Audit of antenatal care in a rural district of KZN, South Africa

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Abstract

Background: Maternal and perinatal mortality remain a big challenge in developing countries, including South Africa, where the figures are amongst the highest in the world. Provision of adequate antenatal care is regarded as a cornerstone of maternal and perinatal health care and is expected to have a considerable impact on achieving the Millennium Development Goals. The detection of high-risk pregnancies through antenatal care has been advocated as a good tool to reduce maternal mortality in developing countries. The South African Government's response in terms of providing free maternal care in public health facilities is commendable but access to quality antenatal care is still questionable. We conducted this audit to evaluate the quality of antenatal care/services provided against the set national standards at the first (booking) visit, and visits at 28 and 36 weeks of gestation, as part of a quality improvement initiative.

Methods: A retrospective cross-sectional descriptive study was undertaken, targeting women who attended public health institutions for antenatal care in the Empangeni sub-district of Uthungulu, which is a health district in KwaZulu-Natal province. Data were collected from 244 pregnant mothers' antenatal care records after delivery, and a random selection from a total of 5 109 women who delivered in Empangeni hospital during July to December 2004. Frequency tables were produced on the predetermined selective antenatal care indicators. A Pearson correlation test was conducted to determine the significant relations, if any, among variables.

Results: The majority of the pregnant mothers were unemployed and poor. Virtually all of them (99.6%) had attended public healthcare (PHC) facilities for antenatal care (88% attended PHC clinics and the rest attended hospitals) and each woman had, on average, six antenatal visits. One quarter did not enrol for a prevention of mother-to-child transmission (PMTCT) programme. Only 9% of pregnant women booked a visit during their first trimester period but most of them (two-thirds) booked a visit during the second trimester of pregnancy. History-taking was done for every woman. Recording of haemoglobin (Hb) estimation was high at the first visit (95%) but low at 28 and 36 weeks (46% and 30% respectively). Recording of syphilis screening was very low (18%) at the first visit and only 2% was screened at 36 weeks. Only 16% received adequate treatment in cases where the results were positive. At 36 weeks, only 2% had a Wasserman reaction (WR) test done to screen syphilis at term. Over half (55%) of the pregnant women received three doses of tetanus toxoid vaccination before delivery.

Conclusion: The study showed that the standard of antenatal care offered in the Empangeni sub-district fell short of the required level. This lack of proper care represents missed opportunities to impact optimally on maternal and perinatal health outcomes. Thus strategies are urgently needed to improve antenatal care through a quality improving initiative.

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Introduction

Provision of antenatal care is regarded as a cornerstone of maternal and perinatal health care and is expected to have a considerable impact on achieving the Millennium Development Goals (goal 5, which aims to improve the health of mothers; a large part of goal 4, which focuses on reducing child mortality; and parts of goal 6, which seeks to combat AIDS, malaria and other diseases).[1] The detection of high-risk pregnancies through antenatal care has been advocated as a good tool to reduce maternal mortality (in some cases by 60%) in developing countries.[2, 3] It has been calculated that for every dollar spent on antenatal care for high-risk women, more than three dollars are saved (compared to managing complications arising from pregnancy).[4]
An estimated 15% of pregnant women in developing countries experience pregnancy-related complications and nearly 530,000 women worldwide die annually from pregnancy-related conditions.[5,6] In developing countries, interventions that are known to be effective in reducing maternal and perinatal mortality and morbidity are not universally provided. A study conducted in Zaria (Nigeria) found that booked mothers delivering in maternity units had fewer complications and a lower maternal mortality than 'unbooked' mothers.[7] This raises assumptions that antenatal care received at booking and follow-up visits is effective.

In spite of efforts taken nationally and locally, South Africa (SA) itself and KwaZulu-Natal (KZN) province have high rates of maternal mortality and perinatal mortality.[8,9] Maternal health programme efforts in developing countries are found to be seriously deficient, particularly in rural areas.[10] Previously, access to maternal health services was a major problem for rural and black communities in SA.[11] The political transition of SA in 1994 brought about many positive changes. The most encouraging was the introduction of free maternal and child (age < 6 years) healthcare (MCH). Since 1998, the South African Demographic and Household Survey (SADHS) and other studies from KZN (Hlabisa and Ubombo districts) have reported high utilisation (> 94%) of antenatal care by pregnant women.[12,13,14] Recent surveys of antenatal patients in Pretoria (Gauteng) and in Greytown (KwaZulu-Natal) have demonstrated that the majority of women commence antenatal care in late pregnancy, i.e. in the second or third trimester of pregnancy.[15,16]

The provision of prevention of mother-to-child transmission of HIV (PMTCT) and anti-retroviral treatment for pregnant mothers are also good reasons to seek antenatal care. At Empangeni Hospital, KZN, more than 40% of pregnant mothers are HIV infected and over 40% transmit the disease to their children.[17] Antenatal care is aimed at improving the general health status of pregnant women, improving their knowledge of the prevention and treatment of HIV, and at ruling out any systematic problems The principles of equitable and humane health service delivery details various steps that need to be considered for antenatal care, and merely attending health facilities is insufficient for obtaining the desired goals of pregnancy outcomes. Results of studies suggest that investment in the quality of care is most important in antenatal health care.[18] Few studies carried out in SA have highlighted the quality of antenatal care during pregnancy. In particular, studies focusing on this topic in rural KZN are very limited.

This study was therefore conducted to evaluate the quality of antenatal services provided in rural KZN against the set national standards at the first (booking) visit, and visits at 28 and 36 weeks of gestation, as part of a quality improvement initiative.[19]

Materials and Methods

Antenatal care in the Uthungulu district

Antenatal care is provided by nursing staff (midwives) at all 14 primary healthcare clinics in the study area, which covers 90% of the antenatal population, and at Empangeni Hospital, which covers the remaining 10% of antenatal population. Most (95%) of the district deliveries are conducted at Empangeni Hospital. Antenatal care at all public health facilities in South Africa (including at Uthungulu) is provided in accordance with national protocol and guidelines.[19] Accordingly, at the first (booking) antenatal visit, full and relevant histories are taken. Pregnancy examinations include inspection and palpation of the pregnant uterus, and measurement of the symphysis-fundal height (SFH) (in centimetres) is taken. Auscultation of the fetal heart is performed from 26 weeks of gestation.

In order to determine an estimation of gestational age, and the expected date of delivery (EDD), the date of the last menstrual period is used (if the woman is sure of her dates). Palpation of the uterus and SFH measurements are used to support the EDD. SFH measurement is used if the dates of the last menstrual period are unknown, or wrong. Obstetrical ultrasound is conducted routinely at this hospital on all pregnant women and the results are also used to estimate gestational age,if needed.

Blood samples are taken to screen for syphilis using a rapid plasma regain (RPR) test (nonspecific regain test). Results of this test are confirmed by means of a treponema haemagglutination test (TPHA). A portable haemoglobinometer is used to determine Hb levels. All pregnant women are supposed to have a Hb measurement done at the first antenatal visit and again at 28 and 36 weeks. HIV serology (after pretest counselling) is done at all primary health care (PHC) clinics and Empangeni Hospital. Rhesus (D) blood grouping (Rh factor), determined using a rapid card test, is conducted at the first visit. Blood pressure (BP) measurement and a urine dipstick test are done at each visit for the screening of protein and glucose levels in the urine. Voluntary counselling and testing for HIV are offered to all pregnant mothers, for possible inclusion in the PMTCT programme.

Each mother attending a public healthcare facility receives stocks of ferrous sulphate (200 mg daily) and folic acid (5 mg daily) for supplementation, until the next appointment. Tetanus toxoid immunisation (a total of 3 doses) is given to prevent neonatal tetanus: 0.5 ml intra-muscular (IM) at the first visit is followed by a second dose 4 weeks later, and the third dose is given 6 months after the second dose.

Based on the findings of the above examinations and tests, a final assessment on risk status is done. Plans are then made for further antenatal care, for the management of any problems, and for the delivery itself. Once risk factors and/or conditions have been identified at any visit to a PHC, the pregnant mother is referred to the Empangeni Hospital antenatal clinic for management.

Study design and population

A retrospective cross-sectional descriptive study was conducted among women who delivered from July to December 2004 (a total of 5109 deliveries) at Empangeni Hospital.

Sample size calculation, selection and data collection

Minimum sample size was calculated using Epi-Info 3.3.2 version. In calculating the sample size we considered the following: population

size 5 109, expected frequency of 9% (< 10%), worst acceptable frequency for any measurable indicator 5.5%, and confidence level 95%. Two hundred and fifty maternity case records (representing mothers who delivered at or above 28 weeks of pregnancy) were selected using a simple random sampling method from all deliveries (obtained from maternity registrars).

At the first visit, a green card known as the "Maternity Case Record" is issued to each pregnant woman attending a health facility. The card is designed and produced by the National Department of Health, in accordance with the standard of antenatal care based on the risk approach. This is in accordance with the, principles and concepts of the World Health Organization (WHO).[2] It is used in all public health institutions during antenatal, labour and perinatal periods. The pregnant woman carries this card home and brings it to the health facility during her antenatal period, at delivery and at post-partum visits. Different parts or pages of the card contain the patient's detailed demographic information and the recording of initial and subsequent assessment, and was the source of data for this study. Data were collected using an Excel spreadsheet during January 2005. Prior permission was obtained from the Empangeni Hospital management to conduct the study. No names of individual patients were used in the analysis and reporting of the results.

Data analysis

Data were entered into a computer and analysed using SPSS 11.5 for Windows. Descriptive statistics were calculated (measures of central tendency, measure of spreading, frequency tables) depending on the measurement scale. A Pearson correlation test was performed to determine the significant relations (5% level of significance) (if any) among nominal variables. The chi-square test of association was carried out to determine the association between categorical variables of the study. Multiple linear regression and binary logistic regression were carried out to determine the significant predictors for numerical (number of antenatal visits) and dichotomous (early booking) dependent variables.

Results

Out of 250 samples, six records were lost and thus excluded from the study. A total of 244 maternity case records were thus reviewed. The mean age of the study subjects was 24.6 years, with a standard deviation of 6.42 years. Teenage pregnancy (age < 20 years) comprised 25%, The majority (53%) of the study subjects were between the ages of 20 and 29 years (see Table I). More than two-thirds of the women (76%) were single. The majority (82%) of these women had completed 6–11 years of education.

The majority (90%) of the pregnant women had no income. Only seven women earned R500 – R1 000, and two women earned over R3 000 a month. Over half (56%) of the pregnant women had more than six members in their family, with the mean number per households being 7.7. Nearly half (46%) of the women had parity between 1 and 3. The mean parity was 3. Virtually all (99.6%) of the pregnant women had booked for antenatal care, of which most (88.3%) had booked at PHC clinics. Only 9% of the pregnant women booked during their first trimester period but two-thirds (67%) of them booked during the second trimester of pregnancy.

Antenatal care indicators at the first visit

The selective antenatal care indicators are shown in Table II. The mean gestational age at the first visit was 22 weeks. It is important to note that the recording of syphilis screening was very low (18%).

Table I: Demographic information of 244 pregnant women (age, education, income, number of family members and parity)

Variables	Percentage
Age in years	
< 20 years	25
20–24 years	33
25–29 years	20
30–34 years	13
=> 35 years	9
Marital status	
Single	76
Married	23
Divorced/widowed	1
Parity	
Nil	40
1–3	46
4 or more	14
Education	
Nil	11
1–6 years	40
6–11 years	45
12 or more years	4
Income per month	
No income	90
Less than R500	1
R500–R3 000	8
More than R3 000	1
Number of family members	
3 or less	11
Between 4 and 6	33
Seven or more	56

Further, of those who had a positive syphilis status recorded only 16.67% had completed the full course of treatment (three doses) before delivery. Most (76%) of the pregnant women took part in voluntary counselling and testing (VCT) for HIV screening in order to join the PMTCT programme.

Table II: Selective antenatal care indicators at first visit

Variables recorded (n = 244)	Percentage
Complete past pregnancy history	95
Present pregnancy history (e.g. LMP)	96
Blood pressure	97
Urine test for – protein – glucose	97 97
Hb estimation	95
Screening test for syphilis results	18
Screening for Rh factor	84
Measurement of height and weight	100
Fundal height	88
Enrolment to VCT for PMTCT	76

Antenatal care indicators at 28 and 36 weeks

As most of the attendees had late booking visits, we measured the selected antenatal care indicators during 28–32 weeks of gestation and recorded the findings as for 28 weeks. Similarly, for women who attended at 36 weeks or later (> 36 weeks), the findings were recorded as for 36 weeks. A total of 233 and 213 women attended at 28 and 36 weeks respectively (see Table III). The numbers at these times were lower than at the first visit. This is because of early delivery (preterm), non-attendance during the defined period, and as a result of late booking.

Table III: Antenatal care indicators at 28 and 36 weeks of pregnancy

Variables recorded	Percentage at 28 weeks (n = 233)	Percentage at 36 weeks (n = 213)
Recording of weight	90	93
Fundal height	93	84
Blood pressure	97	95
Fetal heart rate	100	98
Urine dipstick test results – Protein – Glucose	94 93	91 95
Hb result	46	30
Syphilis screening	Not required	2

Before delivery, on average, every pregnant woman had six (median = 5) antenatal visits. Almost 40% visited 4–6 times before delivery, Completion of 3 doses of tetanus toxoid prophylaxis vaccination was recorded for more than half (55%) of the pregnant women. No demographic variable in this study contributed significantly either for early booking (first trimester) or for the total number of antenatal visits.

Applying multiple regression analysis, we did not find any significant predictor for the number of visits to the health facility. Logistic regression analysis also showed no demographic variable that was significantly associated with early booking.

Discussion

This study was limited to those women who delivered at Empangeni Hospital and received antenatal care from rural PHC health facilities, including Empangeni Hospital. Since most of the antenatal services are provided in PHC clinics and deliveries are conducted at Empangeni Hospital, these data reflected the overall antenatal care information of the population and health facilities of Empangeni sub-district. Mothers who delivered at home or in private or non-governmental (NGO) facilities were not included. This constituted a limitation of the study. A vast majority (95%) of pregnant women did however attend public health facilities in KZN and thus it was assumed that such a selection bias was minimal.[13,14] A possible study limitation would be the record review of care provided retrospectively.[20] Antenatal services provided to clients but not recorded on antenatal cards may lead to information bias with regard to our findings. Services provided but not recorded were considered as not being provided, but the client might have benefited from unrecorded services provided to them. On the other hand, not giving services the recording of variables also leads to false measurements.

The study indicated that the antenatal population in Empangeni sub-district is poorly educated, socio-economically poor, unemployed, and lives in big families. These are the signs of underdevelopment, which are not different to other rural areas in SA.[12] Strategies are thus urgently needed to improve the socio-economic conditions of the rural people, particularly women, who are recognised as marginalised or disadvantaged in South Africa.[21]

The mean parity of these women was 3, and very few (9%) were reported to book in the first trimester of pregnancy. One of the encouraging findings of the study is that, of all the pregnant women who attended antenatal care, most of them (89%) also attended PHC clinics in the district. The mean number of antenatal visits of 6 is more than the national target of 4.[19] Access to antenatal care has improved since the democratisation of SA, as observed in this study and in other studies.[13,14] This improvement can be attributed to the implementation of the policy of free maternal and child (under 6 years) care, and the emphasis on PHC services since 1996. However, in spite of free access, very few women attend clinics during their first trimester of pregnancy. Late visits may be due to their poor understanding of the importance of early booking. Cultural practices, and socio-economic factors related to transport costs might also be responsible for late bookings. A huge potential for health care thus remains insufficiently exploited. This warrants an urgent attempt to introduce health education to this population, targeting early booking for antenatal care together with other priority health issues for women, who are the most vulnerable group in the community.

This study investigated specific components of antenatal care (pregnancy history, examination, screening and prophylaxis) provided to pregnant women in health facilities (PHC clinics and Empangeni Hospital) in the Empangeni sub-district with regards to different gestational ages. It was found that the essential components of antenatal care as defined by SA National Department of Health and WHO (e.g. personal information, screening and services for anaemia, syphilis, tetanus toxoid, immunisation, measuring weight and blood pressure (BP) were not consistent.

The recording of present and past pregnancy history was optimal. The recordings of height, weight, BP, and urine testing were high (90%, 92%, 97%) at the first booking and at subsequent visits (i.e. 32 weeks and 36 weeks), but the optimal rate of 100% should be achieved. These elements that should be assessed are basic measures in monitoring a pregnant mother's health, since they have the potential to pre-determine cephalo-pelvic disproportion, lack of fetal growth and weight gain, development of pregnancy induced or essential hypertension, and complications arising from hypertension and diabetes. It is known and understood that when emphasis is placed on management of the leading causes of maternal deaths arising from gestational hypertension (pre-eclampsia), haemorrhage, puerperal sepsis, toxaemia, obstructed labour and of high-risk women with (pre-existing) diabetes, cardiovascular disorders, anaemia and infections, then maternal mortality can be reduced by skilled personnel, improved quality of antenatal care, and community education, as was shown in Jamaican hospitals and Indian primary health services.[23, 24]

The record of syphilis screening at the first visit was only 18% and at 36 weeks it was even lower (2%). This finding suggests that inadequate screening and treatment of syphilis in pregnancy represents an enormous missed opportunity to reduce maternal, perinatal and infant mortality and morbidity. In addition, inadequate syphilis screening probably represents an inadequate opportunity for reduction of HIV infection among pregnant mothers.[25] Screening for antenatal syphilis is not a problem only in rural SA. Only 38% pregnant women of those who attend antenatal care facilities in sub-Saharan Africa are screened for syphilis.[26] As syphilis screening is undertaken at the facilities by means of a rapid test, it is not unlikely that facilities encounter problems with the supply of the rapid test kits, and/or a lack of training, and/or the intention of healthcare workers to perform the test. On the other hand, screening of blood grouping was at a much higher level (84%). A rapid test kit is also used to perform this test. A similar finding related to syphilis status screening at 36 weeks has been observed in other studies.[26,27] Our performance is poor in screening and treating syphilis during antenatal care. It is therefore necessary to have motivated healthcare workers who will provide adequate antenatal services at rural health facilities.

A low record of complete 3 doses of tetanus toxoid at 36 weeks of gestation was found among 46% pregnant women. It is a compulsory intervention that all pregnant women receive the standard three-dose vaccination for tetanus to prevent neonatal tetanus. Our finding suggests that inadequate vaccination against neonatal tetanus in pregnancy represents an enormous missed opportunity to reduce perinatal and infant mortality. Such a high level of missed opportunities was also reported for another study conducted in Africa.[28] Contributing factors are poor history taking, lack of a current immunisation schedule, and dependence on physician referral for immunisation. These factors are not unlike those evident in our situation. In addition, late booking for antenatal care is also largely responsible for inadequate provision of the recommended doses of tetanus vaccine.

An HIV testing rate of 76% is low for inclusion in the PMTCT at the first visit as higher rates were observed in studies conducted in urban areas.[29] HIV testing is however optional for pregnant mothers and requires informed consent. As mothers are given the option of being included in the programme at any later date, the testing uptake of 76% at the first visit is considered reasonable. The uptake of the programme is dependent on many factors, such as the quality of counselling and provision of testing at the facility. A higher testing uptake rate is desirable at the first visit.

The assessment of the quality of antenatal care services, based on South African national standards, has shown that antenatal care providers are not offering an adequate quality of care. Instructions given in official guidelines, for example on screening of anaemia and syphilis, and the use of prophylaxis for neonatal tetanus, were infrequently carried out. Thus approaches to improve the quality of care should be based on regular training, supporting staff, quality assessments and additional operational research activities. The following are important components of such strategies, using an incremental approach: introducing a few issues at a time and revisiting them regularly; and ensuring participation, choice and ownership of every aspect of the strategy. These might improve the provision of antenatal care.

Conclusion

The study showed that although there has been an improvement in access to antenatal care, the standard offered in the Empangeni sub-district falls short of the required level. This shortfall represents missed opportunities to impact on maternal and perinatal health care. We propose that antenatal visits be used and conducted more effectively since they are an important point of contact between the health facilities and pregnant women.

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