# Determinants of Late Antenatal Care Booking Among Women of Reproductive Age in Lufwanyama District, Zambia.

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## ABSTRACT

Antenatal care (ANC) is one of the most effective interventions for reducing preventable maternal and newborn morbidity and mortality because it facilitates early detection and management of pregnancy-related complications, provides health education, and promotes birth preparedness (WHO, 2021). When ANC is initiated late, women are more likely to miss important preventive and treatment services such as screening for anaemia, hypertensive disorders of pregnancy, HIV, and other conditions that may threaten the health of both mother and baby.

Despite the known benefits of early ANC attendance, only 39.5% of pregnant women in Lufwanyama District initiate ANC during the first trimester (DHIS2, 2025.) This indicates that many women continue to access ANC services late, potentially increasing their risk of adverse maternal and neonatal outcomes.

This study was therefore, aimed at determining the factors associated with late antenatal care attendance among women of childbearing age (15–49 years) in Lufwanyama District, Zambia.

A cross-sectional study design was used in this study. Data was collected from Maternal and Child Health (MCH) facility antenatal registers and questionnaires were administered to 302 pregnant women. Collected data was analyzed using Stata version 15 where factors associated with late antenatal care attendance among women of childbearing age were determined. Logistic regression was used to test the association between the outcome and explanatory variables using bivariate and multivariate analysis. A P-value $< 0.05$ was considered statistically significant.

From this study, education level and peer influence were found to be significant predictors. After adjustment, women with secondary education had reduced odds of late ANC initiation (aOR = 0.312; 95% CI: 0.097–1.006; p = 0.050) However, because the confidence interval includes 1.00, this borderline result should be interpreted with caution, while those influenced by peers who did not register for ANC had increased odds of late initiation (aOR = 3.670; 95% CI: 1.066–12.630; p = 0.039).

The study concluded that peer norms and educational attainment are key determinants of late ANC attendance. Interventions aimed at improving positive community norms and promoting female education may enhance timely ANC use.

**Keywords:** Antenatal care, Late ANC initiation, Logistic regression, Education level, Peer influence, Maternal health

# INTRODUCTION

Antenatal care (ANC) is an essential component of maternal healthcare that aims to improve the health and well-being of both mothers and babies during pregnancy. ANC provides preventive, promotive, and curative services that support healthy pregnancies and safe childbirth (Konlad, 2020).

Evidence shows that timely and adequate ANC reduces adverse maternal and neonatal outcomes such as anaemia, hypertensive disorders of pregnancy, preterm birth, low birth weight, stillbirth, and neonatal mortality (Van der Wal, 2020). Early identification and management of pregnancy-related complications contribute significantly to improved health outcomes for mothers and new-borns.

For this reason, the World Health Organization (WHO) recommends that pregnant women initiate ANC within the first 12 weeks of gestation and complete a minimum of eight contacts during pregnancy (WHO, 2016).

Early ANC initiation enables healthcare providers to identify and manage pregnancy-related risks before complications develop. Women who begin ANC during the first trimester have greater opportunities to receive essential preventive services, nutritional support, and health education (Abdo et al., 2023).

Research indicates that delayed ANC initiation is associated with adverse pregnancy outcomes, including stillbirth, perinatal death, neonatal mortality, anaemia, preterm birth, and low birth weight (Kital et al., 2022; Hailu et al., 2020). These complications contribute substantially to maternal and neonatal morbidity and mortality, particularly in low-resource settings.

In Zambia, although 64% of women attend at least four ANC visits, only 37% initiate ANC during the first trimester (Laisser, 2022). The situation is similar in Lufwanyama District, where only 39.5% of pregnant women attend their first ANC visit within the recommended period. Considering the effects of delayed ANC booking, this is a matter of public health concern.

Promoting early ANC attendance, therefore, remains a critical public health strategy for improving maternal and child health outcomes and achieving national and global health targets. The findings of this study will provide evidence to guide policymakers, healthcare providers, and district health managers in designing targeted interventions aimed at increasing early ANC attendance.

# MATERIALS AND METHODS

This study employed a cross-sectional analytical quantitative research design to identify the determinants of late antenatal care (ANC) initiation in Lufwanyama District, Zambia. This study was conducted between January and march of 2026 in Lufwanyama district, Zambia.

The study involved administering structured questionnaires to participants to capture socio-economic, cultural, individual factors associated with ANC initiation. Data was analyzed using statistical methods to identify patterns, relationships, and predictors of late ANC booking. All pregnant women in Lufwanyama District was the target population for the study, the 1247 pregnant women expected in a quarter was the study population of interest and using Taro Yamane's formula at 95% confidence level and 5% margin of error, 302 pregnant women was the calculated sample and were selected using simple random sampling. Out of the 302 selected participants, all completed the questionnaire and were included in the final analysis.

**Inclusion criteria**

- Pregnant women living in Lufwanyama District

- Pregnant women who were willing to participate and provide informed consent

**Exclusion Criteria**

- Women visiting or are temporary residents and not permanently living in Lufwanyama District
- Women who declined to give informed consent

Data for this study was collected using a researcher-developed structured questionnaire administered to pregnant women attending to antenatal care (ANC) services in Lufwanyama District. The questionnaire for pregnant women consisted of two main sections:

1. Demographic information- capturing age, marital status, education level, occupation, and household income.
2. Factors associated with late ANC visits- identifying socio-economic, cultural, individual, and healthcare system barriers to timely ANC initiation.

The questionnaires were administered to eligible pregnant women during ANC visits, either as self-administered forms or interviewer-administered for participants with low literacy levels. Each participant was given approximately 20 minutes to complete the questionnaire in a private and quiet section of the antenatal clinic to ensure comfort and confidentiality.

Data was analysed statistically using the Statistical software STATA version 15. The data analysis included descriptive statistics to summarize participant characteristics. The association between late ANC booking and predictor variables was assessed using bivariate logistic regression. A P-value $< 0.05$ was considered statistically significant. All predictors with p-value $< 0.05$ were included in the multivariate logistic regression model to identify factors associated with late ANC booking while controlling for potential confounders

Ethical approval was obtained from the Rusangu University ethics committee before the commencement of the study. Informed consent was also obtained from all the participants, and confidentiality and anonymity was maintained throughout the research process. Participants had the right to withdraw from the study at any time. After granting consent, participants were assured of utmost confidentiality and that they would not be required to use their real or original names but Identity numbers generated by the researcher.

## LIMITATIONS OF THE STUDY

This study had some limitations worth noting. Among the limitations of this study is that the study design makes it impossible to draw causal interpretations of the findings obtained. In addition, since the study demanded women to recall previous events, there is the possibility of social desirability and recall biases. Further, the data collection period from January to march, 2026, was too short and was done within just one season of the year. This could potentially affect findings since the study never accounted for seasonal variations in ANC attendance initiation.

## RESULTS

In this study, bivariate logistic regression analysis was conducted to investigate the factors associated with late antenatal care (ANC) attendance among women of childbearing age (15–49 years). The timing of the first antenatal care visit was the outcome variable of interest, categorized as late (1) and early (0). The logistic command in STATA statistical software version 15 was used to determine the factors associated with late ANC attendance among women in the Lufwanyama District.

**Bivariate Logistic Regression Analysis**

Using bivariate logistic regression analysis, the following variables were found not to have a statistically significant association with late antenatal care attendance at the 5% significance level: age group, marital status, employment category, income level, parity, proximity to the health facility, lack of community outreach programs, preference for traditional birth attendants over midwives, belief that early disclosure of pregnancy can lead to miscarriage, lack of decision-making autonomy to start ANC, satisfaction with ANC services offered at the facility, and attending ANC only when pregnancy reaches four months.

However, education level and peer influence were significantly associated with late ANC attendance.

Participants with a secondary education level, compared with those with no formal education, had 0.176 times the odds of initiating their first ANC visit late. This association was statistically significant (95% CI: 0.0938625 – 0.9503454, p = 0.041).

Additionally, participants who agreed that most of their peers did not register for ANC compared with those who did not agree had 3.659 times higher odds of initiating their first ANC visit late. This association was statistically significant (95% CI: 1.09966 – 12.17666, p = 0.034).

**Multivariate Logistic Regression Analysis**

Multivariate logistic regression analysis was performed at the adjusted level. The regression model was developed by entering and removing the predictor variables in a stepwise manner. Variables that showed a statistically significant association with the outcome variable (timing of the first ANC visit) in the bivariate analysis were included in the multivariate model simultaneously. Only variables that remained statistically significant were included in the final model as shown in table 1.

Two independent variables remained in the final model: education level and the perception that most peers do not register for ANC.

Women with a secondary education level, compared to those with no formal education, had 0.312 times the odds of initiating their first ANC visit late after controlling for peer influence. This association was weakly statistically significant (95% CI: 0.096584 – 1.006102, p = 0.05), as in table 1. However, because the confidence interval includes 1.00, this borderline result should be interpreted with caution.

Furthermore, women who reported that most of their peers did not register for ANC compared with those who reported otherwise had 3.670 times higher odds of initiating their first ANC visit late after controlling for education level. This association was statistically significant (95% CI: 1.066277 – 12.62956, p = 0.039), as in table 1.

Table 1: Summary of the Bivariate and multivariate logistic regression analysis of factors

| **Variable** | **Bivariate (unadjusted)** | | | **Multivariate (adjusted)** | | |
|---|---|---|---|---|---|---|
| | **Odds ratio** | **95% CI** | **P-value** | **Odds ratio** | **95% CI** | **P-value** |
| **Education level** | | | | | | |
| 1. None | Ref | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2. Primary | 0.5973 | 0.2148 - 1.6614 | 0.323 | 0.5931 | 0.2115706 - 1.6626 | 0.321 |
| 3. Secondary | 0.1763838 | 0.0939 - 0.9503 | 0.041 | 0.3117 | 0.0966 - 1.0061 | 0.051 |
| 4. Tertiary | 7 .5818 | 0.1372 - 3.5694 | 0.668 | 0.8475 | 0.1605 - 4.4763 | 0.846 |
| **Age group** | | | | | | |
| 1. 15-24 | Ref | | | | | |
| 2. 25-34 | 1.2406 | 0.4429 - 3.4752 | 0.682 | - | - | - |
| 3. ≥35 | 0.6498 | 0.4429 - 1.7636 | 0.397 | - | - | - |
| **Most peers do not register for ANC** | | | | | | |
| 1. Disagree | Ref | | | | | |
| 2. Not sure | 2.1333 | 0.3396 - 13.4023 | 0.419 | 2.3065 | 0.3559 - 14.9497 | 0.381 |
| 3. Agree | 3.6593 | 1.0997 - 12.1767 | 0.034 | 3.6697 | 1.0663 - 12.6296 | 0.039 |

## DISCUSSION

This study found that education level and peer influence were significant predictors of late Antenatal care (ANC) booking among pregnant women in Lufwanyama District. These findings suggest that delayed ANC attendance is influenced not only by individual knowledge and capacity but also by the social environment in which women make decisions about their pregnancies.

The study showed that women with secondary education were less likely to initiate ANC late compared to women with no formal education. However, because the confidence interval includes 1.00, this borderline result should be interpreted with caution. This finding indicates that education may empower women with the knowledge and confidence needed to recognize the importance of early pregnancy monitoring and to seek care promptly. Education is likely to improve health literacy, increase exposure to health information, and enhance women's ability to make informed decisions regarding maternal health.

This finding is consistent with studies conducted in Nigeria and Ethiopia, which reported that higher educational attainment was associated with earlier ANC initiation because educated women better understand pregnancy risks and the benefits of preventive healthcare (Fagbamigbe, Idemudia, 2015 and Gebeyehu et al., 2024). The current study therefore highlights that in predominantly rural districts such as Lufwanyama, education remains a critical factor influencing maternal healthcare-seeking behaviour.

The study further found that women who perceived that most of their peers did not attend ANC were significantly more likely to book late. This was one of the strongest predictors identified in the study. The finding suggests that women's decisions regarding ANC attendance are heavily influenced by social norms and the behaviours they observe within their communities. When late booking is viewed as common or acceptable, women may perceive little urgency to seek care early.

This finding supports the work of Kearns et al. (2014), who reported that social networks and community expectations significantly shape maternal health behaviours. However, while previous studies mainly focused on

family influence, the present study demonstrates that peer perceptions themselves can independently affect ANC timing. This finding emphasizes that health-seeking behaviour is not solely an individual choice but is also socially constructed.

Overall, the findings demonstrate that late ANC booking is influenced by both personal and social factors. While education equips women with the ability to make informed decisions, supportive social norms reinforce positive health-seeking behaviours. Addressing only one of these dimensions may not be sufficient to improve early ANC uptake in rural communities.

## CONCLUSION

The multivariate analysis identified two independent predictors of late ANC initiation: education level and peer influence.

Women with secondary education were less likely to initiate ANC late compared to those with no formal education. Education appears to be protective, likely due to improved health literacy, decision-making capacity, and understanding of the benefits of early ANC.

Conversely, women who perceived that most of their peers do not register for ANC were significantly more likely to initiate their first ANC visit late. This highlights the strong influence of social norms and peer behaviors on maternal health-seeking practices. Peer influence emerged as a substantial predictor of delayed ANC attendance, underscoring the importance of community-level dynamics.

## RECOMMENDATIONS

- Intensify community-based health education campaigns emphasizing the importance of initiating ANC within the first trimester.
- Ensure that health education messages are clear, culturally appropriate, and delivered in local languages.
- Develop targeted educational materials for women with low or no formal education to improve health literacy.
- Establish mother-to-mother support groups to promote positive peer influence. Engage community leaders, traditional leaders, and influential community members in promoting early ANC attendance.
- Support policies and programs that promote girls' education, as higher educational attainment is associated with earlier ANC initiation.
- Integrate reproductive health education into school curricula to enhance awareness before childbearing age.

**Areas for Further Research**

The qualitative dimensions of peer influence and social norms affecting ANC initiation, Health system factors such as service quality and provider–patient interaction that may influence timing of ANC booking and Longitudinal assessment of how awareness interventions impact early ANC attendance over time.

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**Authors' contribution**

JM was involved in conceptualizing the design, data collection, analysis and drafting of the manuscript.

PM guided through, revised and approved the manuscript.

## REFERENCES

1. Abdo, R., Demelash, M., Seid, A.M., et al. (2023) 'First trimester antenatal care contact in Africa: A systematic review and meta-analysis of prevalence and contributing factors', BMC Pregnancy and Childbirth, 23, p. 742. Available at: https://doi.org/10.1186/s12884-023-06034-1
2. Acup, W., Opollo, M.S. and Akullo, B.N. (2023) 'Factors associated with first antenatal care (ANC) attendance within 12 weeks of pregnancy among women in Lira City, Northern Uganda: A facility-based cross-sectional study', BMJ Open.
3. Ahmed, Y.A.A. (2020) Factors associated with utilization of antenatal care in Zambia: A secondary analysis of the 2018 Zambia Demographic Health Survey. Uppsala: Uppsala University.
4. Countdown 2030 (2022) Tracking progress in reproductive, maternal, neonatal and child health in Zambia: An equity-based approach. Available at: https://www.countdown2030.org (Accessed: 11 June 2025).
5. Ermias Geltore, T. and Laloto Anore, D. (2021) 'The impact of antenatal care in maternal and perinatal health', IntechOpen. Available at: https://doi.org/10.5772/intechopen.98668
6. Fagbamigbe, A.F. and Idemudia, E.S. (2015) 'Assessment of quality of antenatal care services in Nigeria: Evidence from a population-based survey', Reproductive Health, 12(1), p. 88. Available at: https://doi.org/10.1186/s12978-015-0081-0
7. Ng'Ambi, W.F., Collins, J.H. and Colbourn, T. (2022) 'Socio-demographic factors associated with early antenatal care visits among pregnant women in Malawi: 2004–2016'.
8. Oladunni, E.K. (2025) 'Evolution of antenatal care models in the 21st century: Traditional, focused and WHO 2016 antenatal care models', PowerPoint Presentation.
9. Palamuleni, M.E. (2024) 'Factors associated with late antenatal initiation among women in Malawi', International Journal of Environmental Research and Public Health.
10. Phiri, P. (2024) 'In Zambia, forgoing antenatal care brings danger, tragedy', Global Press.
11. Rahma Awadh Salmin (2020) Factors associated with delayed booking to antenatal care services (ANC) for pregnant women in West District of Zanzibar, Tanzania.
12. Siamondole, M.W., Lingenda, G. and Kazonga, G. (2021) 'Analysis of determinants of late first antenatal care (ANC) booking in Kasenengwa District, Eastern Province, Zambia: A cross-sectional study', Journal of Gynaecology and Obstetrics, 9(5), pp. 178–188.
13. United Nations (2015) Transforming our world: The 2030 Agenda for Sustainable Development. New York: United Nations General Assembly. Available at: https://sdgs.un.org/2030agenda
14. World Health Organization (2016) WHO recommendations on antenatal care for a positive pregnancy experience. Geneva: World Health Organization.
15. World Health Organization (2021) Maternal health and the Sustainable Development Goals. Available at: https://www.who.int (Accessed: 6 Jan 2025).
16. Zambia Statistics Agency, Ministry of Health (MOH) [Zambia] and ICF (2024) Zambia Demographic and Health Survey 2024: Key Indicators Report. Lusaka, Zambia and Rockville, Maryland, USA: Zambia Statistics Agency, Ministry of Health and ICF.