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LEVEL AND PATTERN OF TRADITIONAL BIRTH ATTENDANT SERVICE UTILIZATION AMONG POSTPARTUM WOMEN IN THE ASSIN FOSU MUNICIPALITY, GHANA: AN ANALYTICAL CROSS-SECTIONAL STUDY

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ABSTRACT

Traditional birth attendants (TBAs) continue to attend births in Ghana despite policies promoting skilled attendance, yet little is known about how intensively women who use TBAs rely on them during pregnancy. This study determined the level and pattern of TBA service utilization among postpartum women who had used TBA services in the Assin Fosu Municipality, Central Region, Ghana. We conducted a community-based analytical cross-sectional survey from July to September 2026 among 250 women who had delivered with a TBA within the preceding 24 months, selected through stratified multistage sampling across all 74 communities. We collected data using a pretested, interviewer-administered questionnaire and analyzed them descriptively with Wilson 95% confidence intervals (CI). Overall, 202 women (80.8%; 95% CI 75.5–85.2) made one or more monthly visits to a TBA during their most recent pregnancy (mean 2.26 visits; SD 1.59), and 60.9% of these made three or more. First contact occurred in the first trimester for 70.0%. TBAs were conducted in 93.9% of all births reported; 87.2% of women had delivered every child with a TBA, and every woman with two or more TBA deliveries attended monthly. Delivery assistance (90.8%), herbal medicine (73.2%), and antenatal care (58.8%) were the principal services; 87.2% of women were satisfied, and 54.0% preferred home for their next delivery. Proximity (75.2%) and lower cost (43.2%) were the leading reasons for choosing a TBA. TBA care in this municipality functions as a continuous parallel maternity service, warranting engagement of TBAs as referral agents and targeted follow-up of repeat users.

Keywords: Traditional Birth Attendants; Skilled Birth Attendance; Antenatal Care; Health Service Utilization; Postpartum Women; Ghana

1 INTRODUCTION

Maternal death remains one of the clearest markers of inequity in global health. The World Health Organization (WHO) estimates that approximately 260,000 women died during and after pregnancy and childbirth in 2023, the great majority from preventable causes [1]. Because most life-threatening obstetric complications arise unpredictably around the time of birth, the presence of a skilled birth attendant who can recognize and manage complications, or refer promptly, is among the most effective ways to prevent maternal, stillbirth and early neonatal deaths. Coverage of skilled attendance, however, remains uneven: approximately 99% of births in high-income countries are attended by a midwife, nurse or doctor, compared with 68% in low-income and 78% in lower-middle-income countries [2]. Under the WHO definition, traditional birth attendants (TBAs), irrespective of any training they may have received, are not skilled attendants, because they generally lack the competencies needed to prevent, recognize and manage obstetric and neonatal emergencies [3]. A high prevalence of home births attended by unskilled personnel has been associated with increased maternal and neonatal mortality [4].

Ghana has made substantial progress towards universal skilled attendance. National facility delivery coverage rose from 42.3% in 1993 to 85.4% in 2022, and inequalities by wealth, education and place of residence narrowed over the same period [5]. These gains followed the deployment of Community Health Officer-midwives to Community-based Health Planning and Services (CHPS) zones [6] and the introduction in 2008 of free maternal health care under the National Health Insurance Scheme (NHIS), which increased the odds of facility-based delivery [7]. In parallel, official policy shifted from training TBAs and incorporating them into primary health care to discouraging TBA-conducted deliveries altogether [8]. TBAs are therefore no longer recognised as providers of delivery care within the formal health system, yet they continue to practise, and their services remain in demand even in communities where facilities are physically accessible and maternal care is nominally free [9].

The Central Region illustrates this persistence. The 2022 Ghana Demographic and Health Survey reported that 11.0% of women in the region delivered with the assistance of a TBA [10]. In the Assin Fosu Municipality, routine District Health Information Management System (DHIMS 2) data recorded 339 TBA-assisted births in 2019, 281 in 2020, 202 in 2021, 72 in 2022 and 62 in 2023, even though skilled delivery coverage in the Municipality reached 93.6% in 2023. Routine figures are likely to understate the true number, because TBA deliveries usually come to the attention of the health system only when women subsequently attend postnatal or child welfare services.

Most studies of TBA use in Ghana have measured utilization as a single event, namely whether a woman delivered with a TBA, and have estimated its prevalence among all women who gave birth [11, 12]. TBA care, however, is rarely confined to the moment of delivery. In many communities, the TBA is consulted from early pregnancy onwards, provides herbal preparations, massage and advice, and remains a principal source of reassurance until delivery and beyond [9, 13]. The regularity of this contact is an important dimension of utilization in its own right: within Andersen's Behavioural Model of Health Services Use [14], it describes the realized pattern of use, and within the Three Delays

Framework [15], a woman who visits a TBA every month is more likely to rely on her at the onset of labour, and less likely to have formed a plan for skilled delivery, than a woman whose contact is occasional. Household authority and women's experiences of facility care further shape these choices [16, 17]. How intensively TBA users rely on TBAs during pregnancy, which services they receive and why they choose them have not, however, been quantified in peri-urban settings of the Central Region, where facilities are physically present.

This article reports the first objective of a larger study of the predictors of TBA service utilization in the Assin Fosu Municipality. It aimed to determine the level and pattern of TBA service utilization among postpartum women who had used TBA services, measured as the number of monthly visits to a TBA during the most recent pregnancy, and to describe the timing of the first TBA contact, repeat delivery with a TBA, the services received, satisfaction with care, the preferred place for the next delivery and the reasons for choosing a TBA.

2 MATERIAL AND METHODS

2.1 Study design and setting

A community-based analytical cross-sectional study was conducted from July to September 2026 and is reported in accordance with the STROBE guidelines [18]. The Assin Fosu Municipality lies in the Central Region of Ghana, covers approximately 374.85 km² and comprises 74 communities organized into four health sub-districts (Akoti, Awisem, Assin Fosu and Nyankomasi). Its projected population for 2024 was 94,740, with 3,790 expected deliveries. The Municipality has two hospitals, one polyclinic, two health centres, four CHPS compounds, one private clinic and one private maternity home, all of which provide maternal and child health services. In 2023, skilled delivery coverage was 93.6%, antenatal care coverage 67.8% and the institutional maternal mortality ratio 28.8 per 100,000 live births. Agriculture and petty trading account for most employment, and Twi is the predominant language. The Municipality therefore combines relatively good physical access to health facilities with the persistence of TBA practice.

2.2 Study population and eligibility

The study population comprised postpartum women aged 15–49 years who had used the services of a TBA for childbirth. Women were eligible if they were residents of the Municipality, had delivered with a TBA within the 24 months preceding data collection and provided informed consent. Women who were seriously ill at the time of data collection were excluded. The population was deliberately restricted to TBA users, because the study sought to characterize the pattern of use among the women who rely on TBAs, a question that a population-based sample dominated by women who delivered in facilities could not address efficiently.

2.3 Sample size

The minimum sample size was estimated with Cochran's formula for a single proportion [19], using the 11.0% proportion of women in the Central Region who delivered with a TBA [10], a 95% confidence level and a 5% margin of error, which gave 151 participants, or 168 after allowance for 10% non-response. Because the parent study also aimed to identify predictors of utilization by multivariable logistic regression, the sample was increased to provide an adequate number of events per predictor variable [20], and was set at 250 within the available resources. A design effect of 1.12 was estimated for the clustering of participants within communities (an average of 3.4 participants per community and an assumed intra-cluster correlation coefficient of 0.05).

2.4 Sampling procedure

A five-stage probability sampling procedure was used. First, we stratified the four sub-districts by area type into an urban stratum (Assin Fosu sub-district; 2,334 expected deliveries) and a rural stratum (Akoti, Awisem and Nyankomasi; 1,456 expected deliveries). Second, we converted expected deliveries in each stratum to estimated TBA deliveries by applying the regional TBA delivery rate of 11.0%, yielding 257 urban and 160 rural TBA deliveries. Third, the sample of 250 was allocated proportionally to the strata (154 urban; 96 rural). Fourth, within each stratum the sample was allocated to communities in proportion to their estimated number of TBA users, derived from DHIMS 2 records of TBA deliveries, facility registers and, where no records existed, from expected deliveries. Fifth, households were selected within each community by systematic random sampling from a random starting point, with a sampling interval equal to the number of eligible TBA users in the community divided by the number of participants required. Where no eligible woman was found, or no one was at home, the next or adjacent household was visited.

2.5 Data collection

Data were collected using a structured, interviewer-administered questionnaire organized into sections covering socio-demographic characteristics, maternal and obstetric characteristics, knowledge of and attitudes towards skilled birth attendance, and the uptake of TBA services. Items were adapted from the Ghana Demographic and Health Survey

questionnaire and the WHO Safe Motherhood Needs Assessment, reviewed by public health experts, translated into Twi and back-translated into English, and pretested among 30 postnatal women in a community outside the study. Six research assistants fluent in English and Twi were trained for two days and administered the questionnaire face-to-face, in private and in the respondent's chosen language; each interview lasted approximately 30–40 minutes. The team reviewed completed questionnaires daily for completeness and consistency, and the Principal Investigator conducted spot checks throughout fieldwork.

2.6 Measurement of TBA service utilization

The primary measure was the number of monthly visits a woman made to a TBA during her most recent pregnancy (range 0–6). Because every respondent had used a TBA, this measure distinguishes women whose contact with the TBA was confined to delivery or occasional consultation from those who maintained regular contact throughout pregnancy. The count was summarized in full and classified as none (0) or one or more (≥ 1); the latter is referred to as monthly attendance. Secondary measures were the gestational age at the first TBA visit (first trimester, ≤ 12 weeks, or later); the number of deliveries with a TBA and the share of all births that a TBA had conducted; the services received from the TBA (multiple responses); satisfaction with TBA care on a five-point scale, grouped as satisfied or very satisfied versus neutral or dissatisfied; the preferred place for the next delivery; and the reasons for choosing a TBA (multiple responses).

2.7 Data analysis

Data were entered into Microsoft Excel with validation rules, a random 10% of questionnaires ($n = 25$) were independently re-entered, and discrepancies were resolved against the paper forms. Analyses were performed in Stata version 17.0 and R version 4.3.1. Categorical variables were summarized as frequencies and percentages, and numerical variables as means with standard deviations (SD) or medians with interquartile ranges (IQR). Proportions describing the level of utilization, the services received and the reasons for choosing a TBA were reported with 95% confidence intervals (CI) calculated by the Wilson score method [21]. Differences in the timing of the first visit, repeat TBA delivery, services, satisfaction and preferred place of delivery between women with and without monthly attendance were examined with the chi-square test, or Fisher's exact test where an expected cell count was below five, with Cramér's V as the measure of association; means were compared with Welch's t -test. All tests were two-tailed, and $p < 0.05$ was considered statistically significant.

3 RESULTS

3.1 Characteristics of the respondents

All 250 sampled women were interviewed (response rate 100%). Their mean age was 29.9 years (SD 6.2; range 18–42), and the four age bands were of broadly similar size. More than half lived in rural communities (58.0%), and four in five were in a union, either married (53.6%) or cohabiting (26.4%). Formal schooling was limited: 62.8% had basic education, 32.8% had none, and only 4.4% had reached secondary school, while no respondent had tertiary education. Trading (42.8%) and farming (31.6%) were the main occupations. The respondents were predominantly Christian (77.2%) and Akan (58.0%), just over half lived in a nuclear family (55.2%), and the most recent child had a median age of 9 months (IQR 3–17) (Table 1).

Table 1: Socio-demographic characteristics of the respondents (N = 250)

Characteristic	n	%
Type of community		
Rural	145	58.0
Urban	105	42.0
Age group (years)		
18–24	56	22.4
25–29	59	23.6
30–34	65	26.0
35–42	70	28.0
Marital status		

Married	134	53.6
Cohabiting	66	26.4
Single	38	15.2
Divorced or widowed	12	4.8
Educational level		
No formal education	82	32.8
Basic	157	62.8
Secondary/senior high school	11	4.4
Occupation		
Trader	107	42.8
Farmer	79	31.6
Artisan	52	20.8
Unemployed	11	4.4
Civil servant	1	0.4
Religion		
Christian	193	77.2
Muslim	53	21.2
Traditionalist or no religion	4	1.6
Ethnicity		
Akan	145	58.0
Ewe	42	16.8
Mole-Dagbani	32	12.8
Ga/Adangbe	22	8.8
Other	9	3.6
Type of family		
Nuclear	138	55.2
Extended	92	36.8
Both nuclear and extended	20	8.0
Age of most recent child (months)		
1–6	99	39.6
7–12	56	22.4
13–24	94	37.6
Not recorded	1	0.4

Other ethnic groups: Grusi (n = 5), Guan (n = 2), Gurma (n = 1) and one Northern group not specified.

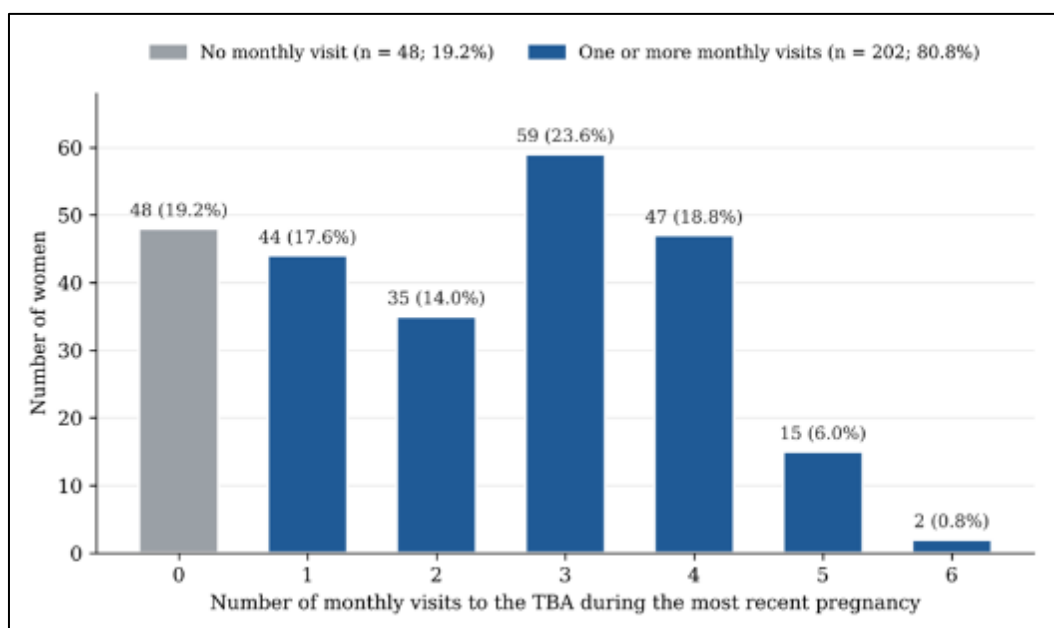
3.2 Level of TBA service utilization

Regular contact with the TBA throughout pregnancy was the usual pattern. Of the 250 women, 202 (80.8%; 95% CI 75.5–85.2) made one or more monthly visits to a TBA during their most recent pregnancy, and 48 (19.2%; 95% CI 14.8–24.5) made none. The number of visits ranged from 0 to 6, with a mean of 2.26 (SD 1.59) and a median of 2 (IQR 1–4); three visits was the most common pattern (23.6%), and only 17 women (6.8%) made five or more. Among the 202 women with monthly attendance, the mean was 2.80 visits (SD 1.28), and 123 (60.9%; 95% CI 54.0–67.4) made three or more (Table 2; Figure 1).

Table 2: Number of monthly visits to the TBA during the most recent pregnancy (N = 250)

Measure	n or value	%	95% CI
Number of monthly visits			
0	48	19.2	14.8–24.5
1	44	17.6	13.4–22.8
2	35	14.0	10.2–18.8
3	59	23.6	18.8–29.2
4	47	18.8	14.4–24.1
5	15	6.0	3.7–9.7
6	2	0.8	0.2–2.9
Mean (SD)	2.26 (1.59)		
Median (IQR)	2 (1–4)		
Monthly attendance			
None (0 visits)	48	19.2	14.8–24.5
One or more visits (≥ 1)	202	80.8	75.5–85.2
Among the 202 women with one or more visits			
Mean (SD)	2.80 (1.28)		
Median (IQR)	3 (2–4)		
Three or more visits	123	60.9	54.0–67.4

CI = confidence interval (Wilson score method); SD = standard deviation; IQR = interquartile range.

**Figure 1: Distribution of the number of monthly visits to the TBA during the most recent pregnancy (N = 250)**

3.3 Timing of the first TBA visit and repeat delivery with a TBA

Contact with the TBA began early in pregnancy. The women first visited the TBA at a mean gestational age of 10.9 weeks (SD 3.7; median 11; range 3–25), and 175 (70.0%; 95% CI 64.1–75.3) did so within the first trimester. The timing of the first visit was not related to monthly attendance ($\chi^2 = 0.24$, $p = 0.624$). Repeat delivery with a TBA, by contrast, was

strongly related to it ($\chi^2 = 102.02$, $p < 0.001$; Cramér's $V = 0.64$): all 158 women who had delivered with a TBA two or more times attended monthly, whereas fewer than half (47.8%) of the 92 women whose most recent delivery was their only TBA delivery did so, and every woman with no monthly visit belonged to this group. Together, the respondents reported 555 births, of which 521 (93.9%; 95% CI 91.6–95.6) had been conducted by a TBA, and 218 women (87.2%) had delivered every one of their children with a TBA (Table 3).

Table 3: Timing of the first TBA visit and number of deliveries with a TBA, by monthly attendance (N = 250)

Characteristic	None (0) n (%)	≥1 visit n (%)	Total n	Test (df)	p	V
Gestational age at first TBA visit						
First trimester (≤12 weeks)	35 (20.0)	140 (80.0)	175	$\chi^2 = 0.24$ (1)	0.624	0.03
After the first trimester (≥13 weeks)	13 (17.3)	62 (82.7)	75			
Mean (SD), weeks	10.98 (3.07)	10.86 (3.88)	250	$t = -0.23$ (86)	0.821	
Number of deliveries with a TBA						
One	48 (52.2)	44 (47.8)	92	$\chi^2 = 102.02$ (1)	<0.001	0.64
Two or more	0 (0.0)	158 (100.0)	158			
Mean (SD)	1.00 (0.00)	2.34 (1.04)	250	$t = 18.25$ (201)	<0.001	

Row percentages. df = degrees of freedom; SD = standard deviation; V = Cramér's V; t = Welch's t-test.

3.4 Services received, satisfaction and preferred place for the next delivery

TBAs provided a broad package of care. Delivery assistance was reported by 90.8% of the women, herbal medicine by 73.2%, antenatal care by 58.8% and postnatal care by 46.0%, while 7.2% received other traditional practices; none of these services differed between women with and without monthly attendance. Satisfaction was high, with 218 women (87.2%) satisfied or very satisfied. Monthly attendance was, however, more frequent in the small group who were neutral or dissatisfied (93.8% versus 78.9%; $\chi^2 = 3.97$, $p = 0.046$). Asked where they would prefer to deliver their next child, 54.0% of the women chose home, and 46.0% chose a health facility, and monthly attendance was more common among those who preferred home (86.7% versus 73.9%; $\chi^2 = 6.51$, $p = 0.011$) (Table 4).

Table 4: Services received from the TBA, satisfaction with care and preferred place for the next delivery, by monthly attendance (N = 250)

Characteristic	Overall n (%)	None (0) n (%)	≥1 visit n (%)	Test	p	V
Services received from the TBA (yes)						
Delivery assistance	227 (90.8)	47 (20.7)	180 (79.3)	Fisher	0.090	0.12
Herbal medicine	183 (73.2)	35 (19.1)	148 (80.9)	$\chi^2 = 0.00$	0.961	0.00
Antenatal care	147 (58.8)	28 (19.0)	119 (81.0)	$\chi^2 = 0.01$	0.942	0.00
Postnatal care	115 (46.0)	24 (20.9)	91 (79.1)	$\chi^2 = 0.38$	0.536	0.04
Other traditional practices	18 (7.2)	2 (11.1)	16 (88.9)	Fisher	0.538	0.06
Satisfaction with TBA care						
Satisfied or very satisfied	218 (87.2)	46 (21.1)	172 (78.9)	$\chi^2 = 3.97$	0.046	0.13
Neutral or dissatisfied	32 (12.8)	2 (6.2)	30 (93.8)			
Preferred place for the next delivery						
Health facility	115 (46.0)	30 (26.1)	85 (73.9)	$\chi^2 = 6.51$	0.011	0.16
Home	135 (54.0)	18 (13.3)	117 (86.7)			

Overall percentages are of the 250 respondents; percentages by attendance are row percentages. More than one service could be reported. Each χ^2 test has 1 degree of freedom. Fisher = Fisher's exact test; V = Cramér's V.

3.5 Reasons for choosing a TBA

Practical considerations outweighed cultural ones. Three-quarters of the women (75.2%; 95% CI 69.5–80.1) chose a TBA because she was closer to home, and 43.2% because she was more affordable than a health facility. Family or community influence was cited by 39.2%, fear of hospitals or a negative experience by 29.2%, cultural acceptability by 28.0% and belief in traditional birth practices by 12.0% (Table 5).

Table 5: Reasons for choosing a traditional birth attendant (N = 250)

Reason (mentioned)	n	%	95% CI
More accessible (closer to home)	188	75.2	69.5–80.1
More affordable than a health facility	108	43.2	37.2–49.4
Family or community influence	98	39.2	33.4–45.4
Fear of hospitals or negative past experience	73	29.2	23.9–35.1
More culturally acceptable	70	28.0	22.8–33.9
Belief in traditional birth practices	30	12.0	8.5–16.6
Other (poor staff attitude)	1	0.4	0.1–2.2

More than one reason could be given. CI = confidence interval (Wilson score method).

4 DISCUSSION

This study found that four in five women who used TBA services in the Assin Fosu Municipality made one or more monthly visits to a TBA during their most recent pregnancy, most of them three or four times, that first contact usually occurred in the first trimester, and that TBAs had conducted more than nine in ten of all the births the women had ever had. TBA care in the Municipality is therefore not an emergency fallback at the onset of labour but a continuous relationship that begins early in pregnancy and is renewed with each birth. This pattern is all the more notable because skilled delivery coverage in the Municipality exceeds 90% and facilities are physically close.

The level of utilization is considerably higher than the 26.5% prevalence of TBA-assisted delivery reported among women attending postnatal services in the North Tongu District [11], but the two figures measure different things. The present estimate is not a population prevalence: it describes the intensity of contact among women who had already used a TBA, whereas earlier studies estimated the share of all women who delivered with one [11, 12]. The measure also differs, since a monthly visit may involve a brief consultation or the collection of herbal preparations, which three-quarters of the women received, rather than a formal antenatal consultation. Read in this way, the finding complements rather than contradicts the existing literature, by showing that among women who use TBAs, use is habitual rather than incidental.

Previous TBA delivery was the clearest correlate of monthly attendance. Every woman who had delivered with a TBA two or more times attended monthly, and all the women without monthly attendance were having their first TBA delivery. Women who have once given birth with a TBA, and in particular those who did so without complication, appear to return to her as a matter of course, which is consistent with qualitative accounts from Northern Ghana in which familiarity, trust and interpersonal warmth sustain the relationship with the TBA [9]. For the health system, this identifies a readily recognizable group, multiparous women with a history of TBA delivery, in whom early identification and birth preparedness planning are most likely to change the place of the next delivery.

The coexistence of TBA care with the formal system is a second important pattern. Only a third of the respondents had attended antenatal care at a health facility during the most recent pregnancy, so for most of them the TBA was the principal or only source of antenatal contact, and the TBA's role extended to herbal medicine and postnatal care. Women who attend antenatal care but nevertheless deliver at home have been described elsewhere in Ghana [13], and the present data indicate that the reverse arrangement, TBA antenatal contact with little facility contact, is common in this setting. The frequent use of herbal preparations is a particular concern, because the safety of such preparations in pregnancy and labour is uncertain and their use was one of the reasons for which official policy turned away from TBAs [8].

Satisfaction with TBA care was high, in keeping with earlier reports from the North Tongu District [22] and Northern Ghana [9]. The higher level of monthly attendance among the small group of women who were neutral or dissatisfied should be interpreted cautiously, since it rests on 32 women; it nevertheless suggests that regular attendance is sustained by habit and proximity rather than by satisfaction alone. The finding that more than half of the women

preferred to deliver their next child at home, and that this preference was more common among regular attenders, indicates that TBA use is likely to persist without intervention, whereas the 46.0% who preferred a facility represent an opportunity for the health system.

Proximity and cost were the leading reasons for choosing a TBA, even though facilities are near and maternal care is free under the NHIS [7]. This apparent contradiction suggests that perceived rather than actual barriers, including informal charges, transport at night and anticipated mistreatment, shape women's choices; almost three in ten cited fears of hospitals or a negative experience, which accords with documented maltreatment during labour in rural Ghana [17]. The influence of family and community, cited by two in five women, is consistent with evidence that intra-familial decision-making, particularly by husbands and mothers-in-law, governs access to maternal care [16]. Together, these findings indicate that interventions should combine respectful maternity care and enforcement of free care with engagement of TBAs as referral and linkage agents, and should ask every woman at antenatal booking, without judgement, whether she also consults a TBA.

The study has several strengths. It used community-based probability sampling across all 74 communities and therefore reached women disconnected from the formal health system, two-thirds of whom had not attended facility antenatal care; the response rate was 100%; and interviews were conducted in Twi or English with a translated and back-translated instrument. Several limitations should also be considered. The study population was restricted by design to TBA users, so the findings describe the intensity of use among users and do not estimate the prevalence of TBA use in the Municipality. Visits, services and satisfaction were self-reported and may be affected by recall and social desirability bias, particularly among women whose child was approaching two years of age. The sampling frame was built from documented and estimated TBA deliveries, so women whose TBA deliveries were never recorded may be under-represented, and the achieved sample of 250 was below the 280 implied by the estimated design effect. Finally, the findings come from a single peri-urban municipality and may not apply to rural districts in which distance to a facility is a binding constraint.

5 CONCLUSION

Among women who use TBA services in the Assin Fosu Municipality, utilization is intensive and continuous: four in five make monthly visits to a TBA during pregnancy, contact begins in the first trimester, and most women deliver all their children with a TBA. TBA care therefore functions as a parallel antenatal and delivery service rather than as a last resort. The Municipal Health Directorate should identify and follow up women with previous TBA deliveries, engage TBAs formally as referral and linkage agents, address perceived cost and the quality of facility care, and integrate questions on TBA use into antenatal counselling. Population-based studies that include women who do not use TBAs are needed to estimate the prevalence of TBA use and to compare users with non-users.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

The authors declare no conflicts of interest regarding this manuscript.

Statement of ethical approval

The Ghana Health Service Ethics Review Committee (GHS-ERC 016/06/26) granted ethical clearance before the study began. The researchers also obtained written permission from the Assin Fosu Municipal Assembly and the Assin Fosu Municipal Health Directorate, as well as clearance from traditional and community leaders in each selected community. The study was conducted in accordance with the Declaration of Helsinki.

Statement of informed consent

We obtained written informed consent from every participant aged 18 years or older; women who could not read or write gave a thumbprint after we read the consent form to them in Twi, in the presence of an independent literate witness. For participants aged 15–17 years, a parent or guardian provided consent, along with the adolescent's own assent. Participation was voluntary, interviews were conducted in private, and questionnaires were identified only by code numbers.

Authors' contributions

BKA conceptualized the study, developed the research methodology, coordinated the research process, contributed to data interpretation, and led the preparation and revision of the manuscript. MOY contributed to the study design, methodology, data collection, interpretation of findings, and critical revision of the manuscript. SMS contributed to developing the research methodology, literature review, data collection, interpretation of findings, and manuscript revision. JBN contributed to the study design, methodological development, data collection, interpretation of results, and critical review of the manuscript. JKA contributed to the research methodology, data collection, data interpretation, and manuscript review. RTM contributed to the literature review, methodological refinement, interpretation of findings, and critical revision of the manuscript. BA contributed to the study design, research methodology, data analysis, interpretation of findings, and critical review of the manuscript. OV contributed to data collection, field coordination, data validation, interpretation of findings, and manuscript revision. AA contributed to the research methodology, data management, interpretation of results, and critical review of the manuscript. PEOA contributed to the literature review, research methodology, interpretation of findings, and substantive revision of the manuscript. RKE contributed to field coordination, data collection, data validation, interpretation of findings, and manuscript review. EAO contributed to the study design, methodological review, interpretation of findings, and critical revision of the manuscript. SD contributed to the study design and methodological review. DKA supervised the study and contributed to methodological review, interpretation of findings and critical revision of the manuscript. BO supervised the study and contributed to its conceptual development, methodological review, interpretation of findings and critical revision of the manuscript. All authors reviewed the manuscript, provided intellectual input, approved the final version for submission and agreed to be accountable for the accuracy and integrity of their respective contributions.

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