BMJ Open

Determinants of traditional birth attendant utilisation among reproductive age women in Ethiopia: a multilevel analysis of the 2019 Ethiopian Demographic and Health Survey

Befkad Derese Tilahun ,[1] Mulat Ayele ,[2] Addis Wondmagegn Alamaw ,[3] Eyob Shitie Lake ,[2] Biruk Beletew Abate ,[1] Gizachew Yilak ,[1] Molla Azmeraw Bizuayehu ,[1] Alemu Birara Zemariam ,[4] Tegene Atamenta Kitaw [1]

To cite: Tilahun BD, Ayele M, Alamaw AW, *et al*. Determinants of traditional birth attendant utilisation among reproductive age women in Ethiopia: a multilevel analysis of the 2019 Ethiopian Demographic and Health Survey. *BMJ Open* 2024;**14**:e087290. doi:10.1136/bmjopen-2024-087290

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (https://doi.org/10.1136/bmjopen-2024-087290).

Received 06 April 2024
Accepted 08 November 2024

For numbered affiliations see end of article.

Correspondence to
Befkad Derese Tilahun;
befkadderese6@gmail.com

ABSTRACT

Objectives To identify the determinants of traditional birth attendants' utilisation among reproductive-age women in Ethiopia.

Design Cross-sectional study design.

Setting Ethiopia.

Participants A total of 3979 weighted samples of reproductive-age women were included.

Outcome measure Traditional birth attendant utilisation.

Results This study found a high prevalence (29.76%) of Ethiopian mothers using traditional birth attendants for delivery, based on data from the 2019 Ethiopian Demographic and Health Survey. Mothers with higher education (adjusted OR (AOR)=0.11, 95% CI: 0.01 to 0.62), who had four or more antenatal care visits (AOR=0.34, 95% CI: 0.21 to 0.54), communities with lower levels of education (AOR=2.21, 95% CI: 1.30 to 3.73), communities with higher poverty levels (AOR=1.71, 95% CI: 1.99 to 2.96) and those from peripheral regions (AOR=3.41, 95% CI: 1.77 to 6.56) were found to be predictors of traditional birth attendants.

Conclusion This study indicates a high prevalence (29.76%) of Ethiopian mothers using traditional birth attendants, highlighting the need for targeted interventions to promote skilled birth attendance. Policymakers should focus on implementing educational programmes targeting reproductive-age women and improving access to quality antenatal care. Specific initiatives could include community-based educational workshops and subsidies for transportation to healthcare facilities. Furthermore, mothers in remote and border districts should receive specialised attention in terms of resource allocation, including skilled personnel and enhanced healthcare access.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The sample size used is large enough to detect the association factors with the high power of the study.
⇒ Analysis of Ethiopia's Ethiopian Demographic and Health Survey (EDHS) data set: population-based with high response rate increased representativeness.
⇒ The cross-sectional design of this study limits the ability to establish causal relationships between home delivery and associated factors.
⇒ The findings may not generalise to other countries with different socioeconomic and cultural contexts since it is EDHS data.
⇒ The study used the 2019 EDHS data, recognising its constraints in capturing current trends for traditional birth attendants in Ethiopia.

BACKGROUND

The WHO defines a traditional birth attendant (TBA) as an individual who supports the mother during labour and delivery, having gained their skills either through personal experience in childbirth or by training other TBAs.[1] Before the establishment of specialised nurses, midwives, physicians and organised healthcare systems, TBAs were the primary providers of delivery care worldwide. Currently, TBAs typically lack formal medical training and are not officially recognised as healthcare professionals by medical authorities.[2] While the number of women delivering within the formal healthcare system has risen in recent years, approximately 22% of pregnant women worldwide still gave birth with the assistance of a TBA outside the formal healthcare system in 2016.[3]

Each year, more than half a million women worldwide die from pregnancy and childbirth complications that are often preventable and treatable, with 99% of these deaths occurring in low- and middle-income countries (LMICs).[4] From 2014 to 2019, 81% of births worldwide were attended by skilled health

personnel. The remaining births were predominantly assisted by TBAs.[5]

A 2017 report indicated that the coverage and progress of skilled birth attendants (SBAs) from 2012 to 2017 varied significantly worldwide, with coverage at 54% in sub-Saharan Africa (SSA) compared with 98% in eastern Europe.[6] In Ethiopia, the recent report (Ethiopian Mini Demographic Health Survey 2019) report showed that only 50% of births were attended by skilled birth.[7] The Ethiopian government aimed to raise the proportion of SBAs to 90% by 2020; however, this target has not yet been reached.[8] As a result, home birth rates are significantly higher in rural areas of the country compared with urban areas, with rates of 60% in rural regions versus 29.6% in urban ones.[7]

Relying on TBAs for pregnancy and childbirth care is associated with an elevated risk of maternal and neonatal complications, including morbidity, disability and even death. Unskilled attendants often lack the necessary knowledge, skills and resources to effectively manage the risks during pregnancy and delivery. As a result, they may struggle to handle serious complications, such as haemorrhage, eclampsia and obstructed labour.[9] Women's reliance on TBAs for pregnancy and childbirth care is thought to significantly contribute to the high levels of maternal and neonatal mortality in SSA. This region has the world's highest maternal mortality rate, accounting for over two-thirds of global maternal deaths annually. Estimates indicate approximately 533 maternal deaths per 100 000 live births, totalling around 200 000 maternal deaths each year.[10]

Expanding access to skilled care across the entire maternal care continuum is a critical priority for enhancing maternal health and achieving Sustainable Development Goal 3.[11] However, TBA remains a significant barrier to achieving (Millennium Development Goal 5) MDG 5, which aims to reduce maternal mortality in LMICs. Approximately 75% of maternal deaths in rural areas result from direct causes, including haemorrhage, eclampsia, obstructed labour and puerperal sepsis. These deaths are often preventable, highlighting the need for improved access to skilled maternal care.[12] A significant proportion of these maternal deaths can be prevented with timely and appropriate interventions, especially through better access to health facility-based intrapartum care.[13]

Ethiopia has made notable progress in reducing its maternal mortality ratio, which declined from 871 per 100 000 live births in 2000 to 412 per 100 000 live births in 2015. Although there has been a steady increase in facility-based deliveries over time (5% in 2000, 10% in 2011 and 26% in 2016), home birth remains prevalent, with more than half of these births attended by TBAs. This is partly due to deeply ingrained cultural practices and rituals surrounding pregnancy and childbirth, where women prefer home births with TBAs who perform these essential rituals.[14]

Previous studies have highlighted considerable regional variations in the utilisation of TBAs during childbirth across different areas of Ethiopia.[15] For example, in zone 3 of Afar, it was reported by Yousuf *et al* that 90% of women opted for trained TBAs for their recent deliveries,[16] while in Angola, Ethiopia, 31.5% of participants chose TBAs and in Kembatta-Tembaro, Ethiopia, TBAs attended 78% of deliveries.[17 18] Despite several regional studies have highlighted the prevalence of deliveries assisted by TBAs in various parts of Ethiopia, there has been no national-level research exploring the overall prevalence and factors influencing the use of TBAs. So, this study, using the most recent nationally representative demographic and health survey data for Ethiopia, investigate the prevalence and factors influencing the use of TBAs among reproductive-aged women. The findings aim to provide valuable insights for maternal health advocates, healthcare practitioners, policymakers and other stakeholders, helping them make informed decisions on how to allocate limited health resources effectively and implement evidence-based interventions to address this critical maternal and neonatal health issue.

METHODS

Data extraction and sampling

This research employed a cross-sectional approach, using data from the 2019 Ethiopian Demographic and Health Survey (EDHS). The primary aim of the 2019 EDHS was to collect comprehensive, nationally representative information on a range of health indicators across Ethiopia, including its nine regional states and two city administrations. The data collection process for the survey followed a two-stage sampling strategy. First, each region was categorised into urban and rural zones, resulting in 21 strata. In the next step, clusters or enumeration areas were selected based on probability proportional to size, with independent selection within each stratum. Lastly, all women of reproductive age residing in the households on the eve of the survey were eligible to participate in the study.

Public and patient involvement statement

None.

Ethics approval and consent to participate

Ethical approval was not required for this study as it used publicly available data. However, permission to use the data was granted by the Demographic and Health Survey programme. Informed consent was obtained from participants at the start of each interview by the EDHS data collectors.

The main outcome of interest

This study aimed to assess whether women received assistance from TBAs during their most recent childbirth. According to the WHO, TBAs are community-based care providers who assist during pregnancy, childbirth and the postnatal period, operating outside the formal healthcare system and without formal training. In this study, the outcome variable was binary: if a respondent stated,

'I received assistance from traditional birth attendants during my most recent childbirth', it was coded as 'yes'; otherwise, it was coded as 'no.'

Description of variables

The primary aim of this study was to investigate the main outcome variable, which was the participation of a TBA in the childbirth process. The determination of this outcome variable was based on the response to the question, 'Who assisted with the delivery?' The responses were categorised into two groups: health personnel and other persons. The health personnel category included doctors, nurses, nurse/midwives, auxiliary midwives and other healthcare providers. The other person category encompassed TBAs, traditional health volunteers, community/village health volunteers, neighbours, friends and relatives. In this study, the term 'traditional birth attendant' referred to births where assistance was provided by any of these individuals.

The explanatory variables used in the study were chosen based on existing literature and included socio-demographic and fertility-related factors. The socio-demographic characteristics encompassed maternal age at the most recent childbirth, educational level (categorised as no education, primary, secondary or higher education), religion (Orthodox, Protestant, Muslim, traditional and others), household Wealth index (classified as poor, medium or higher) and exposure to media (such as reading magazines, listening to the radio and watching television at least once a week), which was classified as either 'exposed' or 'not exposed'. These socio-demographic factors were considered as individual-level covariates.

The fertility-related characteristics taken into account were the birth order of the most recent childbirth (categorised as 'first', '2–4' or 'five or above') and the birth interval between pregnancies of the most recent childbirth (categorised as 'less than 24 months' or 'greater than 24 months'). The utilisation of antenatal care (ANC) was also considered, and it was measured based on the respondent's self-report. All these fertility-related factors were considered as individual-level variables.

Additionally, the study examined community-level characteristics, which included the type of residence, community socioeconomic status, community literacy and region of residence. These factors were taken into account to understand the contextual influences on the outcome variable. Overall, the study considered a range of socio-demographic, fertility-related and community-level characteristics to explore their associations with the involvement of TBAs during childbirth (table 1).

Data analysis

Data extraction, recoding and both descriptive and analytical analyses were conducted using Stata V.17 software. Prior to any statistical analysis, the data were weighted to account for the unequal probability of selection inherent in the EDHS sampling design. This weighting

Table 1 List of independent variables for the assessment of traditional birth attendant in Ethiopia (Ethiopian Demographic and Health Survey 2019)

Variable	Descriptions (classification)
Age of the mother (year)	15–24, 25–34, 35–49
Religion	Orthodox, Protestant, Muslim, other
Residence status	Urban or rural
Region	Larger central: Tigray, Amhara, Oromia, SNNPR Small peripherals: Benishangul, Gambela, Afar, Somali Metropolis: Harari, Addis Ababa, Dire Dawa.
Mother educational status	No education, primary, secondary, higher
Wealth index	Poor, middle and rich
Marital status	Not married or married
Antenatal	No antenatal care visit, 1–3 or 4 and above
Preceding birth interval (months)	<24 months >24 months
Age of respondent at first birth	14 or less, 15–19, 20–24, 25 or more
Number of living children	Primiparous, multiparous, grand multiparous
Birth order	First, second or third, fourth and above
Community poverty level	Low or high
Community women education level	Low or high
Media access (television)	Yes or no
Media access (radio)	Yes or no

SNNPR, South Nation Nationality People Region.

process helped restore the representativeness of the data, ensuring more reliable estimates and SEs. Descriptive statistics were applied to the selected background characteristics, offering an overview of the sample based on both the EDHS years and the pooled estimates.

Multilevel mixed-effect regression analysis

We used descriptive techniques to examine the data. Initially, we calculated the proportion of women who had TBAs during childbirth. Subsequently, we performed a two-variable analysis to examine the associations between personal attributes (like educational attainment, age, number of children, financial status and exposure to media), communal attributes (encompassing living arrangement type, community economic standing, community literacy levels and residential region) and the usage of TBAs.

Considering the hierarchical format of the data set, we employed a multilevel logistic regression model (MLRM) to accommodate the nested design of the data. Multilevel analysis, which is also referred to as hierarchical linear modelling or mixed-effects modelling, is a statistical method that enables the examination of data with a nested or hierarchical arrangement. In this context, the data is organised in a way that observations are grouped within higher-level units, such as individuals within households or students within schools. The MLRM incorporates both fixed effects and random effects. Fixed effects represent the average relationship between variables across all levels of the hierarchy, while random effects capture the variability in this relationship at different levels of the hierarchy. By including both fixed and random effects in the model, we can account for the potential correlations and dependencies within the data due to its hierarchical nature.

In the context of our study, employing an MLRM allows for a more accurate analysis by considering the hierarchical structure of the data set. This approach can provide insights into how individual-level factors interact with higher-level factors, offering a more comprehensive understanding of the relationships between variables. By incorporating multilevel analysis, we can better account for the complex nested structure of the data and obtain more robust estimates of the effects of interest.

The fixed effects were evaluated using binary logistic regression, generating ORs and adjusted ORs (AORs). Model 1 represented an empty model, while model 2 examined the relationship between individual variables and the outcome variable. Model 3 explored the relationship between community variables and the outcome variable. Finally, model 4, the complete model, investigated the relationship between both individual and community variables and the outcome variable. Additionally, we evaluated the random effects by examining the intracluster correlation (ICC). To address over and undersampling, we incorporated the sample weight (v005/1 000 000) in all analyses. The statistical software Stata V.17 was used for data analysis. To evaluate multicollinearity among the variables, the study used the variance inflation factor (VIF) and tolerance values. Multicollinearity was considered a concern if the VIF exceeded four or if the tolerance was below 0.25. Additionally, to assess variation across clusters, the analysis included the calculation of proportional change in variance, ICC and median OR.

RESULTS

Individual level characteristics of study participant

The study sample included a total of 3979 women of reproductive age, with weights of 226 applied to ensure the results were representative. Within the subset of mothers lacking formal education, a significant 51.9% (2065 individuals) indicated they had sought assistance from TBAs. The age distribution showed that the highest percentage of women (51.1%) fell within the 25–34 ages. In terms of religious affiliation, approximately 46.8% of the women identified as Muslim, with Orthodox followers accounting for 31.8%. Geographically, the majority of women (12.3%) are from the Oromia region, closely followed by 11.8% from South Nation Nationality People Region. In terms of ANC visits, 26.7% (1061) of the mothers did not receive any ANC and among them, 16.7% had a TBAs present during childbirth. Furthermore, over 27.4% of mothers living in non-urban areas indicated that they used the services of TBAs (online supplemental table 1).

Community-level characteristics of study participants

Most of the participants, specifically 2975 (74.8%), resided in rural areas. Among areas marked by significant poverty rates (2069 individuals or 52.0%), over 23.0% of mothers mentioned using TBAs. Concerning educational attainment, over half of the mothers were affiliated with communities displaying lower levels of education. This data underscores the prevalence of TBA usage in impoverished areas and emphasises the correlation between educational levels and women healthcare choices. Recognising these relationships is essential for creating tailored interventions that address the specific needs of women in rural and economically disadvantaged communities, taking into account factors like access to healthcare and educational opportunities (table 2).

Model fit and specifications

The multilevel analysis began with a random intercept (null) model to assess the need for random effects at the community (cluster) level. The analysis revealed significant variation in the use of TBAs during women's most recent childbirth across different communities/clusters, supporting the decision to apply a multilevel approach. The ICC for the null model, which measured this variation, was 58.29%, indicating that 58.29% of the variation in TBA utilisation could be attributed to community-level differences. Model 3 was determined to be the best fit for the data. After including both individual and community-level variables in model 3, the variation in the use of TBAs across communities remained statistically

Table 2 Community-level characteristics of study participants Ethiopian Demographic and Health Survey 2019, (weighted n=3979)

Variables	Categories	Traditional birth attendant		Weighted, N
		Yes	No	
Place of residence	Urban	94 (2.4%)	910 (22.9%)	1004 (25.2%)
	Rural	1090 (27.4%)	1885 (47.4%)	2975 (74.8%)
Region	Larger central	418 (10.5%)	1296 (32.6%)	1714 (43.1%)
	Small peripherals	627 (15.8%)	813 (20.4%)	1440 (36.2%)
	Metropolis	139 (3.5%)	686 (17.2%)	825 (20.7%)
Community poverty level	Low	269 (6.8%)	1641 (41.2%)	1910 (48.0%)
	High	915 (23.0%)	1154 (29.0%)	2069 (52.0%)
Community education level	Low	255 (6.4%)	1473 (37.0%)	1728 (43.4%)
	High	929 (23.3%)	1322 (33.2%)	2251 (56.6%)

significant (σ=0.9195, p<0.001). The ICC suggested that 34.66% of the variation in TBA utilisation was due to community-level differences. The variation in utilisation was explained by both individual and community-level factors included in the model (table 3).

Multicollinearity test

VIF and tolerance values were used to assess potential multicollinearity among the variables. A VIF greater than 4 or a tolerance value below 0.25 suggests the presence of multicollinearity. In this study, the highest VIF observed was 2.55, the average VIF was 1.61, and the lowest tolerance value was 1.05. These results indicate that multicollinearity is not a concern among the covariates (online supplemental table 2).

Predictors of traditional birth attendant

The multilevel mixed-effects regression analysis (model 3) yielded results indicating that educational status, Wealth index level, place of residency, community education level, region and ANC visits were significant predictors of using a TBA.

Mothers with higher education were less likely to use a TBA, with odds of 0.11 (AOR=0.11, 95% CI: 0.01 to 0.62). Similarly, mothers who had four or more ANC visits were also less likely to choose a TBA, with odds of 0.34 (AOR=0.34, 95% CI: 0.21 to 0.54). These findings suggest that higher education and increased ANC visits were associated with a reduced likelihood of relying on a TBA during childbirth.

Mothers belonging to communities with lower levels of education and higher poverty levels were 2.21 times more likely to have a TBA (AOR=2.21, 95% CI: 1.30 to 3.73) compared with its counterparts. Similarly, mothers from peripheral regions had a 3.41 times higher likelihood (AOR=3.41, 95% CI: 1.77 to 6.56) of using TBAs. These findings suggest that factors such as low community education, high poverty levels and residing in peripheral regions contribute to an increased likelihood of relying on TBAs during childbirth (online supplemental table 3).

DISCUSSION

There has not been a national investigation of the prevalence and factors influencing TBAs, despite the fact that many regional studies have examined the incidence of TBA-supported deliveries in different Ethiopian regions. A more comprehensive and illuminating viewpoint for clinical decision-making is provided by this multilevel study. In order to provide a thorough overview of the employment of TBAs among Ethiopian mothers of reproductive age, ages 15–45, it evaluated both individual and community-level characteristics relevant to this practice.

According to this study, 29.76% of the women used a TBA to deliver their prior child. Additionally, this study

Table 3 Result of model comparison and random effect to determine predictors of traditional birth attendant EDHS 2019, (weighted n=3979)

Parameter	Null model	Model 1	Model 2	Model 3
ICC	58.29%	34.99%	39.27%	34.66%
AIC	3780.731	2926.223	3605.022	2915.56
BIC	3793.308	3041.053	3649.043	3042.477
Log-likelihood	−2428.8111	−1644.2684	−2156.0398	−1637.6017

AIC, Akaike Information Criterion; BIC, Bayesian Information Criterion; ICC, intraclass correlation .

found that TBAs in Ethiopia were predicted by the mother's educational level, area, location of residence, ANC visits, community education level and community poverty level. A considerable percentage of Ethiopian mothers—29.76%—give birth with TBAs thereby increasing the risk of maternal death.

In this study, the prevalence of TBAs was 29.76% similar to studies Ghana 30%,[19] Kenya 34.3%,[20] South Sudan 36%.[21] This similarity in the prevalence of TBAs between this study and previous findings from South Sudan, Kenya and Ghana can be attributed to geographical proximity, cultural similarities, socioeconomic factors and shared traditional beliefs surrounding childbirth. These factors collectively contribute to the comparable prevalence rates observed in these regions. Nevertheless, this result exceeds the 22% of pregnant women who were attended by a TBA, as observed in research conducted in LMICs,[3] TBAs attend 23% of deliveries in Nepal.[22] In contrast to this study lower than studies in southeastern Ethiopia (38.3%),[23] in Nigeria 50% more likely to use TBA,[24] in Ogun state, Nigeria 44.6%,[25] in Abia state, Nigeria 59%,[26] Kwara state 67.5%.[27] The variation in the prevalence rates of TBAs observed between the current study and previous research in various regions can be attributed to differences in cultural practices. For instance, women may opt for home births with TBAs for privacy and safety, underscoring the significance of traditional customs like specific sitting positions and post-delivery ceremonies. Additionally, dissatisfaction with SBAs who overlook cultural rituals, such as the practice of taking the placenta home for burial,[15 28] along with factors like healthcare infrastructure and study methodologies, contribute to this disparity. These factors shape the utilisation of TBAs in each specific context, leading to the observed differences in prevalence rates.

In this study, higher academic levels among mothers were linked to a reduced chance of using TBAs. This result aligns with the findings of several other studies.[8 29–33] This is due to the fact that women with higher levels of education are generally more informed about the benefits of seeking professional medical care during childbirth,[8 33] and have better access to healthcare services, as well as a higher likelihood of being financially stable compared with those with lower levels of education. Additionally, education makes individuals more conscious of their health and helps them overcome common prejudices that may hinder the use of SBAs.[34 35] Moreover, women with higher education are more adept at identifying signs of pregnancy complications and understanding the importance of medical care during childbirth. Consequently, they are more inclined to choose SBAs for a safer delivery.[36 37] Consequently, the education and advancement of women are key factors in reducing the reliance on TBAs. Providing free education and empowering women who lack formal education would significantly contribute to reducing the prevalence of unskilled care during childbirth.

There was a negative association between the frequency of ANC attend and the use of TBAs. This finding was consistent with other studies.[30 31 38] This may be attributed to the fact that women who receive ANC become more acquainted with the healthcare system and available facilities. Additionally, ANC providers offer guidance and counselling on the benefits of SBAs, which encourages them to plan for delivery in a healthcare facility.[39] Additionally, with more antenatal care visits, women gain a better understanding of the risks related to pregnancy and childbirth that require the expertise of skilled healthcare providers.[23]

Women in the lowest wealth quintile are less likely to use SBAs during childbirth compared with women in wealthier quintiles.[31 36 40] This is often due to a lack of financial resources, which may hinder access to healthcare services, including transportation to health facilities and the purchase of necessary supplies. Although public health facilities may provide delivery services free of charge, mothers are sometimes required to buy additional supplies that are not available at the health centre at the time of delivery. Furthermore, women from the poorest households often face multiple barriers, including limited access to obstetrical care and a lack of funds for transportation, especially in rural areas, which increases the likelihood of using TBAs.[37] On the other hand, women with higher wealth are generally more empowered, have more control over decision-making and are more likely to seek out and use maternal healthcare services.

Women in rural areas were more likely to rely on TBA than those in urban areas, a trend that aligns with previous research findings.[29 41] This difference between urban and rural may stem from urban women's comparatively easier access to professional birth services, as health facilities are usually closer to them, with more readily available transportation options and expanded healthcare infrastructure. In cities, health facilities offering skilled delivery services are generally nearby, often eliminating the need for transport. When transportation is necessary, urban women usually have better access to vehicles than women in rural areas, where health facilities and transport options remain more limited.

Women in smaller, remote areas tend to use TBAs more frequently than those in larger, urbanised regions, a pattern supported by similar research findings.[42 43] This difference may be due to the limited healthcare resources and infrastructure typically found in peripheral areas compared with central ones. With restricted access to formal healthcare services, such as hospitals and skilled birth professionals, women in these regions often turn to TBAs as their main source of support during childbirth. Additionally, the challenges involved in reaching formal healthcare facilities may lead many women to opt for home births assisted by traditional attendants.

This study draws on data from a nationally representative EDHS and employs a population-based approach with strong response rates. The large sample size enhances the study's analytical power, making it well-suited to identifying relevant association factors. The insights gained from this analysis are useful for informing policymakers

and planners in designing targeted interventions. Nevertheless, the study's cross-sectional nature limits its ability to determine causal relationships between home births and associated factors. Additionally, as data were collected through self-reporting by mothers, recall bias is a potential concern. The study also lacks information on several significant factors influencing maternal healthcare utilisation during childbirth, such as emergencies arising during home births that necessitate professional intervention and prior experiences with healthcare services.

Strengths and limitations of the study

This study employed a two-level MLRM to assess the impact of various covariates while accounting for community or cluster-level factors associated with the use of TBAs. The study used a large sample, providing strong statistical power to effectively identify key factors. Data were sourced from the nationally representative EDHS, which was based on a population-wide sample and had a high response rate, enhancing the representativeness of the findings at the national level. However, the results may not be applicable to other countries with distinct socioeconomic and cultural conditions, as the study relies on EDHS data specific to Ethiopia. Additionally, the cross-sectional design limits the ability to establish causal relationships between home delivery and the factors associated with it. The study also faced limitations due to the predominance of quantitative data in the EDHS, which did not allow for an exploration of the cultural and behavioural influences on TBA usage. Finally, the data set was derived from the 2019 EDHS. Given that the data were collected in 2019, the findings may not fully reflect the current trends or shifts in the utilisation of TBAs in Ethiopia.

CONCLUSION

This study identified a relatively high rate of women using TBAs during the delivery of their most recent child, with approximately 29.76% of participants relying on such services. At the individual level, maternal education, Wealth index and utilisation of ANC and at the community level, place of residence, region, community wealth quintile and community education level were significantly associated with the utilisation of TBAs at delivery. To address this issue, policymakers should prioritise educational initiatives aimed at women of reproductive age. Suggested strategies include awareness campaigns, community-driven workshops and providing subsidies for transportation to healthcare centres, all of which can help reduce reliance on TBAs. Additionally, the study found that women who attend four or more ANC visits are less likely to use TBAs, highlighting the critical role of healthcare professionals in educating and guiding women during these visits. The Ethiopian Ministry of Health should focus on expanding ANC services and increasing the frequency of visits to promote facility-based deliveries. Special attention should also be given to mothers in rural and border regions, ensuring adequate resource allocation, healthcare professional and better access to healthcare services. Lastly, future qualitative research is needed to explore the cultural and behavioural factors that contribute to the ongoing use of TBAs.

Author affiliations
[1]Department of Nursing, College of Health Science, Woldia University, Woldia, Amhara, Ethiopia
[2]Department of Midwifery, College of Health Science, Woldia University, Woldia, Amhara, Ethiopia
[3]Department of Emergency and Critical Care Nursing, School of Nursing, CMHS, Woldia University, Woldia, Amhara, Ethiopia
[4]Department of Pediatrics and Child Health Nursing, School of Nursing, College of Medicine and Health science, Woldia University, Woldia, Amhara, Ethiopia

X Biruk Beletew Abate @biruk and Gizachew Yilak @gizachew yilak

Acknowledgements The author is indebted to the DHS programme for giving permission to access the data set.

Contributors BDT developed the concept and the guarantor of this manuscript. BDT: developed the study design and literature review, data extraction, statistical analysis, interpretation of the data and developing the initial drafts of the manuscript and prepared the final draft of the manuscript. MA, GY and TAK: developed the study protocol and were involved in the design, selection of study, data extraction and statistical analysis. AWA and BBA: involved in the design, selection of study, data extraction, prepared and edited the final manuscript. ESL, ABZ and MAB: involved in methodology, formal analysis, software, supervision, validation, visualisation and editing. All authors read and approved the final manuscript.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request. The data is available on responsible request from the corresponding author by the following address. E: mail: befkadderese6@gmail.com

ORCID iDs
Befkad Derese Tilahun http://orcid.org/0009-0006-6205-1139
Mulat Ayele http://orcid.org/0000-0002-4244-9100
Addis Wondmagegn Alamaw http://orcid.org/0000-0003-4927-7556
Eyob Shitie Lake http://orcid.org/0000-0001-7437-6076
Biruk Beletew Abate http://orcid.org/0000-0003-0833-2504
Gizachew Yilak http://orcid.org/0000-0001-5650-9699
Molla Azmeraw Bizuayehu http://orcid.org/0000-0001-9902-7921
Alemu Birara Zemariam http://orcid.org/0000-0001-8195-3011

Tegene Atamenta Kitaw http://orcid.org/0000-0002-7199-1249

REFERENCES

1 Lane K, Garrod J. The return of the Traditional Birth Attendant. *J Glob Health* 2016;6:020302.
2 Temesgen TM, Umer JY, Buda DS, *et al*. Contribution of traditional birth attendants to the formal health system in Ethiopia: the case of Afar region. *Pan Afr Med J* 2012;13:15.
3 Garces A, McClure EM, Espinoza L, *et al*. Traditional birth attendants and birth outcomes in low-middle income countries: A review. *Semin Perinatol* 2019;43:247–51.
4 Tarekegn W, Tsegaye S, Berhane Y. Skilled birth attendant utilization trends, determinant and inequality gaps in Ethiopia. *BMC Womens Health* 2022;22:466.
5 Nacht A, Rivera C, Montes SB, *et al*. The Addition of Traditional Birth Attendant Care to a Home-Based Skilled Nursing Program in Rural Guatemala: A Secondary Analysis from a Quality Improvement Database. *J Midwife Womens Health* 2022;67:107–13.
6 UNICEF. Annual results report. 2017. Available: https://www.unicef.org/media/47736/file/Annual_Results_Report_2017_Health.pdf
7 C. S. Agency. Ethiopia demographic and health survey: Addis Ababa, Ethiopia and USAID, global fund. 2019.
8 Tolossa T, Bekele D. Multilevel analysis of skilled birth attendance and associated factors among reproductive age women in Ethiopia: Data from EDHS 2016. *Int J Afr Nurs Sci* 2020;13:100268.
9 Olakunde BO, Adeyinka DA, Mavegam BO, *et al*. Factors associated with skilled attendants at birth among married adolescent girls in Nigeria: evidence from the Multiple Indicator Cluster Survey, 2016/2017. *Int Health* 2019;11:545–50.
10 U. N. C. F. (UNICEF). Maternal mortality United States: UNICEF. 2019.
11 Miller T, Smith H. Establishing partnership with traditional birth attendants for improved maternal and newborn health: a review of factors influencing implementation. *BMC Pregnancy Childbirth* 2017;17:365.
12 Geleto A, Chojenta C, Taddele T, *et al*. Magnitude and determinants of obstetric case fatality rate among women with the direct causes of maternal deaths in Ethiopia: a national cross sectional study. *BMC Pregnancy Childbirth* 2020;20:130.
13 Collender G, Gabrysch S, Campbell OMR. Reducing maternal mortality: better monitoring, indicators and benchmarks needed to improve emergency obstetric care. Research summary for policymakers. *Trop Med Int Health* 2012;17:694–6.
14 Central Statistical Agency. Ethiopia demographic and health survey: Addis Ababa, Ethiopia and USAID, global fund. 2016.
15 King R, Jackson R, Dietsch E, *et al*. Barriers and facilitators to accessing skilled birth attendants in Afar region, Ethiopia. *Midwifery* 2015;31:540–6.
16 Mulatu T, Alliance MW, Haregu TN. Revisiting the exclusion of traditional birth attendants from birth attendants from formal health. 2010.
17 Shiferaw S, Spigt M, Godefrooij M, *et al*. Why do women prefer home births in Ethiopia? *BMC Pregnancy Childbirth* 2013;13:5.
18 WHO. Making pregnancy safer: the critical role of the skilled attendant: a joint statement by WHO, ICM and FIGO: Geneva, Switzerland. 2004.
19 Tabong P-N, Kyilleh JM, Amoah WW. Reasons for the utilization of the services of traditional birth attendants during childbirth: A qualitative study in Northern Ghana. *Womens Health (Lond)* 2021;17.
20 Liambila WN, Kuria SN. Birth attendance and magnitude of obstetric complications in Western Kenya: a retrospective case-control study. *BMC Pregnancy Childbirth* 2014;14:311.
21 Mugo NS, Agho KE, Zwi AB, *et al*. Factors associated with different types of birth attendants for home deliveries: an analysis of the cross-sectional 2010 South Sudan household survey. *Glob Health Action* 2016;9:29693.
22 Thatte N, Mullany LC, Khatry SK, *et al*. Traditional birth attendants in rural Nepal: knowledge, attitudes and practices about maternal and newborn health. *Glob Public Health* 2009;4:600–17.
23 Ayele GS, Melku AT, Belda SS. Utilization of skilled birth attendant at birth and associated factors among women who gave birth in the last 24 months preceding the survey in Gura Dhamole Woreda, Bale zone, southeast Ethiopia. *BMC Public Health* 2019;19:1501.
24 Awotunde OT, Awotunde TA, Fehintola FO, *et al*. Determinants of utilisation of traditional birth attendant services by pregnant women in Ogbomoso, Nigeria. *Int J Reprod Contracept Obstet Gynecol* 2017;6:2684.
25 Ebuehi OM, Akintujoye IA. Perception and utilization of traditional birth attendants by pregnant women attending primary health care clinics in a rural Local Government Area in Ogun State, Nigeria. *Int J Womens Health* 2012;4:25–34.
26 Philip Etabee B, Gladys N. Factors associated with the choice of traditional birth attendants for delivery by women of child bearing age in Isiala Ngwa south local government area of Abia state, Nigeria. *Int J Sci Acad Res* 2021;02:1707–13.
27 Oluwaseyi AA, Akinleye TA, Yahya KA, *et al*. Perceived factors affecting utilization of traditional birth attendant in Moro loval government area, Kwara state. *J Sci Med Life* 2023;1.
28 Gurara M, Muyldermans K, Jacquemyn Y, *et al*. Traditional birth attendants' roles and homebirth choices in Ethiopia: A qualitative study. *Women Birth* 2020;33:e464–72.
29 Solanke BL, Rahman SA. Multilevel analysis of factors associated with assistance during delivery in rural Nigeria: implications for reducing rural-urban inequity in skilled care at delivery. *BMC Pregnancy Childbirth* 2018;18:438.
30 Acquah E, Nyarko SH, Boateng ENK, *et al*. Spatial and multilevel analysis of unskilled birth attendance in Chad. *BMC Public Health* 2022;22:1561.
31 Nahar MT, Anik SMFI, Islam MA, *et al*. Individual and community-level factors associated with skilled birth attendants during delivery in Bangladesh: A multilevel analysis of demographic and health surveys. *PLoS One* 2022;17:e0267660.
32 Adongo PA, Atanga RA, Yakong VN. Demographic characteristics of women that use traditional birth attendants in Bongo District, Ghana. *Eur J Midwifery* 2020;4:1.
33 Doctor HV, Findley SE, Cometto G, *et al*. Awareness of critical danger signs of pregnancy and delivery, preparations for delivery, and utilization of skilled birth attendants in Nigeria. *J Health Care Poor Underserved* 2013;24:152–70.
34 Setu SP, Islam MA, Halim SFB. Individual and Community-Level Determinants of Institutional Delivery Services among Women in Bangladesh: A Cross-Sectional Study. *Int J Clin Pract* 2022;2022:3340578.
35 de Bernis L, Sherratt DR, AbouZahr C, *et al*. Skilled attendants for pregnancy, childbirth and postnatal care. *Br Med Bull* 2003;67:39–57.
36 Atiqul Hoque Chowdhury Md, Mehedi Hasan Md, Ahmed S, *et al*. Socio-demographic Factors Associated with Home Delivery Assisted by Untrained Traditional Birth Attendant in Rural Bangladesh. *AJPHR* 2013;1:226–30.
37 Addo IY, Acquah E, Nyarko SH, *et al*. Factors associated with unskilled birth attendance among women in sub-Saharan Africa: A multivariate-geospatial analysis of demographic and health surveys. *PLoS One* 2023;18:e0280992.
38 Taye BT, Zerihun MS, Kitaw TM, *et al*. Women's traditional birth attendant utilization at birth and its associated factors in Angolella Tara, Ethiopia. *PLoS One* 2022;17:e0277504.
39 Kea AZ, Lindtjørn B, Tekle AG, *et al*. Southern Ethiopian skilled birth attendant variations and maternal mortality: A multilevel study of a population-based cross-sectional household survey. *PLOS Glob Public Health* 2023;3:e0002466.
40 Armah-Ansah EK, Bawa B, Dindas J, *et al*. A multilevel analysis of social determinants of skilled birth attendant utilisation among married and cohabiting women of Madagascar. *Int Health* 2024;16:642–52.
41 Mcnojia SZ, Saleem S, Feroz A, *et al*. Exploring women and traditional birth attendants' perceptions and experiences of stillbirths in district Thatta, Sindh, Pakistan: a qualitative study. *Reprod Health* 2020;17:3.
42 Wester KC, Medhanyie AA, Spigt M, *et al*. Best practices for addressing socio-cultural barriers to reproductive, maternal and neonatal health service utilization among women from pastoralist communities of Afar, Ethiopia: a qualitative study. *Eth J Health Dev* 2018;32:1–9.
43 Zepro NB, Ahmed AT. Determinants of institutional delivery service utilization among pastorals of Liben Zone, Somali Regional State, Ethiopia, 2015. *Int J Womens Health* 2016;8:705–12.