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Factors influencing labour and birthing positions in Malawi

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Abstract

Background/Aims The World Health Organization encourages women in labour to ambulate and assume upright positions shown to be associated with favourable childbirth outcomes. However, the literature shows that most women in developed and developing countries, including Malawi, give birth in the supine position. There is a lack of research on factors that influence choice of birthing positions among women in Malawi. This study aimed to identify these factors.

Methods A face-to-face descriptive survey was conducted on 373 low-risk postnatal women in Malawi. Bivariate and multivariate analyses were used to determine association between sociodemographic characteristics and choice of labour and birthing position, as well as to identify predictive factors.

Results Walking during labour was significantly associated with age (P=0.018) and monthly family income (P=0.012). During birth, women who had received some degree of education were more likely to use the supine position than those who had not (93% vs 78%; P=0.011). However, women with a higher level of income were less likely to use the supine position than women with low income (82% vs 93%; P=0.005).

Conclusions Age, income and education influence Malawian women's choices for labour and birthing position. There is a need for Malawian women to be informed about and encouraged to use different labour and birthing positions, regardless of their socioeconomic and demographic status, to promote positions that improve maternal and neonatal outcomes. Childbirth education sessions or classes during antenatal care should include information on different birthing positions.

Key words: Birthing position; Parturition; Posture; Supine position; Upright position; Walking

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Introduction

During labour and birth, there are several physiological processes that aid with the expulsion of the fetus, placenta and membranes, including dilation of the cervix, increased frequency and duration of uterine contractions and descent of the presenting part of the fetus (Baddock, 2010). Ambulation and changes in the maternal position during labour and birth can help to increase the frequency and duration of uterine contractions, cervical dilatation, and descent of the fetus, assisting with the effective progress of labour and birth (Baddock, 2010; Blackburn, 2013; Kilpatrick and Garrison, 2017). In essence, certain maternal positions may prevent prolonged labour (Gupta et al, 2012; Blackburn, 2013) and reduce complications, such as postpartum haemorrhage (Thorogood and Donaldson, 2010; Wing and Farinelli, 2017).

Since the late 20th century, various researchers have studied the impact of different positions on labour and birth and found that an upright position leads to favourable childbirth outcomes, such as reduced perineal traumas, assisted birth, labour pains and a shorter duration of the first and second stages of labour, compared to a supine position (de Jonge and Lagro-Janssen, 2004; Terry et al, 2006; de Jonge et al, 2008; 2010; Lawrence et al, 2009). In addition, the World Health Organization (WHO, 2018) encourages women to ambulate and assume upright positions and discourages the use of supine positions during childbirth. However, the literature shows that most women in both developed and developing countries give birth while in the supine position (Lugina et al, 2004; Declercq

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et al, 2007; de Jonge et al, 2009; 2010; Gayeski and Brüggemann, 2009; Nieuwenhuijze et al, 2012). A study by Zileni et al (2017) found that 94.1% of Malawian women give birth in a supine position. Despite the comprehensive literature on birthing position practices, little is known about the socioeconomic and demographic factors associated with choice and use of labour and birthing positions in Malawi. As such, this study aimed to identify the factors that influence the use of various positions during childbirth among women at a maternity unit in Lilongwe, Malawi.

Methods

A cross-sectional survey was conducted with low-risk women at a postnatal ward in Lilongwe, Malawi between July 2012 and October 2013. Systematic sampling was used to select every second woman discharged from the postnatal ward. These women were approached and asked to participate in the study. Women who met the inclusion criteria were given a letter informing them about the study; those willing to participate signed an informed consent form. The Raosoft (2004) sample size calculator was used to calculate a sample size of 373 women, with a 5% margin of error, 95% confidence interval and a 50% response distribution.

Inclusion and exclusion criteria

Women who had a normal spontaneous vaginal birth with a term pregnancy (38–42 weeks) and had received initial postnatal care in the first 24–48 hours after birth were included in the study. Women who had a malpresentation of the fetus, multiple pregnancies or complications, such as eclampsia and severe anaemia were excluded from the study. To avoid recruiting women twice (once at the hospital and once at subsequent postnatal care), all women receiving subsequent postnatal care at 1 and 6 weeks after birth were excluded.

Data collection

A structured survey questionnaire with closed-ended questions was used to collect data on sociodemographic characteristics such as age, level of education, monthly family income, labour and birthing position/s used in the recent labour and birth, preferred labour and birthing position/s and reason/s for using a particular labour and birthing position. The questionnaire was adapted from a validated tool used in a study by Nieuwenhuijze et al (2012) and pretested at the Area 25 Health Centre in Lilongwe district where 25 low-risk postnatal women took part in face-to-face pretest interviews. Any questions that were not clear were rephrased and any errors were corrected accordingly before using the questionnaire in the actual study.

Data analysis

Statistical analysis of the data was conducted using the Statistical Package for Social Sciences version 20. Bivariate analysis was done using Pearson's chi-squared test to determine whether there was a relationship between birthing position used during labour and birth (outcome variables) and independent variables. The binary outcome variables for positions used during labour were walking or other positions (supine, lateral and sitting), whereas the outcome variables for positions used during birth were supine or other positions (lateral, squatting and kneeling). The independent variables were age, parity, denomination, residence, region of origin, education, employment and monthly family income. The bivariate analyses and the theoretical considerations informed the selection of independent variables to be used in a logistic regression model. This multivariate analysis (logistic regression) identified factors that were strong predictors of choice of labour and birth positions among women. Multi-collinearity was checked and there was found to be no intercorrelations between the independent variables included in the model. All the independent variables were entered as dichotomous variables based on the result of the bivariate analysis (chi-squared test).

Ethical considerations

Ethical approval was obtained from the Flinders University's Social and Behavioural Research Ethics Committee (Project Number 5831) and the University of Malawi's College

of Medicine Research Ethics Committee (P.09/12/1285). Permission to conduct the study at the maternity unit was obtained from the Lilongwe District Health Officer.

Results

Table 1 displays the sociodemographic characteristics of the participants. The majority were 20–34 years old (77.7%), had a family income of <60 000 Malawian Kwacha (83.4%), had primary level education (54.5%), were Christian (86.6%), lived in an urban area (58.4%) in the southern region (50.9%), were unemployed (69.4%) and were not informed about birthing positions during antenatal care (55.2%).

Labour: factors influencing positions used

Table 2 displays the results of the chi-squared test for association between walking and sociodemographic variables. Walking during labour was significantly associated with age (P=0.018) and monthly family income (P=0.012). Women aged 19 years or younger were more likely to walk during labour than women aged 20 years and above. Women whose monthly family income was ≥60 000 Malawi Kwacha were more likely to walk during labour than women whose monthly family income was lower.

Birth: factors influencing positions used

Table 3 displays the results of the chi-squared test testing for association between sociodemographic variables and use of the supine position during birth. There was a significant association between use of the supine position and education (P=0.011) and monthly family income (P=0.005). Women who attended school were more likely to use the supine position than women who did not. Women whose monthly family income was <60 000 Malawian Kwacha were more likely to use the supine position during birth than women whose monthly family income was higher.

A further statistical analysis was conducted using binary logistic regression to assess factors that predict the likelihood of using a supine position during birth. The model contained six independent/predictor variables (age, parity, education, family income, employment status and residential area). The model was statistically significant (chi-squared=18.92, P<0.005), indicating that the model was able to distinguish between respondents who used and did not use the supine position during birth. The model was able to explain between 5% (Cox and Snell R square) and 11% (Nagelkerke R squared) of the variance in birthing position used during birth, and correctly classified 91.4% of all cases.

As shown in Table 4, only two independent variables made a statistically significant contribution to the model. These two strongest predictors of using the supine position during birth were education (P=0.011) and monthly family income (P=0.005). Women who attended school were more than four times more likely to use the supine position during birth than those who did not. Women whose monthly family income was <60 000 Malawian Kwacha were approximately five times more likely to use the supine position during birth than women whose monthly family income was higher, controlling for other factors in the model.

Discussion

This study investigated factors influencing the use of positions during labour and birth among women in a postnatal ward in Lilongwe, Malawi. The WHO (2018) policies and guidelines on childbirth practices state that women should be given an opportunity to make a choice about their birthing position, and recommend that women use non-supine positions during birth because these positions are associated with good maternal and neonatal outcomes. Similarly, the National Collaborating Centre for Women's and Children's Health (2007) discourages the use of supine or semi-supine positions during birth, and encourages women to adopt other positions that are comfortable to them. As such, women should be made knowledgeable about different labour and birthing positions so that they can make informed decisions on the type of position/s to use during childbirth. In Malawi, little is known about birthing positions practices during labour and birth.

Table 1. Sociodemographic characteristics of participants

Characteristic	Frequency, *n*=373 (%)
Age (years)	
≤19	53 (14.2)
20 – 34	290 (77.7)
≥35	30 (8.0)
Monthly family income (Malawian Kwacha)	
≤59 999	311 (83.4)
≥60 000	62 (16.6)
Education	
No education	37 (9.9)
Primary	203 (54.5)
Secondary or higher	133 (35.7)
Parity	
1	91 (24.4)
2	99 (26.5)
3	77 (20.6)
4	46 (12.3)
≥5	60 (16.1)
Religion	
Islam	50 (13.4)
Christian	323 (86.6)
Residential area	
Rural	155 (41.6)
Urban	218 (58.4)
Region	
Central	167 (44.8)
Southern	190 (50.9)
Northern	16 (4.3)
Employment status	
Unemployed	259 (69.4)
Employed	114 (30.6)
Being informed about birthing positions at the antenatal clinic	
Informed	167 (44.8)
Not informed	206 (55.2)

However, a study by Kongnyuy et al (2009) reported that most Malawian women knew about supine and semi-sitting positions during childbirth and that most women gave birth in a supine position. Similarly, a study by Zileni et al (2017) reported that the majority of women (66.4% and 99.2%) had knowledge of walking and supine positions used during labour and birth respectively. As regards position recently used during birth, it was found

Table 2. Association between participant characteristics and walking during labour

Characteristic	*n*=373	Walking, *n*=186 (%)	Other positions, *n*=187 (%)	X^2	*P*	Cramer's *V* or Phi value (marked with *)
Age (years)						
≤19	53 (14.2)	36 (67.9)	17 (32.1)	8.059	0.018	0.147
20 – 34	290 (77.7)	136 (46.9)	154 (53.1)			
≥35	30 (8.0)	14 (46.7)	16 (53.3)			
Monthly family income (Malawian Kwacha)						
≤59 999	311 (83.4)	146 (46.9)	165 (53.1)	6.384	0.012	–0.131
≥60 000	62 (16.6)	40 (64.5)	22 (35.5)			
Parity						
Primiparous	91 (24.4)	52 (57.1)	39 (42.9)	2.550	0.110	0.083*
Multiparous	282 (75.6)	134 (47.5)	148 (52.5)			
Religion						
Christian	323 (86.6)	161 (49.8)	162 (50.2)	0.000	0.984	0.001
Islam	50 (13.4)	25 (50.0)	25 (50.0)			
Residence						
Rural	155 (41.6)	81 (52.3)	74 (47.7)	0.607	0.436	0.040*
Urban	218 (58.4)	105 (48.2)	113 (51.8)			
Region						
Central	167 (44.8)	88 (52.7)	79 (47.3)	1.67	0.433	0.067
Southern	190 (50.9)	92 (48.4)	98 (51.6)			
Northern	16 (4.3)	6 (37.5)	10 (62.5)			
Education						
None	37 (9.9)	16 (43.2)	21 (56.8)	0.982	0.612	0.051
Primary	203 (54.4)	105 (51.7)	98 (48.3)			
Secondary or higher	133 (35.7)	65 (48.9)	68 (51.1)			
Employment						
Unemployed	259 (69.4)	129 (49.8)	130 (50.2)	0.001	0.973	-0.002*
Employed	114 (30.6)	57 (50.0)	57 (50.0)			

that for women who had recently given birth, 91.4% used a supine position during birth with only 8.6% using an upright position (kneeling or squatting) (Zileni et al, 2017).

Factors influencing women's choice of position during labour

Age and monthly family income were found to influence use of labour positions. Women aged 19 years or younger were more likely to walk during labour than women who were older. Main et al (2000) and Greenberg et al (2007) reported that women aged 19 years or younger were more likely to have a shorter duration of labour than women aged 39 years and over. Research has shown that walking reduces the duration of the first stage of labour (Lawrence et al, 2013); therefore, it may be the case that younger women had shorter first and second stages of labour because of this tendency to walk around. Young women may be more willing to walk around as research in Tanzania has shown they are more willing to listen and follow advice from midwives than older women (Lugina et al, 2004).

Table 3. Association between participant characteristics and use of a supine position during birth

Characteristic	*n* (%)	Supine position, *n*=341 (%)	Other position, *n*=32 (%)	X^2	*P*	Cramer's *V* or Phi (marked with *)
Education						
No education	37 (9.9)	29 (78.4)	8 (21.6)	8.948	0.011	0.155
Primary	203 (54.5)	189 (93.1)	14 (6.9)			
≥Secondary	133 (35.7)	123 (92.5)	10 (7.5)			
Monthly family income (Malawian Kwacha)						
≤59 999	311 (83.4)	290 (93.2)	21 (6.8)	7.960	0.005	0.146
≥60 000	62 (16.6)	51 (82.3)	11 (17.7)			
Age (years)						
≤34	343 (92.0)	316 (92.1)	27 (7.9)	2.721	0.161	0.085*
≥35	30 (8.0)	25 (83.3)	5 (16.7)			
Parity						
Primiparous	91 (24.4)	84 (92.3)	7 (7.7)	0.121	0.728	0.018*
Multiparous	282 (76.1)	257 (91.1)	25 (8.9)			
Religion						
Christian	323 (86.6)	296 (91.6)	27 (8.4)	0.149	0.700	-0.020*
Islam	50 (13.4)	45 (90.0)	5 (10.0)			
Residence						
Rural	155 (41.6)	143 (92.3)	12 (7.7)	0.237	0.626	0.025*
Urban	218 (58.4)	198 (90.8)	20 (9.2)			
Region						
Central	167 (44.8)	149 (89.2)	18 (10.8)	1.872	0.392	0.071
Southern	190 (50.9)	177 (93.2)	13 (6.8)			
Northern	16 (4.3)	15 (93.8)	1 (6.2)			

The other factor influencing use of labour position was family income. Women who had a monthly family income of >60 000 Malawian Kwacha were more like to walk during labour than women who had a lower monthly family income. This differs from previous findings by Berritta et al (2007), where no significant association was found between socioeconomic status and walking during labour. Future research should investigate the effect of different socioeconomic, cultural and demographic factors on the use of different labour positions across the country, as this could help to identify and address inequalities in childbirth practices in Malawi.

Factors influencing women's choice of position during birth

Education and monthly family income were identified as factors that influence women's choice of birth position. The finding that education influences choice of birthing position 'suggest[s] possible inequalities in the choice of birthing positions' (de Jonge et al, 2009). It has been proposed that highly educated women may have easier access to information on birthing positions and are therefore more likely to choose to use upright positions during birth, which is the recommended practice (de Jonge et al, 2009). However, this study found

Table 4. Binary logistic regression predicting the likelihood of women using a supine position during birth

Predictor variable	B coefficient	Standard error	Wald	df	*P*	Odds ratio	95% confidence interval	
							Lower	Upper
Age	–0.966	0.591	2.667	1	0.102	0.381	0.120	1.213
Parity	0.099	0.482	0.043	1	0.837	1.104	0.430	2.839
Residential area	–0.149	0.404	0.136	1	0.712	0.862	0.390	1.903
Education	1.426	0.503	8.053	1	0.005	4.163	1.555	11.151
Employment status	0.470	0.469	1.006	1	0.316	1.601	0.638	4.013
Monthly family income	–1.422	0.434	10.753	1	0.001	0.241	0.103	0.564
Constant	1.498	0.647	5.365	1	0.021	4.472		

that more highly educated women (ie those with primary or secondary education or higher) were more likely to use the supine position during birth than women with no education. This may be the result of the influence of health professionals compared with traditional birth attendants. A total of 14% of women in Malawi with no education deliver in their homes, compared to 4% of those with secondary education (National Statistical Office, 2017) and may be assisted by traditional birth attendants at home, who encourage the use of semi-sitting positions during birth (Kongnyuy et al, 2009). Women with education are more likely to receive antenatal care and deliver in hospitals (National Statistical Office, 2017), where use of the supine position for birth is more common (Kongnyuy et al, 2009) and more popular among health professionals (Lugina et al, 2004; Mselle and Eustace, 2020), despite the recommendations for semi-upright positions. Research has shown health professionals may lack skills to assist a birth in an upright position, or have a lack of confidence or fear for the safety of women in an upright position, leading to a reluctance among health professionals to encourage and assist with birth in an upright position (Lugina et al, 2004; Mselle and Eustace, 2020). The results of the present study suggest that women who have been to school are more likely to consider a supine position to be appropriate during birth, possibly because they have been influenced by health professionals when receiving maternity care from hospitals. Zileni et al (2017) reported that in Lilongwe, Malawi, 95.7% of women were influenced by midwives to use a supine position during birth. Additionally, it has been reported by Zileni et al (2017) that only 9% of Malawian women know of alternative birth positions. There is a need for all women in Malawi, regardless of their socioeconomic and demographic status, to be given information about different birthing positions. This information may help women to become better informed and to make decisions about the type of positions to use during childbirth.

The second factor influencing the use of birth position was monthly family income. It was found that women who had a monthly family income of <60 000 Malawian Kwacha were more likely to use the supine position during birth than women with a higher monthly family income. No published studies were found by the authors that examined the influence of monthly family income (economic status) on the use of different positions during birth. Indeed, this is an unexpected finding, as higher income is often associated with more education, and it would be expected that women who are less privileged with no education would be more likely to either birth at home in a non-supine position, or birth in hospital in a supine position under the guidance of health professionals. A nationwide study in Malawi reported that 14% of women with no education give birth at home (National Statistical Office, 2017) where they would be assisted by traditional birth attendants who

encourage the use of a semi-sitting position during birth, compared to when they give birth in hospital assisted by midwives who encourage use of supine position (Kongnyuy et al, 2009; Zileni et al, 2017). In the present study, it is possible that women with some education were deferring to the customs of health professionals, as were women without education, and these professionals are more likely to recommend the supine position (De Jonge and Lagro-Janssen, 2004; Kongnyuy et al, 2009; Zileni et al, 2017). This would imply that it is important to ensure that proper health information on labour and birth positions is given to women during the antenatal period, regardless of their socioeconomic status. The differences in education and socioeconomic status found in this study could be interpreted as inequalities in education and socioeconomic status, which both influenced the use of different birthing positions among the participants of the present study. A further nationwide study is needed to examine the socioeconomic, cultural, demographic and healthcare provider-related factors that could influence the choice and use of different positions during labour and birth among women in Malawi. Furthermore, socioeconomic and demographic associations with different birthing positions need to be addressed when informing women about positions that can be used during childbirth.

In a culture where midwives and doctors are more competent with assisting childbirth with the woman in the supine position (Lugina et al, 2004), it may be difficult to alter practice to advise women to use other birthing positions. Most women in Malawi are informed and instructed by midwives to use the supine position during birth (Mselle and Eustace, 2020). Therefore, the authors recommend on-the-job professional development sessions, such as seminars and training sessions, aimed at equipping midwives with current evidence-based information on the benefits of different upright and lateral birthing positions. This could result in midwives not only informing but also encouraging women to use different positions during birth, leading to favourable maternal and neonatal outcomes. Furthermore, training sessions could help to ensure midwives are properly trained to assist childbirth with the woman in upright positions.

Limitations

There are some limitations to this study. The first limitation is that the participants in this study came from a single hospital, meaning the results may not be representative of the wider low-risk birthing population in Malawi. Regarding socioeconomic and demographic factors, this study produced basic survey data that need further exploration using more sophisticated qualitative methodology to properly understand the motivations and implications behind women's choice of birthing positions. Finally, the study did not differentiate between primary/secondary education and higher education, and therefore it is not possible to identify the influence of higher education (which this is associated with higher income) on choice of position during birth.

Conclusions

The aim of this study was to identify sociodemographic factors that influence the use of different positions during labour and birth among women in Malawi. The choice to walk during labour was related to age and monthly family income, where younger women and those with a lower monthly income were more likely to walk around than older women and those with a higher monthly income.

This study also found that the two main factors associated with use of the supine position during birth were education and monthly family income. Having received education was associated with use of the supine position, as was a lower monthly income. The influence of health professionals' preference for the supine position may have affected those who were more educated (who are more likely to attend antenatal care and give birth in a health facility) and those with a lower monthly income. With increasing research evidence showing more favourable maternal and neonatal outcomes are associated with the use of upright positions compared to a supine position during birth, midwives should allow and encourage women to use these positions, regardless of their socioeconomic and demographic status. For midwives to inform and encourage women to use different labour and birth positions, there is a need for on-the-job training, to equip midwives with

Key points

- Existing data show that 94.1% of Malawian women give birth in a supine position, contrary to recommendations to use upright and semi-upright positions, for more favourable maternal and neonatal outcomes, and there is little information on factors that influence the choice of labour and birth positions among women in Malawi.
- This article aimed to identify sociodemographic factors that influence the choice of different positions during labour and birth among women in Malawi.
- Age and monthly family income were found to influence the use of different positions during labour, while education and monthly family income were found to influence the use of different positions during birth.
- There is a need for all women in Malawi, regardless of socioeconomic and demographic status, to be informed about and encouraged to use various labour and birth positions that are associated with improved childbirth outcomes, such as upright positions.
- For midwives to inform, encourage and assist women to use different positions during labour and birth, there is a need for on-the-job training to equip midwives with knowledge and skills on various labour and birth positions.

knowledge and skills on different birthing positions. Assessing midwives' practice and attitudes in relation to birthing positions is also necessary. Further research is needed to explore cultural, healthcare provider and health system factors that influence choice and use of various positions during childbirth.

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References

Baddock S. Physiological changes during labour. In: Pairman S, Tracy S, Thorogood C, Pincombe J (eds). Midwifery: preparation for practice. New South Wales: Elsevier; 2010;607-625

Berritta C, Camorcia M, Capogna G, Cifarelli C. Factors affecting women's ambulation during labour: 11AP1-6. Eur J Anaesthesiol. 2007;24(Supplement 39):140–141. https://doi.org/10.1097/00003643-200706001-00523

Blackburn ST. Maternal, Fetal and Neonatal Physiology: A Clinical Perspective. 4th ed. St Louis: WB Saunders Co; 2013

de Jonge A, Lagro-Janssen ALM. Birthing positions: a qualitative study into the views of women about various birthing positions. J Psychosom Obstet Gynaecol. 2004;25(1):47–55. https://doi.org/10.1080/01674820410001737432

de Jonge A, Teunissen DAM, van Diem MT, Scheepers PLH, Lagro-Janssen ALM. Women's positions during the second stage of labour: views of primary care midwives. J Adv Nurs. 2008;63(4):347–356. https://doi.org/10.1111/j.1365-2648.2008.04703.x

de Jonge A, Rijnders MEB, van Diem MT, Scheepers PLH, Lagro-Janssen ALM. Are there inequalities in choice of birthing position? Sociodemographic and labour factors associated with the supine position during the second stage of labour. Midwifery. 2009;25(4):439–448. https://doi.org/10.1016/j.midw.2007.07.013

de Jonge A, van Diem MT, Scheepers PLH, Buitendijk SE, Lagro-Janssen ALM. Risk of perineal damage is not a reason to discourage a sitting birthing position: a secondary analysis. Int J Clin Pract. 2010;64(5):611–618. https://doi.org/10.1111/j.1742-1241.2009.02316.x

Declercq ER, Sakala C, Corry MP, Applebaum S. Listening to mothers II: report of the second national US survey of women's childbearing experiences: conducted January–February 2006 for childbirth connection by Harris Interactive in partnership with Lamaze International. JPE. 2007;16(4):9–14. https://doi.org/10.1624/105812407X244769

Gayeski ME, Brüggemann OM. Puerperal women's perceptions on vertical and horizontal deliveries. Rev Latino-Am Enfermagem. 2009;17(2):153–159. https://doi.org/10.1590/S0104-11692009000200003

Greenberg MB, Cheng W, Sullivan M et al. Does length of labour vary by maternal age? Am J Obstet Gynecol. 2007;197:428–435. https://doi.org/10.1016/j.ajog.2007.06.058

Gupta JK, Hofmeyr GJ, Shehmar M. Position in the second stage of labour for women without epidural anaesthesia. Cochrane Database Syst Rev. 2012;(5):CD002006. https://doi.org/10.1002/14651858.CD002006.pub3

Kilpatrick S, Garrison E. Normal labour and delivery. In: Gabbe SG, Niebyl JR, Simpson JL et al (eds). Obstetrics: normal and problem pregnancies. Philadelphia: Saunders, Elsevier Inc; 2017; 246–270

Kongnyuy EJ, Mlava G, van den Broek N. Criteria-based audit to improve women-friendly care in maternity units in Malawi. J Obstet Gynaecol Res. 2009;35(3):483–489. https://doi.org/10.1111/j.1447-0756.2008.00990.x

Lawrence A, Lewis L, Hofmeyr GJ, Styles C. Maternal positions and mobility during first stage labour. Cochrane Database Syst Rev. 2013;(8):CD003934. https://doi.org/10.1002/14651858.CD003934.pub3

Lawrence A, Lewis L, Hofmeyr GJ, Dowswell T, Styles C. Maternal positions and mobility during first stage labour. Cochrane Database Syst Rev. 2009;(2):CD003934. https://doi.org/10.1002/14651858.CD003934.pub2

Lugina H, Mlay R, Smith H Mobility and maternal position during childbirth in Tanzania: an exploratory study at four government hospitals. BMC Pregnancy Childbirth. 2004;4(1):3. https://doi.org/10.1186/1471-2393-4-3

Main DM, Main EK, Moore DH 2nd. The relationship between maternal age and uterine dysfunction: a continuous effect throughout reproductive life. Am J Obstet Gynecol. 2000;182(6):1312–1320. https://doi.org/10.1067/mob.2000.106249

Mselle LT, Eustace L. Why do women assume a supine position when giving birth? The perceptions and experiences of postnatal mothers and nurse-midwives in Tanzania. BMC Pregnancy Childbirth. 2020;20(1):36. https://doi.org/10.1186/s12884-020-2726-4

National Collaborating Centre for Women's and Children's Health. Intra-Partum Care: care of Healthy Women and Their Babies during Childbirth. London: RCOG Press. 2007

National Statistical Office. Malawi demographic and health survey 2017. 2017. https://dhsprogram.com/pubs/pdf/FR319/FR319.pdf (accessed 21 August 2021)

Nieuwenhuijze M, de Jonge A, Korstjens I, Lagro-Jansse T. Factors influencing the fulfillment of women's preferences for birthing positions during second stage of labor. J Psychosom Obstet Gynaecol. 2012;33(1):25–31. https://doi.org/10.3109/0167482X.2011.642428

Raosoft. Sample size calculator, USA. 2004. http://www.raosoft.com/samplesize.html (accessed 21 August 2021)

Terry RR, Westcott J, O'Shea L, Kelly F. Postpartum outcomes in supine delivery by physicians vs nonsupine delivery by midwives. J Am Osteopath Assoc. 2006;106(4):199–202

Thorogood C Donaldson C. Disturbances in the rhythm of labour. In: Pairman S, Tracy S, Thorogood C, Pincombe J (eds). Midwifery: preparation for Practice. New South Wales, Australia: Elsevier; 2010, 986–1040.

Wing DA, Farinelli CK. Abnormal labour and induction of labour. In: Gabbe SG, Niebyl JR, Simpson JL, Landon MB, Galan HL, Jauniaux ERM, Driscoll DA (eds). Obstetrics: normal and problem pregnancies. Philadelphia: Saunders, Elsevier Inc; 2017:287–310.

World Health Organization. WHO recommendations: intrapartum care for a positive childbirth experience. 2018. https://apps.who.int/iris/bitstream/handle/10665/260178/9789241550215-eng.pdf (accessed 21 August 2021)

Zileni BD, Glover P, Jones M et al. Malawi women's knowledge and use of labour and birthing positions: a cross-sectional descriptive survey. Women Birth. 2017;30(1):e1–e8. https://doi.org/10.1016/j.wombi.2016.06.003