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Association between socio-demographic factors and the timing of antenatal care initiation in Eersterust, South Africa: A cross-sectional study

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Abstract

Despite improved health infrastructure in South Africa, antenatal care (ANC) initiation before 20 weeks stipulated by the World Health Organization requires attention.¹ Early and regular ANC improves pregnancy outcomes through screening, counselling, and preventive interventions. This descriptive cross-sectional case study investigated socio-demographic factors associated with ANC initiation timing in Eersterust, South Africa. Data from 419 women (aged 18–49 years) were collected using structured questionnaires and analysed at univariate, bivariate, and binary logistic regression levels. Binary logistic results revealed employment status, country of origin, and parity as significant predictors. Employed respondents [AOR 2.23 (CI: 1.43–3.50)], women with parity of 1 [AOR: 1.80 (CI: 1.04–3.12)], and South African-born women [AOR: 1.54 (CI: 0.94–2.53)] had the highest odds of initiating ANC earlier than 20 weeks. Addressing employment barriers, non-citizenship of South Africa, and high parity may facilitate earlier ANC engagement. These significant factors should inform ANC policy design and review to increase utilization and encourage early initiation. Future programmes should target unemployed women and women with multiple children to improve maternal and infant health outcomes. (*Afr J Reprod Health* 2026; 30 [18]: 18-27).

Keywords: Antenatal care initiation, Timely first ANC visit, Late ANC booking, Socio-demographic determinants

Résumé

Malgré l'amélioration des infrastructures de santé en Afrique du Sud, l'initiation des soins prénatals (SPN) avant 20 semaines, comme stipulé par l'Organisation mondiale de la Santé, nécessite une attention particulière.¹ Un début précoce et régulier des SPN améliore les résultats de la grossesse grâce au dépistage, à l'orientation et aux interventions préventives. Cette étude de cas descriptive et transversale a examiné les facteurs socio-démographiques associés au moment d'initiation des SPN à Eersterust, en Afrique du Sud. Les données de 419 femmes (âgées de 18 à 49 ans) ont été recueillies en utilisant des questionnaires structurés et analysées aux niveaux univarié, bivarié et de régression logistique binaire. Les résultats de la régression logistique binaire ont révélé que le statut d'emploi, le pays d'origine et la parité étaient des prédicteurs significatifs. Les femmes employées [AOR 2,23 (IC : 1,43–3,50)], les femmes avec une parité de 1 [AOR : 1,80 (IC : 1,04–3,12)] et les femmes nées en Afrique du Sud [AOR : 1,54 (IC : 0,94–2,53)] avaient les probabilités les plus élevées d'initier les SPN avant 20 semaines. La prise en compte des obstacles liés à l'emploi, de la non-citoyenneté en Afrique du Sud et de la parité élevée peut faciliter un engagement plus précoce dans les SPN. Ces facteurs significatifs doivent informer la conception et la révision des politiques de SPN pour augmenter l'utilisation et encourager un début précoce. Les programmes futurs devraient cibler les femmes non employées et les femmes ayant plusieurs enfants pour améliorer les résultats de santé maternelle et infantile. (*Afr J Reprod Health* 2026; 30 [18]:18-27).

Mots-clés: Initiation des soins prénatals, Première visite SPN précoce, Prise en charge SPN tardive, Déterminants socio-démographiques

Introduction

The World Health Organization recommends that pregnant women begin antenatal care (ANC) in the

first 12 weeks of gestation and have at least eight contacts at specified intervals 12, 20, 26, 30, 34, 36, 38 and 40 weeks to provide preventive care, screening, counselling and support.¹ These

recommendations, issued in 2016, increased the minimum contacts from four to eight because evidence showed that more frequent visits were linked to better maternal health outcomes and lower perinatal mortality.² The healthcare policy in South Africa was aligned with these guidelines in April 2017.³ Early evaluations of this change showed some progress mean contacts rose from 4.8 in March 2017 to 5.9 by February 2018, but the new standard has not yet been achieved.²

Despite these reforms, timely initiation and adequate coverage of ANC remain problematic in many low- and middle-income countries. Analyses of Demographic and Health Survey data from 36 African countries revealed that a relatively small proportion of women initiate ANC within the recommended timeframe.⁴ For example, in The Gambia only about 43 % of women start ANC early before 20 weeks, and women with higher parity or living in urban areas are more likely to delay care.⁴

A recent multilevel study of DHS data from 14 sub-Saharan African countries found that just 8.9 % of mothers had eight or more ANC visits, with rates ranging from 3.7 % in Gabon to 18.9 % in Nigeria.⁵ Factors associated with a higher likelihood of completing eight visits included older maternal age, higher education, higher household income, and exposure to media. Higher birth order and absence of contraception were factors linked to fewer ANC visits.⁵ These patterns highlighted persistent inequities for women with low household income, those living in rural settings, and migrants as the most vulnerable.

Research from South Africa illustrates how structural barriers contribute to ANC being initiated after 20 weeks. In a cross-sectional study of rural and peri-urban communities in Limpopo province, the most frequently reported obstacles to early ANC were being too busy, long waiting times at clinics, distance to the facility, infrequent transport and cultural secrecy.⁶ Even when women knew they should start ANC at 12 weeks, many still presented themselves for ANC later than 20 weeks, especially if pregnancies were unplanned. Conversely, receiving advice from health workers about when to book for ANC reduced the likelihood of delayed initiation. Together, these findings underscore the importance of both health-system factors (such as sufficient staffing and efficient clinic operations) and social factors (like planned pregnancies and

partner support) in determining when women access ANC.

Globally, an estimated 287 000 women died from maternal causes between 2016 and 2020, which translates to about 800 deaths every day.⁵ Achieving the Sustainable Development Goal target of reducing the maternal mortality ratio to below 70 per 100 000 live births by 2030 will require among other things that countries not only expand coverage of ANC but also ensure that women begin ANC before 20 weeks and receive the full package of recommended services. By highlighting existing evidence on policy reforms, service utilisation patterns and barriers to care, this study aims to examine the factors associated with the timing of ANC initiation and utilisation among women in Eersterust, South Africa

Methods

Study design

The study adopted a descriptive cross-sectional design to capture the responses from women, aged 18-49 years, at a single point in time for their timing of initiating utilization of ANC services. Cross-sectional surveys are appropriate for examining associations between socio-demographic characteristics and health-service utilisation without manipulating variables.

Study population

Eligible participants were pregnant women, aged from 18 to 49 years, who were attending ANC at Eersterust Community Health Centre (CHC) during the study period. Both women who initiated ANC before 20 weeks of gestation and those who booked later were included in the case study. Women who were critically ill or unable to provide informed consent were excluded.

Sample

Information from the 2011 Census shows that there were 7,975 women, aged from 18–49 years, in Eersterust.⁷ Although much may have changed since the 2011 Census, this remains the only source of data at this geographical location.

Sample size

Once the area of focus for the research study was selected, the sample size was determined using the prescribed Yamane formula.¹⁴

The formula is as follows:

$$n = \frac{N}{1 + N(e)^2}$$

where n=sample size, N= population size, and e=level of precision.

$$n = 7975/[1+7975 (0.05)^2] = 381$$

The sample was adjusted by 10% as a non-response rate calculation, which was 38.1.

The final study sample size was calculated as 381 + 38 = 419. All 419 participants were interviewed in the case study as indicated by the calculated sample size.

Sampling procedure

A two-stage sampling process was used. Firstly, eight CHCs were selected from Sub-District Six in the District of Tshwane. A simple random sampling method was used to select one name, which was the Eersterust CHC. Random sampling was employed to select study participants from the chosen PHC facility. Every day, the research assistant chose expectant mothers present at the chosen PHC facility until the necessary sample size was obtained. The sample of pregnant women included those who started ANC after 20 weeks of gestation and those who first booked for ANC after 20 weeks. Pregnant women, approached during ANC clinic hours, were provided with information about the study and invited to participate. Recruitment continued each day until the desired sample size (n = 419) was reached. To ensure diversity, recruiting occurred on different days of the week and at different times of day.

Data collection

The study used a structured questionnaire comprising 37 closed-ended questions on socio-demographic and ANC factors. To preserve confidentiality, interviews were conducted in a private room at the clinic, with at least 20 participants interviewed each day depending on eligibility. Prior to data collection, the instrument

was piloted with 10 women at a different clinic to check comprehension, then validated by the Tshwane District Mother and Child Coordinator and reviewed by the North-West University's Human Social Sciences Research Ethics Committee (HSSREC). The study was conducted during the period from 19/04/2024 to 24/07/2025.

Study variables

Outcome variable

The outcome variable for the study was the timing of the first ANC visit. Women were coded as having early initiation if they attended their first visit before 20 weeks' gestation (value = 1) and as having late initiation if they booked at 20 weeks or later (value = 0). The 20-week threshold aligns with South Africa's target for early ANC booking.

Explanatory variables

Explanatory variables included age (1 = 18–24 years, 2 = 25–34 years, 3 = 35–49), employment status (1 = yes and 2 = no), education level (1 = primary (no schooling, primary, completed primary), 2 = secondary (some secondary, completed secondary), 3 = tertiary (other)), parity (birth order) (1 = never been pregnant, 2 = 1, 3 = 2, 4 = 3+), population group (1 = Black/African, 2 = other), marital status (1 = not in union including widowed, divorced, never married and other, 2 = living together, 3 = married), media exposure (1 - from friends, 2 - media grouped by adding radio, television, newspaper and social media), mode of transport (1 = walk, 2 = public transport, 3 = own car, 4 = family/friends/community member provides transport and other), quality of ANC, country of origin (1 - Republic of South Africa, 2 - other where participants were identified from Zimbabwe, Malawi, Mozambique, and Lesotho).

Data management and analytical methods

Data were collected using an interviewer-administered structured questionnaire containing 37 closed-ended questions on socio-demographic characteristics (age, marital status, education, employment, parity, country of origin and household assets), timing of the first ANC visit. The data were captured in EXCEL with data validation cells to enhance the quality

of data and then exported into SPSS version 29 for analysis. Descriptive statistics summarised the sample's socio-demographic characteristics and ANC utilisation patterns. For all variables, frequencies and percentages were calculated. To explore factors associated with (1) early versus late initiation of ANC (first visit before 20 weeks vs at or after 20 weeks), (2) whether a woman made any ANC booking, and (3) perceived quality of ANC, binary logistic regression models were fitted. In each model, independent variables, including age, marital status, education, employment, country of origin, parity, travel time to the clinic, mode of transport, and access to ANC information, were entered simultaneously. A multivariate logistic regression model was used to estimate adjusted odds ratios with 95% confidence intervals, while controlling for potential confounding variables. Model fit was assessed using the Hosmer-Lemeshow test. Statistical significance was set at $p < 0.05$. This inferential approach allowed the identification of socio-demographic and service-related factors that independently predicted late booking and suboptimal ANC utilisation.

Ethics declarations

This paper was extracted from the main author's PhD thesis titled Factors associated with the timing and use of antenatal healthcare services among women in Eersterust, South Africa. Approval to conduct the study was obtained from the HSSREC at North-West University (ethics number NW-01152-23-A7), and further permission was secured from the Tshwane District health authorities and the management of the participating community health centre. Before each interview, potential participants were informed about the purpose of the research, the voluntary nature of their involvement and their right to withdraw at any time without consequences for the care they received. Written informed consent was then obtained.³

Results

Description of participants' timing of first ANC visit

In the present study, just over half of the women (53%) reported initiating ANC before the 20-week threshold, while nearly half (47%) had their first visit at 20 weeks' gestation or later. These

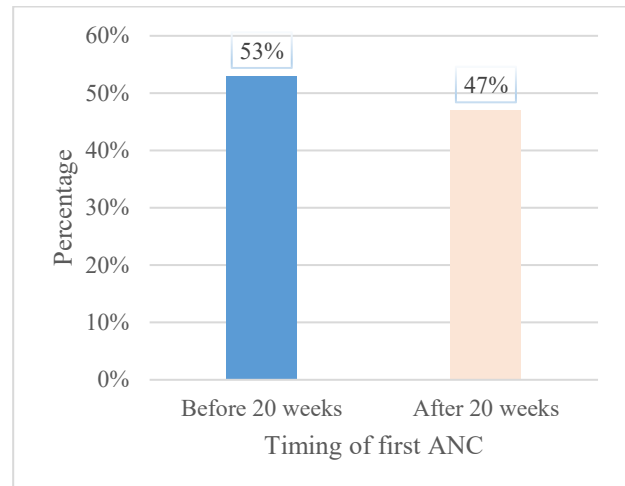


Figure 1: Frequency distribution of the timing of the first antenatal care (ANC) visit. (N=419)

proportions indicate that a substantial number of women are still booking late, despite national efforts to promote early ANC. Figure 1 illustrates the distribution of first-visit timing in the sample.

Characteristics of the study sample

Table 1 summarises the demographic and socio-economic profile of the 419 women who took part in the study. Just over half of the respondents (51%) were aged 25–34 years, a third (32%) were aged from 18–24 years, and the remainder (17%) were 35–49 years. All participants lived in urban areas, and all of them had some formal education. Secondary schooling was the most common qualification, reported by 57% of the sample; 30% had completed only primary education, and 13% had post-secondary training. Considering marital status showed that nearly half of the women (47%) were not in a union, 27% were cohabiting and 26% were legally married. Unemployment was widespread, with about two-thirds of respondents reporting that they were not employed. Parity was low for many women as 40% had no children and 28% had only one child, while 20% had three or more children and 10% had two children. Three-quarters (77%) identified as Black African; the remaining 23% belonged to other population groups. Most participants (91%) were Christians. Regarding household well-being, 70% described their financial situation as “just getting along,” while 18% said they were comfortable and 12% reported being poor. Access to health information was limited: 74% had not received any

Table 1: Distribution of study participants.

Variables		Participants N=419	
		%	N
Socio-Demographics			
Age (years)	18–24	31.5	132
	25–34	51.1	214
	35+	17.4	73
Highest educational level	Primary	29.8	125
	Secondary	56.6	237
	Tertiary	13.6	57
Marital Status	Living together	27.4	115
	Married	25.5	107
	Not in a union	47.1	197
Currently employed	Yes	34.4	275
	No	65.6	144
Parity	0	41.00	172
	1	29.4	123
	2	14.1	59
	3+	15.5	65
Population Group	Black/African	76.6	321
	Other	23.4	98
Religion	Christianity	91.4	383
	Other	8.6	36
Country of Origin	South Africa	67.5	283
	Other	32.5	136
Enabling Factors			
Access to ANC information	Yes	73.7	309
	No	26.3	110
Household Wealth Status	Just getting along	69.9	293
	Poor	12.4	52
Transport to facility	Very comfortable	17.7	74
	Public transport	53.2	223
	Walking	25.3	106
	Other	21.5	90
Travel time to health facility	Less than 15 minutes	50.6	212
	15–30 minutes	42.7	179
	More than 30 minutes	6.7	28
Need-based factors			
Quality of ANC services	Excellent	29.8	125
	Good	33.2	139
	Fair	37.0	155
Fully utilised ANC services	Yes	69.9	293
	No	30.1	126

information about ANC. Transport patterns reflected socio-economic status: more than half (53%) relied on public transport to reach the clinic, 25% walked and 22% used other means such as lifts from family or friends. Travel times were generally short, with 51% of women living within 15 minutes

of the facility and 43% within 15–30 minutes; only 7% travelled for longer than 30 minutes. When asked to rate the quality of ANC services, responses were mixed: 37% considered the care poor, 33% said it was good, and 30% rated it excellent.

Bivariate associations between women's background characteristics and timing of first ANC Visit

Table 2 summarises the bivariate associations between women's background characteristics and the timing of their first ANC visit. Several variables showed statistically significant associations with early initiation (before 20 weeks) of ANC. Timing of ANC differed by population group ($p<0.01$), employment status ($p<0.00$), country of origin ($p<0.00$), number of children ever born ($p<0.00$), household wealth index ($p<0.00$), and access to ANC information ($p<0.03$).

The direction of these associations reveals important patterns. Women from non-Black population groups were more likely to book early, with 64% having their first ANC visit before 20 weeks, whereas half of Black respondents booked later than 20 weeks. Among South African-born respondents, roughly 60% started ANC before 20 weeks; a similar proportion of foreign-born women did so, although some still delayed care beyond the 20-week mark. Employment status was also influential: 65% of unemployed women booked early compared with 54% of employed women, suggesting that work responsibilities may contribute to later presentation. Parity influenced timing, too: about 62% of first-time mothers-initiated ANC early, whereas just over half of women with two children booked after 20 weeks. Even among those with three or more children, a slight majority (54%) still began care before the 20-week threshold. Economic status played a role, as 62% of women who described themselves as “very comfortable” sought care early, compared with lower proportions among those “getting by” or poor. Transport options and information access were additional determinants. Women who walked to the clinic or used family transport tended to book earlier; among those relying on public transport, 59% attended before 20 weeks, but 53% still booked after this point.

Finally, access to ANC information was associated with timely care: 62% of women who

Table 2: Bivariate analysis of factors associated with timing of antenatal care (ANC).

Variables		Before 20 Weeks		After 20 Weeks	X ²	P-value
		N (%)	%	%		
Socio-Demographics						
Age (years)	18–24	132 (31.5)	59.1	40.9	3.395	0.183
	25–34	214 (51.1)	51.4	48.6		
	35+	73 (17.4)	46.6	53.4		
Highest educational level	Primary	125 (29.8)	48.0	52.0	2.363	0.307
	Secondary	237 (56.6)	54.0	46.0		
	Tertiary	57 (13.6)	59.6	40.4		
Marital Status						
	Living together	115 (27.4)	51.3	48.7	0.187	0.911
	Married	107 (25.5)	53.3	46.7		
	Not in a union	197 (47.1)	53.8	46.2		
Currently employed	Yes	275 (34.4)	65.3	34.7	13.313	0.001
	No	144 (65.6)	46.5	53.5		
Parity						
	0	172 (41.1)	62.2	37.8	13.922	0.003
	1	123 (27.9)	40.2	59.8		
	2	59 (10.3)	48.8	51.2		
	3+	65 (20.8)	54.0	46.0		
Population Group	Black/African	321 (76.6)	49.5	50.5	6.560	0.010
	Other	98 (23.4)	64.3	35.7		
Country of Origin	South Africa	283 (67.5)	59.7	40.3	15.872	0.001
	Other	136 (32.5)	39.0	61.0		
Enabling Factors						
Access to ANC information	Yes	309 (73.7)	61.8	38.2	4.674	0.031
	No	110 (26.3)	49.8	50.2		
Household Wealth Status						
	Just getting along	293 (69.9)	53.9	46.1	9.650	0.008
	Poor	52 (12.4)	34.6	65.4		
	Very comfortable	74 (17.7)	62.2	37.8		
Transport to facility	Public transport	223 (53.2)	47.5	52.5	5.689	0.058
	Walking	106 (25.3)	59.4	40.6		
	Other	90 (21.5)	58.9	41.1		
Travel time to health facility	Less than 15 minutes	212 (50.6)	56.1	43.9	1.852	0.396
	15–30 minutes	179 (42.7)	50.3	49.7		
	More than 30 minutes	28 (6.7)	46.4	53.6		
Need-based factors						
Quality of ANC services						
	Excellent	125 (29.8)	47.2	52.8	3.726	0.155
	Good	139 (33.2)	59.0	41.0		
	Fair	155 (37.0)	52.3	47.7		

had received information on ANC began visits before 20 weeks, while half of those without such information started later. These findings underscore

how socio-economic and logistical factors shape women's ability to access ANC within the recommended timeframe.

Table 3: Multivariate association between background variables and the timing of antenatal (ANC) services.

Variables		Adjusted Multivariate Model	
		OR (95% CI)	P-value
Currently employed	Yes	2.23 (1.43; 3.50)	<0.001
	No	Ref	
Parity	0	0.74(0.43; 1.28)	0.247
	1	1.80 (1.04; 3.12)	0.035
	2	1.32(0.73; 2.39)	0.457
	3+	Ref	
Population Group	Black/African	1.21 (0.71; 2.09)	0.451
	Other	Ref	
Country of Origin	South Africa	1.54 (0.94; 2.53)	0.009
	Other	Ref	
Access to ANC information	Yes	1.34 (0.83; 2.18)	0.356
	No	Ref	
Household Wealth Status	Just getting along	1.28 (0.74; 2.22)	0.306
	Poor	1.87 (0.83; 4.20)	0.415
	Very comfortable	Ref	
Transport to facility	Public transport	1.36 (0.73 – 2.56)	0.261
	Walking	1.61 (0.96 – 2.70)	0.007
	Other	Ref	

OR= Odds ratios; CI = confidence interval; Ref = reference category

Table 4: Results of the Hosmer and Lemeshow Test for the testing of goodness of fit.

N	Chi-Square	Df	sig
419	6.843	8	0.554**

Multivariate association between background variables and timing of ANC services

Table 3 presents the adjusted odds ratios from the logistic regression analysis of factors associated with early initiation of ANC. After controlling for other variables, population group, household wealth and access to ANC information were not significantly related to the timing of the first visit. In contrast, employment status, country of origin, parity and the mode of transport remained significant predictors.

Women who were employed had more than twice the odds of initiating ANC before 20 weeks compared with their unemployed counterparts (OR = 2.234, $p < 0.05$). Being born in South Africa also favoured early booking: South African-born respondents were about 1.5 times more likely to start ANC earlier than women from neighbouring countries (OR = 1.540, $p < 0.05$). Parity showed a graded effect; using women with three or more children as the reference group, those

with two children had a 30% higher likelihood of attending their first ANC visit before 20 weeks (OR = 1.32, $p < 0.05$). Mode of transport remained important: women who were able to walk to the clinic, an indicator of living within close proximity, had significantly higher odds of timely ANC initiation than those relying on public or other transport (OR = 1.611, $p < 0.05$).

Model fit was assessed with the Hosmer–Lemeshow goodness-of-fit test, which indicated that the final multivariable model adequately represented the data.⁸

Hosmer and Lemeshow test

The Hosmer–Lemeshow test was used as a statistical method for assessing the goodness of fit of logistic regression models, particularly in contexts such as risk prediction. Since $p = 0.554$ is greater than 0.05, this implies that the logistic regression model fits the data or was correctly specified.

Discussion

This study explored socio-demographic and contextual determinants of when pregnant women in Eersterust first access ANC. Just over half of the participants began ANC before 20 weeks, while nearly half booked later than 20 weeks. These results reflect higher proportions (10%) than the findings from Demographic and Health Survey analyses across sub-Saharan Africa, where only about 38–43% of women initiate ANC in the first trimester.⁵ Late booking undermines opportunities to offer nutrition counselling, iron supplementation and tetanus vaccination and to detect complications.³ Despite South Africa's adoption of the WHO eight-contact model in 2017, there are still barriers to be removed to improve the level of ANC.³

Employment status emerged as a key predictor of ANC initiation before 20 weeks. Women who were employed were more than twice as likely as unemployed women to book before 20 weeks. Employment may provide financial resources for transport, childcare or lost earnings, and is often associated with higher education and health literacy. However, previous work from rural South Africa points out that long clinic queues, distance and competing work responsibilities discourage timely care.⁷ The results in urban Eersterust suggest that the economic benefits of employment may outweigh time constraints, though future research should examine how job flexibility moderates ANC use.

Country of origin also influenced timing. South African-born women were about 1.5 times more likely to start ANC earlier than those born elsewhere. These findings echo evidence from Europe: a review of undocumented migrant women reported that they often initiate care ten weeks later than local women and receive fewer visits, partly due to uncertainty about their entitlements.¹⁰ Migrant women may face language barriers, fear of deportation or discrimination, and unfamiliarity with the health system, all of which can delay care. Interventions tailored to migrant communities, such as culturally sensitive outreach and language support, are needed to ensure equitable access.

Parity showed an inverse relationship with earlier booking for ANC. Women with two children were about 30% more likely to book earlier than

those with three or more children. Other studies report that multiparous women often delay ANC because they rely on past experience or find it difficult to leave home.⁴ Conversely, first-time mothers may seek care earlier due to anxiety or novelty. These patterns highlight the importance of emphasising that every pregnancy carries unique risks and requires early monitoring, regardless of parity.

Transport emerged as a significant barrier. Women who could walk to the clinic were more likely to initiate ANC earlier than those relying on public or private transport. Distance has repeatedly been identified as a major determinant of maternal health-care utilisation; research from the Thailand–Myanmar border found that women who delayed ANC to the third trimester travelled 50% farther than those attending in the first trimester.¹¹ Studies in West Africa and other regions similarly report that long travel times and transport costs deter women from seeking care.¹¹ In this case study, more than half of the respondents used public transport, yet many of them still booked later than 20 weeks for ANC, indicating that transport subsidies or community outreach might be necessary to reduce delays.

Implications for research and practice

Policymakers should prioritize increasing access to healthcare facilities and utilization of ANC services by addressing identified barriers such as transportation, country of origin, parity and employment. Policies that promote initiation of ANC before 20 weeks and completion of the recommended ANC visits can help align local practices with international health standards. Additionally, integrating community health education programs to raise awareness about the importance of ANC and maternal health can empower women to seek timely care.

For healthcare practice, strengthening the capacity of healthcare providers through training in respectful, culturally sensitive, and comprehensive ANC services is crucial. Improving data collection and monitoring systems can enable better tracking of ANC coverage and maternal health indicators, supporting evidence-based decision-making. These combined efforts contribute to advancing progress toward achieving SDG 3.1 and 3.2 by reducing maternal and neonatal mortality rates in Eersterust.

Strengths and limitations of the study

Using Census 2011 data instead of Census 2022 and due to limitations of official statistics, the socio-demographic status of Eersterust for a study on ANC represents key limitations due to outdated population estimates and potentially smaller or less representative sample sizes. Census 2011 captured a total population of about 51.8 million in South Africa, while Census 2022 reported 62 million, reflecting an 18% growth over the intercensal period.¹⁵ This discrepancy means ANC analyses based on 2011 data may underrepresent current maternal health service utilization, fertility patterns, and demographic shifts relevant to recent policy contexts.

This study found that nearly half of women in Eersterust initiated antenatal care (ANC) after 20 weeks, falling well below South Africa's recommended eight-contact ANC policy. Late initiation makes it impossible to complete 8 contacts by delivery. First contact should be ≤ 12 weeks (1st trimester). Starting at 20+ weeks leads to women missing the recommended first contact entirely. 8 contacts require regular visits from 12 weeks to delivery. Late starters physically cannot complete 8 contacts even with perfect adherence afterward.

Furthermore, the study found strong predictors of early ANC booking employment, South African birth, lower parity, and walking distance to the clinic demonstrate that delayed initiation is driven primarily by socio-economic and logistical barriers rather than lack of awareness. Employed women likely face work-related constraints; migrant or non-South African-born women may encounter cultural or language barriers; women with higher parity may underestimate risk or face caregiving burdens; and those living beyond walking distance lack affordable transport options.

To address these specific barriers and align with national maternal mortality reduction targets, interventions must be targeted and integrated across service delivery, community outreach, and individual counselling. Flexible work arrangements and robust maternity leave protections should be implemented for pregnant employees to reduce structural barriers to attending antenatal care. Workplace ANC clinics ought to be established on-site or in close proximity to employment settings, providing convenient access to antenatal services for employed women.

Culturally sensitive ANC outreach must specifically target migrant and non-South African-born communities. This includes training community health workers from migrant communities to conduct home visits and provide education, thereby building trust and improving engagement. ANC information materials should be available in languages spoken by migrant communities to ensure comprehension and reduce language-based barriers to care.

Parity-specific counselling is essential for women with multiple previous births. Messaging for women with two or more previous births should be tailored to emphasize how risk profiles change with increasing parity, rather than relying solely on the assumption that past experience guarantees safety. Clinicians should actively address the belief that previous smooth pregnancies mean there is no need for early ANC, and instead educate women that higher parity increases certain risks such as pre-eclampsia and hemorrhage. By reframing past experience and providing higher-risk education, health systems can encourage earlier and more consistent ANC engagement among women with higher parity.

By addressing these documented barriers rather than assuming information gaps, Eersterust and similar settings can improve timely ANC initiation and move closer to meeting the eight-contact ANC policy, ultimately improving maternal and infant health outcomes.

Authors' contributions

Conception and study design: EMM, BKMN, IIS, MP. Data collection: EMM. Data analysis and interpretation: EMM, BKMN, PN. Manuscript drafting: EMM, PN. All authors approved the final version of the manuscript.

Availability of data and materials

The datasets used and/or analysed during the current study are not publicly available due to ethical considerations and the need to protect participant confidentiality.

Data access may be considered on a case-by-case basis and is subject to approval by the HSSREC of North-West University. The first author reserves the right to decline requests to ensure the privacy and protection of respondents.

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Conflict of interests

The authors declare no competing interests

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