Audit of antenatal care at a community health centre in Tshwane North subdistrict, Gauteng province

Horner V, MSc(CompSc), Research Fellow, South African Medical Research Council, Pretoria
Community Health Department, University of Limpopo, Medunsa Campus, Ga-Rankua
Rautenbach PGD, MBChB, MMed(Civ), Head of Department
Community Health Department, University of Limpopo, Medunsa Campus, Ga-Rankua
Mashamba TJ, MBChB, MMed, Principal Specialist and Senior Lecturer
Obstetrics and Gynaecology Department, University of Limpopo, Medunsa Campus, Ga-Rankua
Mbananga N, RN, PhD(Soc), Visiting Professor, LINK Centre, University of the Witwatersrand, Johannesburg
Olorunju S, PhD(AppStat), Specialist Statistician, Biostatistics Unit, South African Medical Research Council, Pretoria
Ramahlo T, RN, Midwife, Kgabo Community Health Centre, Winterveldt, Pretoria
Kwinda H, MBChB, Medical Officer, Elim Hospital, Elim, Vhembe District, Limpopo Province
Correspondence to: Vincent Horner, e-mail: vincent.horner@mrc.ac.za
Keywords: quality of antenatal care, clinical audit, guideline adherence, maternal health, primary healthcare

Abstract

Objective: Few studies document the level of compliance with antenatal care protocols in primary health care in South Africa. The aim of this study was to conduct an audit of antenatal care at a community health centre in Tshwane North subdistrict in order to measure the level of compliance of maternity staff with antenatal care protocols. This study was part of a larger study on a quality improvement initiative in primary health care.

Design and setting: A retrospective cross-sectional descriptive study was undertaken of women attending antenatal care at the study clinic. Data were collected through a review of the women's antenatal cards using criteria from the *Guidelines for maternity care in South Africa* and the basic antenatal care (BANC) checklist. In addition, qualitative interviews of maternity staff were undertaken in order to investigate reasons for noncompliance with the maternity care guidelines.

Results: The overall rate of compliance of nurses was 85.1%. This is less than optimal. The response (decision-making and interpretation) component of compliance was only 57.6%. This represents a significant missed opportunity in terms of quality of antenatal care. Important protocols, such as that pertaining to the prevention of mother-to-child transmission (PMTCT) of human immunodeficiency virus, were also not carried out correctly. The response to PMTCT protocols was 50% only, another significant opportunity missed. Administrative factors, patient-related factors and deficiencies in the knowledge and skills of nurses were identified and documented as reasons for noncompliance.

Conclusion: The study has provided a detailed picture of the situation with regard to non-compliance with the maternity care guidelines in a primary health care facility. Therefore, these data are very important in terms of quality assurance of maternity services in primary health care.

Introduction

This paper reports on the results of a review and audit of the quality of antenatal care at a clinic in Tshwane North subdistrict. This review and audit was part of a larger study on a quality improvement initiative in primary health care.[1] The focus of the quality improvement initiative was on improving compliance with the *Guidelines for maternity care in South Africa* and the basic antenatal care (BANC) checklist,[2,3] which are the main guidelines for maternal health care in primary health care. The rationale for conducting an audit on compliance with the maternity care guidelines and BANC checklist in primary health care will now be explained.

Although there is good coverage of effective maternal and child healthcare interventions in South Africa, maternal and child health indicators are poor.[4] For example, the coverage for antenatal care is estimated to be 94%, skilled birth attendance 84%, immunisation 93% and contraceptive prevalence 63%, which are all satisfactory. However, the maternal mortality and perinatal mortality rates are high, estimated at between 181 and 382/100 000 and 28/1 000, respectively.[5, 4] Thus, despite the availability of the guidelines and the BANC checklist, these maternal and perinatal mortality rates are unacceptably elevated.

Reports on maternal health, such as the *Saving Mothers 2005-2007: fourth report on confidential enquiries into maternal deaths in South Africa,* [5] suggest that there are problems in respect of compliance with the maternal healthcare guidelines. However, few studies document levels of compliance with the maternity care guidelines in

primary health care in South Africa. Most studies report on the coverage of antenatal care and the attendance of antenatal care by women, but few report on the detailed care activities that are carried out in respect of antenatal patients. Hence, the aim of this audit and review was to document and describe the extent of the problem of noncompliance with the maternity care guidelines at the study clinic, and thus contribute to understanding the problem of noncompliance with maternity care guidelines and protocols in South Africa.

Method

There was a quantitative component to the study to measure compliance at the study clinic, as well as a quantitative aspect, which sought reasons for noncompliance.

Quantitative review

Measuring compliance

A retrospective review of the antenatal cards of patients who attended antenatal care at the study clinic, and who also delivered their babies there, was the main method of assessing compliance. The review measured compliance with 18 antenatal care protocol items that corresponded with the main tasks that nurses are expected to carry out at the clinics. These 18 items were taken from the BANC checklist and the *Guidelines for maternity care in South Africa.* Each protocol item includes a number of subprotocols that describe options, as well as ranges and values. More than 49 rules were identified from the maternity care guidelines pertaining to these antenatal care protocol items by the researcher.[1]

The 18 antenatal care protocol items were:
- Previous pregnancy history.
- Current pregnancy history.
- General medical history.
- General examination.
- Symphysis fundal height (SFH).
- Feotal heart rate.
- Foetal lie and presentation.
- Severe symptoms, such as severe headaches, abdominal pain or discomfort, reduced foetal movement, abdominal bleeding and liquor drainage.
- Pregnancy infection.
- Blood pressure.
- Proteinuria.
- Maternal weight and height.
- Rhesus (Rh) blood group screening.
- Syphilis screening [rapid plasma reagin (RPR) test].
- Haemoglobin screening.
- Human immunodeficiency virus (HIV) screening and implementation of prevention of mother-to-child transmission of HIV (PMTCT).

- Glycosuria.
- Prophylaxis (calcium, iron and folic acid).

Compliance was measured in terms of completion and response. First, the protocol item was checked to determine whether or not it was carried out when due. If risk factors arose or abnormal values were observed, then a medical response was expected (the second part of compliance). Checking responses to identified risk factors is part of interpretation and decision-making. The separation of compliance into completion and response was decided upon because sometimes a task is carried out by a nurse, and perhaps a risk factor is correctly identified. However, the medical response by the nurse may be incorrect or inadequate. Missing information was scored as "not completed" in the record review.

Response adequacy was computed as the number of times that the response was adequate divided by the number of risk factors identified in the review. Similarly, the percentage for completion constituted the number of times that the procedure was actually carried out, divided by the number of times it was due.

Sample size and data collection

A sample of 25 antenatal cards was randomly selected from 114 patient cards, involving patients who had delivered babies in November and December 2010. The characteristics of the study sample are shown in Table I. The average patient age in the sample was 23.4 years, and the average gestational age of the sample at booking, 22.3 weeks. The sample size was selected for logistical reasons. For example, the time taken to review a card by the researcher was approximately three hours. This included creating an entry in the data collection system and entering the review data for the patient. The effort expanded in the review was similar to that involved for a case study. Often, the researcher had to conduct multiple rounds of

Table I: Characteristics of the study sample (n = 25)

Characteristic	Value (%)
Age groups	
Age (younger than 18 years)	8
Age (18-34 years)	92
Age (older than 34 years)	0
Gestational age at booking	
Gestational age (less than 20 weeks)	32
Gestational age (20-30 weeks)	60
Gestational age (more than 30 weeks)	8
Gravida	
Primigravida	40
Gravida (between two and four)	60
Primigravida	0

review of the cards when discrepancies in the criteria were identified and needed correction. Hence, making small adjustments to ensure optimal performance of the review criteria consumed considerable time. The review took four weeks to complete. The data from the record review formed the quantitative component of the study. Basic descriptive statistics were used for data analysis.

A standard data collection instrument was used to address reliability. The data collection instrument was based on the audit instrument from the BANC checklist in South Africa, which, in turn, is an adaptation of the World Health Organization standard on antenatal care.[3] A set of rules that described ranges for tests and an interpretation of patient examinations from the maternity care guidelines was used to address objectivity and observer bias. The record reviewer adhered to these criteria to ensure objectivity.

Study setting

The study clinic is located in a semi-rural township, approximately 45 km from the Pretoria central business district. The population of the township is estimated to be 80 000. The township consists of formal dwellings, as well as shacks, with many backroom dwellings. Unemployment is high (40%) and HIV prevalence is 22%.[6] Its profile fits that of a typical underserved area in South Africa, with a high burden of health issues. A general monthly patient load of approximately 13 000, an average of 210 antenatal patients per month, an average of 78 patients referred for labour per month, and an average of 104 deliveries per month, were typical characteristics at the study clinic. It featured one advanced midwife and 36 registered nurses.

Qualitative review

In addition, there was a qualitative component to the study, which involved interviews with the nurses at three community health centres in Tshwane Health District, including the study clinic, doctors at two referral hospitals, and district officials in charge of maternity services, in order to investigate reasons for noncompliance. Conducting a qualitative evaluation is in line with what is carried out in other studies in terms of measuring compliance and quality of health care. A qualitative evaluation seeks to explain the reasons behind observed process outcomes which cannot be obtained by quantitative means.[7, 8] Interviews with each respondent ranged from 1-2 hours.

The themes covered in the interviews were:
- The availability of guideline booklets.

- Attendance in respect of BANC training.
- Relevance of the content of the guidelines.
- Obstacles to compliance, which included patient-related factors, administrative factors and healthworker-related factors.
- Resources needed to implement the guidelines.
- The user-friendliness of the guidelines.

Ethics clearance

Ethics clearance was obtained from the Medunsa Research Ethics Committee. Study subjects (nurses, doctors and managers) signed informed consent forms.

Quality improvement initiative

The audit reported in this paper was part of a larger study on a quality improvement initiative in primary health care.[1] The larger study pertained to the development of a computerised decision-support system, the Basic Antenatal Care Information System (Bacis) programme, the intention of which was to improve compliance with the maternity care guidelines.[1]

Results

Quantitative review

The results pertaining to compliance are shown in Table II. The overall level of compliance at the study clinic was

Table II: Results of the compliance review

Item	Completion (%)	Adequate response (%)	Compliance (%)
Previous pregnancy history	100	0	84
Current pregnancy history	96	100	96
General medical history	100	100	100
General examination	67.4	50	67.4
Symphysis fundal height	87	*	87
Foetal heart rate (gestational age > 28 weeks)	100	*	100
Foetal lie and presentation (gestational age > 34 weeks)	87	*	87
Severe symptoms	*	66.6	97.8
Pregnancy infections	*	66.6	95.7
Blood pressure	100	0	95.7
Proteinuria	95.7	*	95.7
Maternal weight and height	58.7	*	58.7
Rhesus	88	0	84
Rapid plasma reagin	84	100	84
Human immunodeficiency virus	100	50	92
Haemoglobin	84	100	84
Glycosuria	93.5	*	93.5
Prophylaxis	30.4	*	30.4
Mean values	85.7	57.6	85.1

* This means that the item was not included in the column measure. The reasons for this are explained in the discussion section of this manuscript

measured to be 85.1%. Its completion component was 85.7%, and its response component 57.6%.

Qualitative review

The aim of the qualitative component of the study was to investigate reasons for noncompliance with the maternal healthcare guidelines at the study clinic.

Semi-structured interviews with two district managers, one consultant obstetrician, two advanced midwives and six professional nurses was the main method of data collection for the qualitative component of the study. The results of the qualitative interviews were grouped according to reasons for noncompliance.

Variance between the guidelines and clinic protocols

Previous low birthweight, a sub-item of the previous pregnancy history, was an example of variance between the guidelines and the clinic protocol. A threshold of 2.2 kg or 2 kg was determined to be a low birthweight, rather than the 2.5 kg recommended in the guidelines at the study clinic. This meant that generally the birthweight in this study was lower than the recommended threshold. The second item under guidelines which pertained to the referral of young mothers to hospitals (a sub-item of current pregnancy history) was not considered to be pragmatic. In the qualitative interviews, the nurses said: "There are many women with high parity and gravida, as well as teenage mothers in South Africa. Hence, if they were all to be referred as recommended by the guidelines, this would result in a very large number of referrals to the hospitals, which would be more than the referral hospitals could handle". The nurses said that in practice, young mothers were assessed by a senior midwife as to whether or not they were fit to deliver at the clinic before a decision on referral was made. Guidelines on general medical history, haemoglobin screening, maternal weight and height, hypertension screening and prophylaxis were also at variance with the clinic protocol.

Administrative or health system-related factors

There were compliance challenges in respect of Rh screening, RPR screening and haemoglobin screening owing to administrative problems. Most clinics do not have haemoglobinometers, which are required for haemoglobin screening. Hence, blood samples must be drawn and taken to the laboratory. As a result, patients do not receive their haemoglobin screening results immediately, and the results of the screening are not recorded on the cards if the patients do not return. The laboratories do not always have supplies, and therefore do not complete the screening of patient blood samples. Another administrative problem related to long queues at the clinics, resulting in some protocol items being skipped or not performed, because of time constraints.

Patient-related factors

Patients did not always return for follow-up visits, or booked late. Secondly, the health system is overwhelmed by a high number of teenage pregnancies (as young mothers need special care).

Healthworker-related factors

The main subfactors considered under healthworker-related factors were deficiencies in skills and knowledge with respect to the health workers. For example, in the qualitative interviews, when nurses were asked why there was a problem with completion of SFH, the answer was: "It's a general problem for which training is needed. Firstly, training is needed in obstetrics skills relating to SFH examination. Secondly, training is needed on how to complete the SFH chart properly". Thirdly, it was observed that there was a degree of mathematical intricacy to completing the SFH chart, which also contributed to its non-completion. Deficiencies in obstetrics skills and knowledge affected the completion of foetal lie and presentation.

An important final point on healthworker-related factors pertained to a poor response in respect of HIV screening and the PMTCT protocols. Even though there was a 100% completion rate for the HIV screening, which is satisfactory, there was a very poor response rate of only 50%. According to the *Saving mothers 2005-2007: fourth report on confidential enquiries into maternal deaths in South Africa,* at least 20% of maternal deaths relate to complications of HIV in pregnancy. In order to address this problem, the Department of Health introduced the PMTCT of HIV programme, in which pregnant women must undergo HIV screening. Those who test positive must be treated according to the PMTCT protocols.

The following deficiencies in response to the PMTCT protocols were in this study:

- A significant number of women were given zidovudine prophylaxis. However, the CD4 result was not recorded on the card.
- Sometimes an entry was made that blood was drawn for CD4 count screening. However, the CD4 result was not noted.
- There was no record of a request for a CD4 count in some cases.
- There were no notes on treatment at all in some instances.
- Screening for tuberculosis was not carried out in all of the HIV-positive patients in the review. This is another requirement of the PMTC protocols which was not met.

Other barriers to compliance

Training of nurses in the district and distribution of the guidelines booklets and BANC checklist educational packs is part of the strategy used by Tshwane Metsweding Health District for the promotion and dissemination of the maternity care guidelines and the BANC checklist. In the interviews, the district coordinators reported that "training on the BANC checklist occurred infrequently, even though there is a need for it. As a result, some nurses in the system have received training, while others have not". The training strategy used by the district administration was to train the trainer, whereafter representatives from the clinics would be trained. They would then be expected to train their colleagues at the clinics. However, district coordinators were unsure whether or not the train-the-trainer approach was effective in the clinics as a formal follow-up evaluation had not been conducted.

The following was observed in summarising reasons for noncompliance. Variance between the guidelines and clinic protocols affected the protocol items of previous pregnancy history and current pregnancy history. Patient-related factors affected the protocol item, current pregnancy. Administration-related factors affected protocol items, Rh screening, RPR screening, haemoglobin screening, and maternal weight and height. Knowledge deficiency in nurses affected the protocol items, SFH screening, foetal lie and presentation, severe symptoms, pregnancy infections and HIV screening. Other nurse-related factors affected protocol items, general examination, foetal heart rate, blood pressure screening and prophylaxis.

Discussion

Although 18 protocol items were considered in the review, severe symptoms and pregnancy infections were not included in the results column for "completion" because there were no fields for them on the antenatal cards. This made it difficult to determine whether or not they were performed based on the record review only. The administration must consider the inclusion of "pregnancy infections" and "severe symptoms" as fields on the antenatal cards because they are important items that are listed in the maternal healthcare guidelines. This would make it possible to quantify their completion rates.

Furthermore, only items where serious issues arose in the study were included in the results in the "response" column. Minor issues arose in the study with regard to proteinuria, maternal weight and height, foetal heart rate, foetal lie and presentation, and glycosuria, and were therefore not included for "response". In general, serious issues pertain to these items, although they were not found in this study sample. However, there were problems of completion with regard to many of them, which indicated quality problems.

Prophylaxis was only considered under "completion" as it is not a risk factor.

Although protocols exist for the assessment of the response to SFH, they could not consistently be applied in the record review because of missing information. Inconsistencies were also identified. Hence, the criteria for assessing response with regard to SFH need to be refined by the guideline authors so that it can be consistently applied in a record review. However, the rate of completion for SFH is a useful start in assessing compliance in respect of SFH. In this study, there were challenges in respect of the completion of SFH, indicative of quality problems, as reported in the qualitative interviews. Serious problems of response at the clinics were described by the nurses with regard to a number of other items not included under response, such as foetal lie and presentation, although no serious issues were identified in this regard in this study. However, these items also need to be followed-up in another study, in which they should be tracked and the response thereto quantified. Hence, of the 18 protocol items, only 11 were evaluated for response.

The characteristics of the study sample were not different from the characteristics of a prospective cohort of 100 patients recruited from the same clinic in the larger study on the Bacis programme. This may perhaps be interpreted as meaning that the main characteristics of the review sample were the norm for the study clinic. Also as review criteria were established in this study, future studies using these criteria will have a better method of estimating sample size and be able to work faster.

The overall results showed that the quality of antenatal care rendered at the study clinic was not optimal. Considering that the study clinic is one of the better equipped, staffed and higher-functioning clinics in the Tshwane health district, it can be reasonably assumed that the situation is worse in the lower-functioning clinics, which make up the majority of clinics in the district, and where most mothers attend antenatal care. Hence, there is a need for interventions that improve the compliance of health workers with guidelines and the BANC checklist.

The response of only 57% is a significant missed opportunity in respect of the delivery of high-quality antenatal care. Training and other interventions, such as the Bacis programme, need to be considered in order to improve response. It is critical that response is improved because response failure was determined in those when a risk factor or complication was encountered. There were missed opportunities with respect to completion of SFH, foetal lie and presentation, Rh screening, RPR screening and haemoglobin screening (individual protocol items considered in the review). Responses for HIV screening also represented another significant opportunity that was missed in terms of quality of antenatal care services delivered.

Interventions to lower teenage pregnancies need to be devised by the community with respect to patient-related factors in order to lower the burden on the health system. Ideally, young mothers should be in school. Patients also need to be educated on early attendance of antenatal care and the importance of follow-up visits. The administration needs to address problems relating to the availability of rapid tests, as well as other equipment that affected compliance with RPR screening, Rh screening and Hb screening. Thirdly, the variance between the guidelines and the clinic protocols needs to be investigated further, to determine whether or not it affects the quality of care rendered, as well as patient outcomes.

It was further found that training in respect of the BANC checklist had slowed down since the BANC checklist was introduced several years ago. Hence, a proposal is made that training requires supplementation through interventions such as the Bacis programme. When training resumes, follow-up and monitoring of the train-the- trainer approach at the clinics needs to be carried out to track the implementation and dissemination of the BANC checklist and guidelines.

The researcher observed that at all of the centres visited, including the study clinic, the nurses did not have copies of the guidelines at hand when discussing the maternity care protocols, but answered from memory. This suggests that there was a shortage of guideline booklets. When asked what someone did when they wanted information on the guidelines, the nurses replied: "They normally consult a colleague". It also required effort by the researcher to obtain a copy of the BANC checklist training pack at the beginning of the study to use it as a reference. This suggests that perhaps BANC checklist implementation has slowed in momentum since its inception in 2007, with resultant scarcity of the BANC checklist training packs. This seems to be in accordance with the pattern of most interventions, whereby implementation is sound in the beginning, but then tapers off with time. Therefore, guideline booklets need to be printed and made available at the clinics, where currently there is a shortage thereof. In addition, a system such as the Bacis programme can be used to provide electronic access to the guidelines, thus supplementing the limited supply of hard copies.

The review considered the cards of patients who delivered at the clinic, and hence it might be said that the sample mainly consisted of low-risk patients. However, many serious problems with regard to quality of care were identified in these patients. A future study must also include the cards of patients who commenced antenatal care at the clinic, but who then delivered at the hospital following referral owing to complications.

Provider-related factors that were considered in the qualitative review included knowledge gaps and skill deficiencies in respect of the nurses. However, issues relating to supervision and management can also impact on compliance. These were not the focus of the current study, but should be an opportunity for research in future studies.

Conclusion

This study provided a detailed picture of the situation with regards to noncompliance with the maternity care guidelines in a primary healthcare facility. Therefore, these results are vital in terms of the quality assurance of maternity services in primary health care.

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