Quality of Antenatal Care Provided by Nurse Midwives in an Urban Health Centre with Regard to Low-Risk Antenatal Mothers

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ABSTRACT

Background: India contributes to 19% of the global maternal deaths. Good quality antenatal care can prevent maternal deaths by early detection of complications and maintaining maternal health. There are few studies documenting quality of antenatal care in India. This study aimed to document the antenatal services provided by nurse midwives to low-risk pregnant mothers from an urban population. Aims: The primary objective was to describe the quality of the antenatal care provided by nurse midwives of an urban health centre with regard to low-risk mothers. The secondary objective was to document the maternal and early neonatal outcomes of the enrolled mothers during the period of study. Methods: This prospective cohort study was done on 200 pregnant women who had antenatal care by nurse midwives between April 2014 and November 2014. The quality of care was assessed by a checklist adapted from World Health Organization (WHO). Results: We report that the quality of antenatal care for all domains was above 90% except for the health education domain, which was poor with regard to breastfeeding and family planning in the enrolled 200 pregnant women. Conclusion: Our study concluded that trained nurse midwives when regularly monitored, audited and linked with reliable referral facilities can deliver good quality antenatal care.

Keywords: Antenatal care, continuity of care, maternal deaths, midwifery, quality

Introduction

India’s maternal mortality rate contributes to 19% of the global burden of maternal deaths. Most of the maternal deaths are preventable by access to quality antenatal health care, skilled assistance at delivery, and postnatal care. High-quality antenatal care alone could reduce maternal deaths by more than 20% if accessed and used regularly. Many centrally funded initiatives have been done by India especially since 2005. However, the research on quality assessment of antenatal care is scarce.

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Cite this article as: Pricilla RA, David KV, Siva R, Vimala TJ, Rahman SP, Angeline N. Quality of antenatal care provided by nurse midwives in an Urban health centre with regard to low-risk antenatal mothers. Indian J Community Med 2017;42:37-42.
The antenatal and delivery services provided by our urban health centre were started in response to the request by the local community. The services started in the year 2005 and were provided by trained nurse midwives under the supervision of a family physician or community physician. Trained midwives can provide quality antenatal and delivery care. A Cochrane review in 2008 comparing midwife led care with other models of care concluded that most women should be offered midwife-led care except when there are medical and obstetric complications.[6] We aimed to assess the quality of antenatal care provided by the nurse midwives which would guide us in future improvements.

According to Donabedin’s model of quality, the quality assessment of a health service involves studying the “structure,” “process” and “outcomes.”[7] As clinicians we surmised that the process would be a direct way of measuring quality. It would also help us in implementing changes for the better. The process involves studying the treatment provided, interpersonal relations, diagnostics, appropriate referral, co-ordination and continuity of care.[7] The outcomes of maternal health could also be studied. We thus conducted a prospective cohort study of the antenatal services of our urban health centre with the objective to assess the quality of these services provided by nurse midwives to low-risk mothers. We also documented the maternal and neonatal outcomes of the enrolled mothers.

Methods

Study design and setting

We conducted a prospective cohort study between April 2014 and November 2014 in the urban health centre of a tertiary teaching medical college and hospital in South India. This urban health centre is a secondary care unit providing curative and preventive care to urban population in the locality. It caters to a population of 198,000 and is situated approximately 2 km from the tertiary care centre. It has both in- and outpatient facilities. The inpatient facilities include a two-bed labour room but no facilities for caesarean section. The health services are provided by a team of family medicine and community health physicians and nurses. The antenatal clinic services are provided by nurse midwives once a week. This service was started in the year 2005 during which time the nurse midwives were trained and subsequently monitored regularly.

In the first visit to the centre, the mothers are screened for risk factors by the family physician/community physician. Those at high risk are referred to the obstetric unit of the tertiary centre. The referral was arranged with only one unit to maintain co-ordination and continuity of care. The mothers who were booked after screening had ultrasonography on the same day to confirm the gestational age. This was done by the physician who also performed the initial physical examination and ordered the necessary investigations. At the booking visit, the nurses did group health education mainly on services available at the centre, costs and planning for delivery. The nurses also taught simple exercises to help in relief of back pain and leg cramps. The nurse midwives also had regular training classes and audit of the process of care so that quality of care was maintained.

At subsequent visits, the antenatal care was provided by the nurse midwives. In these visits, the nurse checked the urine of the mothers for albumin and sugar, revised the exercises and provided health education on diet, preparation for delivery, danger signs during pregnancy, breastfeeding and family planning. They monitored and documented the blood pressure, weight of the mother, signs of anaemia and pedal oedema and examined the abdomen to check the growth of the baby. The growth of the baby is documented by plotting symphysio-fundal height of the uterus on a metro gram. The nurse midwives followed up the ordered blood investigations and explained the results to the mothers. The nurses recognized and reported any deviation from the normal to the physician posted at the antenatal clinic for that day. The mothers had a handheld antenatal record. A duplicate record was available at the centre.

Sample size and sampling technique

On the basis of the published literature from South India, we proposed to estimate that 80% (P) of mothers receive overall appropriate clinical quality of care.[8] We assumed an absolute precision (d) of 6% and anticipated 10% to lost to follow-up due to referrals or drop outs. Hence, we worked out a sample size of 200 study participants based on the formula[9]:

\[
Z^2 \frac{P(1-P)}{d^2}
\]

Due to logistical and practical considerations, we decided to recruit all eligible low-risk mothers attending the antenatal clinic during the study period.

Study participants

Our study enrolled 200 consecutive mothers who came for the antenatal check. We excluded mothers with gestational hypertension, gestational diabetes mellitus (GDM) on hypoglycaemic drugs, moderate or severe anaemia, history of heart disease and other systemic illness, past history of caesarean section, mal-presentation, multiple gestation and bad obstetric history.
**Human subject protection**
The Institutional Review Board (IRB) of the college approved the conduct of the study [vide IRB minutes of the meeting [8696] held on 26 February 2014; approval dated 7 April 2014]. Mother’s written informed consent was obtained with regard to the antenatal care process documentation and pregnancy outcomes.

**Study instruments**
The questionnaire for data capture was prepared using checklists suggested for monitoring the quality of the process of antenatal care by the World Health Organization, Indian public health standards, standard treatment and essential drug list and Donabedian model of quality assessment.[7,10-12] The questionnaire was translated into the local language and back translated for validation. The questionnaire assessed the quality of antenatal care using a checklist consisting of five main domains [Table 1]. There were a total of 25 parameters in the quality of antenatal care questionnaire. The assigned score was 1 if a parameter was performed and it was 0 if it was not performed. Each of the parameters had the same system of scoring and was given equal weightage. The minimum potential score was 0 and the maximum overall potential score was 25. The maternal outcomes and early neonatal outcomes of the enrolled mothers were documented.

**Data collection, management and statistical methods**
A project staff who was not part of the healthcare team collected the data. The project staff obtained written consent before enrolling in the study. The mothers were interviewed in privacy after the consultation using the questionnaire. The project staff also checked the antenatal record for concurrence in recording of the various parameters in the checklist. The interview of the mothers was done at 34-38 weeks of gestation. This time period was chosen so that the mothers would have had enough visits to comment on the quality of care. The mothers with high-risk factors would also have been referred by then. The maternal and early neonatal outcomes were followed up at the time of delivery. The project staff visited the mothers at their homes to determine the outcomes if they had delivered elsewhere. The data were entered using Epi-Data software. It was analysed using SPSS version 16.

The absolute distribution of the 25 parameters in all the five domains was calculated as proportions for all the participants. The mean, median, standard deviation and interquartile range for the five domains were calculated. We tested the relationship between quality care and parity, number of visits and years of experience of the care provider by using Mann–Whitney test for two independent groups.

### Results
A total of 200 low-risk mothers were enrolled in the study. There were no drop outs or lost to follow-up. The care was provided by nine nurse midwives who were qualified in general nurse and midwifery (GNM) with a median experience of 8 years. There was an equal distribution of prim parous (50.5%) and multiparous women (49.5%). About one fourth of the mothers had at least one antenatal risk factor. These included mainly gestational diabetes on diet and mild anaemia.

The mean gestational age at registration was 14 weeks. The total number of visits ranged from 2 to 10 and the mean, median and mode for the total visits was 6. The quality of care in the interpersonal domain was above 95% for the five parameters [Table 1]. In the domain of physical examination, all the parameters had a score of more than 95% except the checking for signs of anaemia.

| Table 1: Distribution of the domains of quality of care (N = 200) |
|-----------------------------------------------|-------------------|
| Activities by domains                         | Number reported as Percentage activity carried out |
| **Interpersonal interaction**                 |                   |
| Greetings                                      | 200 100           |
| Politeness                                     | 200 100           |
| Addressing concerns                            | 198 99            |
| Answering concerns                             | 199 99.5          |
| Explaining before examination                  | 191 95.5          |
| **Physical examination**                       |                   |
| Gestational age calculated                     | 199 99.5          |
| Height measured                                | 200 100           |
| Weight measured                                | 200 100           |
| Blood pressure checked                         | 199 99.5          |
| Signs of anaemia checked                       | 176 88            |
| Presence of oedema examined                    | 200 100           |
| Fundal height measured                         | 200 100           |
| Metro gram marked                              | 191 95.5          |
| Presentation checked                           | 196 98            |
| Foetal heart checked                           | 199 99.5          |
| **Diagnostic tests**                           |                   |
| Urine albumin/sugar                            | 200 100           |
| Haemoglobin estimated                          | 200 100           |
| HIV tested                                     | 200 100           |
| **Prophylactic drugs**                         |                   |
| Tetanus toxoid injection given                 | 199 99.5          |
| Iron and folic acid taken                      | 199 99.5          |
| **Health education**                           |                   |
| Diet advice on Iron rich food                  | 196 98            |
| Advice on preparedness for delivery            | 177 88.5          |
| Information about danger signs (maternal and foetal) | 191 95.5     |
| Breast/nipple care advice                      | 150 75            |
| Family planning advice                         | 79 39.5           |
which was 88%. The tetanus toxoid immunization and iron and folic acid prescribing was 99.5%. In the health education domain, more than 95% of the mothers received education on diet and danger signs during pregnancy. The teaching on breast care and family planning was given to 75% and 39.5% of the mothers respectively, which was considered as poor quality [Table 1].

The median scores of all the domains of quality of care except that of health education is same as the quartile score [Table 2]. There was a significant difference in the quality of care with regard to health education between multiparous and prim parous mothers. The health education on family planning was better among the multiparous mothers, as permanent methods of family planning were discussed more frequently than spacing methods. This, in turn, affected the overall score between the two groups. There was no significant difference in the quality of care of the various domains when compared with the experience of the nurse midwives or the number of visits.

Twenty mothers were admitted during the antenatal period at the urban health centre. The common reason was false labour followed by hyperemesis. A total of 27 mothers were referred during the antenatal period and 34 during the intrapartum period. Most of the intrapartum referrals were for failure to progress and foetal distress. This, in turn, affected the overall score between the two groups. There was no significant difference in the quality of care of the various domains when compared with the experience of the nurse midwives or the number of visits.

Among the enrolled mothers, 56% delivered at the urban health centre and 25.5% were referred to the tertiary centre. Only 18.5% of the mothers delivered in other health services like government or private sector [Table 3]. This is due to the state government scheme of remuneration for pregnant women if they deliver in the government centre.

About 78% of the mothers had normal vaginal delivery, 12.5% had instrumental delivery and 9.5% delivered by caesarean section.

The total number of mothers who had postpartum haemorrhage was 14 (7%), 11 of whom were in the urban health centre, two in the referral unit (both needed blood transfusion) and one in the government institution. Most of them (78.5%) were managed with oxytocin.

Only one mother who delivered at the urban health centre had postpartum infection. There were no postpartum referrals or maternal deaths. The main reason for postnatal stay of more than 2 days was puerperal sterilization, caesarean section and neonatal reasons.

The mean and median birth weights of the three groups were similar (2.9 kg). Babies who weighed less than 2.5 kg at birth were about 8.5%. All the babies delivered in the urban health centre had a favourable early neonatal outcome except for one early neonatal death due to severe birth asphyxia.

**Discussion**

This study was able to document the quality of antenatal care provided by nurse midwives to low-risk mothers...
in an urban healthcare unit. The nurses scored well in the interpersonal domain in the form of greeting the mother and addressing concerns. Qualitative studies have shown that interpersonal relations are important in ensuring attendance to antenatal care services.\[^{13}\] High-quality antenatal care ensures early detection of antenatal complications like anaemia and hypertension. In our urban health centre, 88% of the women were checked for signs of anaemia. This aspect needs improvement, as early detection and treatment of anaemia contributes significantly to reducing maternal mortality and morbidity.\[^{14}\]

Among the enrolled women, 99.5% had their blood pressure checked and 100% had their abdomen examined to check and document uterine fundal height. In contrast to this, the District Level Household Survey 3 done in 2007–2008 estimated that only 45.7% of pregnant women had their blood pressure checked and only 18.8% of mothers had a full antenatal check-up.\[^{15}\]

The health education on diet and danger signs in pregnancy given by nurses was more than 95%. The percentage of mothers who were educated on family planning methods was 39.5. According to Rani et al.,\[^{8}\] the percentage of pregnant women counselled on family planning methods in North India was 14.9, whereas that in South India was 43.3. Overall, nurses provided better information than doctors.

The services also ensured continuity of care in providing nurse-led delivery and postnatal care. Continuity of care is one of the prerequisites for good quality of care. The referral linkage was also reliable, as it was to the same obstetric unit. The obstetricians in this unit were aware of the protocols in the nurse-led antenatal and delivery centre and accepted referred mothers who had complication. This ensured that referred mothers will receive the appropriate care.

As there are more nurses available per population than doctors, and if they can provide good quality antenatal care especially with regard to low-risk pregnant mothers, it will not only improve maternal healthcare coverage but also make it more cost-effective. It will also give the doctors quality time with high-risk patients. This service needs to be effectively backed by a sound referral linkage to provide emergency obstetric care. The process of the services needs to be documented regularly, audited and improved based on the audit results. Such an approach could in the long term result in decline in the maternal and neonatal morbidity and mortality.

**Limitations**

This study is limited by the fact that it documented the antenatal services by nurse midwives without comparison to any other services. The nurses were aware of the observation by the project staff and may have performed better because of that.

**Conclusion**

Improving quality of antenatal care improves health outcomes of the pregnant mothers. Good quality antenatal care will ensure regular attendance as evidenced by the number of visits per mother in this study. Nurse midwives when trained and supported with reliable referral services can provide quality antenatal care.

**Acknowledgements**

We gratefully acknowledge the support of MHYP office (Dr. Prem K. Mony and team) and our external mentor Dr. Manickam Ponnaiah of National Institute of Epidemiology, Chennai. We also thank Dr. Luba Petrusha and Dr. Gigi Mathews for all their support, encouragement and guidance.

**Financial support and sponsorship**

This work was made possible by the Maternal Health Task Force (MHYP) at the Harvard T. H. Chan School of Public Health through Grant #01065000621 from the Bill and Melinda Gates Foundation. The Maternal Health Young Professionals (India) Mentoring Program was based at St. John’s Medical College and Research Institute, Bangalore.

**Conflicts of interest**

There are no conflicts of interest.

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