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Determinants of Home Births Among Women in Mazabuka District of Southern Province, Zambia

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Abstract

Background: Home births remain a major public health concern, particularly in developing regions such as Zambia, where many women give birth without skilled assistance. Despite recommendations by the World Health Organisation for skilled birth attendance, women continue to deliver from home. This contributes to high neonatal and maternal morbidity and mortality, undermining efforts to achieve the third Sustainable Development Goal of reducing the global maternal mortality rate to less than 70 per 100,000 live births by 2030. This study therefore investigated the determinants of home births in Mazabuka district, Zambia.

Methods: The study was conducted in four health facilities (Shimungalu Rural Health Post, Mugoto Rural Health Centre, Nakambala Urban Health Centre, and Mazabuka General Hospital) in Mazabuka District, Southern Province of Zambia. The study employed a quantitative analytical cross-sectional design, involving 428 randomly selected postnatal women. The data was collected through a researcher-administered structured interview questionnaire and analysed using SPSS version 25.0 at 5% significance level.

Results: Study participants had a median age of 28 years (IQR: 22–32), most were married (59.4%, n=254), attained secondary education (40.9%, n=175), and earned below K5,000 monthly (76%, n=276). Home births occurred in 5.8% (n=25) of participants. At bivariate analysis, factors associated with home births included age (p=0.0024), marital status (p=0.004), education (p=0.004), employment status (p=0.043), monthly income (p=0.037), parity (p=0.027), timing of ANC (p<0.001), gestation at delivery (p<0.001), financial preparedness (p=0.003), and distance to health facilities (p<0.001). Multivariable analysis revealed that higher education (aOR=0.36, 95% CI: 0.14–0.92, p=0.032), previous caesarean delivery (aOR=0.10, 95% CI: 0.02–0.53, p=0.007), full-term delivery (aOR=0.25, 95% CI: 0.09–0.73, p=0.011), and proximity to health facilities (aOR=0.14, 95% CI: 0.05–0.38, p<0.001) significantly reduced odds of home births.

Conclusion: The study revealed a low prevalence of home births in Mazabuka District, reflecting progress in maternal health. However, socio-demographic and obstetric factors were identified as key barriers to

facility delivery. Addressing home births in the district requires improving education, reducing financial barriers, and enhancing healthcare infrastructure.

Keywords: Prevalence, home births, determinants, obstetric, service-related

Overview

Place of delivery among pregnant women remains a major global public health concern, especially in developing regions where high numbers of women still give birth from home due to the unexpected nature of delivery or by choice (Delibo et al., 2020). Home births also known as 'out of hospital deliveries' constitute births that occur within homes, on the way to the facility, or in any pre-hospital environment without skilled facilitation and supervision (World Health Organization (WHO, 2019a). While WHO recommends safe delivery practices, which include deliveries assisted by skilled birth attendants, some pregnant women in Zambia opt to give birth from home as opposed to a health facility (Kwaleyela and Greatrex-White, 2019). This has significantly contributed to an upsurge in neonatal and maternal morbidity and mortality in Zambia and the world over (Mulenga et al., 2018). Left unchecked, home births could hinder the attainment of the third Sustainable Development Goal (SDGs) aimed at reducing the global MMR to less than 70 per 100,000 live births by 2030 (WHO, 2019). This study therefore investigated the determinants of home births among women in Mazabuka district of Southern province in Zambia.

Background

Home births contribute to an estimated 4 million neonatal deaths and stillborn deliveries worldwide each year, with the highest numbers occurring in south-central Asian countries and in sub-Saharan Africa (SSA), where the incidence of home births is high (Wanyoike, 2020). In many SSA countries, the lack of skilled personnel during delivery largely accounts for a majority of maternal and newborn annual deaths in the first month of life (WHO, 2019). It is reported that the SSA alone accounts for roughly 66% of global maternal mortality and home births significantly contribute to negative maternal outcomes in the region (WHO, 2019)In Sub-Saharan Africa, a woman's risk of dying from preventable obstetric complications during her lifetime is estimated at 1 in 22 as compared to 1 in 7,300 in developed countries, where the incidence of home births remains low, estimated under one percent (Mose et al., 2021). Although proper documentation of home births is lacking in most developing countries, it is reported that home births rise exponentially to greater than 50% in countries such as India and Ethiopia (Wanyoike, 2020). In Zambia, home births account for about 16% of live births, whereas neonatal and maternal mortality is estimated at 27/1,000 and 252/100,000 live births respectively (Zambia Statistics Agency {ZSA} (Zambia Statistics Agency et al., 2020).

Skilled birth attendance is one of the most effective high-impact interventions to reduce maternal and newborn mortality. It is reported that up to two-thirds of newborn deaths could be prevented if births occurred in health facilities where skilled health workers can perform effective health measures (Thornton and Dahlen, 2018). Moreover, hospital deliveries are said to be seven times safer than home births (UNICEF, 2014). This is because delivering in a health facility provides an opportunity to receive high-impact obstetric, neonatal, and emergency care interventions, resulting in improved, maternal, and neonatal health outcomes (Karanja et al., 2018). In addition, evidence indicates that a vast majority of maternal deaths are preventable through existing and well-known medical interventions if only women

sought facility deliveries (Sitaula et al., 2021). Contrary to home births, health facility delivery facilitates postpartum care of the mother and neonate. Despite the benefits of facility-based deliveries, home births still contribute significantly to annual global deliveries, more so in low- and middle-income countries, where facility deliveries remain low (WHO, 2019). Although only 16 percent of deliveries are reported as home births in Zambia, the figure could be higher due to poor documentation (WHO, 2019; ZSA et al., 2020).

Studies have shown that home births have higher rates of perinatal mortality compared to hospital deliveries. According to Delibo et al. (2020), complications associated with home births such as Postpartum haemorrhage (PPH), retained placenta, puerperal sepsis, and hypertensive disorders significantly put women and their newborns at risk of negative health outcomes including death. In addition, home birth outcomes such as prolonged hospital stay have a significant social, emotional, and financial adverse impact on the family and the country at large (UNICEF, 2014). Thus, reducing the incidence of home births and ensuring skilled attendance at birth is widely acknowledged as key to reducing stillbirths and neonatal and maternal deaths (Wanyoike, 2020). Studies have reported that demographic, obstetric, and maternal factors could influence home births (Delibo et al., 2020; Enuameh et al., 2016; Mulenga et al., 2018). However, determinants of home births remain obscure in Mazabuka district.

In order to align with the third SDG in reducing the maternal and neonatal mortality ratio by 2030, the government has in the last 20 years encouraged women to give birth in health facilities by removing user fees for maternal and child health services and banning Traditional Birth Attendants (TBAs), so as to discourage home deliveries (Mulenga et al., 2018). Additionally, Safe Motherhood Action Groups (SMAG) were introduced across the country, to encourage women to deliver at health facilities and educate communities on pregnancy, childbirth, and breastfeeding-related topics. These efforts have resulted in an increase in the percentage of facility deliveries in the country from 64% in 2014 to 84% in 2018 (Zambia Statistics Agency et al., 2020). Nonetheless, home births continue to pose negative consequences on maternal and neonatal health in the country, thus the motivation to undertake this study. Home births remain a significant public health issue in Mazabuka district, with over 4.4% of deliveries occurring at home in the past three years, and 4.7% in 2023 alone as reported by the District Health Management Information System (HMIS, 2023) . This trend is linked to adverse social, emotional, economic, and health outcomes (WHO, 2019). Therefore, this study sought to identify determinants of home births in Mazabuka district as this would guide interventions promoting health facility deliveries.

This study was guided by the Health Belief Model (HBM), to investigate the determinants of home births among women in Mazabuka district. The HBM is a psychological model that attempts to explain and predict health behaviour. among the constructs of this model, which include; perceived susceptibility, perceived severity, perceived benefits, and perceived barriers.

Methodology

The study employed a quantitative approach using an analytical cross-sectional design. This approach was adopted because the study collected numeric data and investigated associations between variables. The study further employed regression analysis techniques in identifying determinants of home deliveries, thus making an analytical design appropriate. Therefore, this study design assisted the researchers in answering the study objectives appropriately. In addition, the design was cross-sectional as it captured information on relevant variables within a specific point in time in Mazabuka district.

The study was conducted in four health facilities in Mazabuka District, one of the 13 districts in the Southern Province of Zambia. The target facilities included; Shimungalu Rural Health Post, Mugoto Rural Health Centre, Nakambala Urban Health Centre and Mazabuka General Hospital. Mazabuka district is located along the main line of rail and the Great North Road and is 125 kilometers south of Lusaka. Mazabuka's main economic activities are peasant and commercial farming, trading, and fishing. The target facilities offered various healthcare services including maternal health care. The facilities were purposively selected based on the high number of home births recorded and locality (rural and urban) and therefore provided a representative sample.

The target population consisted of all women accessing maternal and child health care services at Shimungalu RHP, Mugoto RHC, Nakambala UHC and Mazabuka General Hospital in Mazabuka district. The study population consisted of women of childbearing age accessing postnatal care services at Shimungalu RHP, Mugoto RHC, Nakambala UHC and Mazabuka General Hospital in Mazabuka district. Representative sample sizes were first calculated from each target facility based on postnatal inflow using the proportion-to-size formula (Monthly facility inflow/total facilities inflow * n). To select the study participants, a simple random sampling technique (Fishbowl without replacement) was employed. Using this sampling method, the researcher on each day of data collection made a list of women accessing postnatal care services at each target facility, then assigned a number to each one of the available women. Using the fishbowl method without replacement, the researcher randomly picked 5–10 numbers. The women corresponding to the numbers picked were included in the study. This was repeated each day of the data collection period on different women at each facility until the calculated sample size was attained. A combined average of over a thousand women accessed postnatal care services every month at the target facilities. With an infinite target population of women in the period (within a month) intended for the study, the sample size was calculated using the Cochran formula (Cochran, 1977). Assuming a 95 percent confidence limit, 5 percent acceptable error, and an estimated 50 percent prevalence for an unknown proportion, the minimum sample size required for the study was calculated as shown below.

$$n = \frac{Z^2 p(1-p)}{d^2}$$

Where:

P = Prevalence/proportion (0.5) n = sample size

d =level of precision, taken at 0.05 Z = 1.96 for a 95% confidence level

Therefore:

$$n = \frac{1.96^2 * 0.5 * (1-0.5)}{0.05^2}$$

$$n = \frac{0.9604}{0.0025} = 385$$

Adjusting for a 10% non-response rate

Final n=$\frac{n}{1-NRR} = \frac{385}{0.9} = 428\ women$

Therefore, a total of 428 women were recruited for the study

Sample size per facility

Facility	Postnatal inflow	Sample size per facility (n)
Shimungalu Rural Health Post,	122	n = (122/1185) * 428 = 44
Mugoto Rural Health Centre	141	n = (141/1185) * 428 = 51
Nakambala urban health centre	722	n = (722/1185) * 428 = 261
Mazabuka general Hospital	200	n = (200/1185) * 428 = 72

Total	1185	428

Source: Mazabuka District Health Office (2023)

A pre-tested structured interview questionnaire was used to collect data from participants. The data collection tool was chosen because it enabled the obtaining of data from women with different literacy levels resulting in equal participation. It was translated into the local language to enable easy understanding of the topic by the respondents and translated back into English language. The data collection tool contained both closed and open-ended questions formulated and adapted from various literature that conducted similar studies. The interview questionnaire also covered demographic data and all the variables relevant to this study. The tool contained the following sections: Socio-demographic factors, obstetric factors, service-related factors, and prevalence of home births.

Upon getting permission from all relevant authorities, data was collected from the participants using face-to-face interviews over four weeks. The researchers introduced themselves to the participants before collecting data, explaining the purpose, benefits and risks of the study and assuring participants of anonymity and confidentiality. The Researchers informed participants that their participation was voluntary and that they were at liberty to withdraw at any time without having to suffer any negative consequences. The researchers then obtained verbal assent from participants under 18 years old and informed consent from their parents/guardians, while informed consent was obtained directly from older participants before conducting the interviews. The interviews were conducted in a private area, with each interview lasting not more than 30 minutes. At the end of the interview, each participant and parents/guardians was thanked for taking part in the study.

To ensure that the research findings provide a good reflection of reality, the researchers ensured that the development of the data collection tool was guided by similar literature. All the variables under study were covered in the interview questionnaire and the questions were clearly constructed and brief to avoid ambiguity. Validity was also enhanced by ensuring that probability sampling was used in selecting the participants to give a more representative sample of the population. In addition, adjusting for other variables during analysis also ensured the validity of the findings.

To ensure that the study findings are reliable, the data collection tool was pretested in a pilot study. This ensured the relevance and uniformity of the data collected across all participants. The pilot study also gave room for fine-tuning of the tool. To ensure consistency, the same data collection tool was used and the same questions were asked similarly across all participants, and if a participant was not clear about the question, it was simply repeated without rephrasing it. Further, confidentiality was assured and the physical environment where data was collected was private to enhance honest responses. Reliability was also enhanced by performing Cronbach's alpha coefficient which was 0.80.

To prevent data errors and ensure the safe storage of data, a comprehensive data management plan was implemented. Double data entry was utilized, with two researchers independently entering the collected data into SPSS, and resolving any discrepancies through comparison with the original data. All collected data was securely stored in both digital and physical formats; digital data was kept on password-protected computers and regularly backed up on encrypted external drives, while physical copies were stored in locked cabinets accessible only to the researchers. Regular data audits were conducted to ensure accuracy and completeness, involving cross-checking a random sample of the entered data against the original interview responses. Participant identifiers were anonymized in the dataset to maintain confidentiality, with unique codes replacing personal identifiers. Data entry screens incorporated validation checks to prevent the entry of invalid data, ensuring ranges for numerical entries and mandatory fields for essential

data. Additionally, all researchers involved in data collection and entry underwent thorough training on data handling and error prevention techniques to ensure consistency and accuracy.

A pilot study was conducted at Chivuna rural and Kaonga urban health centres in Mazabuka district because these facilities were similar to the actual study settings in terms of geography and population characteristics. The sample size consisted of 43 postnatal women, which is 10 percent of the sample size. Simple random sampling was used to select participants for the pilot study. This was to test the data collection tool and ascertain the time required to conduct the interview. Additionally, it helped in refining the questions to ensure all the variables in the study were measured appropriately.

To ensure the study met research ethics standards, ethics clearance was sought from the University of Zambia, Biomedical Research Ethics Committee (UNZABREC). The authority to proceed with the study was also obtained from the National Health Research Authority (NHRA). Permission was also sought from Mazabuka District Health Office and Mazabuka General Hospital. Respect for autonomy was regarded by ensuring that participation in this study was voluntary and verbal assent (participants under 18 years) and written informed consent was sought from all participants and parents before their participation. A detailed participant information sheet was read and explained to the participants and parents/guardians, to obtain informed consent.

The principle of beneficence was upheld, as this study did not result in any physical harm or exploitation of the participants. Equally, declining to participate in the study did not result in any harmful consequences. The principle of justice was upheld by treating participants equally regardless of their socio-economic characteristics. To uphold respect for human dignity, the researchers treated all participants with utmost respect. The right to privacy was upheld by ensuring that no personal identification information was recorded in the interview questionnaire but codes instead, and conducting interviews privately. In addition, the completed data tools were kept under strict security conditions to avoid unauthorized access to the information contained therein. Data was protected by limiting the usage of transfer to gadgets for example flash disks and only the researcher had access to the database to ensure security.

The analysis of data and presentation of research findings aimed at establishing the determinants of home births among women in Mazabuka district of Southern Province, Zambia. A total of 428 women in Mazabuka district, responded to structured questionnaires, representing a 100 percent response rate.

During data collection, the data were cleaned and checked for consistency and completeness. All responses were categorised and coded appropriately according to variables, indicators, and cut-off points. Variables were summarized using frequencies, and percentages. The prevalence of home births among women in Mazabuka district was estimated by dividing the total number of women who reported giving birth at home by the total sample size.

Upon completion of data collection, interview questionnaires were checked for completeness then responses coded. The coded data was entered and processed on SPSS version 26.0 for statistical analysis (IBM SPSS Statistics, Version 26.0. 2019. NY, USA). To summarise categorical variables, frequencies, and percentages were presented, while appropriate measures of central tendency and dispersion were presented for numerical variables depending on their distribution. The normality of numeric variables was assessed graphically and by use of normality tests such as the Shapiro-Wilk test. To estimate the prevalence of home births, a ratio of the number of reported home births to the total sample size was determined.

The chi-square test and Fisher's exact test were used to test for associations between home births and categorical variables, whereas the Wilcoxon rank-sum test was used to test for median differences of

numeric variables. To identify the socio-demographic, obstetric, and service-related determinants of home births considering other variables, logistic regression analysis was employed. Both univariable and multivariable logistic regression analyses were conducted. A backward stepwise approach was used in identifying the best-fit model with the aid of various fit statistics. All statistical analyses were conducted at a 5% level of significance. Implying that p-values less or equal to 0.05 were regarded as significant.

Results

The presentation of findings is in accordance with the research objectives. They were presented in the form of tables and cross-tabulations.

Table 3 shows that the median age of respondents was 28 years (IQR, 22, 32), the youngest mother was 15 years of age and the oldest was 48 years. The results show that most participants, 59.4% (254) were married, 40.9% (175) attained secondary education, and 32.5% (139) reached primary education. The majority, 79.6% (341) of the study participants earned a monthly income below K5,000, 57.5% (246) were in informal employment, while 21.5% (92) were unemployed.

Table 3: Socio-demographic characteristics of participants (n=428)

Variable	Category	Frequency (n)	Percent (%)
Age in years	Median (IQR)	28 (22, 32)	
Marital status	Single	174	40.7
	Married	254	59.4
Level of education	Never been to school	20	4.7
	Primary	139	32.5
	Secondary	175	40.9
	Tertiary	94	21.9
Employment status	Unemployed	92	21.5
	Formal	90	21.0
	Informal	246	57.5
Monthly income	Below K5,000.00	341	79.7
	At least K5,000.00	87	20.3

Key: IQR = Interquartile range

As shown in Table 4, the median number of children per mother was 2 (IQR, 1, 3), and the highest number of children reported was eight (8). A majority, 48.5% (207) commenced antenatal care during their first trimester while 40.1% (171) began antenatal care during their second trimester. Most participants, 71.7% (302) made between 4–8 antenatal visits, while, 28.3% (119) made less than 4 visits. Most study participants, 78.9% (337) had vaginal deliveries, while 21.1% (90) had caesarean deliveries. A majority, 82.2% (351) had full-term births whereas 17.8% (76) had preterm births. Most participants, 70.5% (301) reported that they were financially prepared for the pregnancy while 29.6% (115%) were not. About a quarter, 26.9% (115) reported that they experienced complications during pregnancy.

Table 4: Participants' obstetric factors (n=428)

Variable	Category	Frequency (n)	Percent (%)
Parity	Median (IQR)	2 (1,3)	
Timing of antenatal care attendance	First trimester	207	48.5
	Second trimester	171	40.1
	Third trimester	42	9.8
	Never attended	7	1.6
Number of ANC visits	4 – 8 visits	302	71.7
	Less than 4 visits	119	28.3
Mode of delivery	Vaginal delivery	337	78.9
	Caesarean delivery	90	21.1
Gestation age	Preterm birth	76	17.8
	Full term	351	82.2
Financial and logistical preparedness	Yes	301	70.5
	No	126	29.5
Complication during pregnancy	Yes	115	26.9
	No	312	73.1

Results in Table 5 show that most participants, 87.4% (37) lived near a health facility, with 96.5% (412) reporting that their nearest health facility had qualified staff offering maternal delivery services. The majority of the participants, 98.4% (420) regarded the hospitality and respect of staff at the nearest health facility as good, and 96.5% (412) agreed that enough privacy was provided for women seeking delivery services at their nearest health facility while only 3.7 % (16) disagreed.

Table 5: Service-related factors (n=428)

Variable	Category	Frequency (n)	Percent (%)
Distance from the facility	Far	54	12.6
	Near	373	87.4
Staff at the facility that offers maternal delivery services	Yes	412	96.5
	No	15	3.5
Hospitality and respect of health staff	Good	420	98.4
	Poor	7	1.64
Provision of enough privacy at the nearest facility	Yes	412	96.5
	No	15	3.5

Table 6 shows that 5.8% (25) of the participants delivered from home, whereas the majority 94.15 % (403) delivered from the health facility. Delay in noticing signs and symptoms of labour 28% (7) and lack of transport and long distances 56% (14) were the common reasons for homebirths. About 14% (60) of the babies and 13% (54) of the mothers required hospitalisation due to complications after delivery.

Table 6: Prevalence of home births among participants (n=428)

Variable	Category	Frequency (n)	Percent (%)
Place of delivery	Home	25	5.8
	Health facility	403	94.2
Reasons	Delayed to notice signs and symptoms	7	28.0
	Lack of required supplies	4	16.0
	Lack of transport and long distances	14	56.0
Condition of the baby after delivery	Health and well	367	85.9
	Hospitalised	60	14.1
Condition of the mother after delivery	Health and well	373	87.3
	Hospitalised	54	12.7

Results in Table 7 show that the prevalence of home births was significantly associated with age (p = 0.0024), marital status (p=0.004), education level (p=0.004), employment status (p=0.043), and monthly income (p=0.037). Most occurrences of home births were observed among women who were young, unmarried, lowly educated, unemployed, and among those with low monthly income compared to their counterparts.

Table 7: Association between respondents' demographic characteristics and home births

Variable	Category	Home Births		P-value
		No, N=403 n (%)	Yes, N = 25 n (%)	
Age in years	Median (IQR)	28 (23, 32)	20 (17, 30)	***0.0024***^{W}
Marital status	Single	157 (90.2)	17 (9.8)	***0.004***^{C}
	Married	246 (96.8)	8 (3.2)	
Education level	Low	143 (89.9)	16 (10.1)	***0.004***^{C}
	High	260 (96.5)	9 (3.4)	
Employment status	Unemployed	83 (90.2)	9 (9.8)	***0.043***^{C}
	Formal	89 (98.9)	1 (1.1)	
	Informal	231 (93.9)	15 (6.1)	
Monthly income	< K5000	317 (92.7)	24 (7.0)	***0.037***^{C}
	≥ K5000	86 (98.8)	1 (1.2)	

C*=Chi-Squared Test, W= Wilcoxon Rank Sum Test*

Table 8 shows that home births were significantly associated with parity (p=0.027), timing of antenatal care (p< 0.001), gestation at delivery (p<0.001), financial and logical preparedness (p=0.003), complications in previous pregnancy (p=0.014), and distance from nearest health facility (p<0.001) and home births. However, the number of ANC visits, mode of delivery, staff availability at the facility,

privacy during maternal care, and staff hospitality and respect at the facility showed no significant association with home births (p-values > 0.05).

Table 8: Association between obstetric factors, service-related factors, and home births

Variable	Category	Home Births		P-value
		No, N=403 n (%)	Yes, N = 25 n (%)	
Parity	Median (IQR)	2 (1, 3)	1 (1, 3)	***0.027*** ^{W}
Timing of antenatal care attendance	First trimester	199 (96.1)	8 (3.9)	***<0.001*** ^{F}
	Second trimester	167 (97.7)	4 (2.3)	
	Third trimester	35 (83.3)	7 (16.7)	
	Never attended	1 (14.3)	6 (85.7)	
Number of ANC visits	4–8 visits	292 (96.7)	10 (3.3)	*0.058* ^{C}
	< 4 visits	110 (92.4)	9 (7.6)	
Mode of delivery	Vaginal	314 (93.2)	23 (6.8)	*0.098* ^{C}
	Caesarean	88 (97.8)	2 (2.2)	
Gestation at delivery	Preterm	64 (84.2)	12 (15.8)	***<0.001*** ^{F}
	Full term	338 (96.3)	13 (3.7)	
Financial and logistically prepared	Yes	290 (96.4)	11 (3.6)	***0.003*** ^{C}
	No	112 (88.9)	14 (11.1)	
Complications in last pregnancy	Yes	103 (89.6)	12 (10.4)	***0.014*** ^{C}
	No	299 (95.8)	13 (4.2)	
Distance to nearest facility	Far	42 (77.8)	12 (22.2)	***<0.001*** ^{F}
	Near	360 (96.5)	13 (3.5)	
Staff availability at the facility	Yes	388 (94.2)	24 (5.8)	*0.602* ^{F}
	No	14 (93.3)	1 (6.7)	
Enough privacy during maternal care	Yes	387 (93.9)	25 (6.1)	*1.000* ^{F}
	No	15 (100.0)	0 (0.0)	
Staff hospitality and respect at the facility	Good	395 (94.1)	25 (5.9)	*1.000* ^{F}
	Bad	7 (100.0)	0 (0.0)	

C*=Chi-Squared Test, W= Wilcoxon Rank Sum Test, F = Fisher's Exact Test*

4.3.2. Univariable and multivariable logistic regression analysis

The multivariable analysis in Table 9 reveals that several factors significantly influenced the odds of home births. High education vs. low education (aOR = 0.36, 95% CI: 0.14–0.92, p = 0.032), a previous cesarean delivery vs. vaginal delivery (aOR = 0.10, 95% CI: 0.02–0.53, p = 0.007), full-term vs. preterm delivery (aOR = 0.25, 95% CI: 0.09–0.73, p = 0.011), and proximity to health facilities vs. distant locality (aOR = 0.14, 95% CI: 0.05–0.38, p < 0.001) were associated with reduced odds of home births among women. In contrast, age, marital status, staff availability, and the experience of pregnancy complications were not significant determinants of home births.

Table 9: Binary logistic regression analysis on the determinants of home births

Variables	Univariable analysis			Multivariable analysis		
	cOR	CI (95%)	p-value	aOR	CI (95%)	p-value
Age in years	0.91	0.85, 0.96	***0.007***	0.98	0.91,1.06	*0.633*
Marital status						
Unmarried	**Ref**			**Ref**		
Married	0.30	0.13, 0.71	***0.006***	0.61	0.20, 1.83	*0.376*
Level of education						
Low	**Ref**			**Ref**		
High	0.31	0.13, 0.72	***0.006***	0.36	0.14, 0.92	***0.032***
Previous mode of delivery						
Vaginal	**Ref**			**Ref**		
Caesarean	0.31	0.72, 1.34	*0.117*	0.10	0.02, 0.53	***0.007***
Gestation at delivery						
Preterm	**Ref**			**Ref**		
Full term	0.21	0.09, 0.47	***<0.001***	0.25	0.09,0.73	***0.011***
Distance						
Far	**Ref**			**Ref**		
Near	0.13	0.05, 0.29	***<0.001***	0.14	0.05, 0.38	***<0.001***
Staff availability						
Yes	**Ref**			**Ref**		
No	1.15	0.15, 9.15	*0.892*	0.38	0.04, 3.78	*0.409*
Experience of complications in pregnancy						
Yes	**Ref**			**Ref**		
No	0.37	0.17, 0.84	***0.018***	0.60	0.20, 1.77	*0.354*

***cOR**= Crude Odds Ratio, **aOR**= adjusted Odds Ratio, **CI**= Confidence Interval*

Discussion of findings

The discussion of research findings in this study were based on the analysis of responses from a sample of 428 mothers on the determinants of home births among women in Mazabuka district of southern province, Zambia. It includes a discussion of the socio-demographic characteristics, prevalence of home births, and determinants of home births. The chapter further discusses the implications of the findings to nursing care, recommendations, dissemination of findings, limitations of study findings, and the conclusion. The main objective of the study was to investigate the determinants of home births among women in the Mazabuka district in Zambia.

Socio-demographic characteristics

The study involved relatively you women in their reproductive age who mostly were married (Table 3, page 25). This aligns with studies that indicate that marriage is a common characteristic among women of reproductive age. For instance, a study in Nigeria on factors influencing home delivery practices found that 63.2% of participants were married, highlighting how marital status influences childbirth decisions (Johnson et al., 2020). Educational attainment was generally high among study participants, with the

majority having attained at least primary-level education. These findings mirror observations by the Zambia Demographic and Health Survey which indicates high literacy levels among the Zambian population (Zambia Statistics Agency et al., 2020). Similarly, a study conducted in Ethiopia on factors influencing institutional delivery revealed that most of the respondents had attained secondary-level education, emphasizing the role of education in shaping delivery choices (Scott et al., 2018; Teferi et al., 2022). Additionally, Zambia's re-entry policy, which allows young mothers to return to school, and free education programs may have contributed to relatively higher educational levels among participants (Ministry of Education (MoE) and UNESCO, 2016).

The study further revealed low levels of formal employment and monthly income among majority of the participants (Table 3, page 25). This economic profile is indicative of the nature of the study area, which has limited economic activities, therefore, formal employment opportunities are limited. These findings are consistent with a study in Uganda that reported low income levels among rural women, with over 65% earning less than the equivalent of K4,500 per month (Muhongya et al., 2020). Inadequate financial ability could promote home births, as limited income restricts access to health services, including institutional delivery, as financial barriers remain a significant determinant of home births (Maximore et al., 2022).

Prevalence Of Home Births

The study revealed a low prevalence of home births, with only about 6 percent of women delivering at home (Table 6, page 28). This prevalence is significantly lower than rates reported in other African settings. For instance, studies in rural Malawi found that a significant number of women delivered at home (Gamah et al., 2022; Kim et al., 2019). Similarly, a study in Ethiopia reported a home delivery prevalence of 31.1%, largely due to logistical challenges and limited access to healthcare (Delibo et al., 2020; Mose et al., 2021; Teferi et al., 2022). The relatively low prevalence in the current study reflects progress in Zambia's maternal health initiatives, such as the Safe Motherhood Action Groups (SMAGs) and the provision of free maternal healthcare (CSO, 2019). Globally, home births remain uncommon in high-income countries due to well-established healthcare systems. For example, in the United Kingdom, home births account for less than 3% of deliveries, largely by choice and under the supervision of skilled midwives (National Maternity and Perinatal Audit (NMPA), 2018). This disparity in home birth prevalence highlights the critical role of healthcare systems, maternal health policies, and community interventions in shaping delivery practices.

Further findings showed that among the women who delivered at home, the primary reasons were transport and distance challenges, and delays in recognizing signs of labor early. These findings align with regional studies. For instance, in Uganda, transport-related barriers accounted for 48% of home births (Kirungi et al., 2020; Manzi et al., 2018). Long distances to health facilities, poor road networks, and limited availability of emergency transport systems remain significant barriers to accessing skilled delivery services (Sadia et al., 2022). According to the World Health Organization (WHO), access to timely emergency obstetric care could prevent up to 74% of maternal deaths (WHO, 2024). Therefore, helping pregnant women overcome these barriers could enhance positive neonatal and maternal outcomes. Furthermore, delays in recognizing labor signs also indicate gaps in maternal education, which could be addressed through antenatal care (ANC) education programs. In a study conducted in Kenya, women who attended fewer than four ANC visits were more likely to experience home births due to inadequate knowledge of labor symptoms (Karanja et al., 2018; Wanyoike, 2020). This emphasizes the importance

of enhancing ANC coverage and quality to improve maternal awareness and promote timely decision-making.

The proportion of babies and mothers who required hospitalization due to complications after delivery in this study corresponds to findings reported in Malawi, where some mothers and newborns faced complications requiring further care after delivery (Gamah et al., 2022). The relatively lower rates of complications observed in this study could be attributed to Zambia's emphasis on skilled delivery care, which reduces the risk of adverse outcomes. However, the persistence of complications underscores the need to address gaps in maternal and neonatal health care.

Determinants of home births

Socio-demographic factors

The study revealed that in the bivariate analysis, home births were significantly associated with age (p = 0.0024), marital status (p=0.004), education level (p=0.004), employment status (p=0.043), and monthly income (p=0.037) (Table 7, page 29). These findings align with studies in other African contexts. For instance, a study in rural Malawi similarly found that low education levels and unemployment significantly contributed to higher home birth rates (Gamah et al., 2022; Kim et al., 2019). Similarly, women with lower monthly incomes were more likely to deliver outside health facilities in Ethiopia, due to financial constraints and poor access to healthcare services (Ayalew et al., 2022; Kaiser et al., 2019). These associations underscore the influence of socio-demographic factors on maternal healthcare utilization.

Using multivariable logistic regression analysis to gain deeper insights into the determinants of home births by controlling for other factors, it was observed that women with high education levels had significantly (p=0.032) reduced odds of home births compared to those with low education attainment (Table 9, page 31). This finding highlights the protective effect of education on maternal health outcomes, as educated women are more likely to be aware of the benefits of skilled delivery care and the risks of home births. Similar results have been observed in Kenya, where women with secondary or higher education were significantly less likely to deliver at home compared to those with no formal education (Karanja et al., 2018; Wanyoike, 2020). Education empowers women to make informed healthcare decisions and facilitates access to healthcare resources, including antenatal care and transport to health facilities. Therefore, encouraging education among women could have a positive effect on maternal healthcare utilisation. Distance to the nearest health facilities also emerged as a significant determinant of home births (p<0.001), with women living closer to health facilities having significantly reduced odds of home births (Table 9). This finding aligns with regional and global studies that have consistently highlighted distance to health facilities as a critical barrier to accessing skilled delivery care. For instance, in Uganda, women residing more than 10 kilometers from the nearest health facility were three times more likely to deliver at home compared to those living within 5 kilometers (Muhongya et al., 2020). In Zambia, poor road infrastructure and lack of transport options exacerbate the challenges faced by women, making distance a key determinant of health-seeking behavior (Zambia Statistics Agency et al., 2020). These findings underscore the importance of improving healthcare access through better infrastructure, community health outreach programs, and transport systems.

It is noteworthy that age and marital status were not significant determinants of home births in the multivariable analysis, despite their significance in the bivariate analysis. This suggests that the effect of these factors may be mediated by other variables, such as education and income, which were accounted for in the regression model. Similar trends have been reported in studies from Ethiopia and Nigeria, where

age and marital status lost significance after adjusting for socio-economic and geographic factors (Delibo et al., 2020; Johnson et al., 2020; Teferi et al., 2022). This highlights the importance of multivariable analysis in identifying the most influential determinants of health outcomes.

Obstetric Factors

At bivariate analysis, the study revealed that parity, timing of antenatal care (ANC) ($p<0.001$), gestational age at delivery ($p<0.001$), financial and logistical preparedness ($p=0.003$), and complications in previous pregnancies ($p=0.014$) were significantly associated with home births (Table 8, page 29). Similar to these findings, a study in rural Tanzania showed that multiparous women were more likely to deliver at home due to perceived confidence in childbirth (Moshi and Tilisho, 2023). Similarly, delayed initiation of ANC and poor financial preparedness were identified as significant determinants of home births in Ethiopia (Mose et al., 2021). These associations emphasize the potential influence of obstetric factors on home births, giving healthcare provides insight into tailoring health education and recommendations to such women.

The multivariable analysis further showed that a history of cesarean delivery was strongly associated with reduced odds of home births ($p=0.007$), which aligns with findings from studies in Kenya and India, where women with previous cesarean sections were significantly more likely to opt for facility deliveries due to perceived or real risks of complications during subsequent deliveries (Agrawal and Tiwari, 2020; Karanja et al., 2018). These findings underscore the importance of institutional deliveries for women with higher obstetric risks, as health facilities provide the necessary surgical expertise and emergency care. Similarly, delivering at full term significantly reduced the odds of home births among women in the current study ($p=0.011$). This finding may be attributed to the sudden onset of labor in preterm deliveries, which might discourage healthcare-seeking behaviors among women due to limited time and resource constraints. In line with this, studies in Uganda and Nigeria also report that preterm deliveries are more likely to occur at home due to the sudden onset of labor and logistical challenges in accessing healthcare facilities (Johnson et al., 2020; Manzi et al., 2018). These findings highlight the need for targeted community education and improved referral systems to ensure timely facility-based deliveries for high-risk pregnancies.

While a history of previous pregnancy complications was significant in the bivariate analysis, it was not significant in the multivariable analysis. This may indicate that the relationship between pregnancy complications and home births is mediated by other factors such as parity, financial preparedness, or healthcare access. Similar results have been observed in studies from Ethiopia and Ghana, where the significance of pregnancy complications was diminished after adjusting for socio-economic and healthcare factors (Ayalew et al., 2022; Budu, 2020; Enuameh et al., 2016). This underscores the complex interplay of determinants and the importance of multivariable analyses in understanding maternal health behaviors. Notably, the number of ANC visits and mode of delivery showed no significant association with home births. This contrasts with findings from Malawi and Uganda, where fewer ANC visits were linked to higher home birth rates (Tumwizere et al., 2024; Ntenda, 2019). This disparity could be due to variations in study settings, study design, sample sizes, and target populations.

Service-related factors

Study findings in Table 8 (Page 29) showed that no service-related was significantly associated with home births. In this regard, it was observed that staff availability ($p=0.602$), privacy during maternal care ($p=1.000$), and staff hospitality and respect ($p=1.000$) showed no significant association with home births. This finding aligns with studies in Ethiopia and Malawi, where maternal decisions on place of delivery were more strongly associated with socio-economic and logistical barriers rather than interpersonal or

facility-related factors (Delibo et al., 2020; Gamah et al., 2022; Kim et al., 2019). In resource-constrained settings, women often prioritize accessibility and affordability over quality indicators such as staff hospitality or privacy. This suggests that while these factors may be valued, they are not decisive in settings where structural barriers dominate. However, the lack of association between service-related factors and home births contrasts with findings from Kenya and Ghana, where poor provider attitudes, disrespect, and lack of privacy were significant deterrents to facility delivery (Budu, 2020; Wanyoike, 2020). Studies have shown that perceived or actual mistreatment during childbirth negatively affects trust in healthcare systems, leading to higher rates of home births. In Nigeria, research has highlighted that negative provider attitudes contribute to maternal hesitancy in seeking institutional care (Johnson et al., 2020).

The lack of significance of service-related factors was further emphasised in multivariable analysis where staff availability was not a significant determinant of home births. This finding contrasts with studies in Kenya and Nigeria, where inadequate staff availability in health facilities was linked to higher rates of home births, as women perceived health facilities as ill-equipped to provide the necessary care (Johnson et al., 2020; Wanyoike, 2020). However, this study's findings are in line with those from resource-constrained settings where logistical barriers, such as transportation issues and distance to health facilities, outweigh the importance of staff availability (Karanja et al., 2018; Moshi and Tilisho, 2023; Ntenda, 2019). In these settings, even when facilities have staff available, the lack of infrastructure, timely access, and financial constraints often drive women to deliver at home. Furthermore, in some contexts, women's decision to have a home birth may be influenced more by cultural factors, personal preferences, or previous negative experiences with healthcare services, rather than solely by the presence of qualified staff (Johnson et al., 2020). This underscores the need for a holistic approach to improving maternal health outcomes, one that includes not only increasing staff availability but also addressing other critical barriers such as transport, healthcare access, and community awareness.

Implications of findings to nursing care

Nursing Practice

The study revealed significant association between homebirths and age, marital status, and education. Therefore, nurses should prioritize targeted education and counseling for young, unmarried, and lowly educated women during antenatal care (ANC) visits, emphasizing the benefits of skilled birth attendance. Additionally, nurses can play a pivotal role in improving preparedness for delivery by providing guidance on financial and logistical planning.

Nursing Administration

Distance was a significant determinant of homebirths. Therefore, nursing administrators must ensure that healthcare facilities are equipped to address barriers related to access of care. Expanding the reach of maternal health services through mobile clinics, and community health programs, can help reduce the impact of distance on home births. Efforts to integrate respect, privacy, and dignity into care protocols should also be maintained to foster trust, even though these were not significant determinants in this study.

Nursing Education

Given that service and individual factors were significant determinants of home births, nursing education should incorporate training on the unique socio-demographic, obstetric, and logistical factors that influence home births. Future nurses need to be equipped with skills to identify and mitigate risk factors for home births, such as financial and logistical preparedness. Simulated scenarios and community-based

practicums should emphasize culturally competent care and effective communication strategies to engage diverse populations. The curriculum should also focus on equipping nurses with tools to advocate for facility-based deliveries.

Nursing Research

This study highlights the need for further research into socio-cultural and contextual factors influencing home births. Research should also explore the development and effectiveness of community-level interventions, such as transport vouchers programs, in reducing home births. Additionally, longitudinal studies can be explored to assess the long-term impact of antenatal education and outreach programs on delivery outcomes. Such evidence would inform evidence-based policies and nursing interventions to address home births comprehensively.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. Since higher education significantly reduced the odds of home births, health facilities should ensure that healthcare programs prioritize health education and awareness campaigns targeting women. Community health workers can be trained to deliver culturally sensitive and accessible information about the benefits of skilled birth attendance during antenatal care visits and outreach activities. Additionally, antenatal care programs should integrate counseling on recognizing signs of preterm labor and the importance of early facility-based care.
2. Given the significant association between financial and logistical preparedness and home births, health facilities should implement programs that support women in preparing for childbirth. These could include antenatal counseling sessions focused on financial planning, checklists for delivery preparation, and community-based savings groups to reduce economic barriers.
3. The strong association between previous cesarean deliveries and reduced odds of home births highlights the importance of ensuring timely access to emergency obstetric care. Therefore, the Ministry of Health should strengthen referral pathways, provide reliable transportation options, and equip healthcare facilities with the necessary resources to handle obstetric emergencies, encouraging women with prior cesarean histories to deliver in health facilities.
4. The finding that proximity to health facilities reduces the odds of home births underscores the need to improve access to maternal health services. Policymakers should prioritize building health facilities in underserved areas and implementing mobile clinic services to bring care closer to communities. Additionally, transportation support programs and incentives could be introduced to reduce logistical barriers for women living in distant localities.

Utilisation and dissemination of findings

A summary of the research findings will be submitted to the Mazabuka District Health office and all health facilities involved in the study. A full copy of the research study will be made available to the University of Zambia through the School of Medicine, School of Nursing Sciences and University of Zambia great East Road Campus Libraries. Researchers will also hold educative meetings with women attending postnatal care at the target facilities to communicate findings and recommendations. The findings will also be published in an international peer-reviewed journal.

Limitations of the study

The use of a cross-sectional design limits the study's ability to assess the incidence of home deliveries or make any form of causal inferences, due to its inability to establish directionality of associations between variables. Additionally, the study relied on reported information and could therefore be prone to recall bias. To minimize recall bias, the study ensured that the questions were clearly worded and as specific as possible. Additionally, pre-testing of the data collection tool helped identify potential issues in recall accuracy, allowing adjustments before the main study.

Strength of the study

The study employed a comprehensive and rigorous data collection process, adopting a proportion-to-size sampling technique combined with simple random sampling, ensured that the sample was representative of the study population. This enhances the generalizability of the findings to postnatal women in Mazabuka district. The study also employed a wide range of statistical tools, including chi-squared tests, Fisher's exact tests, Wilcoxon rank sum tests, and binary logistic regression, which added robustness to the identification of determinants of home births. In addition, the study analyzed a variety of factors (socio-demographic, obstetric, and service-related) allowing for a holistic understanding of the determinants of home births. These approaches strengthen the conclusions drawn from this study.

Conclusion

This study investigated the determinants of home births among women in Mazabuka District, Zambia, focusing on socio-demographic, obstetric, and service-related factors. The findings revealed a low prevalence of home births in the district, reflecting Zambia's progress in maternal health initiatives. The study highlights the critical obstetric, socio-economic, and geographical barriers that influence the home delivery decision. While maternal health initiatives have contributed to a low prevalence of home births, significant challenges remain in ensuring that all women have access to skilled care during childbirth. In line with the health belief model, the study underscores that modifying factors (i.e. low education levels, previous mode of delivery), perceived threats of complications (i.e. gestation at delivery), and cues to action (i.e. financial constraints and long distances to health facilities) are primary determinants of home births. These factors suggest the need for comprehensive interventions that address both the accessibility and affordability of healthcare in the district. Therefore, strategies to reduce home births should focus on improving education, reducing financial barriers, and enhancing infrastructure to ensure closer proximity to health services. Strengthening antenatal care programs and improving financial support systems could also empower women to make timely and informed decisions about their delivery of care.

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