

A retrospective review of screening for HIV, syphilis and anaemia on first antenatal care visits at a midwife-run obstetric unit in South Africa



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Background: Early enrolment for antenatal care (ANC) is an important strategy in improving perinatal and maternal outcomes. Treatable conditions in pregnancy, such as anaemia, human immunodeficiency virus (HIV), and syphilis can be identified and treated in the early antenatal period, thereby improving maternal and foetal outcomes. However, late enrolment for ANC is a concerning problem, especially in high HIV-prevalence settings, such as South Africa. The aim of this study was to evaluate screening of pregnant women for HIV, syphilis and anaemia on the first antenatal visit at a midwife-run obstetric unit in KwaZulu-Natal, South Africa.

Methods: This audit of maternity case records at a primary health care facility in South Africa focuses on the screening for treatable conditions (i.e. HIV, syphilis and anaemia) among women presenting for their first antenatal visit.

Results: Data were extracted from the files of 400 (87.7%) of the 456 women who enrolled for ANC between July and December 2023. There was good coverage for screening of HIV, syphilis and anaemia. The prevalence of anaemia among women enrolling for ANC was 25% ($n = 99$), 40.8% ($n = 100$) of participants were HIV positive ($n = 100$) and 2.5% ($n = 10$) tested positive for syphilis. Of concern, less than 20% ($n = 72$) enrolled for ANC in the first trimester, thereby limiting the effectiveness of ANC interventions.

Conclusion: The low uptake of early ANC services is of concern, especially in high HIV-prevalence settings.

Contribution: Training of primary health care providers in point-of-care ultrasounds may improve community awareness of the benefits of early ANC. Further investigation is required into the knowledge and perceptions of women regarding ANC services.

Keywords: antenatal care; maternal health; pregnant women; primary health care; women's health.

Introduction

Early enrolment for antenatal care (ANC) is an important strategy in attaining Sustainable Development Goal 3.1 of reducing maternal mortality rates to < 70 per 100 000 livebirths by 2030.^{1,2} Sub-Saharan Africa (SSA) has the highest estimated maternal mortality ratio in the world, 542 reported deaths per 100 000 live births in 2017.^{3,4} Preventable causes of maternal mortality in SSA such as anaemia, infections and hypertensive disorders can be identified and treated in the early antenatal period, thereby improving maternal and foetal outcomes.⁵ The World Health Organization (WHO) recommends that the first ANC visit take place within the first trimester (gestational age [GA] of < 12 weeks) with an additional seven visits.⁶ Antenatal care when provided in the first trimester, or no later than 16 weeks of pregnancy, enables timely intervention for pregnancy-related complications and can potentially prevent maternal and perinatal deaths from avoidable causes.^{7,8,9}

Despite the evidence on the benefits of early initiation of ANC, the uptake of early ANC in SSA remains poor.¹⁰ A recent systematic review reported that the proportion of pregnant women in SSA who initiated ANC early (less than 12 weeks of gestation) ranged from 14.5% in Mozambique to 47.3% in Cameroon to 68.6% in Liberia, with an overall rate of 38.0% (95% CI: 37.8–38.2).^{11,12} Women with secondary or higher education, higher income households, close proximity to health facilities and exposure to media were more likely to initiate ANC early.¹¹ Past obstetric history is

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also a strong predictor of early initiation of ANC as women with previous abortions, caesarean sections and pregnancy-related complications are more likely to present early.¹³ Late presentation for ANC was more likely with women in rural areas and those who had unplanned pregnancies.^{11,14}

Apart from social and obstetric factors, the perceptions of women regarding ANC is an important determinant of the timing of ANC.⁵ Most women consider pregnancy as a normal part of life and not a health issue. There are also misconceptions about early ANC as many pregnant women perceive that early ANC visits are only for those with severe symptoms, such as vomiting, backache and headache and those with HIV.¹³ Previous positive pregnancy outcomes also undermine the value of early ANC in health facilities.⁵ Many pregnant women are often reportedly reluctant to start ANC because of long waiting times at clinics, overcrowded conditions and negative experiences of healthcare providers.^{5,15}

South Africa, a middle-income country in SSA, implemented the WHO ANC recommendations through the Basic Antenatal Care (BANC) policy in 2017 with results similar to other SSA countries.¹⁶ Despite the availability of free ANC, only 69.6% of pregnant women enrolled within the first 20 weeks of gestation, ranging from 64.7% in KwaZulu-Natal to 86.1% in the Northern Cape.¹⁷ Recommendations from the recent Saving Mothers report to prevent maternal deaths included early identification of pre-existing medical conditions and hypertensive disorders in pregnancy.¹⁸ When BANC was implemented early, there was a significant improvement in the detection and management of hypertensive disorders in pregnancy.¹⁶ However, an audit of ANC records in KwaZulu-Natal identified several gaps in the implementation of BANC on the first ANC visit.¹⁹ This study evaluates the prevalence of late booking for ANC and audits the adherence to screening guidelines among pregnant women on their first visit at a primary health facility in KwaZulu-Natal, South Africa.

Research methods and design

Study design

This was a quantitative descriptive study. A retrospective record review was conducted of maternal health records of women who enrolled for ANC between July and December 2023 at a primary health care facility in South Africa.

Study setting

The study was conducted at a peri-urban midwife-run obstetric unit (MOU) on the western border of the Durban (eThekweni) Metropolitan city in KwaZulu-Natal, South Africa.

The health facility serves a low socio-economic community with a high level of unemployment. The facility reports approximately over 1500 pregnant women who attend the MOU for ANC per year.

Clinical services are provided by professional nurses and district medical officers. Women with high-risk pregnancies and who require operative delivery are referred to a regional hospital.

Study population

Inclusion criteria: Pregnant women presenting between July 2023 and December 2023 to the antenatal clinic for their first visit were included.

Exclusion criteria: Pregnant women who had come for follow-up visits and who had started ANC at another facility were excluded.

Data collection

Trained research assistants extracted data from the clinic registers and maternity case records (MCR) using a validated data collection tool. Data were extracted on socio-demographic characteristics, medical and obstetric history and GA at first antenatal clinic visit. The records were audited to assess adherence to the standard of care on first visit that includes estimation of GA, screening and treatment for anaemia, HIV and syphilis. Ultrasound services are not available at the facility. Estimation of the GA was calculated using self-reported last menstrual period or the symphysis-fundal height (SFH).^{2,20} Anaemia was diagnosed using a hand-held haemoglobinometer. Healthcare providers used a point-of-care test to screen for syphilis. A positive syphilis test indicates either prior syphilis or current syphilis. All pregnant women with a positive syphilis test received one dose of penicillin and had blood sent to a laboratory for another syphilis test. Early booking was defined as enrolling for ANC before 20 weeks of gestation.

Data analysis

Data were captured on a Microsoft Excel spreadsheet and imported into the statistical software programme, SPSS 27.0 (SPSS Inc., Chicago, IL, USA), for further analysis. Both continuous and categorical variables were described using descriptive statistics. The outcome of interest was late booking (first visit after 20 weeks of GA). Cross-table analysis using Pearson's chi-square (χ^2) and p values were applied to evaluate the effect of variables on the outcome. Binary logistic (backward) regression analysis was performed on the relevant variable ($p < 0.05$).

Ethical considerations

Ethical clearance to conduct this study was obtained from the Umgungundlovu Health Ethics Research Board (No. UHERB 015/2020). Gatekeeper permission was obtained from the facility management prior to data collection. Data were captured from clinical records; no direct involvement with participants occurred. Participants' names were anonymised and kept confidential. Data were stored on a password-protected laptop. Data will be destroyed after 5 years.

Results

Characteristics of participants

A total of 456 pregnant women enrolled for ANC between July and December 2023. The sample size was 400 (87.7%) as not all records were complete. The socio-demographic profile of participants who booked during the study period is presented in Table 1.

The ages of women at the first antenatal visit ranged from 15–45 years, with a mean age of 26.5 years (s.d. = 6.8). The majority of women were between 20–40 years old (72.5%), and 11 (2.5%) women were older than 40 years. However, 99 (25%) women were teenagers. The number of previous deliveries ranged from 0–7 deliveries, with a mean parity of 1.23 deliveries (s.d. = 1.2). More than half (55.0%) had a parity between 1 and 2. A few (1.0%) had grand multiparity (parity 5 or more). The majority of the women were unmarried (83.5%), had completed high school education (64.7%) and were unemployed (77.5%).

The mean GA at the first ANC visit was 18.7 (s.d. = 6.1) weeks, with a minimum of 8 weeks and a maximum of 32 weeks. However, the majority of pregnant women (73.7%) initiated ANC in the second trimester (between 13 and 26 weeks) of pregnancy, and most ($n = 321$; 80.0%) of the women presented after 20 weeks of GA.

TABLE 1: Socio-demographic characteristics and gestational age at booking of women enrolling for antenatal care.

Variable	<i>n</i>	%	Mean	s.d.
Age in years	-	-	26.5	± 6.8
< 20	99	25.0	-	-
20–30	174	43.8	-	-
31–40	116	28.7	-	-
> 40	11	2.5	-	-
Parity (number of deliveries)	-	-	1.23	1.2
0	129	32.3	-	-
1–2	220	55.0	-	-
3–4	47	11.8	-	-
> 5	4	1.0	-	-
Marital status				
Single	335	83.5	-	-
Married	40	10.0	-	-
Divorce or widowed	25	2.5	-	-
Education				
Primary school or less	23	5.7	-	-
Completed high school	259	64.7	-	-
Attended tertiary education	118	29.6	-	-
Employment				
Employed	90	22.5	-	-
Unemployed	310	77.5	-	-
Gestational age at first antenatal care visit	-	-	18.7	6.1
< 13 weeks (first trimester)	72	18.0	-	-
13–26 weeks (second trimester)	292	73.0	-	-
> 26 weeks (third trimester)	36	9.0	-	-
Gestational age (weeks) at booking for antenatal care				
≤ 20	80	20.0	-	-
> 20	320	80.0	-	-

s.d., standard deviation; GA, gestational age.

Prevalence of treatable conditions

The outcomes of the screening tests for HIV, syphilis and anaemia at first ANC visit are presented in Table 2.

Overall, during enrolment for ANC, 143 women were found to be HIV positive; all of whom were on antiretroviral therapy (ART). Screening for HIV was offered to all women who did not know their status or who previously tested negative ($n = 257$), of whom four (1%) declined to test. Twenty pregnant women were newly diagnosed as HIV positive at their first visit to ANC. A total of 163 pregnant women were identified as HIV positive, of which 98.7% ($n = 151$) were on treatment by the end of the first visit. All women were screened for syphilis and 10 women tested positive for syphilis (2.5% prevalence rate). Nine women (90%) received treatment for syphilis. The prevalence of anaemia was 25% ($n = 99$). Mild anaemia was the most common form of anaemia (16.3%; $n = 64$), followed by moderate anaemia ($n = 29$; 7.2%) and severe anaemia ($n = 6$; 1.5%).

Association between late antenatal care booking and maternal characteristics

The characteristics of women who enrolled late (> 20 weeks of GA) were compared to those who enrolled before 20 weeks of GA in Table 3 to identify possible predictive factors for late booking.

There were no significant associations noted regarding age, marital status, education, employment of parity and late initiation of women in ANC (> 20 weeks of gestation).

Discussion

The services provided at the study facility to pregnant women on the first antenatal visit met expected standards. Almost all women were screened and managed for treatable conditions

TABLE 2: Results of screening tests for HIV, syphilis, and anaemia at first antenatal care visit ($N = 400$).

Treatable condition screened and treated	<i>n</i>	%
HIV screening		
• Known positive before first visit	143	35.8
• Screened at first visit (negative or unknown status at booking)	253	63.3
Tested positive at first visit	20	-
Tested negative at first visit	233	-
• Declined to test ($n = 4$ [1.0%])	4	1.0
HIV Treatment ($N = 163$)		
• HIV-positive pregnant women at first visit	163	100
• HIV-positive women started on treatment	151	98.7
Syphilis screening		
• Tested negative at first visit	390	97.5
• Tested positive at first visit	10	2.5
• Treatment of syphilis positive cases ($n = 10$)	9	90.0
Screening for anaemia		
• Hb > 11 g/dL	301	75.0
• 10–10.9 g/dL (mild anaemia)	64	16.3
• 8–9.9 g/dL (moderate anaemia)	29	7.2
• < 8 g/dL (severe anaemia)	6	1.5

TABLE 3: Factors associated with late antenatal care booking.

Variable	Late booking N = 320		Early booking N = 80		X ² value	P
	n	%	n	%		
Age group (years)						
< 20	82	83.5	17	16.5	1.242	0.743
20–30	141	80.8	33	19.2	-	-
31–40	89	76.9	27	23.1	-	-
> 40	8	77.8	3	22.2	-	-
Marital status						
Single	269	80.3	66	19.7	0.060	0.970
Married	31	78.3	9	21.7	-	-
Divorced or widowed	20	80.0	5	20.0	-	-
Education						
Primary or nil	17	73.9	6	26.1	1.242	0.537
Completed secondary	210	81.2	49	18.8	-	-
Tertiary	93	79.2	25	20.8	-	-
Employment status						
Employed	68	75.9	22	24.1	1.262	0.261
Unemployed	252	81.5	58	18.5	-	-
Parity (number of deliveries)						
0	110	85.2	19	14.8	2.964	0.397
1–2	173	78.6	47	21.4	-	-
3–4	35	75.0	12	25.0	-	-
≥ 5	3	75.0	1	25.0	-	-

such as anaemia, HIV and syphilis on their first visit. However, in the majority of women, these conditions were detected after their first trimesters. Only 18% of pregnant women started ANC in the first trimester (12 weeks of gestation) and 20% booked within 20 weeks of gestation. The prevalence of late booking in this study was much higher than that reported in other studies in South Africa and SSA.²¹ No association could be found between the timing of booking and the age, marital status, education, employment status or parity. This differs from other studies where higher levels of education, partner support, office employment and null parity were all found associated with early booking.¹¹ One possible factor for late enrolment for ANC could be the rural residence of women who used ANC services. Studies in SSA report that women in rural locations were more likely to book late.¹⁴ Also, socio-cultural practices such as the use of traditional health practitioners and traditional medicines may delay attendance at antenatal clinics by pregnant women.²²

The GA of pregnant women when initiating ANC was estimated using the SFH or the last normal menstrual period. At the time of the study, there were no ultrasound services at primary care clinics. Hence, women could only access an ultrasound in the private sector or at regional hospitals. The WHO recommends that all pregnant women have one antenatal ultrasound before 24 weeks of pregnancy.²³ Early ultrasound provides accurate GA and important information about pregnancy that could encourage women to access ANC services earlier. However, in resource-constrained settings in SSA, there is a scarcity of trained ultrasound technicians and limited ultrasound services. Several studies have investigated how training of primary care providers in point-of-care ultrasound (POCUS) influences the quality and uptake of ANC services.²⁴ In Uganda, facilities that offered routine antenatal ultrasound services reported a 32% increase

in the first ANC attendance compared to other facilities.²⁵ One solution in resource-limited settings may be task shifting. Training of doctors, nurses and midwives in POCUS is effective.^{26,27}

Late presentation for ANC posed another challenge in the study population where the prevalence of HIV was (40.8%). Fortunately, screening and treatment at the antenatal clinic were successful in meeting the Joint United Nations Programme on HIV/AIDS (UNAIDS) target of ensuring that more than 95% of ANC attendees knew their HIV status and more than 95% of ANC attendees diagnosed with HIV received ART.²⁸ However, this study did not examine the viral load of pregnant women on their first visits. Other possible factors for late ANC presentation such as partner support, perceptions of clinic services and health provider behaviour were not evaluated in the current study. Late presentation for ANC was highlighted in the Saving Mothers report as a modifiable risk factor for adverse perinatal and maternal outcomes. This study did not report on the outcome of the pregnancies of the participants. However, there is a need for greater community awareness of the benefits of early initiation of ANC services.

Limitations

This study was conducted at a single primary health care facility in KwaZulu-Natal among women with low-risk pregnancies. The results cannot be extrapolated to other provinces or to settings that manage high-risk pregnancies. Screening for the hepatitis B virus was introduced after the study period and was not audited in this study. Only quantitative data were included, and factors for late ANC enrolled requires a qualitative inquiry.

Conclusion

The standard of ANC services at midwife-run unit met national standards. However, low uptake of early ANC services is of concern, especially in high HIV-prevalence settings. Increased community awareness and training of primary health care providers in POCUS may improve early uptake of ANC services.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

CRedit authorship contribution

Keshena Naidoo: Conceptualisation, Formal analysis, Funding acquisition, Project administration, Writing – original draft,

Writing – review & editing. Monjural Hoque: Conceptualisation, Formal analysis, Project administration, Supervision, Writing – original draft, Writing – review & editing. Maariyah Hoque: Data curation, Formal analysis, Investigation, Writing – review & editing. Somaya Buckus: Data curation, Investigation, Writing – review & editing. All authors reviewed the article, contributed to the discussion of results, approved the final version for submission and publication and take responsibility for the integrity of its findings.

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Data availability

All data supporting this study may be made available by the corresponding author, Keshena Naidoo, upon reasonable request.

Disclaimer

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