Outcomes of deliveries in a midwife-run labour room located at an urban health centre: Results of a 5-year retrospective study

K.V. DAVID, R.A. PRICILLA, S. VENKATESAN, S.P.M.F. RAHMAN, YESHVANTH KUMAR G.S., R. VIJAYASELVI

ABSTRACT

Background. We report the short-term maternal and neonatal outcomes for all deliveries conducted in a midwife-run labour room located at an urban health centre serving an urban population of Vellore, Tamil Nadu.

Methods. This 5-year (2005–10) retrospective study included all birth records including those of women and neonates transferred to our tertiary care referral centre. Maternal and neonatal outcomes were analysed among deliveries in the urban health centre and at the tertiary care referral centre.

Results. There were 1873 deliveries during the study period. One-third of women (679, 36.3%) were referred to the tertiary care centre. Seven (0.6%) women had postpartum haemorrhage. There were neither any maternal deaths nor any women with postpartum sepsis. Among the neonates, there were 20 (1.7%) stillbirths, 4 (0.3%) early neonatal deaths and 56 (4.7%) born with an Apgar score of <8.

Conclusion. Skilled midwife care during the antenatal period and during labour leads to good maternal and neonatal health outcomes. Implementing similar programmes could immensely improve the maternal and neonatal health indicators of India.


INTRODUCTION

India has the largest number of births per year (27 million) in the world along with a high maternal mortality ratio (MMR) of about 301 per 100 000 live-births. Thus, India contributes to 20% of the global maternal deaths. Reducing maternal deaths is crucial to achieving the global target of Millennium Development Goal 5.

Maternal mortality in India remains high and trained birth attendance during labour for all women is still much lower than the accepted norms. The Government of India has initiated several programmes since the 1990s to correct this deficit. Emergency obstetric care has been recognized to be a cost-effective strategy for reducing maternal deaths. In 1992–93, India launched the Child Survival and Safe Motherhood programme. This was followed by the Reproductive and Child Health programme in 1997. However, the emergency obstetric care facilities that were set up were not suitably monitored. To improve the availability and access to quality healthcare, especially for those residing in rural areas, the poor, as well as women and children, the government launched the National Rural Health Mission (NRHM). The NRHM promotes training of village health volunteers and provides cash incentives for institutional delivery.

Institutional delivery can be in a tertiary care hospital, district health centre, community health centre or primary health centre. Improving access to skilled care during antenatal, natal and postnatal periods is a key strategy to decrease MMR. The 2005 World Health Report recommends the provision of professional but de-medicalized care through midwife-led birthing centres located close to people’s homes. A trained midwife/auxiliary nurse-midwife (ANM) can deliver skilled birth attendance and thus make a positive change in reducing maternal deaths and postnatal complications. When such trained midwives work with standardized protocols for common emergencies under close supervision of a physician and have a good functional referral system and back up, a successful quality maternity care service can be set up in a low-resource area (rural or urban). Experience and evidence in Sweden and Sri Lanka show that midwifery-based maternal health services supported by referral and emergency obstetric care services were successful in reducing maternal deaths in resource-poor settings.

According to the National Family Health Survey 2006, more than half (50.7%) the women had at least three antenatal care visits for their most recent childbirth, less than a quarter took iron and folic acid for ≥90 days when they were pregnant, just under half the births (48.8%) were assisted by doctors/nurses/lady health visitors/ANMs/other health personnel, 40% institutional births and over one-third (36.8%) received postnatal care for 2 days.

The percentage of women who had three or more antenatal clinic visits ranges from 17% in Bihar and 27% in Uttar Pradesh...
to 90% or more in Kerala, Goa and Tamil Nadu. Moreover, women do not receive high-quality antenatal care as less than three in four had an abdominal examination, less than two in three received other services (weight, blood pressure check, urine albumin check, blood investigations) and only 36% received other information about complications during pregnancy. We hypothesized that utilizing well-trained midwives will improve the quality of maternal healthcare delivery.

METHODS
We documented the experience of an urban health centre in applying midwife-led maternal healthcare. A 5-year retrospective study of maternal outcomes in all those admitted in labour to the urban health centre was done. This included all birth records including those of women and newborns transferred to the tertiary care hospital intrapartum or in the first week postpartum.

Our centre is an established family medicine unit of the Christian Medical College and Hospital (CMCH), a tertiary care hospital in Vellore, Tamil Nadu. The family medicine unit is based at the urban health centre which provides service to the economically backward local population. The services included medical care for all common health problems at the secondary care level. In response to the requests of the local population, a two-bedded labour room and antenatal care facilities were started in the year 2005. The antenatal clinic and labour room are run by trained nurse-midwives. The nurse-midwives had either undergone an 18-month ANM certificate course or a three-year general nursing and midwifery (GNM) diploma course; both are recognized by the State Nursing Council.

At the time of initiating the maternity services, a quick assessment of the knowledge and skills of the nurse-midwives revealed that most of them lacked the skills and confidence to perform basic antenatal care, conduct a delivery and manage emerging complications independently. Hence, two nurses enrolled and completed the emergency obstetric care (EmOC) course conducted at the CMCH. All the nurse-midwives were rotated in the labour ward in the tertiary care centre and in the rural secondary health centre. Clear protocols, based on the Integrated Management of Pregnancy and Childbirth (WHO manual), were written with the help of a senior obstetrician from Michigan and the senior obstetrician of the referral unit of the CMCH. These protocols covered antenatal care as well as common problems seen during intrapartum care. It also listed indications for referral which had to be done in consultation with the on-call family physician.

The nurse-midwives were trained to use the protocol for each patient. Antenatal care was provided by the midwives once a week. One family physician was available for consultation and screening high-risk pregnancies. Women with high-risk pregnancy were referred to the CMCH centre for antenatal care and confinement. The expecting mothers were taught simple exercises, given health education on recognition of danger signs during pregnancy, breastfeeding and weaning. The midwives monitored the blood pressure, weight of the mother and checked the growth of the baby using the symphysis-fundal height (SFH) measurement. SFH was plotted on a metrogram and any deviations were reported to the family physician. The mothers kept the records with them. All documentation and follow-up of investigations was done by the midwives. An ultrasound machine was available mainly for confirming gestational age and for foetal surveillance. Ultrasonography was done by the family physician.

The midwives were trained to follow evidence-based labour and delivery care. At the time of admission to the labour room, general examination was done, maternal uterine contractions were monitored and the foetal heart rate was recorded by the midwives. A per vaginal examination was done only if the patient had effective labour pains. The patient’s relatives were permitted to be with her for moral, physical and emotional support. The WHO simplified partograph was used to monitor progress in labour and to help in deciding referral for patients with prolonged labour. Deliveries were conducted by the midwives. Routine episiotomy was not practised and all perineal tears were sutured by the nurse-midwives. They also performed active management of the third stage of labour, neonatal resuscitation and initial management of postpartum haemorrhage (PPH) by intravenous administration of oxytocin and uterine massage.

Induction of labour was not done routinely. The decision for induction was taken in consultation with the family physician. It was done only for women with term premature rupture of membranes (PROM) and post-dated pregnancies with favourable Bishop score. Augmentation was not done on the request of the family members. If such patients insisted, they were referred to the hospital of their choice. Induction of labour was not done prior to the year 2008.

Women were discharged 24 hours after delivery. A postnatal check of the mother and baby was done by nurse-midwives and family physicians. If there were any maternal or neonatal problems they stayed for a longer period. When referral was advised to the CMCH, which is located 5 km away, the patient’s relatives arranged for the transport. The patient had the choice of being transferred to the government hospital or any local private hospital if they desired. When necessary, the nurse-midwife/physician accompanied the woman during the transfer. The referral was arranged only to one unit of the CMCH whose obstetricians understood the financial situation of the patient and the role played by the midwives in the urban health centre. The decision to exempt payment of fee for services at the CMCH was taken in consultation with the social worker of the obstetric unit. As the referral was smooth, follow-up was also possible. All the recording of antenatal care, admission to the labour ward, monitoring of labour, partograph, delivery, postpartum care, neonatal care and discharge notes were done by the nurse-midwives. The data were entered in SPSS 17.0 (Statistical Package of Social Science) and analysed retrospectively.

RESULTS
During the 5-year period, there were 1873 deliveries in the midwife-run labour room (Table I). Among these, 679 (36.3%) women were referred based on the protocol for management in labour. Of these referred women, 466 had their deliveries at the CMCH. The remaining chose to deliver at the government hospital or a private hospital of their choice. The follow-up of patients who delivered in the tertiary care unit was possible.

Deliveries at the urban health centre
The total number of deliveries at the urban health centre was 1194. Most of them were multiparous (760, 63.7%) women. There were

<table>
<thead>
<tr>
<th>Table I. Location of deliveries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deliveries by location</td>
</tr>
<tr>
<td>At the urban health centre</td>
</tr>
<tr>
<td>Referred to obstetric unit at tertiary care centre</td>
</tr>
<tr>
<td>Delivered at government hospital/other private hospital</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
1158 (97%) normal vaginal deliveries, 30 (2.5%) forceps deliveries and 6 (0.5%) breech deliveries (Table II). Operative and breech deliveries were conducted by the on-call family physician. Only 7 (0.6%) women had PPH, of which 6 were managed by the nurses with the assistance of the on-call family physician. One patient was transfused blood in the urban health centre. One patient was transferred to the CMCH for manual removal of placenta. Active management of the third stage of labour was practised for all deliveries and oxytocin was administered through the intramuscular route by the attending midwife. No woman had puerperal sepsis. There were no maternal deaths during the study period.

**Apgar scores and neonatal outcome**

Among the babies delivered in the urban health centre, 56 (4.7%) had an Apgar score of <8. There were 20 (1.7%) stillbirths and 4 (0.3%) early neonatal deaths (Table II). Thirty (2.5%) babies were referred to the nursery of the CMCH for various reasons including meconium aspiration, birth asphyxia and surgical management of congenital anomalies such as diaphragmatic hernia and imperforate anus. All four early neonatal deaths were due to birth asphyxia. Among the stillbirths, there were two fresh stillbirths; both were of low-birth weight.

**Referred to a higher centre**

A total of 679 (36.3%) women in labour were referred to a higher centre. The decision to refer was made based on the protocols for management in labour. The most common reasons for referral were PROM (136, 20%) and failure to progress (102, 15%). The other reasons included foetal distress (8.8%), pregnancy-induced hypertension (10%), post-dated pregnancies (6.2%) and grade III meconium (6.3%) in early labour (Table III).

**Maternal and neonatal outcome at CMCH**

Among the 466 women referred to the obstetric unit in the CMCH, 234 (50.2%) had a normal vaginal delivery, 92 (19.7%) had operative vaginal deliveries including forceps and vacuum extraction, and 122 (26.2%) women underwent caesarean section (Table II). Forty-one (8.8%) babies had Apgar scores of <8. There were 17 (3.6%) stillbirths and one early neonatal death. Many stillbirths were complicated by pregnancy-induced hypertension, intrauterine growth retardation and congenital anomalies. There were no maternal deaths among the referred patients. Some outcomes could not be ascertained due to missing records.

**DISCUSSION**

The first stated goal in the Eleventh Five-Year Plan (2007–12) of the Government of India was to reduce MMR to 100 per 100 000 live-births. Many programmes have been initiated with this objective in mind. The five most common direct causes of maternal mortality in India are haemorrhage (38%), sepsis (11%), unsafe abortion (8%), hypertensive disorders (5%) and obstructed labour (5%). Deaths due to haemorrhage, sepsis and obstructed labour can be effectively prevented by attendance at delivery by trained personnel. There is a lack of trained staff to manage severe PPH. An index used to measure the availability of such personnel in India gives a score of only 35 out of 100.

We recorded the outcome of a group of low-risk mothers who received antenatal and delivery care by midwives and family physicians. Our observations indicate that it is possible to provide skilled maternal and neonatal care with the help of trained midwives. We believe that outcomes are improved when the midwife-run centre is linked, for referral purposes, to an obstetric unit. As recorded, 0.6% of mothers had significant PPH in the urban health centre; there were no cases of puerperal sepsis.

In Sri Lanka, Malaysia and Thailand, where governments had introduced professional midwifery care at childbirth, there has been a drastic reduction in maternal mortality. Malaysia had introduced the provision of midwifery care through a network of ‘low-risk delivery centres’ supported by high-quality referral care. The MMR there fell from 250/100 000 in 1960 to below 100/100 000 in 1970 and then to below 50/100 000 in the 1980s. Similarly, in Thailand, the government gradually replaced traditional birth attendants with certified village midwives. Thailand also recorded a huge reduction in the MMR from above 400/100 000 to below 50/100 000 by the 1990s. Such examples demonstrate that initiatives to provide skilled professional care will result in a definite reduction in maternal deaths.

In India, the neonatal mortality rate in 2005–06 was 39 per 1000 live-births. This rate varies from state to state. Kerala and Tamil Nadu, where skilled attendance at labour and institutional births are higher, have a low neonatal mortality rate of 11.5 and 19.1 per 1000 live-births, respectively. A recent review showed that the availability of skilled birth attendants could reduce stillbirths by about 23%. The three common causes of neonatal deaths in India are prematurity/low-birth weight, neonatal infection and birth asphyxia. These causes contributed to 78% of all neonatal deaths in India in 2005. These conditions are preventable by skilled maternal and neonatal care at birth. Neonatal and mortality rates are related to the absence of skilled birth attendants.
In Southeast Asian countries, there is an increase in the percentage of births without skilled attendants, which is directly proportional to the neonatal and maternal mortality and it is matched only by that of Africa. During the period of our study, we observed 20 (1.7%) stillbirths and 56 (4.7%) neonates had an Apgar score of <8. The nurse-midwives were able to provide newborn care and basic resuscitation needed for these babies, demonstrating the effect of skilled attendance on newborn deaths.

One in four maternal deaths occurs during the antenatal period. Hence, it is important to identify at-risk mothers and arrange for appropriate follow-up and management. Skilled care during antenatal and labour for mothers can be provided by certified midwives, nurses and doctors. Certified trained midwives would be more cost-effective. The midwives would need hands-on training and refresher classes at frequent intervals. The nurse-midwives in our study worked on the basis of protocols which had clear guidelines on when to refer to the tertiary obstetric unit. Continued supervision and feedback on the outcome of referred cases would benefit the urban health centre on how to improve their outcomes. Thus, a decision to include induction of labour for PROMs and post-dated pregnancies were done after an interim analysis of outcomes of referred cases. The screening of mothers to low-risk category in the antenatal period is also important.

We believe that such a model of maternal care provided by committed nurse-midwives who are supervised by a family physician and supported by a well-linked referral system would greatly improve the availability of skilled maternal and neonatal care to mothers in urban and rural areas. Every mother needs skilled maternal and newborn care which is close to her home and easily accessible. This would contribute to improving the national maternal and neonatal health indicators.

ACKNOWLEDGEMENTS

We gratefully acknowledge Drs Luba Petrusha and Gigi Matthews for their support in the preparation of the protocols and the training of our nurse-midwives. We also thank the nurse-midwives who eagerly and enthusiastically learnt and applied the new protocols.

REFERENCES