

Determinants of the utilisation of alternative birthing positions during the second stage of labour among parturient women in Western Kenya: A cross-sectional study

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ABSTRACT

The position chosen by mothers during labour's second stage plays a vital but frequently neglected role in determining labour outcomes. Despite the link between alternative birthing positions like squatting, kneeling and side-lying with better maternal comfort and neonatal results along with faster labor durations, the lithotomy position continues to be the primary practice at many Kenyan health institutions. The identification of variables that affect the use of alternative birthing positions is a foundational element in developing interventions that support evidence-based and respectful maternity care. This study aims to identify the determinants that affect the use of alternative birthing positions during the second stage of labour among pregnant women in Western Kenya. The research was cross-sectional analytical study with 396 postpartum women at two referral hospitals located in Western Kenya. Participants were selected using systematic random sampling. Structured interviewer-administered questionnaires collected data, which were then analysed using SPSS version 28. The study employed descriptive statistics to summarize socio-demographic characteristics and applied chi-square tests along with multivariate logistic regression to identify factors linked to the utilization of alternative birthing positions. Statistical significance was determined by p-values lower than 0.05. A minority of 25.8% of women selected alternative birthing positions for delivery compared to the majority who chose the lithotomy position with 74.2%. Women who had access to information about birthing positions (AOR = 3.88, $p < .001$), received provider encouragement (AOR = 4.91, $p < .001$), used birthing aids (AOR = 2.76, $p = .007$), and chose upright positions (AOR = 3.42, $p < .001$) showed significant increases in their use of alternative birthing positions. The use of alternative birthing positions was not significantly related to socio-demographic factors such as age or parity, though there were weak associations with marital status and level of education. The use of alternative positions depends on healthcare provider practices in giving information and support to parturient mothers, together with the preparedness of healthcare facilities with available birthing aids to support alternative birthing positions and women's understanding on alternative birthing options. Socio-demographic factors had no significant influence in the utilization of alternative birthing positions. Antenatal education programs need to provide information about different birthing position choices. Healthcare facilities should be adequately equipped with appropriate birthing aids and resources to support the use of alternative birthing positions.

Key words: Alternative birthing positions; Second stage of labour; Lithotomy position; Maternal knowledge; Healthcare provider support; Parturient women

I. INTRODUCTION

Childbirth plays a crucial role in women's lives while representing a major public health issue worldwide. Even though obstetric technology and practices have developed significantly, maternal and neonatal morbidity and mortality rates continue to be high in many low- and middle-income countries. According to the World Health Organization's 2024 data, there are about 287,000 preventable maternal deaths each year on a global scale. A large number of these fatalities and complications happen throughout labor and delivery which emphasizes the essential need to follow evidence-based childbirth procedures. Labor outcomes and the birthing experience are strongly connected to the positions women choose during the second stage of labor, which is an adjustable factor according to recent evidence (Gupta et al., 2017; Healy et al., 2020).

Second stage of labor begins when the cervix is completely dilated and ends with the birth of the baby, and which presents with both physical and emotional challenges. The mother's posture directly affects essential physiological events during this stage, which include uterine contractions, maternal pushing efforts, and fetal descent. Scientific studies demonstrate that upright or non-traditional birthing positions such as squatting, sitting, side-lying, kneeling, or hands-and-knees improve labor progression through gravitational force enhancement and fetal alignment

improvement while also providing greater maternal comfort (Yadav et al., 2021; Satone & Tayade, 2023). The use of these birthing positions enhances blood circulation and oxygen delivery, which may lead to improved neonatal outcomes.

Alternative birthing positions are widely acknowledged for their advantages yet remain underutilized throughout numerous regions globally, with sub-Saharan Africa experiencing particularly low rates of adoption. The lithotomy position remains the most common birthing posture during the second stage of labor throughout Kenya's western region. Many healthcare providers choose the supine position, where legs are elevated and supported by stirrups, because it facilitates access and monitoring during childbirth. Research findings indicate that using the lithotomy position during delivery can lead to higher occurrences of perineal injuries as well as longer labor durations and more frequent episiotomies while yielding poorer neonatal Apgar scores (Berta et al., 2019; Mutinda et al., 2020).

The persistent preference for the lithotomy position in childbirth despite its known drawbacks prompts examination of the deep-rooted factors that determine birthing position choices. Though healthcare provider preferences and institutional norms are influential, women's awareness and cultural beliefs, along with their past experiences and available support systems, impact their birthing position choices. Research indicates that numerous women lack information about their birthing position choices and seldom receive support to express their labor preferences (Musie et al., 2019; Jiregna et al., 2024). Labor ward physical design and availability of the supportive equipment determine the feasibility of using alternative birthing positions, according to Healy et al. (2020).

Health system readiness is another critical determinant. The physical layout of labor wards combined with the availability of birthing stools or mats along with institutional policies determine women's practical ability to select alternative birthing positions. A study by Healy et al. A 2020 United Kingdom study by Healy et al. demonstrated that women's choices to give birth in upright positions were frequently negated because of environmental limitations and provider reluctance. The impact of limitations becomes more severe in resource-limited areas like Western Kenya which necessitates intentional policy and structural improvements

The continued use of the lithotomy position during childbirth stems from wider socio-cultural influences. Some of the communities define childbirth as a medical procedure that allows medical professionals to dominate decision-making over traditional practices and individual choices. Clinical settings can make women feel powerless when hierarchical relationships between providers and patients exist. Women might avoid choosing alternative birthing positions because of past negative experiences or lack of knowledge of this other birthing positions (Zileni et al., 2017).

Numerous factors influence the choice of birthing position. These have been associated with parturient women's knowledge of birthing positions, health care provider encouragement, and facility readiness to support alternative birthing positions. A study conducted in Malawi by Zileni et al. (2021) looked at variables affecting birthing positions. Zileni et al. (2021) discovered that birthing positions were significantly influenced by education level, parity, prior delivery experience, and prenatal counseling. Similarly, research by Lin et al. (2018) found that health literacy and provider communication, along with facility readiness, were identified as key factors that enable women to choose alternative birthing positions. Overcoming the underutilization of alternative birthing positions requires a deep understanding of both personal and organizational factors.

In Western Kenya, the lithotomy position is routinely utilized as a birthing position in most health care facilities despite substantial evidence highlighting its association with maternal and neonatal drawbacks (Kituku et al., 2019). Exploring the factors that drive the use of lithotomy positions helps healthcare providers improve patient outcomes while simultaneously respecting women's autonomy and experiences during childbirth. A woman's sense of control and dignity during labor depends significantly on her perceived ability to control her body and environment. Provided with information and options alongside proper support, women prefer choices matching their personal comfort levels and physiological requirements according to Zileni (2021) and Satone & Tayade (2023). Without access to information or support, parturient women may passively accept established routines, which leads to poor maternal and neonatal outcomes.

1.1 Statement of the Problem

The second stage of labour is a critical period that significantly influences maternal and neonatal outcomes. Evidence from the World Health Organization demonstrates that alternative birthing positions, including squatting, kneeling, sitting, side-lying, and hands-and-knees, are associated with shorter labour duration, improved maternal comfort, reduced perineal trauma, fewer obstetric interventions, and better neonatal outcomes compared with the conventional lithotomy position (WHO, 2018). Despite these documented benefits, the lithotomy position remains the predominant mode of childbirth in many health facilities across low- and middle-income countries, including Kenya,

where it continues to be routinely practiced irrespective of women's preferences or current evidence-based recommendations.

Several factors have been suggested to influence women's use of alternative birthing positions, including limited maternal knowledge, inadequate antenatal education, provider attitudes, restrictive institutional policies, lack of supportive equipment, and cultural beliefs. However, there is limited empirical evidence identifying the relative contribution of maternal, provider, and facility-related factors influencing the utilization of alternative birthing positions in this region.

Without context-specific evidence on the determinants of the utilization of alternative birthing position, healthcare providers and policymakers lack sufficient information to design targeted interventions that promote evidence-based maternity care and improve maternal and neonatal outcomes. Therefore, this study sought to determine the factors associated with the utilization of alternative birthing positions during the second stage of labour among parturient women in selected referral hospitals in Western Kenya. The findings are expected to inform clinical practice, antenatal education, health facility preparedness, and policy initiatives aimed at increasing the adoption of safe and evidence-based birthing positions.

1.2 Research Objective

To evaluate determinants of the utilization of alternative birthing positions during the second stage of labour among parturient women in Western Kenya

1.3 Research Question

What are the determinants of the utilization of alternative birthing positions during the second stage of labour among parturient women in Western Kenya?

II. METHODOLOGY

2.1 Study Design

The research utilized a cross-sectional analytical method to identify factors affecting the use of alternative birthing positions in the second stage of labor. The study design was suitable because data was collected at a specific point in time which allowed researchers to outline patterns of birthing positions used and determine related factors for women birthing position used. This method was used to explore how maternal characteristics and socio-demographic factors along with institutional contexts relate to birthing position choices.

2.2 Study Area

The study was conducted in two referral hospitals in Western Kenya: The research took place at two referral hospitals located in Western Kenya, which are Kakamega County Teaching and Referral Hospital, along with Bungoma County Referral Hospital. The study chose these public health facilities because they handle high delivery numbers and serve as key maternal and child healthcare centers for the region. The hospitals deliver complete obstetric services to a population from both urban and rural settings. The two sites were selected to document diverse childbirth experiences and perspectives.

2.3 Target Population

The study's target population consisted of women in labor who gave birth at the chosen hospitals throughout the research timeframe. The selected women displayed diverse reproductive histories and socio-demographic backgrounds, along with varied cultural experiences which made them appropriate subjects for examining birthing position determinants. The study concentrated on women who delivered vaginally to explore how position choices during the second stage of labor were affected by various factors.

2.4 Eligibility Criteria

Women who were included in the study were those who had spontaneous or assisted vaginal delivery at selected hospitals, were medically stable, and had given informed consent. The study excluded women who had

undergone cesarean section because they did not experience the second stage of labor, as well as those with communication impairments due to unconsciousness or mental health crisis.

2.5 Sample Size Determination

The calculation of the sample size used the Yamane formula for finite populations while maintaining a 95 percent confidence level and a 5 percent margin of error. The projected total population amounted to 3,600 women. The calculation indicated that at least 360 participants were needed for the sample. The research increased the initial sample size by 10 percent for potential non-response or incomplete data which brought the total number of participants to 396. The study allocated participants equally across both facilities.

The Yamane formula for finite populations is:

$$n = \frac{N}{1 + Ne^2}$$

Where:

n = Sample size (corrected)

N = Total population size

e = Margin of error (expressed as a decimal)

For the study:

(projected population)

$e = 0.05$ (5% margin of error)

Confidence level = 95%

Calculation:

$$n = \frac{3,600}{1 + 3,600 \times (0.05)^2} = \frac{3,600}{1 + 3,600 \times 0.0025} = \frac{3,600}{1 + 9} = \frac{3,600}{10} = 360$$

This gives **360 participants**

With 10% adjustment for non-response:

$$360 \times 10 / 100 = 36$$

$$360 + 36 = 396$$

2.6 Sampling Procedure

Systematic random sampling technique was used to recruit participants who met eligibility requirements. Researchers identified women who delivered in the past day or two through daily delivery registers. The total number of daily deliveries divided by the daily recruitment target determined the sampling interval. The initial day participant was randomly selected, followed by choosing additional participants through the established interval system. Daily recruitment continued until the required sample size was reached.

2.7 Data Collection Tools

The research utilized a structured interviewer-administered questionnaire for data collection which originated from existing literature and previously validated tools. The questionnaire was divided into four sections. The first section gathered information on participants' socio-demographic details, including age, marital status, educational attainment, occupation type, and parity level. The second section evaluated mothers' knowledge and perspectives about different birthing positions. The third section examined facility and provider-related factors by exploring equipment availability, provider encouragement techniques, and delivery privacy conditions. The observational checklist was used to collect data on the birthing position used during the second stage of labor. The research team created the questionnaire in English before converting it into Kiswahili and Luhya, which are the main local languages, to guarantee that respondents would understand the questions. A back-translation process was carried out to verify that the translated versions maintained accuracy and consistency.

2.8 Validity and reliability

To ensure validity, the research instruments were reviewed by three maternal health experts for content accuracy and cultural relevance. A pretest was conducted in a different facility with similar characteristics, and feedback was used to refine the tools. The internal consistency of the questionnaire was measured using Cronbach's alpha, with overall tool scores above 0.80 indicating acceptable reliability. Observational data were cross-referenced with maternity ward records to enhance accuracy and reduce discrepancies.

2.9 Data Collection Procedure

Over three months, trained research assistants specializing in nursing, midwifery, or public health conducted the data collection. The research assistants completed training sessions focused on research ethics, informed consent procedures, and correct questionnaire administration methods. Within 24 to 72 hours after delivery, research assistants identified eligible women in postnatal wards, explained the study's purpose, and obtained their written informed consent.

To maintain confidentiality and promote honest answers, the interviews took place in secluded areas of the maternity wards. The study participants received assurance that their involvement was completely voluntary and their responses would not impact their medical care. The principal investigator conducted daily reviews of completed questionnaires to ensure they were fully completed and accurate before entering the data. The data collection was done from March to May 2025.

2.10 Variables of the Study

The study measured the birthing positions used during the second stage of labor as the dependent variable, which included; squatting, kneeling, side-lying, all fours, or lithotomy positions. The study's independent variables consisted of socio-demographic factors, including age, education level, marital status, and occupation, along with obstetric history, which covered parity and prior delivery experiences, as well as maternal knowledge and attitudes, provider behavior, facility infrastructure, and cultural influences.

2.11 Data Management and Analysis

The researchers loaded coded data into the Statistical Package for the Social Sciences program (SPSS) version 28. The research team implemented data cleaning and validation processes to verify the data's completeness, consistency, and accuracy. The analysis of demographic and categorical variables was conducted through basic statistical measures including means, frequencies, and percentages. The study utilized inferential statistics in order to determine how independent variables impacted birthing position utilization. The study used chi-square tests to discover significant connections among categorical variables and logistic regression analysis to measure the association strength and direction between predictor variables and alternative birthing positions. The study evaluated odds ratios by setting 95 percent confidence intervals and defined statistical significance with p-values smaller than 0.05.

2.12 Ethical Considerations

The Masinde Muliro University of Science and Technology Institutional Research and Ethics Committee provided ethical approval for the study. The National Commission for Science, Technology and Innovation (NACOSTI) and the County Health Management Teams of Kakamega and Bungoma granted additional authorization. Every participant received information about the study goals and their rights while understanding that their participation was completely voluntary.

Participants gave written informed consent before their involvement in the study. Research participants who were unable to read or write received an oral reading of the consent form in their native language while an impartial witness observed as they provided their agreement through a thumbprint. The analysis process included identifier removal to maintain participant privacy while data remained confidential. Access to the raw data was restricted to the research team who safeguarded it in password-protected files and secured cabinets.

III. FINDINGS & DISCUSSION

3.1 Sociodemographic Characteristics

The analysis included a total of 396 women who were giving birth. The data shows that 102 women (25.8%) delivered using alternative birthing positions during the second stage of labor while 294 women (74.2%) delivered in the lithotomy position. Women who delivered using alternative positions had an average age of 27.1 years with a standard deviation of 4.9 years, while women who delivered using the lithotomy position averaged 26.8 years with a standard deviation of 5.1. The age differences showed no statistical significance ($p = .421$).

The choice of birthing position during labor showed a significant correlation with marital status. The lithotomy position was used by 86.1% of married women during delivery which was significantly higher than the 78.4% who used alternative positions ($p = .032$). Educational level also showed a notable trend. Women who delivered in the lithotomy position (30.5%) were more likely to have received primary education than those who delivered in alternative positions (21.6%), yet women using alternative positions had a marginally higher tertiary education rate (34.3%) compared to lithotomy position users (30.4%). The statistical analysis found a significant difference in

primary education attainment ($p = .018$). The groups showed no meaningful statistical differences regarding their employment status or number of children.

Table 1

Sociodemographic Characteristics by Birthing Position (N = 396)

Variable	Alternative Position (n = 102)	Lithotomy Position (n = 294)	p-value
Age (mean $\pm$ SD)	27.1	26.8	.421
Married (%)	78.4	86.1	.032
Primary Education (%)	21.6	30.5	.018
Secondary Education (%)	44.1	39.1	.203
Tertiary Education (%)	34.3	30.4	.281
Unemployed (%)	49.0	55.3	.214
Primiparous (%)	43.1	49.7	.398

3.1.1 Facility and Provider-Related Factors

The characteristics of both facilities and providers played a key role in determining birthing position preferences. Women who delivered in alternative positions received information on birthing options (68.6%) while those who delivered in the lithotomy position indicated having less information on birthing options (24.1%) with statistical significance ($p < .001$). The alternative position group reported a 74.5% rate of provider encouragement towards choosing a preferred birthing position which was significantly higher than the 19.6% rate among lithotomy users ($p < .001$).

Supportive birthing aids availability demonstrated a significant association with birthing position selection as 42.2% of those in the alternative group reported access to these aids versus 11.4% among the lithotomy group ($p < .001$).

Table 2

Facility and Provider Factors Associated with Birthing Position

Factor	Alternative Position (%)	Lithotomy Position (%)	p-value
Received Information on Positions	68.6	24.1	$< .001$
Provider Encouraged Position Choice	74.5	19.6	$< .001$
Availability of Birthing Aids	42.2	11.4	$< .001$

3.1.2 Maternal Knowledge and Attitudinal Factors

The utilization of birthing positions displayed a strong connection with maternal awareness and perceptions. The data shows that 71.6% of women employing alternative birthing positions had previous knowledge of these positions while just 28.2% of lithotomy users reported similar prior knowledge ($p < .001$). The percentage of women who believed their birthing position affected labor outcomes reached 84.3% among alternative position users while it stood at 49.6% for those in the lithotomy position ($p < .001$).

Women who delivered in alternative positions showed significantly more preference for upright birthing (76.5%) compared to those who delivered in lithotomy positions (32.7%) ($p < .001$), indicating that previous beliefs likely shape labor decisions.

Table 3

Maternal Knowledge and Attitudes by Birthing Position

Factor	Alternative Position (%)	Lithotomy Position (%)	p-value
Knew About Alternative Positions	71.6	28.2	$< .001$
Believed Position Affects Labor	84.3	49.6	$< .001$
Preferred Upright Position	76.5	32.7	$< .001$

3.2 Logistic Regression

A multivariate logistic regression analysis was conducted to identify independent predictors of alternative birthing position use. We included all variables that demonstrated statistical significance at the bivariate level ($p < .05$) into the analytical model. The results demonstrated that information about birthing positions (AOR = 3.88, 95% CI [2.27, 6.63]), provider encouragement (AOR = 4.91, 95% CI [2.78, 8.66]), and a preference for upright positions (AOR = 3.42, 95% CI [2.01, 5.83]) each served as strong independent factors that predicted alternative birthing

position usage. Women who reported birthing aids availability demonstrated significantly higher use of upright positions with an adjusted odds ratio of 2.76 and a 95% confidence interval ranging from 1.32 to 5.79.

Table 4

Multivariate Logistic Regression Predicting Use of Alternative Birthing Positions

Predictor Variable	AOR	95% CI	p-value
Received Information on Positions	3.88	[2.27, 6.63]	< .001
Provider Encouraged Position Choice	4.91	[2.78, 8.66]	< .001
Availability of Birthing Aids	2.76	[1.32, 5.79]	.007
Preference for Upright Position	3.42	[2.01, 5.83]	< .001

IV. DISCUSSION

The study examined the determinants affecting the use of non-traditional birthing positions during the second stage of labor by pregnant women in Western Kenya. The study found out that women had limited knowledge on alternative birthing. The conventional lithotomy position was used by 74.2% of the participants for delivery. The data indicate that women's choices during labor emerge from intricate interactions among maternal understanding of options, support from healthcare staff, readiness of medical facilities, and cultural or personal preferences.

The study found out that women who knew about different delivery positions were far more likely to use them, 71.6% versus 28.2% among those without that knowledge ($p < .001$). This finding matches results from Ethiopia (Jiregna et al., 2024) and Malawi (Zileni et al., 2017), which also showed that maternal knowledge strongly influences the birthing positions women choose. Both studies reported that when antenatal education included discussion of delivery positions, the use of alternative positions increased. This could be because knowledge influences choices.

Provider encouragement emerged as another powerful influence. Healthcare provider verbal support during labor increased the likelihood of women using alternative positions by nearly five times ($AOR = 4.91$, $p < .001$). These results match the results from Healy et al. (2020) and Zileni et al. (2017), who demonstrated that midwife assistance and reassurance leads to enhanced confidence among mothers and increased their readiness to adopt alternative positions during childbirth. A study by Musie et al., (2019) points out that provider engagement deficiencies are obstacles to achieving respectful and woman-centered maternity care. This research demonstrates that health care providers' behaviors, attitudes and support significantly affect how empowered women feel when giving birth, in terms of utilizations of birthing positions.

The study determined that birthing aids availability like stools and adjustable beds served as one of the factors that influenced childbirth practices. Women who had access to birthing aids used alternative positions with nearly triple the likelihood compared to those without such access ($AOR = 2.76$, $p = .007$). The results of this study correspond to the research findings of Lin et al. (2018). The study by Lin et al. (2018) stressed the necessity of ergonomic supports for maintaining safe and effective upright labor positions. Medicalized birth practices from past medical traditions continue to shape the physical infrastructure of many Kenyan hospitals which prioritize the lithotomy position. The absence of physical support tools limits women's birthing choices and hinders healthcare professionals from safely alternative birthing positions.

The choice of birthing position was most strongly determined by maternal preference. The analysis showed that women who expressed a preference for upright delivery positions were three times more likely to use them ($AOR = 3.42$, $p < .001$). When women have access to supportive environments they will choose alternative birthing positions. A woman's birth position preference develops from several experiences which encompass past deliveries, cultural practices, individual pain perception and education on birthing position during antenatal clinic visits. Restrictive facility norms or provider resistance prevented some women from achieving their preferred alternative birthing positions.

The results from this study showed that socio-demographic variables including age and parity showed no significant connection with choices of birthing positions. Kituku et al. (2019) found different results in their study. The study by Kituku et al. (2019) showed younger and first-time mothers tended to follow medical advice and choose supine birthing positions. The study's control of provider behavior and facility readiness could have masked any potential effects of age or parity.

The study's multivariate analysis revealed that healthcare provider behavior in giving information on birthing position and supportive environmental with necessary equipments played decisive roles in turning patient knowledge and preferences into actual utilization of birthing positions. The study demonstrates the necessity of providing education to women as well as transforming institutional practices and provider training systems. The research conducted by Mutinda et al. (2020) underscores provider challenges in supporting alternative positions due to

inadequate training or tools despite the awareness of alternative birthing positions. According to WHO (2018) health systems must be respectful and equitable while responding to women's needs and choices and this study backs up this goal by identifying enabling or hindering factors for such responsiveness.

The findings largely align with prior research but also reveal some differences. For example, Berta et al. (2019) reported a clear link between higher education and choosing upright birthing positions, whereas our study did not find a significant association between tertiary education and upright birth. This discrepancy could reflect regional differences in how reproductive health information is delivered, or a ceiling effect where even well-educated women are constrained by institutional practices and cultures.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

The research demonstrated that Western Kenyan women in labor use alternative birthing positions rarely during the second stage because of lack of information on alternative birthing positions, insufficient birthing aids and healthcare behaviours in the support of parturient women on alternative birthing positions. Utilization rates depend on women's prior knowledge of birthing positions as well as support from health providers and facility readiness alongside maternal preferences. Health system and interpersonal dynamics proved to be stronger influences than socio-demographic factors like marital status and educational background.

5.2 Recommendations

Routine antenatal education should include structured sessions about birthing positions at health facilities. Women need to understand the benefits and learn about different birthing positions through these sessions, which should also motivate them to voice their personal preferences. Ministry of Health to provide policies, equipment, and modifications to enable alternative birthing positions in the health facilities.

Declaration of Interest

The authors declare that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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