

Factors associated with late seeking of prenatal care in the district of Lugela-Zambézia, Mozambique

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Abstract

Objectives: to analyze the factors associated with late prenatal care attendance by pregnant women at the Lugela health center in the first quarter of 2023.

Methods: cross-sectional survey conducted with 205 pregnant women. Data were collected using a structured questionnaire, supplemented with information from the pregnant woman's prenatal records. R software version 4.2.0 was used to perform inferential statistical analyses, calculating odds ratios (ORs) and constructing a logistic regression model. Categorical variables were analyzed descriptively and tested for associations with late prenatal care attendance. Multivariate logistic regression considered a significance level of 5%, with early prenatal care attendance as the dependent variable.

Results: 69.3% (n=142) of the pregnant women interviewed considered prenatal care initiation late. Late prenatal care seeking was significantly associated with education ($p=0.034$, $OR=0.228$, $95\%CI= -2.915$ to -0.046), age ($p=0.040$, $OR=0.506$, $95\%CI= -1.369$ to 0.006), and pregnancy planning ($p=0.009$, $OR=0.451$, $95\%CI= -1.485$ to -0.106).

Conclusion: the factors associated with late prenatal care seeking were essentially obstetric, socioeconomic, and sociodemographic, highlighting the need for strategies targeted at more vulnerable groups.

Key words Prenatal care, Associated factors, Mozambique



Introduction

The World Health Organization (WHO) envisions a world where all women and newborns receive high-quality care throughout pregnancy, childbirth, and the post-natal period. Antenatal care (ANC), also known as prenatal care, serves as a platform for important healthcare functions, including health promotion, screening, diagnosis, and disease prevention.^{1,2}

Studies have demonstrated that the combination of prenatal care and risk prevention during pregnancy provides pregnant women with a healthy life. The success of prenatal care depends on the timing and number of consultations.^{3,4}

Accordingly, early initiation is one of the factors associated with adequate prenatal care, which aims to decrease maternal and neonatal mortality, ensuring the birth of a healthy infant at the end of the pregnancy and maternal satisfaction.^{5,6}

In Africa, over two thirds of pregnant women attend at least one prenatal care consultation. To achieve this life-saving potential of ANC for women and neonates, four or more medical consultations are required, a package often referred to Focused Prenatal Care.^{7,8}

A study concerning opportunities for newborns in Africa demonstrated 71% ANC coverage, while in developed countries, this figure was over 95%. In Sub-Saharan Africa, 69% of pregnant women have at least one prenatal consultation. However, the main challenge is the coverage of early initiation, which is less than 44% in Africa.⁹

According to Mozambique's 2021 health sector report, 95% of pregnant women had at least one prenatal consultation, and of these, 11% attended the healthcare facility at 12 weeks of pregnancy or less. On the other hand, the 2021 health statistical yearbook for Zambezia province, revealed 100% coverage of pregnant women who benefited from ANC consultations, but only 11% had their first consultation with a gestational age of 12 weeks or less.^{10,11}

According to data from Mozambique's latest Demographic and Health Survey (DHS 2022-2023), 87% of women who attended a maternity service in the two years preceding the inquiry, received prenatal care from a qualified health professional. However, concerning the provinces, Zambezia shows the lowest coverage (66%). The survey revealed that coverage of four or more prenatal consultations for women who had a live birth within two years prior to the survey varied across provinces, with Maputo showing the highest percentage (83%) and Zambezia the lowest (26%).¹¹

Regarding the study location, 90.2% of pregnant women received ANC. Of these, 4% had their first consultation before 12 weeks, ranking second in achieving the provincial goal for Zambezia Province. The Namarrói

district ranked first with 3% of reaching this goal during the analysis period.^{12,13}

According to WHO (2016), late prenatal care is defined as the initiation of prenatal care after the 12th week of pregnancy.⁹ This late initiation compromises the adequate follow-up of the pregnancy, hindering the timely completion of supplementary tests and leading to negative maternal and fetal outcomes.¹³

Therefore, the present study aimed to analyze factors associated with the delayed initiation of prenatal care at the Lugela health center.

Methods

The research was conducted in Lugela district, situated in the central region of Zambezia province, 210 km from the capital city of Quelimane. It has an area of 6,178 km² and is located between parallels 15° 18' South and 15° 20' South, and meridians 36° 08' and 36° 14'. This represents about 5.9% of the province's total area (105,008 km²). The district is bordered to the south by the Mocuba district, along the Lugela River; to the north by the Namarrói district, via the Lú River; to the east by the Ile and Mocuba districts, along the Licungo River; and to the west by the Milange district. The data collection process was carried out at the health center in the district's main village. The Lugela health center was selected because it is one of the district's two level I health facilities that have low ANC coverage up to 12 weeks of pregnancy.

Healthcare facilities in rural areas are classified as Type I and Type II. Type II facilities are the smaller ones that provide primary healthcare services and do not offer inpatient care in rural areas. Type I facilities are larger, more specialized, and offer inpatient services.¹⁴ The average life expectancy of the district's population is 46 years, and the illiteracy rate is 70.9% (49.5% for men and 87.4% for women). The fertility rate is 7.9%.¹⁵ This was a cross-sectional study with a quantitative approach.

The research was conducted from January to March, comprising the first quarter of 2023. This period was when data was collected at the study site.

The study population included individuals aged 18 years or older. The sample size was 205 pregnant women who attended the health center during normal working hours seeking prenatal care. A non-probabilistic convenience sampling technique was used.

For the calculation of sample size, a projection of the monthly mean values of prenatal care service usage at the study location was considered. Based on these means, the sample size was calculated using a 95% confidence interval and a 5% margin of error.¹⁶

Inclusion criteria were pregnant women who attended prenatal consultations at the health center during the study period, were 18 years of age or older, and who agreed to participate in the study. The exclusion criteria comprised

any acute or chronic condition that limited pregnant women's ability to participate in the study, pregnant women with impaired mental health, and those aged under 18 years. The non-inclusion of adolescent pregnant women was due to the difficulty in obtaining assent and informed consent.

The dependent variable was benefiting from or adhering to prenatal consultations. The independent variables related to sociodemographic characteristics were: age group in years (18–24 years and >25 years); educational attainment (no schooling, primary, secondary, university); place of residence (around the village Yes/No); marital status (with partner or without partner); distance from home to the hospital (<10 km or >10 km); pregnancy planning (Yes or No); time in months from seeking prenatal services (1–3 months, 4 or more); number of children; occupation (farmer, self-employed, non-governmental organization - NGO, public sector); economic variable: average monthly income in minimum wage, corresponding to R\$ 676.97 (1–3, 4–5, don't know).

For the study, the data collection technique used was face-to-face interviews. Trained interviewers used a structured interview guide for women eligible for the study. Data collection was also completed using the pregnant woman's prenatal form "Mod-SIS-B01-B," which is intended for use at her first and subsequent contacts with the health facility to record demographic and obstetric variables for the purpose of monitoring the pregnancy. The selection of participants was performed by the trained data collection team, who identified potential participants as soon as they left their prenatal care appointments. Participants were then led to a specific room to ensure greater privacy, where they were informed about the study's purpose and the informed consent process. If the pregnant women consented to participate in the study, the interviewers proceeded with data collection, guided by the structured questionnaire.

Microsoft Excel version 2016 and the R statistical package version 4.2.0 were used for data analysis. Excel was used to create the database, perform descriptive statistics, and format tables. The R package was used for inferential analysis, including tests of association between variables, univariate logistic regression, and Fisher's exact test for values less than five. For the multiple logistic regression analysis, a 5% significance level was considered statistically significant.

The final logistic regression analysis identified a significant association between prenatal care outside the recommended period and the variables of maternal age, education, and pregnancy planning. Based on this finding, a reduced model was developed. Subsequently, a comparison between the two models was performed using the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) to assess the quality of the fit.^{17,18}

The AIC and BIC criteria served as auxiliary tools for final model selection, providing an objective metric for model comparison. The approach of choosing the model with the lowest AIC aligns with the goal of finding a balance between model complexity and fit.¹⁸

The AIC and BIC were chosen for model selection because they allow for the comparison of different models, helping to select the one with the best fit. Both criteria penalize complex models, which helps to avoid overfitting (excessive fit to the training data) and ensures the chosen model is capable of explaining the data's patterns.¹⁷

The Wald test was applied to the research to evaluate the logistic model as a whole. This test is used to determine the significance of the estimated model coefficients, checking if each coefficient is significantly different from zero.^{17,18}

The study was approved by the research ethics committee of the Higher Institute of Health Sciences of Maputo under code TFCMEPS15/22. Furthermore, data collection was authorized by the administrative entities that oversee the Lugela health center.

Results

Regarding the initiation of prenatal care, the criterion for prenatal care was considered non-recommended for 69.3% (n=142) of pregnant women and recommended for 30.7% (n=63), according to WHO guidelines. For the age group variable, 49.2% (n=101) of those who attended prenatal consultations were over 25 years old, and of these, 75.2% had a late initiation of prenatal care. Concerning marital status, 66.7% of those who affirmed not having a partner had late initiation. With regard to educational attainment, 63.3% of those who reported having no education or only the primary level had late initiation of prenatal care. Regarding residence, 65.5% of the pregnant women who reported to live outside the village initiated prenatal care in an inadequate period.

Regarding the descriptive analysis of gestational variables, 60% of respondents who initiated prenatal care late were multiparous. As for pregnancy planning, 77.9% of those who reported not having planned their pregnancy had a late initiation of prenatal care. Finally, regarding partner support during pregnancy, it was found that 72.3% of those who reported not receiving support initiated prenatal care late. (Table 1)

For the socioeconomic variable, 70.6% of the women surveyed who reported an income between one and three minimum wages initiated prenatal care during a non-recommended period.

The analysis of variables in the final logistic regression model (Table 2), after variable selection, showed a significant *p*-value for prenatal care outside the recommended period in the variables of maternal age, education, and pregnancy planning.

For the education variable, women who reported having a primary or no education had a 22.8% reduced chance of seeking prenatal care in the first months after conception compared to those with a secondary education (OR=0.228, 95%CI= -2.915 to -0.046). Regarding

maternal age, women aged 25 or older had a 50.6% reduced chance of seeking prenatal care in the first twelve weeks of gestation compared to those who were younger (OR=0.506, 95%CI= -1.369 to 0.006). As for pregnancy planning, women who reported not having planned their

Table 1

Sociodemographic factors associated with the late seeking of prenatal care. Lugela-Zambézia, Mozambique, 2023.

Variables	2° WHO				Total N=205	p
	Recommended (≤12 weeks) n=63		Non-recommended (>12 weeks) n=142			
	n	%	n	%		
Age group (years)						0.036
Unknown	0	0	5	100.0	5	
18 - 24	38	38.4	61	61.6	99	
≥ 25	25	24.8	76	75.2	101	
Educational attainment						<0.001
No education	0	0	44	100.0	44	
Primary education	55	36.7	95	63.3	150	
Secondary education	8	72.7	3	27.3	11	
Marital status						0.6187
With a partner	27	33.3	54	66.7	81	
Without partner	36	29.0	88	71.0	124	
Residence						0.1212
Living in the district capital	15	22.7	51	77.3	66	
Out of the capital	48	34.5	91	65.5	139	
Planning						0.0002
Unplanned pregnancy	30	22.1	106	77.9	136	
Planned pregnancy	33	47.8	36	52.2	69	
Support in pregnancy (partner)						0.0211
Yes	72	67.3	35	32.7	107	
No	27	27.7	71	72.3	98	
Parity						0.00012
Primigravida	47	22.1	19	77.9	66	
Multiparous	56	40.0	83	60.0	139	
Time of seeking						<0.001
At discovery	8	72.7	3	27.3	11	
1 - 3 Months	55	100.0	0	0	55	
4/+ Months	0	0	8	100.0	8	
Unknown	0	0	131	100.0	131	
Occupation						0.0162
Domestic worker	12	30.8	27	69.2	39	
Subsistence farmer	42	27.6	110	72.4	152	
Self employed	4	80.0	1	20.0	5	
NGO* worker	1	25.0	3	75.0	4	
Public servant	4	80.0	1	20.0	5	
Monthly income						0.0179
1 to 3 minimum wages	20	29.4	48	70.6	68	
3 to 5 minimum wages	5	83.3	1	16.7	6	
Unreported	38	29.0	93	71.0	131	

* NGO = Non-Governmental Organization.

Table 2

Complete model of sociodemographic factors of pregnant women in relation to prenatal care initiation in the district of Lugela-Zambézia. Mozambique, 2023.							
	Estimates	Standard error	Z	p	95%CI		Odds ratio
(Intercept)	0.637	0.046	13.856	< 2e-16	0.274	3.2	1.895
Age group (years) Ref: 18 - 24 years							
≥ 25 years	-0.748	0.364	-2.053	0.04	-1.369	0.006	0.473
Unknown	-0.481	3028.726	0	1			0.618
Education Ref: secondary							
Primary	-1.332	0.934	-1.426	0.034	-2.915	-0.046	0.264
No education	-19.094	1002.583	-0.019	0.985			0
Planning Ref: Yes							
No	-0.961	0.368	-2.607	0.009	-1.485	-0.106	0.383
Monthly income Ref: Unreported							
1 to 3 minimum wages	-0.206	0.388	-0.53	0.596			0.814
3 to 5 minimum wages	1.787	1.293	1.382	0.167			5.974
Occupation Ref: Public servant							
Subsistence farmer	-0.515	1.515	-0.34	0.734			0.598
Self employed	0.815	2.011	0.405	0.685			2.258
Domestic worker	-0.711	1.516	-0.469	0.639			0.491
NGO worker	-1.127	2.016	-0.559	0.576			0.324
Time of seeking Ref: 1 - 3 months							
4/+ Months	-0.997	0.041	-24.59	0.434			0.369
Unknown	-0.994	0.019	52.978	0.163			0.37

pregnancy had a 45.1% reduced chance of complying with the recommended period for prenatal care compared to those who had planned their pregnancy (OR=0.451, 95%CI= -1.485 to -0.106) (Table 3).

Discussion

Concerning factors associated with late seeking of initiation of prenatal care, the present study identified

Table 3

Reduced model of sociodemographic factors of pregnant women regarding prenatal initiation in the district of Lugela-Zambézia. Mozambique, 2023.				
Variables	Coefficients	95%CI		OR
(Intercept)	1.737	0.274	3.2	5.68
Age group Ref: 18 - 24 years				
≥25 years	-0.682	-1.369	0.006	0.506
Education Ref: Secondary				
Primary	-1.48	-2.915	-0.046	0.228
Planning Ref: Yes				
No	-0.795	-1.485	-0.106	0.451

OR= Odds Ratio.

diverse socioeconomic, sociodemographic and obstetric factors.

The educational attainment variable showed a positive association between having no education and late initiation of prenatal care, which suggests that women who reported having only the primary education were less likely to complete the recommended period of prenatal care compared to those who had completed high school. Analyzing the context of the study area, with an illiteracy rate of 70%, we can conclude that educational attainment negatively influences the access to health services. This also explains the refusal of some women to participate in the study, who claimed lack of time. These results were similar to those found in studies conducted in Ghana in 2018,¹⁹ which observed that women with secondary and higher education were less likely to postpone their first prenatal appointment than women without formal education. This may be due to differences in comprehension levels and awareness of the negative effects of delaying prenatal appointments among women with varying levels of education. In other words, educated women are likely to be more appreciative or knowledgeable of the problems associated with delaying their first prenatal consultation than those who have not received formal education.²⁰ Therefore, education allows women to develop the necessary confidence to make decisions about their health and more easily understand the importance of prenatal services. Moreover, a higher level of education is generally linked to greater autonomy in the decision to seek prenatal care.

This finding is corroborated by Goudard's study,²⁰ which also identified that pregnant women with a lower level of education are more likely to initiate prenatal care late. These results were also observed in other studies,^{21,22} which indicated that women with higher levels of education are better able to identify signs of complications during pregnancy and tend to practice healthy eating habits to avoid risks to themselves and their babies. Therefore, education influences both the utilization of health services and the completion of prenatal care at the Lugela health center.

Regarding family planning, the study showed that women who reported their pregnancy was unplanned were about 55.9% less likely to receive the recommended number of prenatal care visits compared to those who had planned their pregnancy. This scenario is likely because women discovered their pregnancy late, combined with a lack of a joint family planning culture or even a fear of telling their partners about the birth of a child. This aligns with what some oral sources at the study site reported: the number of children a couple should have is planned

by the man, and the woman simply obeys. These findings are consistent with several studies, such as the research on 870 pregnant women conducted by Cruz-Bendezú²¹ in the USA. This author and their collaborators found that women with unplanned pregnancies were more likely to detect their pregnancy later, which may also be due to the fact that the pregnant woman dedicates less attention and affection to this pregnancy. Furthermore, a woman with an unwanted pregnancy may not seek appropriate care and may be unwilling to obtain any prenatal information from health professionals.^{23,24,25}

Intimate partner violence during pregnancy is an important factor that can influence maternal and child health, including delayed access to prenatal care, as highlighted in a recent systematic review. This relationship underscores the need to address gender-based violence as an integral part of maternal and child health care.²⁶ For the study site, policies and programs are in place to protect women and children, including a law against domestic violence, a program for the prevention of and response to violence against women and children, and economic empowerment initiatives designed to strengthen women financially.

Our analysis of the marital status variable revealed that 66.7% of the respondents who reported not having a partner at the time of the survey initiated prenatal care late. This is likely because single pregnant women take longer to come to terms with their pregnancy due to a lack of partner support. They may also feel apprehensive about attending their first prenatal care visit without a partner, unlike married women or those with partners who are often accompanied by their partners on their first visit to the healthcare facility. These findings are consistent with a study by Rurangirwa,²³ which reports that pregnant women who did not live with a partner had a higher frequency of inadequate prenatal care utilization.^{19,24} Some studies also report that single women have a three times higher risk of not receiving prenatal care when compared to married women. A hypothesis for this finding could be related to partner support during pregnancy.²⁷

In the analysis of socioeconomic variables, it was observed that 33.2% of the respondents earned less than three minimum wages, and of these, 70.6% initiated prenatal care outside the recommended period. The context of the study site is critical to these findings. The population must travel a minimum of 11 km to reach a healthcare facility, and these long distances, combined with a lack of public transportation and difficult access roads, are significant barriers. Consequently, pregnant women often do not have enough money for the main mode of transport in the area - motorcycle taxis - which

contributes to their delayed seeking of prenatal care. These findings are consistent with studies by other authors who have shown that the quality of prenatal care is affected by income, as low-income pregnant women initiate care late and, consequently, have fewer consultations.^{28,29} Therefore, the likelihood of receiving prenatal care within the recommended period was greater among women with higher incomes than among those with low incomes.

While there are numerous policies and initiatives aimed at reducing gender inequality, it is important to note that most of them focus on empowering women. Although there are also broader efforts to promote gender equality, men and boys also benefit from specific policies, especially in patriarchal contexts. The action plan for gender equality, education programs, and civil society initiatives are key policies that seek to address the cultural and social norms that perpetuate patriarchy.³⁰

The research had several limitations, including communication difficulties with the eligible group due to a lack of fluency in the local language; the refusal of some women to participate, citing lack of time; and the poor condition of prenatal records, which hindered the proper visualization of variables.

The findings of this study led to the conclusion that factors associated with the late seeking of prenatal care are sociodemographic, obstetric and socioeconomic in nature. The study found that having only a primary-level education or no formal education, being 25 years of age or older, and having an unplanned pregnancy were all associated with the late seeking of prenatal care. Therefore, paying special attention to this group may reduce delays in the prenatal visit. Having completed high school or higher education, the presence of a partner in prenatal consultations, and a planned pregnancy all increase the likelihood of receiving the first prenatal consultation within the recommended period.

The identified factors for the irregular use of prenatal care services imply that the engagement of other government sectors, beyond the Ministry of Health, is pertinent and indispensable for improving health indicators.

Authors' contribution

Mutequeta N e Germano Pires: conceptualization and study design, supervision of data collection, data analysis, manuscript writing. Cambe MI e Muamine E: study design, supervision of data collection, data analysis, manuscript writing. All authors approved the final version of the article and declared no conflicts of interest.

Data availability

All datasets supporting the results of this study are included in the article.

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