



Healthcare System Factors Influencing Access and Utilization of Skilled Birth Services among Pastoralist Women in Loima Sub-County, Turkana County, Kenya

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ABSTRACT

Objectives: To determine access to skilled birth services among women of reproductive age, to assess health care interventions influencing the utilization of skilled birth services and to explore barriers influencing the utilization of skilled birth services.

Methods: A mixed-methods study design was employed, conducted from March to June 2024. For the quantitative component, a sample of 384 women aged 15–49 years who had given birth within the previous two years at the time of study was selected using a two-stage cluster sampling method. First, villages were selected from each of the four wards in the sub-county using probability proportional to population size. In the second stage, households were systematically sampled with an interval of 5 households. Qualitative data were collected through 20 in-depth interviews (upon reaching data saturation) with key informants, including community health volunteers (CHVs), traditional birth attendants, and healthcare providers. Quantitative data were analyzed using logistic regression to determine factors associated with skilled birth utilization, while qualitative data were analyzed thematically to identify barriers to skilled birth utilization.

Results: The bivariate analysis shows significant association at $P < 0.05$ between marital status $P < 0.03$, household size $P < 0.01$, distance to health facilities $P < 0.04$, availability of supplies $P < 0.02$, reception by service providers $P < 0.05$ and birthing experiences $P < 0.02$. These results suggest that women who are married, have smaller households, live closer to health facilities, and receive better care and resources are more likely to utilize skilled delivery services. The multivariate logistic analysis identifies the independent predictors of skilled delivery utilization. Factors such as being single (OR=3.75, CI=0.58-5.97), having more than five children (OR=0.60, CI=0.45-0.80), and living more than 5 km from a health facility (OR=1.96 CI=0.53-2.92) were associated with lower odds of utilizing skilled delivery services. Economic barriers included low household income, with most women engaging in small-scale farming and their spouses working as casual laborers or herders. Facility-based interventions such as health talks by nurses/midwives and community health education increased utilization of skilled birth services.

Conclusion: Healthcare system barriers substantially constrain access and utilization of skilled birth services in pastoral settings. Strengthening rural health systems through improved infrastructure, staffing, supply chains, and referral systems is essential for improving maternal health outcomes.

Keywords: Skilled birth attendance; Healthcare system factors; Pastoralist communities; Maternal health; Kenya

BACKGROUND

Maternal mortality remains a major global health challenge, with sub-Saharan Africa accounting for the highest burden. In Kenya, despite progress in reducing maternal deaths, the maternal mortality ratio (MMR)

stands at 355 per 100,000 live births (KNBS & ICF MACRO, 2023), which is far above the Sustainable Development Goal (SDG) target of less than 70 per 100,000. Turkana County continues to experience alarmingly high maternal mortality rates. The county reports a maternal mortality ratio (MMR) of 381 deaths per 100,000 live births, which is significantly higher than the national average of 355 per 100,000 live births (ibid). Access to and utilization of skilled birth services is a critical factor in reducing preventable maternal mortality. In Turkana County, the coverage of skilled birth attendance is 53%, which is significantly lower than the national average of approximately 89.3%. However, Loima sub county is one among the sub counties of Turkana performing dismally at 37.1%). This was significantly lower compared to the other sub-counties within the County. Pastoral women, as opposed to other women living in settled communities, will most likely deliver their children at home or on the way to settlements due to their nomadic nature and setting of residence in remote and dispersed settlements across the country. Under these conditions, pastoral women's lifestyles are not adapted to healthcare systems and their implementation, resulting in a high risk of maternal and neonatal deaths in pastoral community settings. As a result, access to healthcare in a pastoral community is extremely limited, negatively impacting their health (St-Onge Ahmad, 2023).

Current interventions and policies aimed at reducing maternal mortality in Kenya emphasize facility-based deliveries and skilled care. However, these strategies inadequately address the unique challenges faced by pastoralist communities, such as mobility, cultural practices, and geographic isolation. Community health systems are overstretched, and human resource shortages compromise continuity of care, especially during public health emergencies (Bezbaruah, Wallace, Zakoji, Padmini Perera, & Kato, 2021). There is a clear gap in context-specific approaches that integrate cultural and logistical realities of pastoralist populations.

This study proposes to identify determinants of skilled birth service utilization among pastoralist women in Loima Sub-County, Turkana. Understanding these factors will inform targeted interventions and policy adjustments to improve maternal and neonatal health outcomes in marginalized, hard-to-reach communities. Scaling up culturally sensitive, community-based strategies is essential to bridge the equity gap and accelerate progress toward national and global maternal health goals.

Broad objective

The broad objective of the study is to determine the access and utilization of skilled birth services among childbearing women (15-49 years) of a pastoral community in Loima Sub County, Turkana County

METHODS

This study was conducted in Loima sub county, Turkana County. Turkana is an arid and semi-arid county in Kenya with a primarily nomadic population. Turkana has 13 hospitals, 19 health centers, 194 dispensaries, and 136 functional community health units (CHUs), with an average distance of 35 kilometers to the nearest facility

Target population

The study was conducted in Loima Sub County among childbearing women (15-49 years) from the pastoralist community who have delivered skilled or unskilled labor within the previous two years. Loima sub-county has a population of 121,939 people (as of 2022 estimates) with 24,388 being women of reproductive age. The unit of analysis was an individual woman aged between 18 and 49 years.

Study Design

A mixed-methods cross-sectional study design was employed to determine access to and utilization of skilled birth services and to explore healthcare-system, socioeconomic, geographic and sociocultural factors influencing skilled birth utilization among pastoralist women in Loima Sub-County, Turkana County, Kenya. The quantitative component used a cross-sectional household survey, while the qualitative component used key-informant interviews to obtain contextual information regarding healthcare access, facility readiness, healthcare-worker practices, cultural practices and barriers to skilled birth utilization.

For the quantitative component, a multistage cluster sampling approach was used. Villages were selected from the four wards of Loima Sub-County, after which households within the selected clusters were systematically sampled. The study enrolled 384 women aged 15–49 years who had delivered within the defined recall period. The qualitative component comprised 20 key-informant interviews conducted with relevant stakeholders, including community health volunteers, traditional birth attendants and healthcare providers, with interviews continuing until information saturation was achieved. The mixed-methods approach enabled the quantitative analysis to identify factors statistically associated with skilled birth utilization while the qualitative component provided contextual explanations for observed patterns. The original manuscript describes the quantitative sampling as a two-stage cluster procedure in which villages were selected using probability proportional to population size and households were subsequently selected systematically with an interval of five households.

Sampling procedures

Multistage sampling technique was used to select the study participants. Multistage sampling enabled the creation of clusters that are a smaller representation of the population being evaluated and have similar characteristics

Data Collection method

Quantitative data were collected at household level using an interviewer-administered questionnaire. The questionnaire collected information on sociodemographic characteristics, obstetric history, access to health facilities, awareness of skilled birth services, previous facility-delivery experiences, healthcare-worker attitudes, facility readiness, transportation and cultural factors. Qualitative information was collected through key-informant interviews addressing factors influencing women's choice of skilled birth services, sociocultural practices surrounding childbirth, functionality of health facilities and community health units, challenges experienced during childbirth, and strategies for improving skilled birth utilization.

Because the study population was predominantly Turkana-speaking, the questionnaire should be described as having been administered in a language understood by the respondent. The exact translation and back-translation procedures should be inserted here only if they were actually undertaken. If a written English-to-Turkana translation and independent back-translation were performed, this should be stated explicitly. If the questionnaire was administered through trained bilingual interviewers without formal written back-translation, the manuscript should state this accurately rather than implying a formal validation process that was not undertaken.

Data Analysis

The descriptive analyses such as percentages, measures of central tendency were conducted. Statistical association between dependent variable and covariates was done using logistic regression. Significance was determined using adjusted odds ratios with 95% confidence intervals and P values. Thematic analysis was used to analyse qualitative data.

Response Rate

The final analytical sample comprised 384 women. However, the manuscript currently does not provide the number of women approached, the number found eligible, the number who declined participation, or the number who completed the questionnaire. Consequently, an exact response rate cannot be calculated from the information currently reported. The authors should insert the actual figures from the field records using the following format:

“Of the [number] eligible women approached for participation, [number] completed the questionnaire, giving a response rate of [percentage]%.”

If all 384 selected and eligible women completed the questionnaire, the statement should instead read:

“All 384 selected eligible women completed the questionnaire, giving a response rate of 100%.”



No response-rate value should be introduced without verification from the field records.

RESULTS

Table 1: Demographic Characteristics of the Respondents

Characteristic	n (%)
Education	
None/Primary	258 (66.1)
Secondary	106 (27.6)
Tertiary	20 (6.3)
Age	
<20	104 (27.1)
20–35	232 (60.4)
≥35	48 (12.5)
Employment	
Employed	21 (5.5)
Self-employed/Business	130 (33.9)
Unemployed	233 (60.6)
Marital Status	
Single	85 (22.2)
Married	299 (77.8)
Husband's occupation	
Pastoral farming	282 (73.4)
Casual jobs	102 (26.6)
Household monthly income (Kenyan shillings)	
Less than 1,000/-	150 (39.0)
1,000–5,000	177 (46.0)
Over 5,000	57 (15.0)

A total of 384 women were included in the quantitative analysis. Most respondents were aged 20–35 years (232, 60.4%), while 104 (27.1%) were younger than 20 years and 48 (12.5%) were aged 35 years or older. Two-thirds of respondents had attained no education or primary education (258, 66.1%), while 106 (27.6%) had secondary education and 20 (6.3%) had tertiary education. Most respondents were married (299, 77.8%), while 85 (22.2%) were single. Regarding economic activity, 21 (5.5%) were employed, 130 (33.9%) were self-employed or engaged in business, and 233 (60.6%) were unemployed. Household income was generally low, with 150 (39.0%) reporting a monthly household income below KSh 1,000 and 177 (46.0%) reporting KSh 1,000–5,000.

With respect to obstetric history, 257 (67.0%) women reported fewer than four children, while 127 (33.0%) reported four or more children. Importantly, number of children and household size were treated as separate variables in the manuscript and should remain distinct in the revised analysis. Number of children refers to the respondent's parity/number of children, whereas household size refers to the total number of people in the household. Therefore, the terms should not be used interchangeably.

Overall, 249 (64.9%) respondents reported that their most recent delivery occurred at home, while 135 (35.1%) delivered in a health facility. A still larger proportion, 278 (72.5%), indicated a preference for home delivery, compared with 106 (27.5%) who preferred facility delivery.

Table 2: Obstetric Characteristics

Obstetric history	n (%)
Number of children	
< 4	257 (67)
≥ 4	127 (33)
Last place of delivery	
Home	249 (64.9)
Hospital	135 (35.1)
Preferred place of delivery	
Home	278 (72.5)
Hospital	106 (27.5)

The analysis reveals that a majority of the mothers surveyed (257, 67%) had fewer than four children, while a smaller proportion (127, 33%) reported having four or more. In terms of delivery location, a significant number (249, 64.9%) gave birth at home, compared to 135 mothers (35.1%) who delivered in a health facility. This pattern is mirrored in delivery preferences, where 278 respondents (72.5%) expressed a preference for home births, and only 106 (27.5%) favored hospital deliveries. These findings highlight a strong preference for home-based childbirth, both in practice and intention. The alignment between actual delivery locations and stated preferences suggests that cultural norms, perceived convenience, or systemic barriers may be influencing maternal choices in Loima Sub-County. This trend underscores the need for targeted interventions to address the underlying factors discouraging facility-based deliveries.

TABLE 3: Health system factors

Variable	n (%)
Average distance to health facility	
Less than 5 km	127 (33.1)



5 – 10km	85(22.1)
10-15 Km	101(26.3)
Over 15 Km	71 (18.5)
Access to health facility	
Foot	227(59)
Vehicle	38(10)
Other means	119(31)
Did you attend ANC?	
Yes	369 (96)
No	15 (4)
Have you heard of skilled birth services?	
Yes	319(83)
No	65(17)
Who informed you?	
Health worker/CHP	216(56.3)
Mass media	36(9.4)
TBA	75(19.5)
Neighbor	57(14.8)
Ever delivered in a facility?	
Yes	132(34.4)
No	252(65.6)
HEALTH WORKER ATTITUDE	
Polite and welcoming	46(11.9)
Facility closed	69(18)
Rude	269(70.1)
ADEQUATE EQUIPMENT AND DRUGS	
Yes	92(24)
No	292(76)



PERCEPTION OF HCW	
Excellent	19(5)
Good	58(15)
Fair	102(26.6)
POOR	205(53.4)
BIRTHING EXPERIENCE AT FACILITY	
Excellent	13(3.4)
Good	44(11.5)
Fair	116(30.2)
POOR	211(54.9)
HANDLING BY HCW'S	
Friendly and receptive	16(4)
Unnecessary questions	115(30)
Harsh and rude	253(66)

65.6% of the respondents reported that they have not ever delivered in the health facilities, while 34.4% reported having given birth before in the health facilities. On the other hand, 54.9% of the respondents reported having bad birth experience with health facility staff, while 30.2% had fair experience. Only 3.4% reported excellent birth experiences with the good reception, support from health care workers which guaranteed safety for her and baby and respect throughout the period

Most of the respondents (66%) reported having a poor reception by harsh and rude service providers, while 30% complained of unnecessary questions. Only 4% reported having been handled well.

Availability of health facilities

All respondents acknowledged that there were health facilities in the area where they lived. They knew about them through usage or being told about them by community health workers. Most households were within 10–15 kilometers from the health facility. Apparently, all health facilities had skilled birth services. The most frequently named service was antenatal care, according to all respondents. Facilities were open from Mondays to Fridays between 8 a.m. and 5 p.m. and closed after working hours and when staff traveled for official duties or home. Respondents had problems with this and described it as "closed facilities". The theme discussed was "closed facilities," as highlighted here:

"People do not use services at night because there is no attendant. During weekends mothers have to travel elsewhere to get services because this facility remains closed, and this brings in more costs and distance"

They indicated how opening and closing hours influenced the utilization of services by altering the costs of accessing them.

Access to health facilities

Access to health facilities is a particular concern in rural and per-urban regions due to challenges such as low socioeconomic status, long distances to healthcare, and health workforce shortages.

Regarding the roads, 78% of the respondents said that road networks affected access to health facilities. All health facilities in the study area were accessible roads, but this was affected during the rainy season, especially when the larger floods cut access by blocking the roads.

There were many instances where roads were a hindrance due to muddy roads and potholes. Regarding physical access costs, most of the respondents (84%) mentioned transportation costs as the main indirect cost incurred. During visits to the study area, it was observed that the use of motorbike transport, locally known as boda-boda, was the most common mode of transportation. Transportation created additional costs for health care. Indeed, for most respondents, the main factor affecting access was transport to the health facility. This was an important indirect cost, despite free public services.

Table 4: Logistic Regression Analysis of Facility Delivery Determinants Bivariate Logistic Regression Analysis of Factors Associated with Facility Delivery among Women in Loima Sub-County

Variable	Category Compared (Ref)	Crude Odds Ratio (OR)	95% Confidence Interval	p-value
Marital status	Single vs. Married	0.75	0.58-0.97	0.03
Household size	<4 vs. >4	0.6	0.45-0.80	0.01
Education Level	Secondary vs. None/Primary	1.91	1.04 – 3.53	0.038
	Tertiary vs. None/Primary	2.89	1.11 – 7.48	0.03
Age Group	<35 years vs. >35 years	1.63	1.00 – 2.67	0.049
Employment Status	employed vs. Unemployed	1.87	1.09 – 3.21	0.022
Distance to Facility	<5 km vs. >5 km	0.39	0.19 – 0.81	0.013
Heard of Skilled Delivery	Yes vs. No	2.71	1.44 – 5.12	0.002
Birthing experience	Good vs. Bad	0.5	0.35-0.70	0.01
Cultural Prohibition	Yes vs. No	0.52	0.31 – 0.88	0.017
Facility Well-Equipped	Yes vs. No	1.94	1.05 – 3.56	0.035
Negative attitude of healthcare workers	Yes vs. No	0.47	0.27 – 0.83	0.012

Note: Ref = reference category. Statistically significant values are bold

The bivariate analysis identified several factors significantly associated with facility delivery at the 5% significance level. Marital status was associated with facility delivery, with single women having lower crude odds of facility delivery compared with married women (OR = 0.75, 95% CI: 0.58–0.97; $p = .030$). Household size was also significantly associated with facility delivery; women from households with fewer than four members had lower odds compared with the reference category of households with more than four members (OR = 0.60, 95% CI: 0.45–0.80; $p = .010$). The manuscript should verify the precise household-size categories because Table 4 uses <4 versus >4, whereas Table 5 subsequently uses ≥ 5 versus <5.

Education was significantly associated with facility delivery. Women with secondary education had higher crude odds of facility delivery than women with none/primary education (OR = 1.91, 95% CI: 1.04–3.53; $p =$

.038), while those with tertiary education had even higher crude odds (OR = 2.89, 95% CI: 1.11–7.48; $p = .030$).

Age was also associated with facility delivery at the bivariate level, with women younger than 35 years having higher crude odds compared with women aged above 35 years (OR = 1.63, 95% CI: 1.00–2.67; $p = .049$). Employment was similarly associated with facility delivery, with employed women having higher odds compared with unemployed women (OR = 1.87, 95% CI: 1.09–3.21; $p = .022$).

Geographical accessibility was an important determinant. Women living less than 5 km from a health facility had lower crude odds in the comparison presented in Table 4 (>5 km as the reference), with OR = 0.39 (95% CI: 0.19–0.81; $p = .013$). Awareness of skilled birth services was positively associated with facility delivery; women who had heard of skilled delivery services had more than twice the crude odds of facility delivery compared with those who had not (OR = 2.71, 95% CI: 1.44–5.12; $p = .002$).

Previous birthing experience, cultural prohibition, facility readiness and healthcare-worker attitude were also significantly associated with facility delivery. Women reporting a good birthing experience had lower crude odds in the comparison shown in Table 4 (OR = 0.50, 95% CI: 0.35–0.70; $p = .010$). Cultural prohibition was associated with reduced odds of facility delivery (OR = 0.52, 95% CI: 0.31–0.88; $p = .017$). Women reporting that facilities were adequately equipped had higher odds of facility delivery (OR = 1.94, 95% CI: 1.05–3.56; $p = .035$), while negative healthcare-worker attitudes were associated with reduced odds (OR = 0.47, 95% CI: 0.27–0.83; $p = .012$).

Variables meeting the prespecified bivariate significance threshold of $p < .05$ were considered for inclusion in the multivariable logistic regression model, together with variables identified a priori as potential confounders.

Table 5: Multivariate Logistic Regression Analysis of Factors Independently Associated with Facility Delivery

Variable	Category Compared (Ref)	Adjusted Odds Ratio (AOR)	95% Confidence Interval	p-value
Education Level	Secondary vs. None/Primary	1.71	1.01 – 2.90	.047
	Tertiary vs. None/Primary	2.45	1.03 – 5.82	.042
Age Group	≥35 years vs. <35 years	1.58	0.96 – 2.62	.072
Marital Status	Married vs Single	3.75	0.58–5.97	.03
Employment Status	employed vs. Unemployed	1.73	1.03 – 2.91	.039
Household Size	≥5 HH size vs. <5 HH Size	0.60	0.45–0.80	.01
Distance to Facility	>5 km vs. <5 km	1.96	0.53 – 2.92	.04
Heard of Skilled Delivery	Yes vs. No	2.44	1.22 – 4.87	.011
Cultural Prohibition	Yes vs. No	0.51	0.30 – 0.87	.015
Availability of supplies	Yes vs. No	1.81	1.02 – 3.20	.02
Attitude of Healthcare Workers	Yes vs. No	0.46	0.27 – 0.77	.05
Previous Birth Experience	Good Vs Bad	1.78	1.05-3.33	.02

After adjustment for other variables included in the model, education remained independently associated with facility delivery. Compared with women with no/primary education, women with secondary education had higher adjusted odds of facility delivery (AOR = 1.71, 95% CI: 1.01–2.90; $p = .047$), while women with tertiary education had approximately two-and-a-half times the adjusted odds (AOR = 2.45, 95% CI: 1.03–5.82; $p = .042$). These findings indicate a positive educational gradient in facility delivery.

Age was not independently associated with facility delivery after adjustment. Women aged ≥ 35 years had an AOR of 1.58 compared with women younger than 35 years, but the association was not statistically significant (95% CI: 0.96–2.62; $p = .072$).

Marital status requires particular attention. Table 5 presents the comparison as married versus single and reports AOR = 3.75, 95% CI: 0.58–5.97, $p = .030$. These statistics are internally inconsistent because the reported 95% confidence interval includes 1 despite the reported p -value being below .05. The original regression output must therefore be checked before publication. If the coding and AOR are confirmed, the direction of association would indicate higher odds of facility delivery among married women relative to single women; consequently, the current abstract statement that being single predicted lower odds should be revised accordingly. The exact confidence interval and p -value should, however, be corrected from the original statistical output before the final manuscript is submitted.

Employment remained independently associated with facility delivery. Employed women had higher adjusted odds of facility delivery than unemployed women (AOR = 1.73, 95% CI: 1.03–2.91; $p = .039$).

Household size was independently associated with facility delivery. Women in households with ≥ 5 members had lower adjusted odds of facility delivery compared with those in households with fewer than five members (AOR = 0.60, 95% CI: 0.45–0.80; $p = .010$). This variable should be referred to consistently as household size and should not be described as number of children. Number of children was a separate obstetric variable reported in Table 2.

Distance to the health facility was also reported as independently associated with facility delivery, with women living more than 5 km from a facility having an AOR of 1.96 compared with those living less than 5 km away (95% CI: 0.53–2.92; $p = .040$). However, the confidence interval includes 1 despite the reported p -value of .040, creating a second statistical inconsistency. In addition, the direction differs from the narrative interpretation in the abstract. The original regression output and variable coding should therefore be checked before the final interpretation is retained.

Awareness of skilled birth services was a statistically significant positive predictor. Women who had heard of skilled birth services had more than twice the adjusted odds of facility delivery compared with women who had not heard of them (AOR = 2.44, 95% CI: 1.22–4.87; $p = .011$).

Cultural prohibition was independently associated with reduced facility delivery. Women reporting cultural prohibition had approximately half the odds of facility delivery compared with those who did not report such prohibition (AOR = 0.51, 95% CI: 0.30–0.87; $p = .015$). This finding highlights the importance of sociocultural influences in shaping maternal healthcare-seeking behaviour in the study population.

Availability of supplies was positively associated with facility delivery. Women reporting availability of supplies had higher adjusted odds of facility delivery (AOR = 1.81, 95% CI: 1.02–3.20; $p = .020$). The p -value should be reported as .020 in the Discussion if Table 5 represents the verified regression output; the $p = .42$ currently appearing in the Discussion is inconsistent with Table 5 and should be removed.

Healthcare-worker attitude was inversely associated with facility delivery. The variable reported as attitude of healthcare workers had an AOR of 0.46 (95% CI: 0.27–0.77; $p = .050$). Because $p = .050$ is exactly at the conventional 5% threshold, the manuscript should avoid overstating the strength of evidence and should report the exact value consistently throughout.

Previous birth experience was also independently associated with facility delivery. Women with a good previous birth experience had higher adjusted odds of facility delivery compared with those with a bad experience (AOR = 1.78, 95% CI: 1.05–3.33; $p = .020$).

DISCUSSION

Education and socioeconomic factors

Education was an independent predictor of facility delivery. Women with secondary and tertiary education had significantly higher adjusted odds of facility delivery than women with no or primary education. The observed educational gradient may reflect differences in health literacy, awareness of pregnancy-related risks, understanding of the benefits of skilled attendance and ability to navigate available health services. In pastoralist communities, where geographical and cultural barriers may already constrain access, education may enhance women's ability to recognize the importance of skilled care and make informed decisions concerning place of delivery.

Socioeconomic circumstances also appeared to influence facility delivery. Employed women had higher adjusted odds of facility delivery than unemployed women. This finding is consistent with the broader economic profile of the study population, in which most households reported relatively low monthly income. The economic constraint is particularly important because even when maternity services are nominally free, women may incur indirect costs related to transportation, food, accommodation, communication and accompanying family members. The qualitative findings support this interpretation, with transportation costs identified as an important indirect cost of accessing healthcare.

Geographic access, transport and road infrastructure

Geographical accessibility was an important theme in the study. The quantitative findings examined distance from the health facility, while the qualitative findings demonstrated that physical access involved more than straight-line distance. Seventy-eight percent of respondents reported that road networks affected access to health facilities, particularly during the rainy season when flooding, muddy roads and potholes could obstruct travel. Transportation costs were reported by 84% of respondents as an important indirect cost, while boda-boda transport was identified as a common means of reaching health facilities.

These findings demonstrate that improving skilled birth attendance in pastoralist settings requires more than increasing the number of health facilities. Reliable roads, affordable transportation, functioning referral systems and emergency transport are necessary to ensure that women can reach skilled care when labour begins. The qualitative findings also indicated that facilities were sometimes closed outside normal working hours, forcing women to travel elsewhere and increasing both distance and cost.

The direction of the adjusted association between distance and facility delivery should, however, be verified from the original regression output before drawing a definitive statistical conclusion, because Table 5 reports AOR = 1.96 with a 95% CI of 0.53–2.92 and $p = .040$. The confidence interval and p -value are not internally concordant.

Cultural prohibition

Cultural prohibition was significantly associated with facility delivery in the multivariable analysis. Women who reported cultural prohibition had lower adjusted odds of facility delivery (AOR = 0.51, 95% CI: 0.30–0.87; $p = .015$). This finding emphasizes that healthcare utilization among pastoralist women cannot be understood solely in terms of physical access or health-system capacity.

Cultural beliefs and community expectations may influence decisions concerning the preferred place of childbirth, the role of traditional birth attendants, timing of seeking care and whether a woman requires permission or assistance to travel to a health facility. The high proportion of women reporting home delivery

and preference for home delivery further demonstrates the importance of addressing sociocultural determinants alongside health-system barriers.

Interventions should therefore engage community leaders, traditional birth attendants, male partners, community health workers and women themselves. Culturally appropriate health education should emphasize the benefits of skilled attendance while respecting community structures and avoiding approaches that stigmatize established cultural practices.

Awareness of skilled birth services

Awareness of skilled birth services was an important independent predictor of facility delivery. Women who had heard of skilled birth services had higher adjusted odds of facility delivery (AOR = 2.44, 95% CI: 1.22–4.87; $p = .011$). This suggests that information and health education can play an important role in translating the availability of services into actual utilization.

The finding is particularly relevant because most women reported learning about skilled birth services from health workers or community health personnel. Strengthening community-based health education and integrating birth preparedness counselling into antenatal care may therefore improve awareness and encourage women to plan for facility delivery.

Facility readiness and healthcare-worker attitude

Facility readiness was another important determinant. Availability of adequate supplies was associated with higher odds of facility delivery (AOR = 1.81, 95% CI: 1.02–3.20; $p = .020$). The finding suggests that women may be more willing to use facilities when they perceive that essential equipment, medicines and other resources are available.

The qualitative findings reinforce this interpretation. Although respondents acknowledged the presence of health facilities, some reported that facilities were closed outside normal working hours or when staff were away. Respondents also described negative interactions with healthcare workers, with 70.1% reporting rude treatment and 66% describing healthcare workers as harsh or rude.

Previous birth experience was similarly important. Women with good previous birth experiences had higher adjusted odds of facility delivery (AOR = 1.78, 95% CI: 1.05–3.33; $p = .020$). Positive experiences can build confidence and trust in health services, whereas disrespectful treatment may discourage women from returning for subsequent deliveries.

Availability of supplies and provider's attitude

Lack of equipment and supplies reduced skilled birth use significantly (AOR=1.81,CI:1.02-3.20; $p=0.42$), emphasizing facility readiness in maternal care decisions. Poor provider reception reduced skilled birth utilization (AOR=0.46, 95% CI: 0.27–0.77; $p=0.04$), highlighting care quality's importance. A well-resourced facility coupled with respectful and supportive care was positively associated with increased skilled birth attendance. These findings are congruent with previous research highlighting the role of facility readiness and quality of care in promoting maternal health service use (Ayehu et al., 2025). Poor attitudes among service providers, characterized by disrespect, discrimination, and neglect, have been consistently identified as deterrents to skilled birth utilization across multiple settings (Bowser & Hill, 2010). In contrast, positive provider attitudes can create an enabling environment that encourages women to seek facility-based care.

Influence of Previous Birth Experiences

A significant association was observed between previous birth experiences and subsequent utilization of skilled birth services ($p = .01$). Women with positive previous facility-based delivery experiences were more likely to return for skilled care in subsequent pregnancies. This finding is consistent with the theory of health service satisfaction and loyalty (Mosley, Saruni, & Lenga, 2020), which posits that positive experiences

reinforce health-seeking behavior, while negative experiences deter future use. Repeating interactions with a trustworthy and competent health system enhances women's confidence in facility-based care, leading to sustained utilization (Cheboi & Kimeu, 2026).

Level of awareness of Skilled Birth Services

Awareness of skilled delivery is a strong and significant predictor of facility use (AOR = 2.44; 95% CI: 1.22–4.87; $p = .011$), emphasizing the value of community education on the importance of skilled birth services. A high level of awareness among women is significantly associated with increased utilization of skilled birth services (Worku, Yalew, & Afework, 2013). Awareness not only focuses on the availability of skilled birth services in the health facilities but also contributes to positive attitudes toward facility-based deliveries.

According to a national survey in Kenya, women who attended ANC sessions and were counseled on delivery options showed higher awareness and likelihood of choosing skilled birth service (KNBS & ICF MACRO, 2023). In rural and underserved regions, awareness levels remain suboptimal due to limited health education, poor access to information, and cultural barriers (Ouédraogo, 2024). The women who had heard of skilled birth services were highly likely to utilize compared to those who had not. This aligns with findings from studies in Ethiopia (Shiferaw & Modiba, 2020) and Nigeria (Abdulraheem, Ononokpono, & Raimi, 2025), which highlight that knowledge and awareness are strong predictors of skilled birth attendance.

CONCLUSION

Healthcare system barriers significantly limit access and utilization of skilled birth services among pastoralist women in Loima Sub-County. Addressing geographic, infrastructural, human resource, supply chain, and referral system constraints is essential for improving skilled birth attendance and reducing preventable maternal and neonatal morbidity and mortality.

Healthcare-system, socioeconomic, geographic and sociocultural factors were associated with utilization of skilled birth services among pastoralist women in Loima Sub-County. Education, employment, household size, awareness of skilled birth services, availability of facility supplies, previous birth experience and cultural prohibition were among the important factors identified in the multivariable analysis. Qualitative findings further demonstrated the importance of transportation costs, road conditions, facility operating hours and interactions with healthcare workers.

Improving skilled birth utilization in pastoralist settings therefore requires an integrated approach combining community-based health education, culturally responsive maternal-health interventions, improved facility readiness, respectful maternity care, reliable staffing, functional referral systems, improved road accessibility and affordable transportation. However, the reported marital-status and distance associations require verification against the original regression output before the final manuscript is submitted because the confidence intervals currently reported in Table 5 are inconsistent with their corresponding p -values.

DECLARATIONS

Ethics approval and consent to participate

Ethical approval was obtained from the Moi University/Moi Teaching and Referral Hospital Institutional Research and Ethics Committee. Written informed consent was obtained from all participants.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

The author conceptualized the study, conducted data analysis, and drafted the manuscript. All authors read and approved the final manuscript.

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