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DEMOGRAPHIC DETERMINANTS OF LABOUR AND DELIVERY SERVICE UTILISATION IN SELECTED HEALTH FACILITIES IN LUSAKA DISTRICT, ZAMBIA

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Abstract:
Background: The use of labor and delivery health services is essential for improving maternal and neonatal outcomes, yet disparities in service utilization persist, even in urban areas. This study examined the demographic factors affecting the use of labor and delivery health services among postnatal women in selected health facilities in Lusaka District, Zambia. **Methods:** A descriptive, cross-sectional, quantitative study was conducted among 343 postnatal women aged 15–49 years who had delivered within 6 months of data collection. Participants were selected from six public health facilities using stratified random sampling at the facility level and systematic sampling for respondents. Data were collected using a pretested structured interview schedule and analyzed with SPSS version 22.0. Associations were examined using chi-square tests and logistic regression at a 95% confidence interval, with statistical significance set at $p<0.05$. **Results:** Overall, 306 (89.2%) respondents utilized labor and delivery health services, while 37 (10.8%) did not. In bivariate analysis, maternal education ($\chi^2=20.769$, $p<0.001$) and parity ($\chi^2=10.286$, $p=0.006$) were significantly associated with utilization, whereas age was not significant, and family income showed only a marginal association. In binary logistic regression, women with parity 3–4 and ≥5 had lower odds of utilization than those with parity 1–2. After multivariable adjustment, maternal education remained the only independent predictor of utilization (OR=3.500, 95% CI: 1.046–11.861, $p=0.042$**).** **Conclusion:** Use of labor and delivery health services was high in the study setting. Maternal education remained the main independent factor influencing service use. Focused maternal health education and interventions that address educational inequalities may help boost the use of skilled childbirth services in urban Zambia**.**

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Keywords: labor and delivery health services, utilization, maternal education, parity, skilled childbirth services, Zambia

1. Introduction

Despite substantial progress in maternal and newborn health, preventable complications during labour, childbirth, and the immediate postpartum period remain major contributors to maternal and neonatal mortality, especially in low- and middle-income countries. Evidence indicates that improved survival depends not only on access to services, but also on the availability of timely, safe, respectful, and effective care provided by skilled personnel within responsive health systems (Kruk *et al.*, 2018; Koblinsky *et al.*, 2016; Tunçalp *et al.*, 2015; Roder-DeWan *et al.*, 202. This priority is aligned with Sustainable Development Goals 3.1 and 3.7, which call for reductions in maternal mortality and universal access to sexual and reproductive healthcare; however, progress remains uneven, and sub-Saharan Africa continues to bear a disproportionate share of the global burden of maternal deaths (United Nations General Assembly, 2015; WHO *et al.*, 2025).

The use of labor and delivery health services is shaped by interconnected demographic and contextual factors. In sub-Saharan Africa, maternal education, age, parity, household wealth, place of residence, antenatal care visits, and distance to health facilities are consistently associated with facility-based childbirth. Additionally, perceived quality of care, transportation barriers, and prior care experiences also influence women's decisions to seek skilled attendance at delivery facilities (Moyer and Mustafa, 2013; Doctor *et al.*, 2018; Dunlop *et al.*, 2018).

In Zambia, institutional delivery has also been linked to educational attainment, socioeconomic status, antenatal care utilization, and access to proper delivery facilities, while provider attitudes, indirect costs, and community expectations continue to influence childbirth care-seeking behavior (Ensor *et al.*, 2014; Gabrysch *et al.*, 2011; Rashid *et al.*, 2022; Sialubanje *et al.*, 2014). Although Lusaka is an urban area, disparities in maternal healthcare use persist, with inequalities in continuity of care, emergency obstetric access, perceived quality, and women's experiences across communities (Jacobs *et al.*, 2023; Jacobs *et al.*, 2024; Hibusu *et al.*, 2024). Women's choices regarding labor and delivery care are still influenced by educational level, socioeconomic status, and prior interactions with healthcare providers, highlighting the need for context-specific evidence on the demographic factors that affect service use in urban Zambia (Katemba *et al.*, 2018; Kyei *et al.*, 2012). In this context, the present study examined the demographic factors influencing the use of labor and delivery health services in selected health facilities in Lusaka District, Zambia, to generate evidence to guide interventions that promote equitable access to skilled childbirth care.

2. Methodology

This chapter describes the methodology used in the study. It details the research design, study setting, population, sampling procedures, inclusion and exclusion criteria, sample size calculation, data collection tools and methods, measures to ensure validity and reliability, pretesting, and ethical considerations. The study aimed to identify the demographic factors linked to the utilization of labor and delivery health services among women attending selected urban health facilities in Lusaka District.

2.1 Study Design

A descriptive cross-sectional quantitative design was used to examine the demographic factors associated with the utilization of labor and delivery health services among women in selected urban health facilities in Lusaka District.

2.2 Study Setting

The study was conducted in Lusaka Urban District, Zambia's most urbanized area, across six public health facilities that offer 24-hour labor and delivery services along with Basic Emergency Obstetric and Neonatal Care (BEmONC). These included Kanyama First Level Hospital, Chawama First Level Hospital, Bauleni Health Centre, Mtendere Health Centre, Matero Reference Health Facility, and George Health Centre. In addition to routine maternity services, these facilities have referral connections with the University Teaching Hospital and Levy Mwanawasa University Teaching Hospital for comprehensive emergency obstetric and neonatal care.

2.3 Study Population

The study population comprised postnatal women attending under-five and postnatal clinics at the selected health facilities. The target population included women aged 15-49 years who had delivered within six months prior to data collection. Both primiparous and multiparous women attending these clinics during the study period were eligible for inclusion.

2.4 Sample Size and Sampling Method

2.4.1 Sample Size

A total sample of 343 women participated, calculated using a prevalence formula.

2.4.2 Sampling Method

The study employed stratified random sampling to select the participating health facilities. The ten labour and delivery facilities were grouped into two strata based on service utilisation coverage: high-coverage facilities (>60%) and low-coverage facilities (<60%). Three facilities were randomly selected from each stratum, giving a total of six facilities. This approach enhanced representation across utilisation categories and

ensured that each facility had an equal probability of being selected. Systematic sampling was employed to select study participants.

2.4.2.1 Inclusion Criteria

The study included postnatal women aged 15-49 years who had delivered within the six months preceding data collection and were attending the children's clinic at the selected health facilities, who were able to provide informed consent

2.4.2.2 Exclusion Criteria

The study excluded women whose infants were older than six months, those who did not consent to participate, those attending with sick children at the time of data collection, and women outside the reproductive age group.

2.5 Data Collection

Data was collected for the period of 6 weeks.

2.5.1 Data Collection Tools

A pretested structured interview schedule was used for data collection. The instrument was developed in English and translated into Nyanja to facilitate effective communication with participants. It included both open and closed-ended questions, arranged in a standardized order to ensure consistency during data collection. The interview schedule comprised two sections: Section A covered respondents' demographic information, and Section B gathered data on the utilization of labor and delivery health services.

2.6.2 Data Collection Technique

Data were collected on designated days with prior permission from the facility management and Maternal and Child Health (MCH) in-charges. A private room was arranged within each facility to ensure confidentiality during interviews. The researcher introduced herself to each respondent and explained the purpose of the study in detail. Individuals willing to participate were given a participant information sheet; for those unable to read, the researcher read and explained the contents to facilitate informed participation. Written informed consent was obtained from each participant before the interview began. To ensure consistency, interviewers strictly followed the interview schedule and asked all questions as written, without influencing participants' responses. Each interview lasted approximately 15 to 20 minutes.

2.7 Validity

2.7.1 Internal Validity

Internal validity was enhanced by choosing an appropriate study design and basing the data collection process on an extensive literature review. A standardized data collection tool was employed to ensure consistency in the questions asked across all participants.

Additionally, the questions were written in clear, unambiguous language to reduce misinterpretation and improve response consistency.

2.7.2 External Validity

External validity was improved by expert review of the data collection tool and by conducting a pilot study before the main research.

2.8 Reliability

Questionnaire reliability was tested through pre-testing. During this process, participants were asked to identify any questions they did not clearly understand. All items were presented in the same order to each participant, and probes were used when needed to clarify responses. The inclusion of open-ended questions also allowed respondents to share their own ideas and raise important issues that may not have been anticipated when the data collection tool was developed.

2.9 Pilot Study

A pretest of the data collection tool was conducted at Ngombe Health Centre using about 10% of the study population. The site was selected because its features were similar to those of the health facilities included in the main study. As a government-operated urban clinic, Ngombe Health Centre offers curative, preventive, maternal, neonatal, and child health services, as well as labor and delivery services, making it a suitable location for pilot testing. The pretest was conducted to evaluate the clarity, relevance, and suitability of the interview schedule prior to the main study, and respondents were selected using systematic sampling.

2.10 Ethical Considerations

Ethical approval for the study was received from the Excellence in Research Ethics and Science Converge (ERES). Additional permission to access the selected health facilities was granted by the Lusaka Provincial Medical Office, the District Health Office, and the respective facility in-charges.

Before data collection, the purpose of the study was explained to all participants, and informed consent was obtained from those who agreed to take part. For respondents under 16 years old, assent was obtained from their guardians. Participants were told that the study aimed to examine demographic factors associated with the use of labor and delivery health services in urban health facilities in Lusaka. They were also informed that participation was voluntary, no incentives would be provided, and they could withdraw from the study at any time without penalty.

Confidentiality and anonymity were maintained throughout the study. No names were recorded on the interview schedules, and code numbers were used instead of personal identifiers. Interviews were conducted in private settings within the Maternal, Neonatal, and Child Health department, and all study materials were stored securely and made accessible only to the principal investigator.

3. Data Analysis

3.1 Data Processing and Analysis

Data processing and analysis began by verifying each completed questionnaire for completeness and consistency. The responses were then coded and organized into relevant categories to facilitate analysis. Statistical analysis was performed using SPSS version 22.0. The associations between categorical independent variables and the dependent variable were examined using the Chi-square test. Binary logistic regression was initially conducted at the univariate level to identify demographic factors associated with the utilization of labor and delivery health services, followed by multivariate logistic regression to control for potential confounders and identify independent predictors of utilization. Statistical significance was set at $p < 0.05$, and results were interpreted with 95% confidence intervals.

4. Results

Table 1: Respondents' Demographic Characteristics (n=343)

Mothers' demographic characteristics	Frequency	Percentage (%)
Mothers age group in years		
15 – 24	127	37.0
25 – 34	167	48.7
35 – 49	49	14.3
Total	**343**	**100.0**
Marital Status		
Single	35	10.2
Separated	18	5.2
Married	283	82.5
Divorced	5	1.5
Widowed	2	0.6
Total	**343**	**100.0**
Education		
No formal education	12	3.5
Primary	142	41.4
Secondary	166	48.4
Tertiary	23	6.7
Total	**343**	**100.0**
Occupation		
House wife	192	56.0
Formally employed	27	7.9
Self employed	100	29.2
Other	24	7.0
Total	**343**	**100.0**
Parity		
1 – 2	205	59.8
3 – 4	98	28.6
5 +	40	11.7

Total	**343**	**100.0**
Family income		
Less than K500	91	26.5
K500 to K1,000	172	50.1
Above K1,500	80	23.3
Total	**343**	**100.0**

Table 1 shows that the largest proportion of respondents was aged 25–34 years, 167 (48.7%), followed by those aged 15–24 years, 127 (37.0%), while women aged 35–49 years accounted for 49 (14.3%). These findings suggest that the study population was predominantly young women in the reproductive age group.

In terms of marital status, most respondents were married, 283 (82.5%), whereas only a small proportion were single, 35 (10.2%), separated, 18 (5.2%), divorced, 5(1.5%), or widowed, 2 (0.6%). Regarding educational attainment, secondary education was the most common level, reported by 166 (48.4%) respondents, followed by primary education, reported by 142 (41.4%). Only a few participants had no formal education (12, 3.5%) or tertiary education (23, 6.7%).

With respect to occupation, more than half of the respondents were housewives (192, 56.0%), 100 (29.2%) were self-employed, 27 (7.9%) were formally employed, and 24 (7.0%) were in other occupations. Concerning parity, the majority had one to two children (205, 59.8%), followed by those with three to four children (98, 28.6%), and those with five or more children (40, 11.7%).

Household income findings showed that 172 (50.15%) respondents reported a monthly income of K500 to K1,000, the most common category. A further 91 (26.5%) reported earning less than K500, while 80 (23.3%) had a household income above K1,500. Overall, the findings indicate that the study population was largely composed of married young women with secondary-level education, low parity, limited formal employment, and modest household income.

4.1 Utilization Levels

Figure 1 shows that most respondents, 306 (89%), used labour and delivery health services, while 37 (10.8%) did not, indicating a high overall rate of facility-based delivery in the study group.

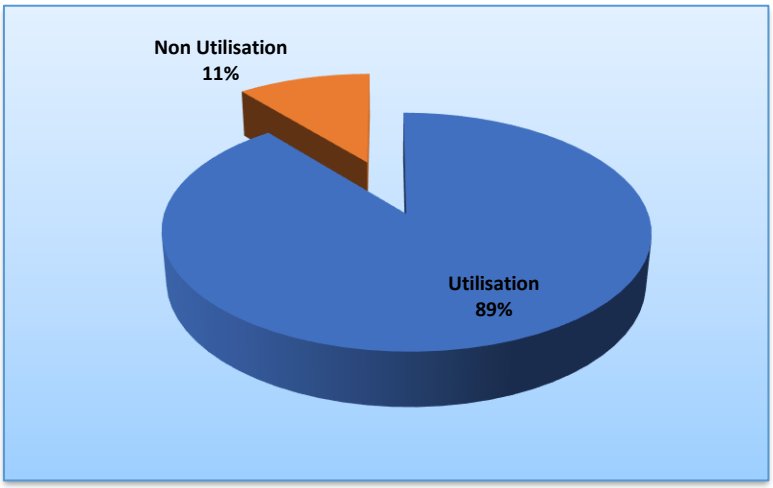

Figure 1: Utilization Levels (n=343)

Table 2: Respondents' Place of Delivery (n=343)

Place of Labour and Delivery	Frequency	Percentage (%)
At home	37	10.8
At the health centre	210	61.2
At the hospital	92	26.8
At a private hospital	4	1.2
Total	**343**	**100.0**

The distribution of place of labor and delivery (Table 2) shows that most respondents gave birth in public health facilities, with 210 (61.2%) delivering at health centers and 92 (26.8%) at hospitals. Only a small percentage were delivered in private hospitals, 4 (1.2%), while 37 (10.8%) reported delivering at home.

Table 3: Intended Place of Delivery (n=343)

Intended Place of Delivery	Frequency	Percentage (%)
Yes	226	65.9
No	117	34.1
Total	**343**	**100.0**

The findings show that most respondents, 226 (65.9%), delivered at their planned health facility, while a significant proportion, 117 (34.1%), delivered elsewhere than originally intended.

Table 4: Intended Place of Delivery among Those Who Did Not Deliver at the Intended Place (n=117)

Intended place	Frequency	Percentage (%)
At home	1	0.9
At the health centre	101	86.3
At a private hospital	4	3.4
At the government hospital	11	9.4
Total	**117**	**100.0**

Table 4 shows that most respondents, 101 (86.3%), initially planned to deliver at a health center, while smaller proportions planned to deliver at a government hospital (11, 9.4%) or a private hospital (4, 3.4%).

Table 5: Reasons for Delivering at the Place Delivered from (n=342)

Reason	Frequency	Percentage (%)
Lack of transport	30	8.8
Bad staff attitude	13	3.8
Long distance	6	1.8
Sudden onset of labour	45	13.2
Others	256	74.9
Total	**342**	**100.0**

Table 5 shows that most respondents, 256 (74.9%), reported other various reasons influencing their choice of delivery location, indicating that delivery sites were often chosen based on specific circumstances. A notable number, 45 (13.2%), mentioned the sudden onset of labor as the reason for delivering at that location. Smaller numbers reported lack of transportation (30, 8.8%), negative staff attitude (13, 3.8%), and long distance to the facility (6, 1.8%) as influencing factors.

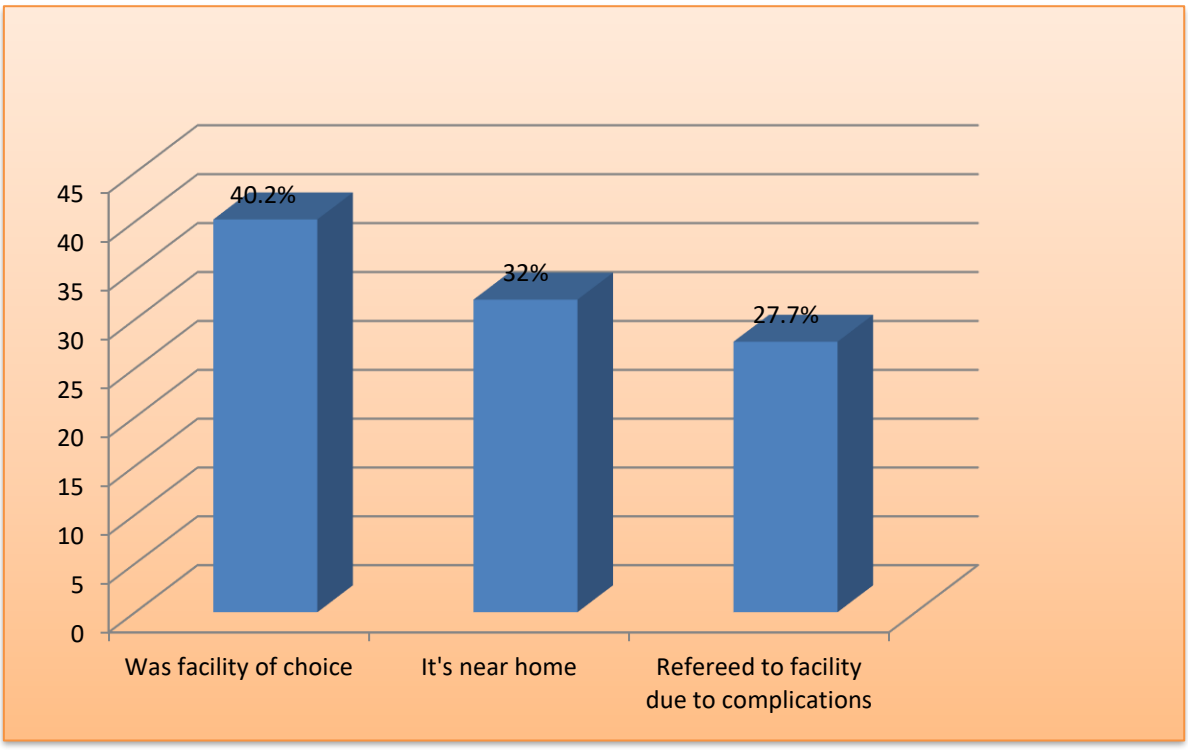

Figure 2: Other Varied Reasons Which Influencing Their Place of Delivery

Figure 2 shows that among respondents reporting "other" reasons for their place of delivery, the largest proportion, 102 (40.2%), delivered at a facility of their choice. This was followed by 71 (27.7%) who were referred to a hospital because of complications, while 32.0% reported delivering at a facility near their home.

Table 6: Relationship between Respondents' Demographics Traits and Use of Labor and Delivery Health Services (N=343)

Independent variable	Category	Utilization, n (%)	Non-utilization, n (%)	Total	χ^2	P-value
Age (years)	15–24	114 (89.8)	13 (10.2)	127	8.871	0.140
	25–34	154 (92.2)	13 (7.8)	167		
	35–49	38 (77.6)	11 (22.4)	49		
Educational level	No formal education	11 (91.7)	1 (8.3)	12	20.769	<0.001
	Primary	114 (80.3)	28 (19.7)	142		
	Secondary	158 (95.2)	8 (4.8)	166		
	Tertiary	23 (100.0)	0 (0.0)	23		
Family income (ZMW)	<K500	76 (83.5)	15 (16.5)	91	5.871	0.053
	K500–K1,000	154 (89.5)	18 (10.5)	172		
	>K1,500	76 (95.0)	4 (5.0)	80		
Parity	1–2	191 (93.2)	14 (6.8)	205	10.286	0.006
	3–4	84 (85.7)	14 (14.3)	98		
	5+	31 (77.5)	9 (22.5)	40		

Overall utilization of labor and delivery health services was high, with 306 (89.2%) reporting utilization and 37 (10.8%) reporting non-utilization (Figure 1).

Age was not significantly associated with utilization (χ^2 = 8.871, p = 0.140). Utilization remained high among women aged 15–24 years at 114 (89.8%) and those aged 25–34 years at 154 (92.2%), but was comparatively lower among women aged 35–49 years at 38 (77.6%), who also had the highest non-utilization proportion, 11 (22.4%).

Educational level showed a strong, statistically significant association with utilization (χ^2 = 20.769, p < 0.001). Utilization increased with education level: no formal education, 11 (91.1%); primary, 114 (80.3%); secondary, 158 (95.2%); and tertiary, 23 (100%). The highest rate of non-utilization was among those with primary education, 28 (19.7%), while no non-utilization was reported among those with tertiary education, 0 (0%).

Family income showed a borderline association with utilization (χ^2 = 5.871, p = 0.053). Utilization increased across income categories, from <K500, where 76 individuals (83.5%) used the service, to K500–K1,000, where 154 individuals (89.5%) used the service, and to>K1,500, where 76 individuals (95.0%) used the service. Conversely, non-utilization decreased from 15 (16.5%) in the <K500 group to 18 (10.5%) in the K500–K1,000 group, and 4 (5.0%) in the >K1,500 group.

Parity was significantly associated with utilization (χ^2=10.286, p=0.006), with utilization decreasing with increasing parity: 1-2 births, 191 (93.2%); 3-4 births, 84 (85.7%); and 5+ births, 31 (77.5%). The highest rate of non-utilization was seen among women with 5+ births at 9(22.5%), compared to 14(14.3%) with 3-4 births and 14(6.8%) with 1-2 births.

Table 7: Binary Logistic Regression of Factors Associated with Utilisation of Labour and Delivery Health Services (N=343)

Predictor	Category	Odds Ratio (OR)	95% CI	P-value
Parity	1–2	Ref	—	—
	3–4	0.440	0.201–0.963	0.040
	≥5	0.252	0.101–0.633	0.003
Maternal education	Primary/no education	Ref	—	—
	Higher education	5.249	2.323–11.861	<0.001

The above table shows that the Binary logistic regression (with adjustment for potential confounding) identified parity and maternal education as independent predictors of utilisation of labour and delivery health services.

Maternal education was a strong predictor. Women with higher educational levels had significantly higher odds of utilization compared to those with primary or no education (reference) (OR=5.249, 95% CI: 2.323–11.861, p<0.001), highlighting a substantial positive impact of education on service adoption.

Table 8: Multivariate Logistic Regression Model for Utilisation of Labour and Delivery Health Services

Independent variable	Category	Odds Ratio (OR)	95% CI	P-value
Age (years)	15–24	Ref	—	—
	25–34	1.358	0.329–5.823	0.657
	35–49	0.558	0.098–3.168	0.510
Parity	1–2	Ref	—	—
	3–4	0.280	0.069–1.136	0.075
	≥5	0.305	0.057–1.638	0.166
Educational level	Low educational level	Ref	—	—
	High educational levels	3.500	1.046–11.861	0.042
Family income (ZMW)	<K500	Ref	—	—
	K500–K1,000	1.777	0.614–5.145	0.289
	>K1,500	1.488	0.367–6.032	0.578

The multivariate logistic regression model (adjusting for age, parity, educational level, and family income) showed that maternal education remained an independent predictor of utilization of labor and delivery health services, whereas age, parity, and family income were not statistically significant after adjustment.

Age was not independently linked to utilization. Compared with women aged 15-24 years, those aged 25-34 years had higher odds, but the association was not significant (OR=1.358, 95% CI: 0.329-5.823, p=0.657). Women aged 35-49 showed lower odds, but this was also not significant (OR=0.558, 95% CI: 0.098-3.168, p=0.510).

Parity showed a decreased odds pattern with increasing parity but did not achieve statistical significance after adjustment. Relative to parity

Parities of 1-2 and 3-4 were associated with lower odds (OR=0.280, 95% CI: 0.069-1.136, p=0.075), and parity ≥5 similarly showed reduced odds (OR=0.305, 95% CI: 0.057-1.638, p=0.166).

Educational level remained statistically significant. Respondents with higher educational levels had higher odds of utilization than those with lower educational levels (OR=3.5, 95% CI: 1.046-11.861, p=0.042), indicating that education independently predicts the use of labor and delivery services even after controlling for other sociodemographic and obstetric factors.

Family income was not a significant predictor in the adjusted model. Compared with <K500, income K500-K1,000 showed higher odds but was not significant (OR=1.777, 95% CI: 0.614-5.145, p=0.289), and >K1,500 was also non-significant (OR=1.488, 95% CI: 0.367-6.032, p=0.578). These results indicate that income effects observed in bivariate analysis may be influenced or confounded by education.

Conclusion: After controlling for confounding factors, the model shows that higher maternal education is a key independent determinant of labor and delivery service utilization in this sample, while age, parity, and income do not independently predict utilization at the 5% significance level.

5. Discussion

Utilization of institutional labor and delivery services is a key evidence-based intervention for reducing maternal mortality and improving both maternal and neonatal outcomes. Facility-based deliveries increase the chances of skilled birth attendance, prompt detection and management of obstetric complications, and appropriate referrals when needed. However, home deliveries without skilled birth attendants remain a persistent challenge in many low- and middle-income settings, even where access to health facilities is reported, and coverage gains do not always result in equitable or comprehensive delivery of care.

This study aimed to identify demographic factors associated with the use of labor and delivery health services among women in selected health centers in the Lusaka Urban District. The study population included postnatal women of childbearing age who had given birth within 6 months prior to data collection, and data were collected using an interviewer-administered questionnaire.

5.1 Demographic Characteristics of the Respondents

The sociodemographic profile of respondents in this study shows a predominantly young urban postnatal population, with the largest group aged 25-34 years (48.7%), followed by those aged 15-24 years (37.0%). Women aged 35-49 years constitute a smaller portion (14.3%), as shown in Table 1. This pattern aligns with epidemiological expectations because fertility and recent childbirth are typically concentrated in younger and middle reproductive age groups in urban areas. The age distribution observed here broadly matches analyses based on Zambia DHS data and other studies in sub-Saharan Africa on institutional delivery. These studies mainly involve women aged 15-49 years and tend to report childbirth service-use patterns focused on women in their 20s and early 30s, even as coverage of facility delivery has increased over time (Gebremichael & Fenta, 2021a;

Mumba *et al.*, 2025; Rashid *et al.*, 2022; Zambia Demographic and Health Survey 2018 [FR361], n.d.) Additionally, evidence from multi-country DHS analyses indicates that the relationship between maternal age and delivery location varies across contexts, with most births occurring among women in their 20s and early 30s. However, some studies suggest that older women, particularly those over 35 years, may have higher odds of home delivery in certain settings, likely due to differences in parity, prior birth experiences, and socioeconomic factors (Gebremichael & Fenta, 2021b; Tekeba *et al.*, 2025).

A high proportion of respondents were married (82.5%) and housewives (56.0%), suggesting that decisions regarding the place of delivery were likely shaped by household-level dynamics and resource availability, including partner support, transport, and access to necessary delivery supplies. This interpretation is consistent with the qualitative findings of Jacobs *et al.*, 2023, which identified financial and social barriers to facility-based delivery.

Evidence from Nigeria indicates that being unmarried was associated with higher odds of non-use of facility delivery services in multivariable analysis, suggesting that partnership-related financial and social support may matter for care seeking during childbirth (Adedokun & Uthman, 2019). In Zambia, adjusted analyses have more strongly emphasized education, wealth, residence, and ANC-related factors, indicating that any crude marital status effect may be partly explained by these correlated determinants (Rashid *et al.*, 2022). Recent Ugandan multilevel evidence also reports contradictory patterns across studies and attributes such differences to contextual and socio-cultural variation (Towongo *et al.*, 2025).

The educational profile of respondents showed that most women had secondary education (48.4%) or primary education (41.4%), while relatively few had tertiary education (6.7%) or no formal education (3.5%). This suggests a moderately educated study population, which may positively influence maternal health service use through improved health literacy, risk perception, and engagement with formal care pathways. Consistent with this, studies from Zambia, Ethiopia, Chad, and Nigeria have reported significantly higher odds of institutional delivery or skilled birth attendance among women with higher levels of education (Aragaw *et al.*, 2024; Negash & Wubneh, 2025; Rashid *et al.*, 2022), with similar patterns also seen in West African Countries like Sierra Leone, Niger, and Mali (Ameyaw & Dickson, 2020). However, the evidence is not consistent; analyses from Ghana and rural Bangladesh found that maternal education lost significance after adjusting for other factors, suggesting that the apparent effect of education may be partly due to wealth, antenatal care use, residence, insurance, or household decision-making influences (Afaya *et al.*, 2024; Kumbeni & Apanga, 2021). These mixed findings highlight the importance of considering maternal education within a broader socio-economic and health-system context rather than as a standalone factor.

The occupational profile of respondents shows that most women were housewives (56.0%), followed by self-employed women (29.2%), while fewer respondents were formally employed (7.9%) or classified as “other" (7.0%). This distribution indicates that the study population mainly consisted of women outside formal salaried jobs, with a

notable portion engaged in informal or self-directed economic activities — a sociodemographic pattern often observed in maternal health service utilization studies across Zambia and other low- and middle-income settings.

The parity profile of respondents indicated that most women had parity 1-2 (59.8%), followed by parity 3-4 (28.6%), while a smaller portion were grand multiparous (more than 5 births) (11.7%). This suggests that the study population mainly consisted of women with low to moderate parity, with fewer in the highest parity category. This pattern is commonly seen in maternal health service utilization studies that consider parity as a key reproductive characteristic and explanatory variable.

The distribution of family income among respondents shows that half of the women (50.1%) fell within the K500–K1,000 income range, while 26.5% reported earning less than K500, and 23.3% reported income above K1,500. This pattern indicates that most of the study population came from low- to lower-middle-income households, with a smaller portion from higher-income households. This observation is important in maternal health research because household economic status is a well-established socio-economic factor often analyzed in relation to institutional delivery and skilled birth attendance.

5.2 Overall Utilization Levels of Labour and Delivery Health Services

The current study shows a high overall use of labor and delivery health services, with 306 (89.2%) of respondents delivering in a health facility and 37 (10.8%) delivering at home. This pattern suggests a relatively strong preference for facility-based childbirth in the study area and may indicate improvements in demand for skilled birth attendance, service availability, and community awareness of obstetric risks.

The observed utilization level largely aligns with Demographic and Health Survey data, which show high institutional delivery coverage and ongoing socio-demographic and antenatal care factors influencing service uptake. Similarly, the secondary analysis by Rashid *et al.* (2022), based on 2018 Demographic and Health Survey data collected nationwide and coordinated from Lusaka, highlights continued factors associated with institutional delivery at the population level (Rashid *et al.*, 2022; Zambia Demographic and Health Survey 2018 [FR361], n.d.). This finding is similar to settings where facility delivery is the norm. In Ghana, analysis of the 2017–2018 Multiple Indicator Cluster Survey reported high institutional delivery rates (Kumbeni & Apanga, 2021), while multi-country LMIC evidence also shows generally high coverage but ongoing within- and between-country disparities in facility births (Wilson *et al.*, 2024).

Unlike the high utilization seen in this study, institutional delivery remains considerably lower in underserved and remote areas. Evidence from rural Bangladesh and the Papua Region in Indonesia shows significantly reduced facility delivery coverage (44.82% and 50.1%, respectively), illustrating how rural location, geographic barriers, and social vulnerability can impede the effective use of expanded services. Consistently, data from multiple low- and middle-income countries (LMICs) reveal wide variation across nations, from very low to nearly universal facility births, indicating that overall

utilization must be understood within the broader context of health system capacity and equity.

Table 2 shows that most women delivered at a health center (61.2%), followed by a hospital (26.8%), with only a small percentage using private hospitals (1.2%), while 10.8% delivered at home. This pattern indicates that primary-level public facilities are the main setting for routine childbirth, with hospitals serving as a secondary option, consistent with tiered service delivery models where uncomplicated births are managed at lower levels and complications are referred upward within an effective coverage and health system quality framework. However, the gap between intended and actual delivery locations—65.9% delivering at their planned facility versus 34.1% elsewhere—shows that delivery plans often do not reliably match actual care pathways, influenced by time-sensitive constraints and system-level dynamics during labor.

Table 4 shows that among women who delivered outside their intended location (n=117), the intended delivery location was predominantly a health centre (86.3%), while the intention to deliver at home was rare (0.9%). This pattern suggests that deviations from planned delivery sites are more likely to be driven by time-sensitive intrapartum and access constraints (e.g., rapid labour progression, transport delays, and referral re-routing) than by a preference for home birth. Similar intention realisation gaps and facility switching have been documented across settings, including peri-urban Nairobi and rural western Kenya, and are further shaped by transport/referral functionality and perceived differences in facility capability and quality (Avoka *et al.*, 2022a; Bell *et al.*, 2020; Croke *et al.*, 2024; Maharjan *et al.*, 2024; Naanyu *et al.*, 2020).

Table 5 and Figure 2 show that the reasons behind the place of delivery are complex. Most responses fell into the "other" category (74.9%), but the most common specific constraints were sudden labor onset (13.2%) and lack of transport (8.8%), with smaller percentages mentioning staff attitude (3.8%) and distance (1.8%). When "other" is broken down (Figure 4), two main drivers emerge: delivering at a preferred facility (40.2%) and being referred to a hospital due to complications (27.7%). Overall, these results suggest that the actual delivery location is influenced by a combination of urgent events during labor, transportation, and referral systems, and the choice of facility based on perceived quality or capacity. This underscores that contact with a facility does not necessarily guarantee effective access to high-quality intrapartum care.

5.3 Association between Demographic Factors and Utilization of Labour and Delivery Health Services

The bivariate (χ^2) analysis (Table 6) showed that utilization was significantly associated with maternal education (χ^2=20.769; p<0.001) and parity (χ^2=10.286; p=0.006). In contrast, maternal age was not statistically significant (χ^2=8.871; p=0.14), while family income demonstrated a borderline association (χ^2=5.871; p=0.053).

5.3.1 Maternal Age

Utilization was 114 (89.8%) among women aged 15-24, 154 (92.2%) among those aged 25-34, and 38 (77.6%) among women aged 35-49, with non-utilization rates of 13 (10.2%), 13 (7.8%), and 11 (22.4%), respectively; however, age was not statistically linked to utilization (χ^2=8.871; p=0.14). This indicates that any differences observed in age may be influenced by more immediate factors (e.g., education, parity, and enabling resources), which aligns with the limited age variation reported in Ghana, contrasting with evidence from Ethiopia, where age was a significant predictor of skilled birth attendance.

5.3.2 Maternal Education

Utilization of labor and delivery health services increased with educational attainment, from 91.1% among women with no formal education to 100% among those with tertiary education, while non-utilization was highest among women with primary education (19.7%). This association was statistically significant (χ^2=20.769; p<0.001) and remained significant in multivariable analysis, with women with higher educational status having greater odds of using labor and delivery services than those with lower educational levels (OR=3.5, 95% CI: 1.046–11.861; p=0.042). This finding is consistent with evidence from Peru and Nepal, where higher maternal education was associated with greater use of institutional delivery services (Rodrigo-Gallardo *et al.*, 2023; Thasineku *et al.*, 2025). Similar results have also been reported in Zambia, Ethiopia, and Bangladesh, where maternal education significantly predicted utilization of institutional delivery (Rashid *et al.*, 2022; Gashaye *et al.*, 2021; Raru *et al.*, 2022; Yaya *et al.*, 2017). However, studies from Ethiopia suggest that the connection between maternal education and institutional delivery may operate alongside other factors, including antenatal care attendance, household wealth, women's decision-making power, travel time, and access to services (Yoseph *et al.*, 2020; Nigusie *et al.*, 2021).

Overall, the present findings suggest that maternal education influences labour and delivery service utilization both directly and indirectly through improved health literacy, autonomy, and engagement with maternal healthcare, underscoring female education as an important long-term strategy for improving maternal health service uptake.

5.3.3 Parity

In this study, parity was significantly linked to the use of labor and delivery health services at the bivariate level (χ^2=10.286, p=0.006). Usage declined as parity increased. The highest utilization was among women with 1–2 births, at 191 (93.2%), followed by women with 3–4 births, at 84 (85.7%), and women with parity ≥5, at 31 (77.5%). Conversely, non-utilization rose from 6.8% among women with 1–2 births to 14.3% among women with 3–4 births, and to 22.5% among women with parity≥5. Binary logistic regression indicated that, compared to women with parity 1–2, those with parity 3–4 had significantly lower odds of utilization (OR=0.440, 95% CI: 0.201–0.963, p=0.040), and women with parity of ≥5 had even lower odds (OR=0.252, 95% CI: 0.101–0.633, p=0.003). However, this

association diminished after adjusting for other factors and was no longer statistically significant in the multivariable model.

This inverse pattern generally matches findings from Ethiopia, Ghana, Madagascar, Tanzania, and Uganda, where higher parity is linked to lower use of institutional, hospital-based, or health-facility delivery services (Gashaye *et al.*, 2021; Kumbeni and Apanga, 2021; Armah-Ansah *et al.*, 2024; Straneo *et al.*, 2022; Mugambe *et al.*, 2021). One possible reason is that women with multiple childbirths may see labor as familiar and thus feel less need for skilled birth attendance. Additionally, women with larger families might face cumulative challenges, such as transport costs, childcare demands, and household responsibilities. However, evidence from Ethiopia also indicates that institutional delivery is influenced by a broader set of factors, including antenatal care, education, residence, and access to services, which can lessen the independent impact of parity after adjustment (Nigusie *et al.*, 2020; Gashaye *et al.*, 2021). This aligns with the current study, in which parity was significant in the crude and binary models but became non-significant in the multivariable analysis, suggesting that parity may serve more as an indicator of lower utilization than as a direct cause.

5.4 Implications of the Study Findings for Nursing and Midwifery

5.4.1 Nursing Practice

The findings highlight the need to strengthen nursing and midwifery practices through targeted maternal health education, especially for women with lower levels of education. Nurses and midwives should focus on birth preparedness, recognizing danger signs, prompt care-seeking, and the importance of skilled birth attendance throughout maternity care. Women with higher parity may also need more support, as their prior childbirth experiences may reduce their perceived need for facility-based delivery. Additionally, routine care should prioritize practical birth planning and referral preparedness, including transportation arrangements, emergency contacts, and the identification of an appropriate delivery facility to reduce delays and ensure continuous care.

5.4.2 Nursing Education

This study emphasizes the importance of increasing focus on the social determinants of maternal health service utilization in nursing and midwifery education, including maternal education, parity, household circumstances, and access-related barriers. Students and practicing professionals should be trained to understand that women's use of skilled childbirth services is influenced not only by clinical factors but also by broader social and practical factors. Therefore, nursing and midwifery curricula should strengthen training in health education, effective communication, and birth preparedness counselling, while ongoing professional development should foster respectful maternity care, culturally responsive practices, and early detection of women at risk of not utilizing services. Improving these skills may enhance the quality, equity, and responsiveness of maternity care.

5.4.3 Nursing Research

The study adds to existing evidence on demographic influences on the use of labor and delivery health services in urban Zambia and highlights important areas for further research. Since maternal education remained the only independent predictor, future studies should examine how education influences women's health literacy, autonomy, risk perception, and ability to access care. Additionally, qualitative, mixed-methods, and intervention research are needed to understand why some women deliver outside their intended facilities and to evaluate whether improved antenatal counseling, birth preparedness, and targeted support can increase the timely use of skilled childbirth services.

5.4.4 Nursing and Midwifery Administration

The findings highlight the important role of nursing and midwifery administration in ensuring safe, timely, and respectful maternity care. Strong leadership is needed to maintain adequate staffing, service readiness, and effective coordination of maternity services, especially in high-volume facilities. From a midwifery perspective, supportive supervision, mentorship, and continuous quality improvement are essential for promoting respectful maternity care and improving women's childbirth experiences, which may influence future use of facility-based delivery services.

5.4.5 Conclusion

This study found that the use of labour and delivery health services was generally high among women attending selected health facilities in Lusaka District. At the bivariate level, maternal education and parity were significantly associated with service use, whereas age was not, and family income showed only a weak association. However, after adjusting for other factors, maternal education remained the only independent predictor, indicating that women with higher educational attainment were more likely to use labour and delivery health services.

These findings suggest that, even in an urban context with relatively better physical access to health facilities, utilisation of skilled childbirth care remains strongly shaped by women's educational status. The study, therefore, highlights that improving service uptake requires not only the availability of maternity services but also targeted strategies that address educational and informational disparities among women of reproductive age.

5.5 Recommendations

5.5.1 Nursing and Midwifery Practice

Nurses and midwives should intensify targeted maternal health education during antenatal care, with special attention to women with low educational attainment and those with higher parity. Counselling should focus on birth preparedness, timely decision-making, danger signs in labour, and the continued importance of skilled attendance in every pregnancy, regardless of previous childbirth experience.

5.5.2 Policy and Public Health Programming

The Ministry of Health and district health authorities should enhance community-based maternal health promotion strategies that address educational disparities in service use. Public health efforts should include simplified health messages, improved birth preparedness education, and stronger connections between communities and health facilities to reduce delays caused by transportation issues and unplanned changes to delivery sites.

5.5.3 Nursing and Midwifery Education

Training institutions should incorporate more comprehensive content on social determinants of maternal health, health literacy, respectful maternity care, and customized communication into nursing and midwifery curricula. Continuing professional development programs should also equip practicing midwives and nurses to recognize and support women at higher risk of not utilizing services.

5.5.4 Further Research

Further studies should explore, using qualitative and mixed-methods approaches, how maternal education influences women's decisions about the place of delivery in urban Zambia. Additional research should also examine the gap between intended and actual place of delivery and evaluate interventions to improve utilisation among women with lower educational attainment and other vulnerable groups.

5.5.5 Provincial and District Health Offices

The Provincial and District Health Offices should strengthen maternal health service delivery by improving staffing levels, ensuring the availability of essential maternity resources, and efficiently coordinating referrals across facilities. Greater emphasis should also be placed on targeted maternal health education, particularly for women with lower educational attainment, as well as on birth preparedness, transport planning, and respectful maternity care. Routine monitoring of utilisation patterns should be strengthened to identify underserved groups and guide context-specific interventions to improve uptake of labour and delivery health services.

5.5.6 Study Strengths

The study's strengths include its multi-facility urban setting, use of a pretested, structured data-collection tool, and inclusion of women with recent delivery experience, which reduced recall periods. The application of both bivariate and multivariable analyses also strengthened the interpretation of factors associated with utilisation of labour and delivery health services.

5.5.7 Study Limitations

The study was limited by its cross-sectional design, which does not allow causal inference, and by its facility-based nature, which may reduce generalisability to women

who did not attend health facilities. The use of self-reported data may also have introduced recall and social desirability bias. In addition, the study's urban focus limits the transferability of the findings to rural settings, and some relevant contextual factors may not have been fully captured.

6. Dissemination and Utilization of Findings

The study findings were presented to the Department of Nursing Sciences at the School of Medicine, University of Zambia, and later shared during the postgraduate seminar week at UNZA. The results were also intended for dissemination to key stakeholders involved in maternal health service delivery through forums such as workshops, conferences, and community stakeholder meetings. A copy of the report was submitted to the Lusaka District Health Office. Additionally, the findings were prepared for publication in the European Journal of Public Health Studies. Five bound copies of the research report were produced and distributed to the Department of Nursing Sciences, the UNZA Medical Library and Main Library, the Ministry of Health, and the researcher.

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Author's Contribution
Harriet Mulonda Simaubi conceptualized the study and analyzed the data. Joyce Namalogo drafted and proofread the manuscript. All authors reviewed, approved the final version, and contributed to the publication costs.

Conflict of Interest Statement
The authors declare no conflicts of interest.

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References

Abebe, T. A., & Debelew, G. T. (2025). Utilization of maternal health care services and associated factors among pregnant women in Kersa district, Jimma zone, Southwest Ethiopia. *PLOS One, 20*(5). https://doi.org/10.1371/journal.pone.0323977

Abeje, G., Azage, M., & Setegn, T. (2014). Factors associated with Institutional delivery service utilization among mothers in Bahir Dar City administration, Amhara region: A community-based cross-sectional study. *Reproductive Health, 11*(1), 22. https://doi.org/10.1186/1742-4755-11-22

Adedokun, S. T., & Uthman, O. A. (2019). Women who have not utilized health service for delivery in Nigeria: Who are they and where do they live?. *BMC Pregnancy and Childbirth, 19*(1), 93. https://doi.org/10.1186/s12884-019-2242-6

Afaya, A., Nesa, M., Akter, J., & Lee, T. (2024). Institutional delivery rate and associated factors among women in rural communities: Analysis of the 2017–2018 Bangladesh Demographic and Health Survey. *BMJ Open, 14*(3), e079851. https://doi.org/10.1136/bmjopen-2023-079851

Ameyaw, E. K., & Dickson, K. S. (2020). Skilled birth attendance in Sierra Leone, Niger, and Mali: Analysis of demographic and health surveys. *BMC Public Health, 20*(1), 164. https://doi.org/10.1186/s12889-020-8258-z

Andargie, T. A., Lealem, E. B., & Andargie, B. A. (2025). Urban-rural disparities in skilled birth attendance among women in Ethiopia: Multivariate decomposition analysis. *PLOS One, 20*(7). https://doi.org/10.1371/journal.pone.0327565

Aragaw, F. M., Atlie, G., Tesfaye, A. H., & Belay, D. G. (2024). Spatial variation of skilled birth attendance and associated factors among reproductive age women in

Ethiopia, 2019; a spatial and multilevel analysis. *Frontiers in Global Women's Health, 5*. https://doi.org/10.3389/fgwh.2024.1082670

Armah-Ansah, E.K., Budu, E., & Wilson, E.A. (2024). What predicts health facility delivery among women? Analysis from the 2021 Madagascar Demographic and Health Survey. *BMC Pregnancy and Childbirth, 24*, 116. https://doi.org/10.1186/s12884-024-06252-1

Avoka, C. K., Banke-Thomas, A., Beňová, L., Radovich, E., & Campbell, O. M. R. (2022). Use of motorised transport and pathways to childbirth care in health facilities: Evidence from the 2018 Nigeria Demographic and Health Survey. *PLOS Global Public Health, 2*(9). https://doi.org/10.1371/journal.pgph.0000868

Baten, A., Biswas, R. K., Kendal, E., & Bhowmik, J. (2025). Utilization of maternal healthcare services in low- and middle-income countries: A systematic review and meta-analysis. *Systematic Reviews, 14*(1), 88. https://doi.org/10.1186/s13643-025-02832-0

Bell, G., Macarayan, E. K., Ratcliffe, H., Kim, J.-H., Otupiri, E., Lipsitz, S., Hirschhorn, L., Awoonor-Williams, J. K., Nimako, B. A., Ofosu, A., Leslie, H., Bitton, A., & Schwarz, D. (2020). Assessment of Bypass of the Nearest Primary Health Care Facility Among Women in Ghana. *JAMA Network Open, 3*(8). https://doi.org/10.1001/jamanetworkopen.2020.12552

Central Statistical Office, Ministry of Health, University Teaching Hospital Virology Laboratory, University of Zambia Department of Population Studies, & ICF (2019). Zambia Demographic and Health Survey 2018. Central Statistical Office, Ministry of Health, University Teaching Hospital Virology Laboratory, University of Zambia Department of Population Studies, and ICF. https://www.zamstats.gov.zm/wp-content/uploads/2023/12/2018-Zambia-Demographic-and-Health-Survey.pdf

Croke, K., Kapaon, D., Opondo, K., Cooper, J., Nzinga, J., Olwanda, E., Rahim, N., & Kruk, M. E. (2024). Care seeking during pregnancy: Testing the assumptions behind service delivery redesign for maternal and newborn health in rural Kenya. *Health Policy and Planning, 39*(10), 1099–1108. https://doi.org/10.1093/heapol/czae088

Doctor, H. V., Nkhana-Salimu, S., & Abdulsalam-Anibilowo, M. (2018). Health facility delivery in sub-Saharan Africa: Successes, challenges, and implications for the 2030 development agenda. *BMC Public Health, 18*(1), 765. https://doi.org/10.1186/s12889-018-5695-z

Dunlop, C. L., Benova, L., & Campbell, O. M. R. (2018). Effect of maternal age on facility-based delivery: Analysis of first-order births in 34 countries of sub-Saharan Africa using demographic and health survey data. *BMJ Open, 8*(4). https://doi.org/10.1136/bmjopen-2017-020231

Ensor, T., Green, C., Quigley, P., Badru, A. R., Kaluba, D., & Kureya, T. (2014). Mobilizing communities to improve maternal health: Results of an intervention in rural

Zambia. *Bulletin of the World Health Organization, 92*(1), 51–59. https://doi.org/10.2471/BLT.13.122721

Gabrysch, S., Cousens, S., Cox, J., & Campbell, O. M. R. (2011). The influence of distance and level of care on delivery place in rural Zambia: A study of linked national data in a geographic information system. *PLoS Medicine, 8*(1). https://doi.org/10.1371/journal.pmed.1000394

Gashaye, A., Kibret, G.D., Bazezew, Y., & Mengist, B. (2021). Factors affecting institutional delivery in Ethiopia: A multi-level analysis. *International Journal of Africa Nursing Sciences, 15*. https://doi.org/10.1016/j.ijans.2021.100331

Gebremichael, S. G., & Fenta, S. M. (2021). Determinants of institutional delivery in Sub-Saharan Africa: Findings from the Demographic and Health Survey (2013–2017) from nine countries. *Tropical Medicine and Health, 49*(1), 45. https://doi.org/10.1186/s41182-021-00335-x

Hibusu, L., Sumankuuro, J., Gwelo, N. B., & Akintola, O. (2024). Pregnant women's satisfaction with the quality of antenatal care and the continued willingness to use health facility care in Lusaka district, Zambia. *BMC Pregnancy and Childbirth, 24*(1), 20. https://doi.org/10.1186/s12884-023-06181-5

Jacobs, B., Ir, P., Bigdeli, M., Annear, P. L., & Van Damme, W. (2012). Addressing access barriers to health services: An analytical framework for selecting appropriate interventions in low-income Asian countries. *Health Policy and Planning, 27*(4), 288–300. https://doi.org/10.1093/heapol/czr038

Jacobs, C., Michelo, C., & Hyder, A. (2023). Understanding maternal choices and experiences of care by skilled providers: Voices of mothers who delivered at home in selected communities of Lusaka city, Zambia. *Frontiers in Global Women's Health, 3*. https://doi.org/10.3389/fgwh.2022.916826

Jacobs, C., Musukuma, M., Hamoonga, R., Sikapande, B., Chooye, O., Wehrmeister, F. C., Michelo, C., & Blanchard, A. K. (2024). Trends and Inequalities in Maternal and Newborn Health Services for Unplanned Settlements of Lusaka City, Zambia. *Journal of Urban Health, 101*(S1), 125–137. https://doi.org/10.1007/s11524-024-00837-z

Johnson, T., & Pierce, H. (2025). Trends in health facility deliveries by time, region, and sociodemographic characteristics in low- and middle- income countries. *BMC Pregnancy and Childbirth, 25*(1), 896. https://doi.org/10.1186/s12884-025-08027-8

Katemba, B. M., Bwembya, P., Hamoonga, T. E., Chola, M. C., & Jacobs, C. J. (2018). Demand side factors associated with quality antenatal care services: A case study of Lusaka District, Zambia. *Frontiers in Public Health, 6*, 285. https://doi.org/10.3389/fpubh.2018.00285

Koblinsky, M., Moyer, C. A., Calvert, C., Campbell, J., Campbell, O. M. R., Feigl, A. B., Graham, W. J., & Langer, A. (2016). Quality maternity care for every woman, everywhere: A call to action. *The Lancet, 388*(10057), 2307–2320. https://doi.org/10.1016/S0140-6736(16)31333-2

Kota, K., Chomienne, M.-H., Geneau, R., & Yaya, S. (2023). Socio-economic and cultural factors associated with the utilization of maternal healthcare services in Togo: A cross-sectional study. *Reproductive Health, 20*(1), 109. https://doi.org/10.1186/s12978-023-01644-6

Kruk, M. E., Gage, A. D., Arsenault, C., Jordan, K., Leslie, H. H., Roder-DeWan, S., Adeyi, O., Barker, P., Daelmans, B., Doubova, S. V., English, M., García-Elorrio, E., Guanais, F., Gureje, O., Hirschhorn, L. R., Jiang, L., Kelley, E., Lemango, E. T., Liljestrand, J., & Pate, M. (2018). High-quality health systems in the Sustainable Development Goals era: Time for a revolution. *The Lancet Global Health, 6*(11), e1196–e1252. https://doi.org/10.1016/S2214-109X(18)30386-3

Kumbeni, M. T., & Apanga, P. A. (2021). Institutional delivery and associated factors among women in Ghana: Findings from a 2017-2018 multiple indicator cluster survey. *International Health, 13*(6), 520–526. https://doi.org/10.1093/inthealth/ihab002

Kyei, N. N. A., Campbell, O. M. R., & Gabrysch, S. (2012). The influence of distance and level of service provision on antenatal care use in rural Zambia. *PLoS ONE, 7*(10). https://doi.org/10.1371/journal.pone.0046475

Maharjan, M., Sharma, S., & Kaphle, H. P. (2024). Factors associated with bypassing primary healthcare facilities for childbirth among women in Devchuli municipality of Nepal. *PLOS ONE, 19*(4). https://doi.org/10.1371/journal.pone.0302372

Manyeh, A. K., Akpakli, D. E., Kukula, V., Ekey, R. A., Narh-Bana, S., Adjei, A., & Gyapong, M. (2017). Socio-demographic determinants of skilled birth attendants at delivery in rural southern Ghana. *BMC Research Notes, 10*(1), 268. https://doi.org/10.1186/s13104-017-2591-z

Moyer, C. A., & Mustafa, A. (2013). Drivers and deterrents of facility delivery in sub-Saharan Africa: A systematic review. *Reproductive Health, 10*, 40. https://doi.org/10.1186/1742-4755-10-40

Mugambe, R.K., Yakubu, H., & Wafula, S.T. (2021). Factors associated with health facility deliveries among mothers living in hospital catchment areas in Rukungiri and Kanungu districts, Uganda. *BMC Pregnancy and Childbirth, 21*, 329. https://doi.org/10.1186/s12884-021-03789-3

Mukonka, V., Sialubanje, C., McAuliffe, F. M., Babaniyi, O., Malumo, S., Phiri, J., & Fitzpatrick, P. (2024). Effect of a mother-baby delivery pack on institutional deliveries: A community intervention trial to address maternal mortality in rural Zambia. *PLOS ONE, 19*(3). https://doi.org/10.1371/journal.pone.0296001

Mumba, P., Miyoba, T. O., Musonda, E., Mulasikwanda, M., & Shumba, S. (2025). Trends, spatial distribution and determinants of maternal home deliveries in Zambia. *BMC Pregnancy and Childbirth, 25*(1), 422. https://doi.org/10.1186/s12884-025-07393-7

Mzembe, T., Chikwapulo, V., Kamninga, T. M., Vellemu, R., Mohamed, S., Nthakomwa, L., Chifungo, C., Wazny, K., Musau, K., Abdullahi, L., Peterson, M., Madise, N., &

Chipeta, M. G. (2023). Interventions to enhance healthcare utilisation among pregnant women to reduce maternal mortality in low- and middle-income countries: A review of systematic reviews. *BMC Public Health, 23*(1), 1734. https://doi.org/10.1186/s12889-023-16558-y

Naanyu, V., Mujumdar, V., Ahearn, C., McConnell, M., & Cohen, J. (2020). Why do women deliver where they had not planned to go? A qualitative study from peri-urban Nairobi Kenya. *BMC Pregnancy and Childbirth, 20*(1), 30. https://doi.org/10.1186/s12884-019-2695-7

Negash, W. D., & Wubneh, H. D. (2025). Skilled birth attendance and its associated factors in Chad and Nigeria: A multilevel analysis of DHS data. *PLOS Global Public Health, 5*(12). https://doi.org/10.1371/journal.pgph.0005290

Nigusie, A., Azale, T., & Yitayal, M. (2020). Institutional delivery service utilization and associated factors in Ethiopia: a systematic review and meta-analysis. *BMC Pregnancy and Childbirth, 20*, 364. https://doi.org/10.1186/s12884-020-03032-5

Nigusie, A., Azale, T., Yitayal, M., & Yeshita, H.Y. (2021). Institutional delivery service utilization and associated factors in Ethiopia: A community-based cross-sectional study. *BMC Pregnancy and Childbirth, 21*, 476.

Putri, N. K., Laksono, A. D., Ernawaty, Kusrini, I., Astuti, & Y., Matahari (2025). Factors associated with institutional delivery in remote areas: A cross-sectional survey in Papua Region, Indonesia. *BMC Pregnancy and Childbirth, 25*(1), 1124. https://doi.org/10.1186/s12884-025-08231-6

Raru, T.B., Ayana, G.M., Yuya, M., Merga, B.T., Kure, M.A., Negash, B., Birhanu, A., Alemu, A., Dessie, Y., & Dheresa, M. (2022). Magnitude, trends, and determinants of institutional delivery among reproductive age women in Kersa Health and Demographic Surveillance System Site, Eastern Ethiopia: A multilevel analysis. *Frontiers in Global Women's Health, 3*. https://doi.org/10.3389/fgwh.2022.821858

Rashid, M., Chowdhury, M. R. K., Kader, M., Hiswåls, A.-S., & Macassa, G. (2022). Determinants of Utilization of Institutional Delivery Services in Zambia: An Analytical Cross-Sectional Study. *International Journal of Environmental Research and Public Health, 19*(5), 3144. https://doi.org/10.3390/ijerph19053144

Roder-DeWan, S., Nimako, K., Twum-Danso, N. A. Y., Amatya, A., Langer, A., & Kruk, M. (2020). Health system redesign for maternal and newborn survival: Rethinking care models to close the global equity gap. *BMJ Global Health, 5*(10). https://doi.org/10.1136/bmjgh-2020-002539

Rodrigo-Gallardo, P. K., Caira-Chuquineyra, B., Fernandez-Guzman, D., Urrunaga-Pastor, D., Alejandro-Salinas, R., Vasquez-Chavesta, A. Z., & Toro-Huamanchumo, C. J. (2023). Determinants of non-institutional childbirth: Evidence from the Peruvian demographic and health survey. *European Journal of Obstetrics & Gynecology and Reproductive Biology: X,* 20. https://doi.org/10.1016/j.eurox.2023.100250

Scott, N. A., Henry, E. G., Kaiser, J. L., Mataka, K., Rockers, P. C., Fong, R. M., Ngoma, T., Hamer, D. H., Munro-Kramer, M. L., & Lori, J. R. (2018). Factors affecting home

delivery among women living in remote areas of rural Zambia: A cross-sectional, mixed-methods analysis. *International Journal of Women's Health, Volume 10,* 589–601. https://doi.org/10.2147/IJWH.S169067

Setu, S. P., Islam, Md. A., & Halim, Sk. F. B. (2022). Individual and Community-Level Determinants of Institutional Delivery Services among Women in Bangladesh: A Cross-Sectional Study. *International Journal of Clinical Practice, 2022*(1). https://doi.org/10.1155/2022/3340578

Sialubanje, C., Massar, K., Hamer, D. H., & Ruiter, R. A. C. (2014). Personal and environmental predictors of the intention to use maternal healthcare services in Kalomo, Zambia. *Health Education Research, 29*(6), 1028–1040. https://doi.org/10.1093/her/cyu057

Solomon, H., Henry, E. G., Herlihy, J., Yeboah-Antwi, K., Biemba, G., Musokotwane, K., Bhutta, A., Hamer, D. H., & Semrau, K. E. A. (2022). Intended versus actual delivery location and factors associated with change in delivery location among pregnant women in Southern Province, Zambia: A prespecified secondary observational analysis of the ZamCAT. *BMJ Open, 12*(3). https://doi.org/10.1136/bmjopen-2021-055288

Straneo, M., Beňová, L., & van den Akker, T. (2022). No increase in use of hospitals for childbirth in Tanzania over 25 years: accumulation of inequity among poor, rural, high parity women. *PLOS Global Public Health, 2*(8). https://doi.org/10.1371/journal.pgph.0000345

Tarik, Y. D., Nigussie, A. A., Balcha, W. F., & Getu, A. A. (2022). Factors associated with institutional delivery among mothers who gave birth within 1 year prior to the study at Gilgelbelles town, Northwest Ethiopia: A mixed-methods study. *BMJ Open, 12*(11). https://doi.org/10.1136/bmjopen-2022-061218

Tekeba, B., Zegeye, A. F., Gebrehana, D. A., & Tamir, T. T. (2025). Prevalence and Determinants of Home Delivery among Women with Easy Access to Health Facilities in Sub-Saharan African Countries: A Multi-level Mixed Effect Analysis. *Annals of Global Health, 91*(1), 5. https://doi.org/10.5334/aogh.4615

Thasineku, O. C., Pandit, S., Gurung, Y. B., Adhikari, R., Acharya, D., & Dulal, B. P. (2025). Factors associated with the choice of delivery place in Nepal based on dual pathway analysis using demographic and health survey 2022. *Discover Public Health, 22*(1), 602. https://doi.org/10.1186/s12982-025-01005-7

Towongo, M. F., Ngome, E., Navaneetham, K., & Letamo, G. (2025). Multilevel and spatial analysis of factors influencing non-institutional delivery care utilization among Ugandan women: Insights from the 2016 UDHS. *BMC Public Health, 25*(1), 4075. https://doi.org/10.1186/s12889-025-25131-8

Tunçalp, Ö., Were, W. M., MacLennan, C., Oladapo, O. T., Gülmezoglu, A. M., Bahl, R., Daelmans, B., Mathai, M., Say, L., & Kristensen, F. (2015). Quality of care for pregnant women and newborns—the WHO vision. *BJOG, 122*(8), 1045–1049. https://doi.org/10.1111/1471-0528.13451

United Nations General Assembly (2015). Transforming our world: The 2030 Agenda for Sustainable Development (A/RES/70/1). United Nations. https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf

Wang, W., Mallick, L., Allen, C., & Pullum, T. (2019). Effective coverage of facility delivery in Bangladesh, Haiti, Malawi, Nepal, Senegal, and Tanzania. *PLOS ONE, 14*(6), e0217853. https://doi.org/10.1371/journal.pone.0217853

Wilson, E. B., Niehaus, L., Jiwani, S. S., Hazel, E. A., Maïga, A., & Amouzou, A. (2024). Delivery and postnatal care among women in 71 low- and middle-income countries: Analyzing coverage gaps using household surveys. *BMC Pregnancy and Childbirth, 24*(1), 505. https://doi.org/10.1186/s12884-024-06681-y

World Health Organization, UNICEF, UNFPA, World Bank Group, & UNDESA/Population Division (2025). Trends in maternal mortality 2000 to 2023: Estimates by WHO, UNICEF, UNFPA, World Bank Group and UNDESA/Population Division. World Health Organization. https://www.who.int/publications/i/item/9789240108462

Yaya, S., Bishwajit, G., & Ekholuenetale, M. (2017). Factors associated with the utilization of institutional delivery services in Bangladesh. *PLOS ONE, 12*(2). https://doi.org/10.1371/journal.pone.0171573

Yoseph, M., Abebe, S.M., Mekonnen, F.A., Sisay, M., & Gonete, K.A. (2020). Institutional delivery services utilization and its determinant factors among women who gave birth in the past 24 months in Southwest Ethiopia. *BMC Health Services Research, 20*, 265. https://doi.org/10.1186/s12913-020-05121-9