participated in the pregnancy form, and of the participating mothers, most (88.9%) of

them were counseled about the timely initiation of breast feeding.

### Timely initiation of breastfeeding

The prevalence of timely initiation of breastfeeding in the current study was 73.7%, with a 95% CI (69.65%–77.67%). Conversely, 123 (26.3%) of mothers delayed the initiation of breastfeeding for their newborns. The most common reasons for not initiating breastfeeding within one hour were the mother and newborn being in a separate place (delay rooming-in) (33.3%) and maternal illness (26.8%) (Fig. 1).

### Factors associated with timely initiation of breastfeeding

To identify factors associated with TIBF, both bivariable and multivariable logistic regression analyses were performed. In the bivariable logistic regression analysis, age of the mother, parity, number of ANC follow-ups, time of delivery, counseling given immediately after delivery on TIBF, health care provider giving support and guidance on TIBF, obstetric complications, newborn immediately crying after delivery, skin-to-skin contact, rooming in, and family support were becoming candidate variables for multivariable logistic regression analysis at  $p < 0.25$ . However, in the multivariable logistic regression analysis model, multiparity, counseling given immediately after delivery on timely initiation of breastfeeding, health care provider support and guidance on TIBF, obstetric complications, and rooming-in were factors significantly associated with timely initiation of breastfeeding at a  $P$ -value less than 0.05.

In this study, the odds of timely initiation of breastfeeding among multiparous mothers were 2.25 (AOR: 2.25, 95% CI: 1.32, 3.84) times higher when compared with primiparous mothers. Similarly, mothers who were counseled about timely initiation of breast feeding within one hour after delivery were 4.19 times (AOR: 4.19, 95% CI: 2.20, 7.98) more likely to initiate breast feeding within one hour than those mothers who were not counseled about timely initiation of breast feeding during postpartum. Moreover, the likelihood of timely initiation of breastfeeding among mothers who received support and guidance from health care providers about timely initiation of breast feeding was 1.95 times (AOR: 1.95, 95% CI: 1.01, 3.77) higher when compared with mothers who did not receive support and guidance about timely initiation of breast feeding.

In addition, mothers who had no obstetric complications during and immediately after delivery were 4.44 times (AOR: 4.44, 95% CI: 2.34, 8.42) more likely to initiate breastfeeding timely when compared with mothers

**Table 2** Obstetrics and health service, provider related characteristics of the study participants in Debre Tabor comprehensive specialized hospital, northwest, Ethiopia 2024 ( $n = 467$ )

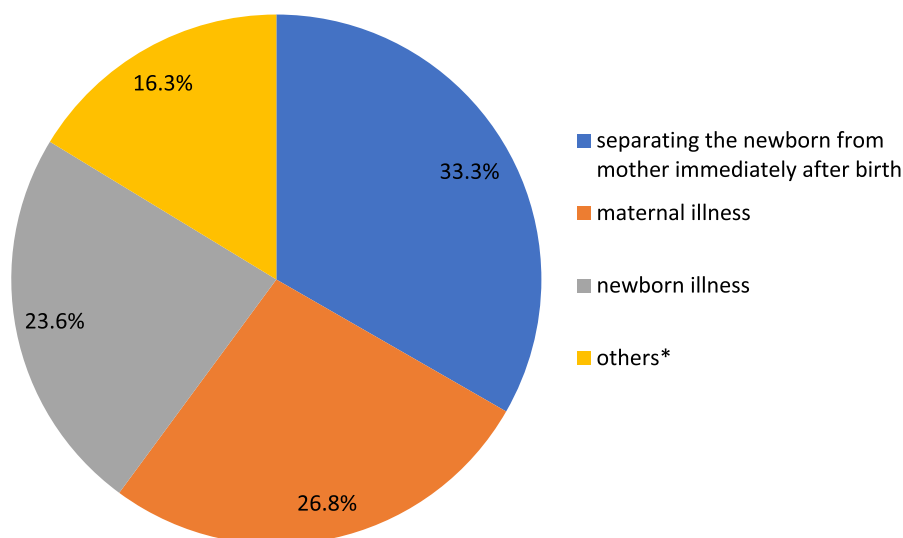
Variables	Categories	Frequency	Percentage (%)
Parity	Primipara	153	32.8%
	Multipara	314	67.2%
Birth order	1st	151	32.3%
	2nd -4th	284	60.8%
	5th and above	32	6.9%
Pregnancy intendedness	Intended	426	91.2%
	Unintended	41	8.8%
Gestational age	Preterm(< 37wks)	28	6.0%
	Term( $\geq$ 37wks)	439	94.0%
ANC follow-up	Yes	434	92.9%
	No	33	7.1%
Number of ANC follow-up	< 4 times	96	22.1%
	$\geq$ 4 times	338	77.9%
Place of ANC follow-up	Hospital	209	48.2%
	Private clinic	72	16.6%
	Health center	153	35.2%
Counseled about TIBF during ANC follow-up	Yes	237	54.6%
	No	197	45.4%
Mode of delivery	Spontaneous vaginal delivery	412	88.2%
	Instrumental assisted delivery	55	11.8%
Type of birth	Single	452	96.8%
	Multiple	15	3.2%
Time of delivery	Day	219	46.9%
	Night	248	53.1%
Counseled about TIBF immediately after delivery	Yes	304	65.1%
	No	163	34.9%
Health professional provide support and guidance about TIBF	Yes	340	72.8%
	No	127	27.2%
skin to skin contact	Yes	376	80.5%
	No	91	19.5%
Rooming-in practiced	Yes	362	77.5%
	No	105	22.5%
Newborn immediately cry after delivery	Yes	403	86.3%
	No	64	13.7%
Delay cord clamping	Yes	372	79.7%
	No	95	20.3%
Family support	Yes	372	79.7%
	No	95	20.3%
Obstetric complication	Yes	74	15.8%
	No	393	84.2%
Birth attendant	Midwife	323	69.2%
	IESO	84	18.0%
	Doctor	60	12.8%
Birth attendant trained BEmONC	Yes	217	46.5%
	No	250	53.5%
Level of education	Diploma	68	14.6%
	Degree	299	64.0%
	Master and above	100	21.4%

**Table 3** Maternal and newborn health-related characteristics of the study participants in Debre Tabor comprehensive specialized hospital, northwest, Ethiopia 2024 ( $n = 467$ )

Variable	Category	Frequency	Percentage (%)
HIV status	Positive	23	4.9%
	Negative	423	90.6%
	Unknown	21	4.5%
breast problems	Yes	11	2.4%
	No	456	97.6%
Sex of newborn	Male	210	45%
	Female	257	55%
first minute APGAR score	Low APGAR score (< 7)	47	10.1%
	Good APGAR score ( $\geq 7$ )	420	89.9%
Birth weight of newborn	Low birth weight (< 2500 g)	29	6.2%
	Normal birth weight ( $\geq 2500$ g)	438	93.8%

APGAR score: Activity, Pulse, Grimace, Appearance, and Respiration score

### reasons of delay initiation of breastfeeding



**Fig. 1** Reasons not to initiate breast feeding timely among immediate postpartum mother-newborn pairs in Debre Tabor comprehensive specialized hospital, northwest Ethiopia, 2024. \* = maternal exhaustion, sleepy baby, lack of information, insufficient breast milk

who had obstetric complications during and immediately after delivery. Finally, the odds of timely initiation of breastfeeding among mothers who practice rooming-in were 3.65 times (AOR: 3.65, 95% CI: 2.05, 6.51) higher when compared with mothers who were not practicing rooming-in (Table 4).

### Discussion

This study assessed the prevalence of timely initiation of breastfeeding and its associated factors.

The World Health Organization classifies timely initiation of breastfeeding rates as poor (0–29%), fair

(30–49%), good (50–89%), and very good (90–100%), and its recommendation on timely initiation of breastfeeding is very good [24].

In this study, the prevalence of timely initiation of breastfeeding was 73.7%. Though WHO recommends a “very good” category of TIBE, the practice in this finding is in a “good” category. The findings of this study are in line with mini EDHS 2019 72.0% [10], West Belesa district, Ethiopia 77.0% [38], Bahir Dar city, Ethiopia 75.4% [26], Dire Dawa City, Ethiopia 70.9% [39], Tanzania 71.1% [40] and Turk 70.7% [41]. The possible explanation might be due to similarities with Bahir Dar and west



**Table 4** Factors associated with timely initiation of breastfeeding among immediate postpartum mother-newborn pairs in Debre Tabor comprehensive specialized hospital, northwest, Ethiopia, 2024 (n = 467)

Variables	Timely initiation of BF		COR (95% CI)	AOR (95% CI)
	Yes n (%)	No n (%)		
Age				
15–24	36(62.1)	22(37.9)	1	1
25–34	268(74.2)	93(25.8)	1.76(0.98, 3.14)	1.08(0.46, 2.52)
≥ 35	40(83.3)	8(16.7)	3.05(1.21, 7.71)	2.84(0.78, 10.30)
Parity				
Primipara	92(60.1)	61(39.9)	1	1
Multipara	252(80.3)	62(19.7)	2.69(1.75, 4.12)	2.25(1.32, 3.84) **
Number of ANC follow up				
0	15(45.5)	18(54.5)	1	1
1–3	65(67.7)	31(32.3)	2.51(1.12, 5.64)	1.86(0.63, 5.49)
≥ 4	264(78.1)	74(21.9)	4.28(2.05, 8.90)	2.31(0.86, 6.19)
Time of delivery				
Day	173(79.0)	46(21.0)	1.69(1.11, 2.58)	1.31(0.76, 2.26)
Night	171(68.9)	77(31.1)	1	1
Counseled on TIBF immediately after delivery				
Yes	272(89.5)	32(10.5)	10.74(6.65, 17.35)	4.19(2.20, 7.98) ***
No	72(44.2)	91(55.8)	1	1
Received support and guidance by health care provider about TIBF				
Yes	287(84.4)	53(15.6)	6.65(4.21, 10.49)	1.95(1.01, 3.77) *
No	57(44.9)	70(55.1)	1	1
Obstetric Complications during and after delivery				
Yes	31(41.9)	43(58.1)	1	1
No	313(79.6)	80(20.4)	5.42(3.21, 9.15)	4.44(2.34, 8.42) ***
Newborn immediately cries after delivery				
Yes	319(79.2)	84(20.8)	5.92(3.39, 10.33)	1.63(0.75, 3.56)
No	25(39.1)	39(60.9)	1	1
Skin to skin contact				
Yes	300(79.8)	76(20.2)	4.21(2.60, 6.82)	1.25(0.49, 3.17)
No	44(48.4)	47(51.6)	1	1
Rooming-in				
Yes	303(83.7)	59(16.3)	8.01(4.95, 12.97)	3.65(2.05, 6.51) ***
No	41(39.0)	64(61.0)	1	1
Family support on BF				
Yes	295(79.3)	77(20.7)	3.59(2.23, 5.77)	0.60(0.28, 1.29)
No	49(51.6)	46(48.4)	1	1

AOR Adjusted odds ratio, COR crude odds ratio, CI confidence interval

\* =  $p < 0.05$ \*\* =  $p < 0.01$ \*\*\* =  $p < 0.001$ 

Belesa districts in socio-demographic characteristics, and access to information and maternal educational level. The other reason might be a similarity in the number of study participants who received counseling about TIBF during ANC follow-up. In Bair Dar city, 54.9% of mothers received counseling about TIBF during ANC follow-up, and in the current study, 54.6% of study participants received counseling about TIBF during ANC follow-up. In addition, most of the above studies were cross-sectional and facility-based; mothers who visited the health facility had access to counseling for the timely initiation of breastfeeding. The similarity with Turk might be due to the fact that the average age of the study participants was nearly similar. The mean age of the study participants in Turk was 28 years, and in the current study, it was 29 years. The other reasons might be similarity with Turk was study setting, both conducted in a comprehensive specialized hospital, and place of residence of study participants also being nearly similar; 76.9% in Turk and 71.9% in the current study were living in urban areas.

The findings of this study were higher than those of studies done in the rural eastern zone of Tigray, 61.9% [42], the southwest region of Ethiopia, 41% [43], the Arsi zone of Tiyo woreda, Ethiopia, 67.3% [34], the Gurage Zone, Ethiopia, 43.7% [44], Mizan-Aman Town, Ethiopia, 64.5% [45], and Amibara district, Ethiopia, 39.6% [46]. The discrepancy of the finding could be a result of the difference in study population; the above previous studies included mothers who were delivered by C/S, which delayed the initiation of breast feeding as compared to mothers who delivered vaginally [42, 43, 45, 47] and the educational status of the study participants. In the rural eastern zone of Tigray (39.6%), Mizan Aman (29.4%), Arsi zone Tiyo woreda (49.9%), and Amibara district (32.5%), mothers had no formal education, but in the current study, 50.3% of study participants were colleges and above in their educational status. Those mothers who had higher educational status might have good knowledge and information about TIBF. The other reasons for this variation might be due to differences in the place of delivery and antenatal care follow-up. The current study was facility-based; the study participants were only mothers who delivered at health institutions, whereas the above previous studies were community-based; they included mothers who delivered at home (Mizan-Aman, 9.6%; eastern zone of Tigray, 5.2%; Amibara district, 39.5%; and southwest region of Ethiopia, 4.8%). Those mothers who gave birth at healthcare facilities could benefit from receiving direct guidance and counseling on the practice of timely initiating breastfeeding from health care providers as compared to those mothers who gave birth at home [48]. In Amibara district and Arsi zone Tiyo woreda, only 70% and 63% of mothers had antenatal care

contact, respectively, but in the current study, 92.9% of mothers had antenatal care contact. Those mothers who had antenatal care contact might have received counseling services about TIBF. The other reason might be the variation in time of the study (study period). The previous studies were conducted 2–5 years ago, but the utilization of maternal and child health services increased over time through the active involvement of health extension workers and their community mobilization of the health development army, which may help mothers' access information about the benefits of TIBF in the form of health education or counseling [49]. The practice of TIBF was also higher than the studies conducted in Zimbabwe 60.3% [50], Ghana 39.4% [51], Bangladesh 51% [52] and Pakistan 35.1% [53]. This difference might be due to variations in the time of conducting the study and maternal socio-demographic characteristics like residence. In Bangladesh, Pakistan, and Zimbabwe, more than 70% of the study participants live in rural areas, while in the current study, 71.9% of mothers live in urban areas. Mothers who reside in urban areas have more access to health care services, information, and health-seeking behaviors than those who live in rural areas [54], which might lead to mothers having better information about TIBF. The other might be due to health service utilization characteristics since different countries are guided by different ministries of health. In addition, there was variation in sources of data; secondary data were used in Zimbabwe, which might not have had accurate information on TIBF, but the current study used primary data.

However, the findings of this study were lower than those of studies conducted in Ethiopia: Motta town 78.8% [55], Wolaita Sodo city 80.2% [35] and Gunchire town 80.5% [33]. The possible explanation might be due to the time difference from birth to conducting the study. The above previous studies included mothers having children from 6 months to 2 years; conducting a study with long durations from birth to data collection time would be prone to recall bias and might have led to an overestimation in the previous studies [33, 35, 55]. In the current study, mothers were interviewed immediately after one hour of delivery, which can minimize recall bias. The other reason might be due to the difference in exposure of study participants to mass media. In Wolaita Sodo, 91.4% of mothers were exposed to mass media, but in this study, only 14% of mothers were exposed to mass media about TIBF. Those mothers who had access to mass media were more likely to initiate breastfeeding on time than their counterparts [56]. In addition, it might be due to the difference in approaches of the health care providers in awareness-creation on the initiation of breastfeeding.

Regarding the factors, the variable multiparity was statistically associated with timely initiation of breast feeding, in which the odds of timely initiation of breastfeeding among multiparous mothers were higher than primiparous mothers. It is desirable to improve the health extension workers since this suggests that mothers who give birth in a health facility have received information from health professionals. This finding is consistent with studies conducted in Dire Dawa, Ethiopia [39], sub-Saharan African [57], and Bangladesh [58]. The possible reason might be that having previous experience with childbirth (could have the chance to be counseled about the timely initiation of breastfeeding by healthcare providers) makes multiparous mothers start breastfeeding timelier than primiparous mothers. The other possible explanation might be that multiparous mothers may have good skills and knowledge of the timely initiation of breastfeeding and proper infant feeding practices. Prior breastfeeding experience predicts breastfeeding initiation by strengthening a mother's breastfeeding intention, determination, and self-efficacy by providing a more realistic understanding of her breastfeeding intentions and expectations [59].

The current study showed that the likelihood of timely initiation of breastfeeding among mothers who were counseled on TIBF immediately after delivery was higher compared to mothers who were not counseled immediately after delivery. This implies that health professionals should be aware that counseled with early initiation of breastfeeding is better and important factors to reduce early neonatal deaths. This is supported by the studies done in Sodo Zuria District, South Ethiopia [60], Addis Ababa [27], and India [61]. The possible reason might be that receiving breastfeeding information immediately after delivery, which is the most appropriate time for delivering key messages, may enable them to have good attachment and positioning of their newborns for breastfeeding and develop self-confidence to feed breast milk to their newborns. This is because immediate, focused advice and information from health care providers about the importance of timely initiation of breastfeeding and its importance to both newborn and maternal health might lead them to be more likely to initiate breastfeeding within one hour of birth [62].

This study revealed that the odds of timely initiation of breastfeeding were higher among mothers who received support and guidance from health care providers about timely breast-feeding initiation when compared to those who did not receive support and guidance from health care providers. This suggests that midwives are highly advised to support and assist the mother in starting to

breastfeed as soon as the baby is delivered, in addition to providing essential neonatal care. This finding was in line with studies done in Addis Ababa Public Hospital [47] and Ghana [51]. This might be because encouragement and motivation from healthcare providers help mothers take a stand in TIBF practice. There is supporting evidence from a study that shows skilled and properly trained healthcare providers can encourage mothers to initiate breastfeeding early, explain its advantages, provide counseling on the risks of pre-lacteal feeding, provide proper attachment and positioning to initiate breastfeeding timely, and explain the importance of TIBF and the continuation of breastfeeding [63], which in turn might help the mothers to initiate breastfeeding timely.

In addition, obstetric complications that occurred during and immediately after delivery were significantly associated with TIBF. The odds of timely initiation of breastfeeding among mothers who had no obstetric complications during and immediately after delivery were higher than those of mothers who developed obstetric complications. This implies that it is better to prevent obstetric complication like preeclampsia, retained placenta, perianal tear, and postpartum hemorrhage during labor and delivery. This was in line with the studies done in Addis Ababa Yikatet 12 Hospital [64] and Nepal [30]. Complications during and immediately after delivery can negatively impact breastfeeding initiation time, possibly due to increased postpartum pain from the complication, which requires additional postpartum management or separation of mother and newborn in the moments after birth, restricting newborns from being early breastfed. It has been noted that mothers who suffer post-partum complications are often separated from their babies for care activities and interrupt efforts towards successful breastfeeding initiation, causing breastfeeding delays [31]. As a result, the mothers might be exhausted to care for the newborn and to initiate breastfeeding timely.

Finally, the odds of timely initiation of breastfeeding among mothers who practiced rooming-in were higher than those mothers who did not practice rooming-in. This implies that the health care professionals should have to strongly advise the mother about-in and its multi-directional benefit to initiate early breastfeeding to the neonate as well as the mother. This finding is consistent with studies conducted in Egypt [65] and Nigeria [29], which showed that practicing rooming-in is positively associated with the timely initiation of breast feeding. The possible explanation might be that rooming-in has a great impact on improving mother-baby bonding, strengthening skin-to-skin contact, increasing a mother's confidence, and reducing psychological stress. Moreover, by putting mother and newborn together, a mother

learns to recognize and promptly respond to the baby's early feeding cues (opening the mouth, rooting, and sucking on the tongue, fingers, or hand), thus facilitating the initiation and continuation of breastfeeding [12]. Early bonding between a mother and the newborn triggers psycho-physiological reactions that could help achieve basic biological needs [15].

### Strengths and limitations of the study

In this study, mothers were interviewed immediately after one hour of birth, which could minimize recall bias and also help to act as soon as possible for newborns who did not initiate breastfeeding at the moment. Since breastfeeding is time-dependent, the longer the wait, the higher the risk of neonatal morbidity and mortality. Also, this study used a multimodal data collection method. The study hospital is the only specialized public hospital in the region; it was thought that this study site was representative of the study population. The main limitation was that, since the study design is cross-sectional it doesn't reveal cause effect relationship.

### Conclusion and recommendation

Timely initiation of breastfeeding in the current study was lower than World Health Organization recommendations. being multiparty, counseling immediately after delivery, receiving health care provider support and guidance, obstetric complications immediately after delivery, and practicing rooming-in had an identified factor for timely initiation of breastfeeding. It is recommended that clinicians, health professionals involved in labor and delivery, ANC clinic staff, and health extension workers educate the mother and her spouse about the potential consequences of obstetric complications, the significance of staying in the same room, and the importance of receiving support, guidance, and counseling from health-care providers as soon as possible after giving birth. We also advise aspiring researchers to pursue studies in perinatal interventional study design.

### Abbreviations

ANC	Antenatal Care
AOR	Adjusted Odds Ratio
CI	Confidence Interval
COR	Crude Odds Ratio
C/S	Cesarean Section;
EDHS	Ethiopia Demography Health Survey
HSTP-II	Health Sector Transformation Plan II
PNC	Postnatal Care
SDG	Sustainable Development Goal
SPSS	Statistical Package for Social Science
TIBF	Timely Initiation of Breast Feeding
UNICEF	United Nations Children's Fund
WHO	World Health Organization

## Supplementary Information

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Supplementary Material 1.

Supplementary Material 2.

### Authors' contributions

GA; methodology, visualization, review, curation, writing the first draft, and resource, ADG; conceptualization, methodology, software, formal analysis, writing the first draft, and resource. DT; visualization, review, ZE; methodology, review, BG; review, editing, MA; methodology, review, MM; curation, supervision, validation, visualization, review, and editing, ADD; visualization, review, and editing, GM; visualization, review, and editing, JM; visualization, review, and editing, BK; methodology, software, review, TW; curation, supervision, validation, visualization, review, and editing.

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### Data availability

The data and all other materials used in this study are available from the corresponding authors.

### Declarations

#### Ethics approval and consent to participate

An ethical approval letter was obtained from the school of midwifery on behalf of the Institutional Review Board of the University of Gondar, College of Medicine and Health Sciences which was submitted to the Debre Tabor comprehensive specialized Hospital medical director office to get permission for data collection. Respondents were informed on the purpose of the study, the importance of their participation, and their rights. Finally, written informed consent was obtained from the participants before starting the actual data collection and performed in accordance with the declaration of Helsinki which established by the 1964. Privacy and confidentiality of the participants were assured by not providing names or any identity in the data sheet, and all information obtained from the participants was kept confidential. The data was used for research purposes only.

#### Consent for publication

All authors who approved this manuscript are eligible for publication.

#### Competing interests

The authors declare no competing interests.

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