Audit of antenatal and delivery care at a midwife obstetric unit, South Africa

A K M Monjurul Hoque,[1] MBBS, MSc, MPH, PhD ID; **S Buckus,**[1] MB ChB; **M Hoque,**[2] B App Soc Sci; **K Jagernath,**[1] MB ChB

[1] *KwaDabeka Community Health Centre, KwaDabeka, South Africa*
[2] *South African College of Applied Psychology, Durban, South Africa*

Corresponding author: A K M Hoque (mhoque75@gmail.com)

Background. Poor-quality antenatal and intrapartum care is associated with poor maternal and neonatal health outcomes. Audit of care is an essential tool to identify gaps for standard protocols and guidelines that can assist with evidence-based intervention to ensure consistent quality of care during the antenatal period and delivery.
Objectives. To measure compliance on specific antenatal and delivery care indicators based on national guidelines.
Method. A cross-sectional study was conducted of women who had given birth between January and June 2021 in a midwife obstetric unit. Descriptive statistics were used to describe continuous and categorical variables. Both the mean and standard deviation (SD) were calculated for continuous variables, and proportions for categorical variables.
Results. The mean age and gestational age of the sample were 26 years and 16 weeks, respectively. Teenage pregnancy constituted 13.5%. Most of the antenatal and delivery care indicators had good compliance (>95%). However, gaps were identified for: recording of last menstrual period (78.5%); syphilis treatment at antenatal booking (72.7%); repeat syphilis test at 32 weeks (43.4%); and completion of basic antenatal care checklist during antenatal care (46.3%). Lower rates for delivery care indicators were found for: recording of measurement of length and head circumference of the neonates (76.5%); and use of pain relief to mothers at delivery (5.4%). The outcome indicators measured were good, as low birthweight, delivery complications and neonatal death rates were 11.6%, 10.7% and 1.4%, respectively.
Conclusions. The study found good compliance with antenatal and delivery care, but some indicators, such as the basic antenatal checklist, completion of syphilis treatment and use of pain relief, were poor. These results are vital for a quality improvement programme, including training of midwives on basic antenatal care, and using maternity care guidelines in primary healthcare facilities. A multicentre study is recommended for further study.

Reducing the maternal mortality ratio (MMR) to <70 per 100 000 live births and the neonatal mortality ratio (NMR) to <12 per 1 000 live births are the aims of the United Nations (UN)'s Sustainable Development Goals (SDGs) for maternal care.[1] In order to attain these objectives, universal and high-quality antenatal care (ANC) and care during delivery (childbirth or intrapartum) in health facilities are crucial. Maternal morbidity and mortality rates in healthcare facilities vary greatly according to reports from low- and middle-income countries (LMICs), indicating varying levels of care quality.[2] Maternal and neonatal morbidity and mortality are linked to inadequate ANC and intrapartum care.[3] The biggest problem is ensuring consistent quality of care during ANC and delivery in South Africa (SA), where maternal mortality is high, and the health system is regarded as insufficient.[4] In comparison to higher level healthcare settings, a study from five sub-Saharan African (SSA) nations reveals that the general quality of basic maternal care is suboptimal in primary healthcare (PHC) institutions.[5] Evidence

suggests that 74 - 98% of severe maternal disabilities and deaths can be averted, even with limited resources, if the intervention strategies are based on appropriate and correct information.[6,7]

Nationally and internationally, providing ANC and care during childbirth is recognised as the cornerstone of improving maternal and perinatal health, and these are anticipated to have a significant positive impact on reaching the SDGs.[1] Early detection of high-risk pregnancies is the goal of ANC. ANC has been promoted as a helpful strategy to lower maternal and perinatal morbidity and mortality, especially in resource-limited nations and communities.[8] The institutional maternal mortality ratio (iMMR), which was 189 deaths per 100 000 live births in 2009, decreased to 99 deaths per 100 000 live births in 2019 in SA.[9] As a signatory to the UN's SDG project, SA mplemented initiatives to enhance the health of women, children and adolescents, with the goal of further lowering maternal and neonatal mortality and morbidity.[1] In order to improve the quality of ANC through

better screening and detection, and appropriate management of pregnancy-related issues during pregnancy and delivery or childbirth, the adopted modifications in ANC services are now focused on increasing the frequency of ANC visits, and commencing ANC initiation early.[10]

According to research on maternal and perinatal fatalities in SA, inadequate ANC visits and delays in accessing ANC are factors in the increased incidence of these deaths.[9,11] In a survey, it was found that failure to initiate ANC is the main cause of the 33% perinatal mortality that occurs at birth.[12] Similar correlations between poor ANC uptake in SA and other regions of the world and adverse pregnancy outcomes, including preterm deliveries, stillbirths and neonatal deaths, have been found in epidemiological reports.[11,13-16] According to the most recent SA Demographic and Health Survey (SADHS) 2019, most pregnant women (94%) attend ANC, 76% receive ≥4 ANC visits and 96% women give birth in medical facilities.[17] However, with these good healthcare access indicators, considerable differences are seen on maternal and perinatal negative outcomes between health districts, provinces, rural and urban areas, and different sociodemographic categories in various SA regions.[18] The report also highlights the fact that maternal and perinatal mortality rates remained high in rural areas. Other data point to rising trends in low birthweight (LBW) (≤2.5 kg) deliveries and a greater rate of population-based MMR (536 per 100 000 live births) in SA.[19]

Few studies have been carried out in SA highlighting the quality of ANC and care at childbirth, in particular in rural areas. Studies focusing on this topic in KwaZulu-Natal Province (KZN) are also limited. Clinical audit is a crucial tool for assessing how well standardised protocols are being used, as well as how well an institute is performing, allowing for the identification of accomplishment and gaps, and ultimately ensuring the best possible service delivery. Therefore, as part of a quality improvement initiative at a midwife obstetric unit (MOU) of KwaDabeka Community Health Centre (KCHC), this study was conducted to evaluate the ANC quality and care at the time of delivery against the national standards. Based on the national recommendations for SA, we measured the compliance on the specific and crucial antenatal and delivery care indicators that are required to be adequately monitored and managed during ANC and childbirths.

Methods

Setting and population

The study was carried out at a PHC facility that offers first-level maternity care to residents of peri-urban communities in the Ethekwini (Durban) health district of KZN. There are >150 000 residences in the district, predominantly housing black people. These communities are located on the north-western boundaries of the district. Under KCHC, there are 21 mobile points and 7 fixed PHC clinics that offer ANC for low-risk pregnancies, and route patients to the MOU of KCHC for delivery care. This MOU provides delivery services with midwives, other support staff and a resident medical officer in the event of emergencies. Most residents are impoverished, jobless and live in formal and (mostly) informal types of housing. The residents are largely dependent on public healthcare facilities. Unpublished information from KCHC indicates that there are 210 000 patients by headcount and 6 000 maternity-related cases on average annually (ANC, delivery and postnatal care). The annual antenatal clinic first booking attendance is approximately 1 500, with about 850 vaginal deliveries. The regular ANC is offered as a day service from 07h00 to 16h00, and delivery services are available around the clock. The national protocol 'Guidelines for Maternity Care in South Africa – A Manual for Clinics, Community Health Centres and District Hospitals' is used when providing ANC and delivery services.[20] As a result, these PHC clinics identify and refer high-risk pregnant women to hospitals for ANC and delivery. At this MOU, only low-risk pregnant women are given delivery services. However, low-risk pregnant women are sent to the hospital for delivery and additional management of the mother and/or newborn if complications arise during delivery. At KCHC, only vaginal deliveries are performed, without the use of any instrument, such as vacuum or forceps. This MOU does not make use of labour augmentation.

Study design

An institution-based cross-sectional descriptive study was undertaken using data from maternity case records (MCRs) of all women who gave birth between January and June 2021.

Data sources, screening and management of ANC and delivery

At the first antenatal (booking) visit, the midwives from PHC clinics are required to obtain and record relevant demographic, personal, medical and obstetric histories, conduct medical and obstetric examinations, and screen pregnancy-related risk factors and conditions using MCRs.[20] The MCR is a nationally developed and implemented recording document, as part of antenatal and delivery care for SA. It is designed to capture data for booking, follow-up ANC visits and delivery information. The MCR is used and provided to each pregnant mother at the booking visit and given to her to take home and present at all ANC visits and at the time of delivery. For women who have had no ANC, the MCR is issued and used at the time of delivery. At the booking visit, gestational age (GA) is estimated from the last menstrual period (LMP) reported by women, or by examination of the fundal height in cases where the LMP was unknown. Screening and testing for anaemia (at booking visit and at delivery) and syphilis and HIV testing (at booking, repeated at 32 weeks' GA and at delivery) and Rhesus (Rh) blood grouping (only at booking visit) are undertaken using standard tests as a routine procedure in SA. Voluntary counselling and testing for HIV, and HIV treatment, are offered to all pregnant women for inclusion in the universal antiretroviral treatment (ART) programme. This also works towards prevention of mother-to-child transmission (PMTCT) of HIV, if the mothers accept and there is no contra-indication (e.g. suspected cases of tuberculosis). At all ANC visits, pregnant women are screened for high-risk pregnancies for referrals to hospital ANC and deliveries based on national protocol.[20]

When a pregnant woman attends the MOU with labour pain, an examination and assessment is undertaken to diagnose labour,

and classify the patient for any obstetric and fetal risks for delivery. Labour is defined as painful uterine contractions accompanied by effacement and dilation of the cervix, and/or with the presence of show, and/or rupture of the amniotic membrane. Women with active labour without any apparent or imminent complications are then admitted and allowed to continue to deliver at KCHC using a partogram in the MCR (a chart entering all maternal and fetal observations, fluid intake and output and medications) to monitor the progress of labour, among other variables. Alert and action lines on the partogram, together with other observations (e.g. temperature of mother, blood pressure (BP), fetal heart rate, etc.) are used to identify labour complications in mothers and fetuses during labour. Patients with complications or risk factors (e.g. raised BP of mothers, pre-eclampsia, eclampsia, fetal distress, etc.) identified during different stages of labour or delivery, or neonatal complications that cannot be managed at the MOU, warrant referral to hospital for delivery. For those who deliver at the MOU, observations are done for 8 hours after delivery.

Study sample and data collection

A total of 398 mothers were recorded as delivered in the labour ward during the study period. Mothers who did not attend ANC (*n*=10), were referred to hospital during delivery (*n*=9) or delivered at home or on the way to KCHC (*n*=17) were excluded from the sample. Therefore, a total of 362 mothers formed the study sample. A standard data collection tool was developed to address the selected indicators for ANC and delivery care from the SA national guidelines for maternity care (ANC and delivery), in particular in a MOU. The characteristics of the study sample are shown in Table 1. The following antenatal care indicators were taken into account: recording of medical history; history of miscarriage; blood pressure; Rh blood grouping; booking height and weight measurement; urine analysis results; LMP; completion of the basic ANC (BANC) checklist; measurement of the symphysis fundal height (SFH) in cm; booking haemoglobin (Hb); booking syphilis test; booking syphilis test result; booking syphilis cases treated; repeat syphilis tested (at or around 32 weeks' GA); positive cases of syphilis treated; initial HIV status known (at initiation of ANC); initial HIV test undertaken (those were unknown); repeat HIV tests at 32 weeks; initial HIV test results and initiation of ART or PMTCT; and administration of first dose of tetanus toxoid (TT). Indicators for delivery care were: recording of Hb measurements; syphilis testing; syphilis test results (positive or negative); treatment of syphilis-positive cases; HIV testing (in those who were negative during ANC); final HIV test results at delivery; total HIV-positive women on ART; condition of the amniotic membrane; labour duration; delivery time; APGAR scores in 1 and 5 minutes of the neonates; gender; length; head circumference (HC); birth defects of the neonates; condition of the mother's perineum (birth injury to mother); and delivery outcomes such as LBW babies, stillbirths and neonatal deaths. For this study, two research assistants independently extracted data from the MCR and then entered them into an Excel (Microsoft, USA) spreadsheet. The study variables that were not recorded into MCR were regarded as having not been measured.

Table 1. Demographic and obstetric information recorded at booking visit (*N*=362)

Variable	*n* (%)*
Age recorded	362 (100.0)
Mean (SD) age, years	26.3 (5.6)
<20 years	49 (13.5)
≥20 - 24 years	100 (27.6)
≥25 - 29 years	107 (29.6)
≥30 - 34 years	80 (22.1)
≥35 years	26 (7.2)
Marital status recorded	362 (100.0)
Single	351 (97.0)
Married	8 (2.2)
Other	3 (0.8)
Parity recorded	361 (99.7)
0	93 (25.7)
1 - 2	226 (62.6)
3 - 4	39 (10.8)
>5	3 (0.9)
GA at booking visit	359 (99.2)
≤13 weeks	68 (19.0)
14 - 20 weeks	281 (78.2)
>20 weeks	10 (2.8)
Mean (SD) GA, weeks	16.2 (5.6)
History of miscarriage (*n*=359)	29 (8.1)
ANC visits, *n*	362 (100.0)
1 - 3	120 (33.1)
4 - 7	167 (46.1)
≥8	75 (20.7)

*Unless otherwise indicated.
SD = standard deviation; GA = gestational age; ANC = antenatal care.

Data analysis

Data from Excel were exported and coded for analysis in SPSS 22.0.1 (SPSS Inc., USA). Descriptive statistics were used to describe continuous and categorical variables. Both the mean and standard deviation (SD) values were calculated for continuous variables, and proportions for categorical variables. Age was categorised into <20 (teenage), 20 - 24, ≥25 - 29, ≥30-34 and ≥35 years; parity into 0, 1 - 2, 3 - 4 and ≥5, and HIV and syphilis test results (status) of mothers were expressed as positive or negative. Gestational ages at the booking visit were categorised into <13, 14 - 20 and >20 weeks.

Ethical clearance

The Umgungundlovu Health Ethics Review Board granted ethical approval (ref. no. UHERB 015/2020). Additionally, approval was received from the KCHC management. The participants' and healthcare professionals' names were not mentioned in the data presentation.

Results

The mean age with SD of the sample was 26 (5.6) years, with a minimum of 14 and maximum of 41 years. The mean (SD) GA

at ANC initiation visit was 16 (5.5) weeks, and ranged from 6 to 26 weeks. Teenage pregnancy constituted 13.5% of the sample. Most (79.3%) of the mothers were between 20 and 34 years old. The majority were single (97%), and parity was usually between 1 and 2 (62.4%). A few (1.3%) had multiparity, and 8.1% had a history of previous miscarriage. Only 19% had initiated ANC early (<13 weeks' GA). Most (75.6%) had initiated ANC between 14 and 20 weeks' GA. Only 20.7% had a high number (≥8) of ANC visits.

Table 2 shows the ANC indicators. Most (>95%) of the ANC indicators had good compliance of care at the booking visits. These were the recording of medical history, history of miscarriage, booking BP, booking height and weight, urine analysis results, fundal height measurement, HB measurement, Rh blood grouping, initial HIV testing, syphilis testing and final initiation of ART. However, LMP was known and recorded for only 78.5% of mothers. Only two-thirds of syphilis cases completed their treatment when they were found to be positive at the booking visit. Less than half (43.4%) had a repeat syphilis test at or around 32 weeks' GA, and 94.5% of these had test results available. All women who had positive syphilis test results (n=5) at 32 weeks' GA, were treated. Less than half (46.3%) of the women were found to have completed BANC check lists.

Among all mothers who had ANC, 326 (86%) knew their HIV status at the time of ANC initiation. Among HIV-positive women before the first ANC visit, 90.8% were receiving ART. A total of 242 women who knew that their HIV status was negative, together with those who did not know their HIV status, were tested for HIV. Among those found to be HIV positive (n=27), and those who knew they were HIV positive but did not initiate ART (n=11) before first ANC visit (total n=38), 35 (92.1%) of them accepted and initiated ART at the first ANC visit. Repeat HIV tests during pregnancy were recorded for 201 women, 93.4% of those women (n=215) who were HIV negative. Only 7 were found to be HIV positive. These 7 and 3 who were found to be HIV positive at the first test did not accept ART initially (n=10), but accepted and initiated ART at the repeat ANC visit. All HIV-positive (n=158) pregnant women accepted and initiated ART. Among all the mothers, 325 (90%) were recorded as having received the first dose of TT.

Indicators for delivery care (Table 3) showed good compliance or coverage (>95%) for the following care indicators: HB estimation (96%); syphilis test undertaken (100%); syphilis test results (98.8%); HIV testing and final HIV status (100%); ART rate (100.0%); use of partogram (100%); condition of the amniotic membrane (100%); duration of labour (95.6%); time of delivery (99.4%); recording of birth injury to neonates (98.9%) and mothers (conditions of perineum) (98.3%); gender of the neonates (98.3%); birthweight (95.3%); delivery complications (98.1%); record on the use of pain relief (98.1%); record of resuscitation (yes/no) of newborns (98.3%); and delivery outcomes (96.4%). However, lower rates of delivery care indicators were seen in measurement of length and head circumference of the neonates (76.5%). The outcome indicators measured from the audit were LBW (11.6%), use of pain relief (5.4%) and neonatal death rate of 1.4% (14 per 1 000 live births).

Table 2. Recording of booking of ANC variables (N=362 pregnant women delivered)

Variable/indicator	n (%)
Recorded medical history	358 (98.9)
History of miscarriage	359 (99.0)
Booking BP recorded	359 (99.2)
Booking height and weight recorded	354 (97.8)
Urine analysis results recorded	354 (97.8)
LMP known and recorded	284 (78.5)
Recorded fundal height measurement	360 (99.4)
Completion of BANC checklist	164 (46.1)
Rh blood grouping	362 (100.0)
Booking HB recorded	347 (95.9)
HIV status recorded known	310 (85.7)
On ART (pre ANC)	108 (90.8)
HIV first ANC test done	242 (100.0)
ART initiated at first visit (n=38)	35 (92.1)
Repeat HIV test done during ANC (n=215)	201 (93.4)
Initiated ART (n=10)	10 (100.0)
Total ART during ANC (before delivery) (n=153)	153 (100.0)
Booking syphilis test done	362 (100.0)
Booking syphilis result recorded	332 (91.7)
Syphilis-positive (n=332)	11 (3.3)
Booking syphilis-positive cases treated (n=11)	8 (72.7)
Repeat syphilis tested at or around 32 weeks' GA	157 (43.4)
Repeat syphilis test results at or around 32 weeks' GA (n= 157)	148 (94.5)
Repeat syphilis test positive (n=148)	5 (3.3)
Repeat syphilis-positive cases treated (n=5)	5 (100.0)
1st dose of tetanus toxoid given	325 (89.8)

ANC = antenatal care; BP = blood pressure; LMP = last menstrual period; BANC = basic ANC; RH = Rhesus; HB = haemoglobin; ART = antiretroviral therapy; GA = gestational age.

Discussion

Our study was carried out at the lowest level of healthcare facility in SA that provided ANC and delivery services to communities of poor socioeconomic standing. The findings are relevant to ANC and delivery care given to women with low-risk pregnancies by midwives. ANC and delivery services provided but not recorded in the MCR were considered as not being provided. The client might have benefited from unrecorded services provided subsequently, leading to information bias. Similarly, services not provided but recorded may also have led to false measurements. The demographic features of this study's sample matched those of a larger sample from the same healthcare facility in a previous study,[21] for instance, the mean age of the pregnant women who gave birth, the percentage of teenage pregnancies, the lateness of ANC bookings, and the HIV positivity rate at delivery.

This audit assessed numerous variables performed during ANC (Table 2) and at childbirth (Table 3), as recommended by national guidelines. Good record-keeping was the practice of the midwives in this facility, observed for the majority (>90%) of the variables. This is encouraging, as every variable is an essential tool in providing optimal ANC or life-saving management during delivery. Furthermore, the overall results highlighted the fact that the quality

Table 3. Variables recorded at the time of delivery for the sample (N=362)

Variable/delivery indicator	n (%)
HB measured and recorded	350 (96.7)
Syphilis test done	362 (100.0)
Syphilis test results recorded	355 (98.6)
Syphilis results positive	5 (1.4)
Syphilis treatment completed	5 (100.0)
HIV results at delivery recorded	362 (100.0)
Total HIV positive	158 (43.6)
Received ART	158 (100.0)
Use of partogram	362 (100.0)
Condition of the amniotic membrane	362 (100.0)
Duration of labour	346 (95.6)
Time of delivery	360 (99.4)
Gender of the neonates	356 (98.3)
Birth injury to neonates recorded	358 (98.9)
Birth injury to mothers recorded	356 (98.3)
Delivery (birth/neonatal) outcome	349 (96.4)
Birthweight of babies recorded	345 (95.3)
LBW (<2.5 km)	40 (11.6)
Delivery complications recorded (yes/no)	355 (98.1)
Actual delivery complications recorded (n=355)	38 (10.7)
Use of pain relief recorded	355 (98.1)
Used pain relief	19 (5.4)
Record of resuscitation of neonates (yes/no)	355 (98.3)
Length of the baby recorded	277 (76.5)
Head circumference of the baby	277 (76.5)
Delivery outcome recorded (n=362)	352 (97.2)
Neonatal deaths (n=352)	5 (1.4)

HB = haemoglobin; ART = antiretroviral therapy; LBW = low birthweight.

of ANC and delivery care rendered by midwives was good, with only a few limitations. The rate of LMP recorded was 78.5%, which is lower than the standard. Women who use injectable contraceptives for family planning often do not get their menstrual period before falling pregnant, which may have resulted in the low rate of LMP reported.[22] However, the compliance of assessment and recording of SFH was good, unlike in other findings from SA.[23]

Regarding HIV management, HIV status at the first ANC visit was known to 85.6% of women. These women's knowledge of their HIV status was lower than the 95% that is the expected national set target rate,[24] according to the 95:95:95 strategy. This is dependent on women's behaviour in terms of seeking HIV tests and ART. All women who did not know their HIV status and those who were known to be negative were tested during the booking visit. Before the start of ANC, 90.8% of those who knew they had HIV were receiving ART. After the first HIV test and the first ANC visit, the ART rate improved to >95%, the national target rate.[24] The repeat HIV test rate during pregnancy was also lower than expected, at 93.4%. This could again be related to the health-seeking behaviour of women, as some had only one ANC visit, or had their first visit late. However, after the repeat HIV test during ANC visits, all HIV-positive women (100%) received ART. This was considered optimal for HIV care in the facility. This was

an important point regarding the healthcare workers' (midwives') performance, and this is similar to other findings from SA.[23]

The performance of syphilis testing and recording at booking was good (100%). However, there was inadequate record-keeping (91.7%) for results. This may be due to the delay in obtaining results from the hospital laboratory (away from KCHC). Of those found syphilis positive (n=11), 8 (73%) were treated. The reasons for the remaining women not receiving treatment were unknown, and this is concerning. However, refusal of treatment or unavailability of medication are occasionally encountered in SA. A repeat syphilis test was performed on 62% of women at 32 weeks' gestation. This lower rate for a repeat test at 32 weeks was related to women's personal behaviour (attendance and willingness). The recording and treatment of syphilis was optimal (100%) at 32 weeks' gestation. The screening and management of syphilis in our setting was better than in other studies. For example, one audit showed that only 18% of women had records for syphilis testing, with even lower rates (16.6%) of completion of treatment.[25]

The BANC checklist was fully completed for only 46.3% of the women. This finding was also consistent with the findings from another SA study.[23] The BANC checklist is a comprehensive assessment of pregnant women and the fetus, hence time-consuming. As part of the intervention plan for the promotion and dissemination of the maternity care guidelines and the BANC checklist, training of all midwives at PHC facilities, together with the distribution of the guidelines on the BANC checklist, is justified. It is necessary to have midwives trained and motivated at PHC clinics, including KCHC, so that they can provide adequate antenatal services to pregnant women.

Delivery care

The recording of syphilis and HIV testing and treatment at the time of delivery were encouraging, at 100%, in compliance with the national target.[19] Furthermore, our study showed good representation of delivery complications, with an incidence of only 10.7%. The fact that the MOU is intended to deliver women with low-risk pregnancies justifies this low rate. These findings are promising, as they may be a result of good identification and referral of high-risk pregnancies during ANC and delivery. There was a LBW incidence of 11.6%, which is comparable with, but higher than, the combined prevalence in SSA (9.76%) and lower than the 13.5% in Durban, SA.[26,27] Poor socioeconomic conditions, lack of education and unemployment were contributing factors. The documentation of length and head circumference of the infants was suboptimal (76.5%). This is seen as a foregone opportunity to provide adequate care, as these measurements, including birthweight, are used on a regular basis to monitor an infant's growth and wellbeing from baseline.

Our study showed good recording on the use of pain relief (98%), but only a few (5.4%) actually received it, in spite of the benefit of pain relief during delivery. The reasons for the low uptake are unknown. However, a study from Egypt determined that 82.9% of women were unaware that analgesia options were available during labour, and hence women opted for caesarean section deliveries owing to labour pain.[28] It was shown that >50% of caesarean sections could be avoided if adequate analgesia was

provided during labour. In a community confronted with numerous adversities, optimal maternity service delivery should be a priority. Audit of the care provided in ANC and delivery at KCHC showed promising results, which are of a higher standard when compared with units in a similar setting in SA.[23] However, there are areas where improvement would be warranted.

Limitations
This review used MCRs of women who delivered at KCHC, a PHC facility. However, not all of them received ANC at the same health facility. Thus these results can be extrapolated to surrounding PHC facilities that provide ANC and delivery services. The sample consisted of low-risk pregnant women. However, we found overall good practice by the midwives, with few problems regarding the quality of care during ANC and at delivery.

Conclusion
This study showed overall good compliance on most of the antenatal and delivery care indicators. However, there were a few concerning issues, such as non-compliance with the BANC checklist, treatment of syphilis at the booking visit and the low rate of documentation of length and head circumference of the neonates. In addition, the use of labour pain relief for mothers was suboptimal. These results are vital in terms of quality assurance of maternity services in PHC. Continuous in-service training, monitoring and evaluation of adherence to maternity care guidelines, developing teamwork, robust management and educational programmes for midwives, among other strategies, are pivotal aspects in ensuring optimal care. A future multicentre study including all types of health facilities for antenatal and delivery care at clinics and hospitals is recommended, as it will guide policy-makers and health managers in improving maternal and neonatal health outcomes.

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