Predictors of Unskilled Birth Attendance among Women of Reproductive Age: A case of Kilifi county, Kenya

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Abstract

Background: Globally, 59% of women deliver at home, predominantly in rural sub-Saharan Africa, compared to a 61% global rate for skilled birth attendance. In Kilifi County, Kenya, 85% of births are attended by skilled professionals, below the national average of 89%. The study aimed to explore predictors of unskilled birth attendance among women in Kilifi North and South Sub-counties, Kenya.

Methods: A cross-sectional study was conducted among 372 women aged 18 to 49 years. Participants were eligible if they were either pregnant at the time of the interview or had previously given birth, regardless of whether the delivery was attended by a skilled or unskilled birth attendant. The data obtained was analysed using STATA version 14, where Logistic regression analysis was conducted to identify predictors of unskilled birth attendance.

Results: Of the 372 women interviewed, 76 (20.4 %) reported delivering under unskilled birth attendance. The predictors of unskilled birth attendance included older maternal age (35+ years) [AOR=2.21; 95% CI: 1.19–4.16; p=0.013], higher gravidity (≥4 pregnancies) [AOR=4.27; 95% CI: 2.22–8.60; p<0.001], and being widowed or single [AOR=2.26; 95% CI: 1.19–4.30; p=0.013]. Experiencing danger signs during pregnancy was associated with reduced odds of unskilled birth attendance [AOR=0.54; 95% CI: 0.31–0.96; p=0.036]. Education level showed a protective association in unadjusted models, with tertiary education yielding the lowest odds.

Conclusions: Age, income, education, and healthcare access barriers significantly hinder women's use of skilled birth attendants. Cultural practices, traditional preferences, and societal perceptions also impact childbirth decisions. Distant travel to health facilities hinders timely access, particularly in emergencies. Additionally, maternal knowledge, driven by education and awareness, plays a crucial role in reducing risks for mothers and newborns.

Recommendations: To improve uptake of skilled birth attendance, targeted community education and culturally sensitive outreach should be explored, especially for older and high-parity women. Strengthening healthcare infrastructure, engaging traditional birth attendants in referrals, deploying mobile clinics, and increasing male involvement in maternal health are critical steps toward addressing access barriers and changing community perceptions.

Keywords: *Unskilled birth attendance, Traditional Birth attendance, Kilifi, Predictors, barriers*

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Introduction

Globally, skilled birth attendance is used 70% of the time; however, only 50% of African countries practice it (1). In Kenya, while 98% of women report receiving prenatal care from licensed healthcare providers (2), maternal mortality remains high. Additionally, a significant proportion of deliveries are still attended by unskilled birth attendants (UBAs), who often rely on personal experience and traditional practices (3). This reliance on UBAs leads to dangerous practices, including poor

hygiene and delayed recognition of life-threatening complications such as postpartum haemorrhage (4). According to the Kenya Demographic and Health Survey(KDHS) (5), only 66% of expectant mothers in Kenya receive help from skilled birth attendants. Furthermore, this is particularly concerning in Kilifi County, where the maternal mortality rate is twice the national average at 800 deaths per 100,000 live births (6).

The Sustainable Development Goal (SDG) 3.1 aims to decrease the global maternal death ratio to less than 70 per 100,000 live births by 2030 (7). Despite efforts by the Kenyan government and the Ministry of Health to improve maternal health, the uptake of skilled birth attendance remains low in Kilifi County, where only 85% of deliveries are attended by skilled professionals, compared to the national average of 89%, furthermore, it is noteworthy that the rates of competent birth attendance vary significantly between the sub-counties in Kilif (2). Based on KHDS 2022 (2), a significant proportion of expectant mothers, specifically 66%, get help during delivery from qualified birth attendants. This implies that 34% of women, roughly one in every three, continue to seek assistance from unskilled birth attendants, such as traditional birth attendants (TBAs) who often lack the essential skills and clinical training required to manage the five leading causes of maternal mortality, such as severe bleeding, infections, and hypertensive disorder, among other causes.

The Kenya Session Paper No. 1's main objective was to dramatically boost the rate of skilled attendance at delivery, to reach 90% by 2015, as opposed to 44% in 2003; therefore, the Kenyan government launched the Maternal and Newborn Health (MNH) Road Map in August 2010 (8). Additionally, by increasing the percentage of skilled birth attendance to 87% by 2020, the Reproductive Maternal Newborn Child and Adolescent Health (RMNCAH) investment framework sought to improve the achievement of the SDGs for maternal health.

To meet the objectives established by SDGs, it is important to accelerate the decrease of disease and death rates among mothers and infants, according to the World Health Organisation's (1) report on trends in maternal mortality. The goal is to do this via promoting overall health and making sure that there are good health conditions in place, with a focus on bringing the global maternal mortality ratio (MMR) down to less than 70 per 100,000 live births by 2030.

Despite substantial governmental and international efforts to increase skilled birth attendance, many women in Kilifi County continue to rely on unskilled birth attendants. This gap between available healthcare services and the utilisation of skilled birth attendance highlights a critical issue: Why do women in Kilifi County continue to opt for unskilled birth attendants despite the known risks? This study, therefore, aimed to investigate the factors contributing to the persistent use of unskilled birth attendants among women in Kilifi County, to identify barriers and provide insights to improve maternal healthcare access and outcomes.

Methodology

Study area

The study focused on Kilifi South and North Sub-counties. Kilifi South has five wards, namely, Junju, Mwarakaya, Shimo la Tewa, Chasimba and Mtepeni, while Kilifi North has seven wards, namely, Tezo, Sokoni, Kibarani, Dabaso, Matsangoni, Watamu and Mnaran. Kilifi South sub-county in the southern part of Kilifi County is approximately 526 square kilometres and has a population of about 155,000 people, while Kilifi North sub-county in the northern part of Kilifi County is approximately 828 square kilometres. The main facilities in Kilifi South are Mtwapa sub-county hospital, while for Kilifi North, it is Kilifi County Referral Hospital, among other sub-county facilities.

Study design

A cross-sectional design using a quantitative approach was adopted, and data were collected between November and December 2023 in Kilifi County. The outcome

variable in this study was unskilled birth attendance, defined as home deliveries conducted without the assistance of trained health professionals. Predictor variables included maternal age, gravidity, marital status, education level, and experience of danger signs during pregnancy. Additional factors such as the number of living children, household income source, and the main expense bearer were also examined.

Study population

The study population were women aged 18-49 years who were pregnant at the time of the interview or had ever given birth either through skilled or unskilled attendance and consented to participate in the study. Women outside this age range or not from these sub-counties were excluded.

Sample size and sampling techniques

The sample size was calculated using the Yamane formula based on the projected numbers of women using these healthcare services.

$$n = \frac{N}{1+N\ e\ (\text{square})}$$

Where n is the desired sample, N is the total population, and e is the margin of error set at 0.05. Given a population of 5,260 and substituting in the formula, the total study sample was 372.

The study used a multi-staged and random sampling approach to select six public health institutions in Kilifi North and South. Two sub-county hospitals were purposefully included. A convenient sampling technique was used to recruit consenting women of reproductive age at these facilities, as shown in Table 1.

Data collection methods

Data was collected using structured, interviewer - administered questionnaires. The questionnaires captured demographic characteristics such as age, education level, and gender, as well as key variables related to the factors influencing unskilled birth attendance. Trained research assistants conducted face-to-face interviews with study participants using the preferred respondents' language, following standardised data collection procedures to ensure consistency and accuracy. Before data collection, the research team conducted a two-day training for data collectors focusing on research ethics, the content of the questionnaire, and proper interviewing techniques. Field supervisors reviewed completed questionnaires daily to check for completeness and clarity, and any inconsistencies were addressed promptly through callbacks or field verification.

Validity and reliability

Research instruments (questionnaires) were validated by specialists to ensure internal validity and reliability. Adjustments were made based on expert feedback, and verbal responses were cross-checked with Mother and Baby booklets to ensure accuracy.

Ethical considerations

Ethical approval was sought from the Jaramogi Oginga Odinga University of Science (JOOUST ERC) 41/11/23-01 and a research permit from NACOSTI. NACOSTI/P/23/31912 Permission to conduct the research was also requested from the Kilifi County Department of Health and Sanitation. Written informed consent was obtained from each participant and confidentiality was maintained by anonymising and de-identifying all data collection tools.

Table 1
Distribution of Respondents Per Study Site

SN	Facility	Level	Sub county	Number of WRA	Sample (n)
1	Gede Sub-County Hospital	SCH	Kilifi North	1230	87
2	Mtwapa Sub-County Hospital	SCH	Kilifi South	1510	107
3	Matsangoni Health Centre	Health centre	Kilifi North	820	58
4	Tezo Hospital	Health centre	Kilifi North	930	66
5	Mnarani Hospital Dispensary	Dispensary	Kilifi South	320	23
6	Tunzanani Dispensary	Dispensary	Kilifi South	450	32
	Total			5260	372

Data analysis

Quantitative data were analysed using STATA Version 14, employing descriptive statistics, Chi-Square analysis, and logistic regressions with a significance level of $p \leq 0.05$ and CI of 95%. Descriptive statistics were used to summarise participants' sociodemographic and clinical characteristics, with frequencies and percentages reported for categorical variables. The primary outcome variable was UBA, defined as delivery occurring at home under the supervision of a non-trained individual. Bivariate analysis was conducted using Pearson's Chi-square test to assess associations between independent variables and the outcome. Variables with a *p*-value ≤ 0.05 in the bivariate analysis were included in a multivariate logistic regression model to identify independent predictors of unskilled birth attendance. Crude and adjusted odds ratios (ORs and AORs) with 95% confidence intervals (CIs) were calculated, and statistical significance was considered at $p \leq 0.05$.

Table 2

Distribution of Demographics by Level of Unskilled Birth Attendance in Kilifi

Characteristic	n	n = 372[1,2]	Skilled, n = 296[1]	Unskilled, n = 76[1]	p-value[3]
Maternal Age	372				<0.001
18-24 Years		72 (19.4%)	66 (91.7%)	6 (8.3%)	
25-34 Years		170 (45.7%)	146 (85.9%)	24 (14.1%)	
35 and above		130 (34.9%)	84 (64.6%)	46 (35.4%)	
Religion	372				0.029
Adventist		45 (12.1%)	36 (80.0%)	9 (20.0%)	
Catholic		50 (13.4%)	36 (72.0%)	14 (28.0%)	
Muslim		36 (9.7%)	29 (80.6%)	7 (19.4%)	
Protestant		196 (52.7%)	163 (83.2%)	33 (16.8%)	
Traditionalist		12 (3.2%)	5 (41.7%)	7 (58.3%)	
Other		33 (8.9%)	27 (81.8%)	6 (18.2%)	
Marital status	372				0.035
Married		288 (77.4%)	236 (81.9%)	52 (18.1%)	
Widowed/single		84 (22.6%)	60 (71.4%)	24 (28.6%)	
Education level	372				<0.001
None		30 (8.1%)	16 (53.3%)	14 (46.7%)	
Primary		237 (63.7%)	187 (78.9%)	50 (21.1%)	
Secondary		88 (23.7%)	77 (87.5%)	11 (12.5%)	
Tertiary		17 (4.6%)	16 (94.1%)	1 (5.9%)	
Mother's occupation	372				0.200
Civil Servant		17 (4.6%)	16 (94.1%)	1 (5.9%)	
Farmer		115 (30.9%)	85 (73.9%)	30 (26.1%)	
Housewife		125 (33.6%)	102 (81.6%)	23 (18.4%)	
Trader		115 (30.9%)	93 (80.9%)	22 (19.1%)	
Husband's occupation	270				0.200
Civil Servant		38 (14.1%)	35 (92.1%)	3 (7.9%)	
Farmer		71 (26.3%)	60 (84.5%)	11 (15.5%)	
Not employed		47 (17.4%)	34 (72.3%)	13 (27.7%)	
Other		31 (11.5%)	26 (83.9%)	5 (16.1%)	
Trader		83 (30.7%)	67 (80.7%)	16 (19.3%)	
Main expense bearer	372				0.019
Husband		212 (57.0%)	180 (84.9%)	32 (15.1%)	
Wife		124 (33.3%)	91 (73.4%)	33 (26.6%)	
Husband/wife		24 (6.5%)	16 (66.7%)	8 (33.3%)	
Parents		12 (3.2%)	9 (75.0%)	3 (25.0%)	
Sub-County	372				0.600
Kilifi North		231 (62.1%)	182 (78.8%)	49 (21.2%)	
Kilifi South		141 (37.9%)	114 (80.9%)	27 (19.1%)	

[1] n (%) [2] Column-wise proportion [3] Pearson's Chi-squared test; Fisher's exact test

Results

Socio-demographic characteristics and prevalence

A total of 372 women of reproductive age from Kilifi County participated in the study, yielding a response rate of 100%. The majority were aged 25–34 years (170; 45.7%) and had attained primary education (237; 63.7%), were married (288; 77.4%), and belonged to the Protestant religion (196; 52.7%). Regarding occupation, farming was the most common (115; 30.9%), followed by trading and civil service. Only 24; 6.5%) of women reported earning more than their partners. Out of the 372 respondents, 76 (20.4%) reported having home deliveries attended by unskilled birth attendants, while 296 (79.6%) delivered with skilled assistance. Home deliveries were slightly more common in Kilifi North (49; 21.2%) compared to Kilifi South (27; 19.1%). Table 2.

Clinical characteristics

Women with between a single and three previous pregnancies (193; 90.6 %) were more likely to use skilled birth attendance compared to (103; 64.8%) with more than four previous pregnancies. Similarly, more women with between one and three children were likely to use skilled birth attendance (206; 92.0%) compared to (85; 60.7%) unskilled birth attendance use for those with more than four children. Women who were older at their first pregnancy were also likely to utilise skilled birth attendance, as shown in Table 3.

Predictors of unskilled birth attendance

Before adjusting for confounders, the study revealed that education level was significantly associated with lower odds of unskilled birth attendance (UBA). Compared to women with no formal education, those with primary education had 69% lower odds of UBA (OR = 0.31; 95% CI: 0.14–0.67; p = 0.003), those with secondary education had 84% lower odds (OR = 0.16; 95% CI: 0.06–0.42; p < 0.001), and those with tertiary education had 93% lower odds (OR = 0.07; 95% CI: 0.00–0.42; p = 0.016).

Table 3

Clinical Characteristics and Level of Unskilled Birth Attendance

Characteristic	N	N = 372[1,2]	Skilled, N = 296[1]	Unskilled, N = 76[1]	p-value[3]
Gravida	372				<0.001
1-3		213 (57.3%)	193 (90.6%)	20 (9.4%)	
4 and above		159 (42.7%)	103 (64.8%)	56 (35.2%)	
Number of children alive	372				<0.001
1-3		224 (60.2%)	206 (92.0%)	18 (8.0%)	
4 and above		140 (37.6%)	85 (60.7%)	55 (39.3%)	
None		8 (2.2%)	5 (62.5%)	3 (37.5%)	
Number of deceased children	372				0.200
1-3		69 (18.5%)	50 (72.5%)	19 (27.5%)	
4-6		2 (0.5%)	2 (100.0%)	0 (0.0%)	
None		301 (80.9%)	244 (81.1%)	57 (18.9%)	
Age at first pregnancy	372				0.500
13-15		9 (2.4%)	6 (66.7%)	3 (33.3%)	
16-18		103 (27.7%)	80 (77.7%)	23 (22.3%)	
19-20		132 (35.5%)	102 (77.3%)	30 (22.7%)	
21-24		91 (24.5%)	77 (84.6%)	14 (15.4%)	
25 and above		37 (9.9%)	31 (83.8%)	6 (16.2%)	
Vaginal bleeding	228	163 (71.5%)	137 (84.0%)	26 (16.0%)	0.200
High blood pressure	228	52 (22.8%)	44 (84.6%)	8 (15.4%)	0.600
Abdominal pain	228	142 (62.3%)	117 (82.4%)	25 (17.6%)	0.800
Difficulty in breathing	228	7 (3.1%)	5 (71.4%)	2 (28.6%)	0.600
Headaches and blurred vision	228	37 (16.2%)	27 (73.0%)	10 (27.0%)	0.120

1 n (%) [2] Column-wise proportion [3] Pearson's Chi-squared test; Fisher's exact test

Older maternal age (≥35 years) was also significantly associated with higher odds of UBA compared to women aged 25–34 years (OR = 2.21; 95% CI: 1.19–4.16; p = 0.013). Additionally, women who experienced danger signs during pregnancy were 46% less likely to have unskilled birth attendance (OR = 0.54; 95% CI: 0.31–0.96; p = 0.036).

Women with four or more pregnancies had more than four times higher odds of UBA compared to those with one to three pregnancies (OR = 4.27; 95% CI: 2.22–8.60; p < 0.001), and those with four or more living children had significantly higher odds compared to those with one to three children (OR = 7.41; 95% CI: 4.18–13.7; p < 0.001).

Women with no living children also had increased odds (OR = 6.87; 95% CI: 1.32–30.4; p = 0.012). Furthermore, widowed or single women had more than twice the odds of UBA compared to married women (OR = 2.26; 95% CI: 1.19–4.30; p = 0.013).

After adjusting for confounders, women aged 35 years and above remained significantly more likely to deliver with unskilled attendants [AOR=2.21; 95% CI: 1.19–4.16; *p*=0.013]. Gravidity of four or more was also significant [AOR=4.27; 95% CI: 2.22–8.60; *p*<0.001].

Widowed or single marital status remained an independent predictor [AOR=2.26; 95% CI: 1.19–4.30; *p*=0.013]. Experiencing danger signs during pregnancy was associated with reduced likelihood of home birth [AOR=0.54; 95% CI: 0.31–0.96; *p*=0.036]. See Table 4.

Discussion

In the adjusted model, Women aged 35 years and above had significantly higher odds of UBA compared to those aged 25–34 years, suggesting that older women may perceive less risk during childbirth due to previous delivery experiences or may hold more entrenched cultural preferences for TBAs.

Table 4

Predictors of Unskilled Birth Attendance

Characteristic		Crude analysis			Adjusted analysis		
		OR[1]	95% CI[1]	p-value	OR[1]	95% CI[1]	p-value
Mother's Age	25-34 Years	—	—		—	—	
	18-24 Years	0.55	0.20, 1.34	0.2	0.85	0.29, 2.26	0.800
	35 and above	3.33	1.92, 5.92	<0.001	2.21	1.19, 4.16	*0.013*
Gravida	1-3	—	—		—	—	
	4 and above	5.25	3.03, 9.41	<0.001	4.27	2.22, 8.60	*<0.001*
Danger signs during pregnancy	No	—	—		—	—	
	Yes	0.68	0.41, 1.14	0.14	0.54	0.31, 0.96	*0.036*
Marital status	Married	—	—		—	—	
	Widowed/single	1.82	1.03, 3.16	0.037	2.26	1.19, 4.30	*0.013*
Education level	None	—	—				
	Primary	0.31	0.14, 0.67	0.003			
	Secondary	0.16	0.06, 0.42	<0.001			
	Tertiary	0.07	0.00, 0.42	0.016			
No. of children alive	1-3	—	—				
	4 and above	7.41	4.18, 13.7	<0.001			
	None	6.87	1.32, 30.4	0.012			
Main expense bearer	Husband	—	—				
	Wife	2.04	1.18, 3.54	0.011			
	Husband/wife	2.81	1.06, 6.97	0.029			
	Parents	1.88	0.40, 6.68	0.4			
Occupation	Civil Servant	—	—				
	Farmer	5.65	1.08, 104	0.1			
	Housewife	3.61	0.68, 66.7	0.2			
	Trader	3.78	0.71, 70.1	0.2			

[1] OR = Odds Ratio, CI = Confidence Interval

Widowed or single women were more than twice as likely to deliver through unskilled birth attendance than their married counterparts, emphasising the importance of social support and spousal involvement in facilitating access to skilled delivery services. Women who experienced danger signs during pregnancy were significantly less likely to engage unskilled attendants during delivery, consistent with findings in Nigeria, where perceived pregnancy risks motivated timely care-seeking from formal health providers (12).

Women with primary, secondary, and tertiary education had 69%, 84%, and 93% lower odds of UBA, respectively, compared to those with no formal education. This protective effect has been documented in multiple studies, including analyses from Bangladesh, Southern Ethiopia, and across 37 low- and middle-income countries, where education enhanced women's health literacy, decision-making power, and ability to navigate health systems (9,11,14). Mahfuzur et al. (9) found that women with no formal education in Bangladesh were significantly more likely to deliver through unskilled attendance, while Priebe et al. (14) reported a strong positive correlation between increasing education and skilled birth attendance in LMICs.

Women with four or more pregnancies had over four times the odds of UBA, and those with four or more living children had more than seven times higher odds, compared to those with fewer children. Women with no living children had higher odds of UBA, potentially reflecting experiences of previous poor outcomes or mistrust in formal health systems. Similar trends have been observed in Benin and Zambia, where multiparous women, confident from past deliveries, were less likely to seek facility-based care (10,15). These patterns may also reflect cultural norms that normalise home births as routine among women with high parity, as suggested in Gabrysch and Campbell's review (17). The high odds among women with no living children may stem from stigma, grief, or fatalistic attitudes towards childbirth, as observed in qualitative studies from Ghana (19).

Economic roles within the household also influenced delivery choices. Women who were the main bearers of household expenses or who shared financial responsibilities with their spouses had significantly higher odds of UBA compared to those whose expenses were borne solely by their husbands. These findings imply that financial strain or role conflict may limit timely access to skilled care. While financial empowerment is often seen as enabling maternal health service use, it may also introduce competing priorities, especially for women engaged in informal labour, such as trading or farming. Studies from Nigeria and Kenya support these findings, highlighting that maternal health decisions are shaped not only by economic means but also by household dynamics, time poverty, and cultural expectations (18,16). Interventions aimed at increasing skilled birth attendance must therefore adopt a multidimensional approach addressing not just individual knowledge or access, but also broader socio-economic and relational factors within households and communities.

Finally, the persistence of unskilled birth attendance in Kilifi County reflects a combination of demographic, socio-economic, and health system factors. Interventions must go beyond the availability of services and address the underlying drivers of inequity, including poverty, limited education, and structural weaknesses in the health system. There is a need for integrated strategies that combine health system strengthening with community-based empowerment to ensure that all women can access and choose skilled birth attendance.

Study Limitations

This study was a cross-sectional design, and it presents limitations including recall and social desirability biases, which may affect the accuracy of reported data. Also, the findings of this study are context-specific and therefore not generalizable, and the single-time

data collection overlooks trends like changes in healthcare access. Self-reported data may have led to underreporting of adverse outcomes, and the study could not establish causality, only associations. Health system challenges are identified, but the study's snapshot nature prevents tracking changes over time.

Conclusions

This study demonstrates that UBA remains a significant public health concern, influenced by a complex interplay of socio-demographic and clinical factors. Advanced maternal age, unmarried status, high parity, and assuming primary or joint responsibility for household expenses were significantly associated with increased odds of UBA, whereas formal education at all levels and the experience of danger signs during pregnancy were associated with reduced likelihood of seeking unskilled delivery care. These findings highlight the need for comprehensive, context-sensitive interventions that extend beyond individual-level health education to address broader predictors of UBA. Policies aimed at increasing skilled birth attendance should prioritise female education, strengthen antenatal care services to enhance risk awareness, and promote male involvement and household support during pregnancy. Moreover, addressing financial barriers and integrating maternal health interventions within broader gender and social protection frameworks will be critical in shifting care-seeking behaviours.

Recommendations

We recommend targeting underserved communities with outreach programs to improve awareness of skilled birth attendance and maternal healthcare. Culturally sensitive maternal healthcare, involving partnerships with traditional birth attendants (TBAs) and local communities, is crucial for bridging gaps between traditional and modern practices. Improving healthcare infrastructure, workforce training, and access to maternal care, including mobile clinics, will strengthen access to skilled birth attendance. Additionally, implementing evidence-based practices and regular monitoring could enhance quality, thus encouraging more women to seek skilled maternal care.

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Author contributions

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- Investigation: NS
- Methodology: NS, DO, GA
- Project administration: DO
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