Original Article

Emergency Obstetric Care in a Rural Hospital: On-call Specialists Can Manage C-sections

Shyam V Ashtekar, Madhav B Kulkarni, Ratna S Ashtekar, Vaishali S Sadavarte
Bharat Vaidyaka Sanstha, Nashik, 1Department of Mathematics and Statistics, BYK College of Commerce, 2Hospital at Dindori, Nashik, Maharashtra, India

ABSTRACT

Background: Institutional birth and Emergency Obstetric Care (EmOC) are important strategies of the National Rural Health Mission (NRHM). While the Community Health Center (CHC) is expected to serve EmOC needs in NRHM, the CHCs are hamstrung due to chronic shortage of specialist doctors. Alternative strategies are therefore needed for ensuring EmOC. Objectives: This study aims to estimate the EmOC needs in a private rural hospital from case records and find some useful predictors for caesarean section (C-section) and to assess C-section needs in the context of on-call specialist support. Materials and Methods: We analyzed a two-decade series of 2587 obstetric cases in a private rural hospital for normal deliveries and EmOC including C-section. Results: About 80% of the obstetric cases were normal deliveries. Of the remaining 20% cases that required EmOC, nearly one-third required C-section. In the series, two maternal deaths occurred due to hemorrhage. About 13% case records showed past abortion, which adds to EmOC workload. Primiparous mothers with higher age had a greater incidence (23%) of C-section. The C-section rate shows a steady rise from 3% to above 10% in the series. Conclusions: This rural hospital required C-section in 6.4% cases. This C-section workload was managed with the help of on-call specialists. The local hospital team could manage 93.6% of the cases and abortions with only two maternal deaths. This strategy of an on-call specialist team can be an option for CHCs till resident specialists are adequately available.

Keywords: Abortion, community health center, C-section, emergency obstetric care

Introduction

The well-known Lancet series on maternal survival insists on good intrapartum care in health centers. But, the article argues that “...the capacity to provide adequate and timely emergency obstetric care (EmOC) is, however, the minimum standard a health system is ethically obliged to provide to begin to address maternal mortality.”(1) EmOC consists of two levels; the basic EmOC (BEmOC) and the comprehensive EmOC (CEmOC). CEmOC requires caesarean section (C-section) and blood availability. NFHS3 (2005–06) estimates that C-section constituted 5.6% of rural deliveries and 16.8% of urban deliveries, and 8.5% of the total deliveries.(2) The urban–rural difference is partly because of scarcity of facilities in rural areas. The NRHM launched in 2005 sought to reduce maternal and neonatal deaths and therefore adopted the strategy of promoting institutional deliveries. However, the MOHFW reported a shortfall of 68% of obstetricians and gynecologists even in 2008–09.(3) Even in a progressive state like Maharashtra, in 2008, of 407 posts of gynecologists in Community Health Centers (CHCs), 264 were vacant and anesthetists were even more scant.(4) It is no wonder that in the year 2009–10, all 407 CHCs in the state of Maharashtra could perform merely 4001 C-sections, less than 10 per annum per unit.(5) In response to these chronic specialist shortages, health administrations have deployed various strategies. The well-known Chiranjeevi Yojna (CY) of Gujarat is a partnership with the private health sector and has a C-section rate of 6.2% in the year 2008.(6) This figure can be considered as the lower end of the optimal range of...
C-section rate especially because it is obtained from a large-scale public private institutional arrangement. The second CEmOC strategy is the FOGSI (Federation of Obstetric Societies of India)-sponsored scheme of training basic doctors. In this, the MOHFW, Government of India, in partnership with the FOGSI and Indian College of Obstetrics and Gynecology (ICOG) has embarked upon implementing the Comprehensive Emergency Obstetric (EmOC) Certificate Program in 20 states of India to help our country achieve the goals set as per NRHM and MDGs. In Tamilnadu, a First Referral Unit (FRU) with CEmOC was made available at 30–40 km distance with emergency transport support. This has been the limiting factor in rural services. The present study intends to examine the EmOC workload at a private rural hospital and how a local team could manage EmOC with the help of on-call specialists for C-section and also to find some useful predictors for C-section.

**Materials and Methods**

The northern block of Dindori in Nashik district (Maharashtra) has a mixed population of tribal and nontribal rural communities. On the eastern side, this block has flourishing grape farms and wineries but the other western hillside has tribal communities subsisting on single rice crops and migration for seasonal labor. The block has two CHCs, 10 primary health centers and 67 health subcenters. Economic progress in the two decades has replaced bullock carts with motorbikes, jeeps and cars. Road traffic has apparently grown many times over in the two decades. Cell phones are ubiquitous even in tribal areas. The private hospital in this study was started in 1988 to offer rational and ethical care for rural people. This hospital is based in Dindori village in a rural block in Nashik district in Maharashtra, 25 km away from the city of Nashik. This block has a population of 2.65 lakh spread in 157 villages. The district hospital is 25 km by road and takes about 1 h to reach from Dindori. For all but 1 year, the hospital was run by a nongynecologist doctor and coauthor of this paper who is a pediatrician by training. From 1998, an Ayurveda graduate lady doctor joined the hospital work, and she has learnt all the BEmOC skills except Medical Termination of Pregnancy. The Obstetric–Gynec work dominated clinical work in all these years. The study includes all the 2587 birth events in the hospital from 1988 to 2007. The families came from tribal and nontribal villages. The obstetric case records are the database for this study. Incomplete case records (88) were deleted from the study. The following important variables were available for analysis: Mother’s age, parity, abortion history, birth weight of the baby and outcome description of obstetric event. Records of mother’s education, weight and hemoglobin were not mentioned on the case record itself and the ANC records were not available for this retrospective study; hence, these three factors could not be considered. It was not possible to get the data of any obstetric cases referred to city hospitals for medical or other reasons, which is a limitation. The outcome at the time of delivery, either full-term or pre-term, was recorded in each case as: (a) type of obstetric event and (b) type of obstetric intervention done. Episiotomy assistance was not categorized as assisted delivery. We analyzed the association of C-section with parity and age of mother to find any predilection for C-section. The process of tracking progress of labor and assessment of risk factors was recorded by discussion with the local team of doctors and from some case sheets. We could get an abortion incidence from the recorded obstetric history, with some limitations of recall. It was not mentioned if the stated abortion was natural or induced. It was noted that this hospital has no blood storage unit. The details of any other cases referred from the hospital to another center are not available.

**Results**

Table 1 shows that 80% of the cases are Full-Term Normal Deliveries (FTNDs). The remaining 20% events include complicated outcomes that need active EmOC.

**Table 1: Obstetric outcome in the series**

| Category of obstetric outcome/event | Subcategory | N  | %  |
|------------------------------------|-------------|----|----|
| Fetal outcomes                     | Subtotal A  | 218| 8.3|
| Pre-term                           | 160         | 6.2|
| Twin                               | 30          | 1.2|
| Antepartum fetal deaths            | 13          | 0.5|
| Intrauterine death                 | 7           | 0.3|
| Congenital anomaly, distress with PET | 6       | 0.1|
| Intrapartum fetal death            | 2           | 0.1|
| Major interventions and complications | Subtotal B  | 295| 11.4|
| C-section (C-section)              | 167         | 6.5|
| Vacuum extraction of baby          | 101         | 3.9|
| Breech-assisted delivery           | 21          | 0.8|
| Difficult delivery                 | 4           | 0.2|
| Serious post partum hemorrhage     | 1           | 0.0|
| Short general anesthesia           | 1           | 0.0|
| Full-term normal delivery          | Subtotal C  | 2072| 80.1|
| Home delivery or delivery in vehicle | 2    | 0.1|
| Total                              | 2587        |    | 100|

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The major interventions (11%) include C-section, Breech and vacuum deliveries. The fetal outcomes (9%) include pre-term babies, stillbirths, fetal distress, twins, Intrauterine Growth Retardation and Intrauterine Death. C-section is the most essential obstetric intervention that required a specialist team and even blood at times. Hence, we analyzed the series for C-section separately. Table 2 gives the annual deliveries and C-section rates. The data for first 3 years was clubbed as C-section services not well organized in these years. The series yields a rate of 3–12.6% for C-section, and a mean of 6.4%. The spike C-section rate to 12.6% in year 1999 is probably due to the availability of a resident full-time gynecologist and a pediatrician in that year, who left work the next year because of insufficient work. Association of C-section with maternal age and parity was tested, and the details are presented in Figure 1. For this, the data was divided into three age groups: (i) <20 years, (ii) 20–25 years and (iii) above 25 years. Then, the records were categorized according to the parity: (i) Parity 0 or (ii) Parity 1 and above. It is observed that primiparous mothers experienced a higher incidence of C-section. This rise is especially higher for mothers in the age group of 25 years and above. The difference was statistically significant (P value close to 0). Two mothers died in the entire series, one in 1995 and another in 2008. The first maternal death was because of Post Partum Hemorrhage. She was admitted without prior registration and came in the third stage of labor and experienced post partum bleeding. She was referred to the district hospital at Nashik, where she died half an hour later due to disseminated intravascular coagulopathy (DIC), which causes continued bleeding. The second case was of a mother coming from a nomadic cowherd family who was also not registered with the hospital. She was brought to the hospital with severe Ante Partum Hemorrhage due to abruptio placenta, and she also died due to DIC. These two maternal deaths give a maternal mortality rate (MMR) of 0.8 per 1000 births. The case records suggest that 13.6% women had experienced one or more abortions.

Discussion

Good EmOC is most critical for reducing MMR, and C-section is the central issue in EmOC as it requires a trained surgeon and anesthetist. The National Rural Health Mission (NRHM) has been promoting institutional delivery to reduce maternal and neonatal deaths. An obstetric and anesthetic specialist is necessary in CHCs for CEmOC. To address the problems of chronic shortages of specialists at CHCs, the NRHM has adopted various strategies like CY in Gujarat, selective FRU development in Tamilnadu and contracting private doctors for services at CHCs. Contracts with private specialists for each CHC have also not yielded results, as shown by the C-section statistics of Maharashtra. The FOGSI scheme of training basic doctors is yet to deliver on a scale and, anyway, seems to be a somewhat long and tenuous process. It calls for training of a large number of doctors for C-section and anesthesia, posting and retaining them for CHCs, ensuring motivation for surgery and solving logistical problems at CHCs like blood and anesthesia. The Tamilnadu scheme seems to be the one promising option in the NRHM experience.

This study explores obstetric outcomes of a long series of maternity services in a private rural hospital. The outcome recorded in each case as type of obstetric event and obstetric interventions done are obviously not very rigorous. With these provisos, nearly 80% cases are FTNDs while 20% events are complicated and hence require EmOC assistance. In the 20% difficult cases, nearly one-third required C-section, which were managed with the help of on-call specialists available at

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**Table 2: Year-wise incidence of C-section**

| Year   | C-section | Total deliveries | Percentage |
|--------|-----------|-----------------|------------|
| 1989–93| 10        | 325             | 3.1        |
| 1994   | 6         | 165             | 3.6        |
| 1995   | 4         | 132             | 3.0        |
| 1996   | 7         | 145             | 4.8        |
| 1997   | 10        | 179             | 5.6        |
| 1998   | 13        | 194             | 6.7        |
| 1999   | 20        | 159             | 12.6       |
| 2000   | 13        | 197             | 6.6        |
| 2001   | 5         | 173             | 2.9        |
| 2002   | 12        | 164             | 7.3        |
| 2003   | 9         | 203             | 4.4        |
| 2004   | 17        | 184             | 9.2        |
| 2005   | 21        | 182             | 11.5       |
| 2006   | 15        | 144             | 10.4       |
| 2007   | 4         | 40              | 10.0       |
| Total  | 166       | 2586            | 6.4        |
a distance of 30 km and 1 h away. It is possible that some obstetric cases were referred to the Govt Rural Hospital or district hospital at the stage of enquiry if they were unable to pay any costs in a private hospital, although this hospital charged much less than private hospitals in the district city. But, the cases referred to district hospitals for being high risk were very few and would not alter the 20% portion of difficult cases in Table 1 greatly. In the initial years, C-section services’ help was not readily available at this hospital. Some cases may have been referred to private hospitals, but data is not available on these cases. The low C-section rate in those years may be due to these referrals. Most of the non-C-section workload and the abortions were managed by a local team of the two doctors with basic skills. Use of vacuum extraction of the baby in case of 4% of the deliveries was also helpful in averting some C-sections. The skills for tackling abortion are easier to learn as compared with C-section. This study spanning over the last two decades suggests an alternative strategy when resident specialists are not available. As 80% of the events in the series are full-term normal deliveries, the 24-h presence of a skilled obstetric specialist is not necessary. The local team could manage about 93% of the cases. This is also the implication of the lancet series. The adverse event is not fully predictable and so the center needs to have well-trained and motivated doctors to at least diagnose the forthcoming complexity and call for specialists in time. Therefore, the real need for surgeon and anesthetist was limited (6.4% in this study). C-section was highest in the year 1999, the only year the hospital had an in-house obstetrician, which could be the cause of a somewhat higher C-section rate that year (12%). But, we could not find any other difference it made to the maternal or fetal outcomes in 1999. The dip in C-section rate in 2001 cannot be explained on the basis of the data available. It is important to note that the post-2005 level of higher than 10% C-section rate may be due to higher safety criteria on the part of the providers. The C-section rate shows a steady rise from 3% to above 10% in the series in Table 1, barring years 2000 and 2001, with the highest and lowest figures, and year 2003 with another low record of 4.4%. Hence, we may suggest that the safe level of C-section rates in such situations can be above 10% with the current set of factors, like better monitoring, risk perception, mobility of surgeons and some client pressure in the private sector. This hospital has a low MMR (0.8/1000 births) despite the fact that primaparous mothers made nearly half the case load (47%). It is this group that has a higher risk and need more of C-section help, the evidence being that primaparous mothers in this series had 8.4% C-section deliveries as against 4.8% for higher parity. The overall C-section rate of 6.4% in this study is similar to the statewide CY rate (6.2%) in Gujarat. However, some C-sections must have been missed in both this and the CY study due to referral to public facilities. It must be mentioned here that enrolment to CY required a resident gynecologist for each unit, which is not the case here. The current series shows a higher occurrence of C-section (23%) for primaparous mothers in higher age groups. This can be a helpful alert for the on-call specialist team. NFHS3 also shows a higher C-section incidence among primiparous mothers (14.8% as against 8.2 for parity 2) and a high C-section rate of 9.2% in the 20–34-year age group as compared with age groups below or above it. Although the scale of this study is small and confined to one private rural hospital, this is the very model with which most rural private hospitals are managing maternity services for some years. Hence, instead of getting stuck without a surgeon–anesthetist team for each CHC, or till such time as we get them in good numbers, mobile teams should be deployed. It is possible to keep a rapid mobile squad at a select location. With a birth rate of 20, a block with 2 lakh population will have 4000 deliveries per annum, yielding a C-section workload of 400 over the year at a liberal calculation with 10% C-section rate. This implies just above one C-section per day. Because a team can manage two to four C-sections a day, we can club a population of 4 lakhs under one team. This covers about four CHCs in adjacent blocks for providing C-section support. It is also necessary to ensure a good local BEmOC team at all CHCs. The Tamilnadu FRU strategy takes the patient to the FRU, while this private rural hospital works the other way, hiring on-call specialists. For the family, the latter approach is more convenient. The series spanning two decades has low maternal mortality, which is proof that such a strategy can work. This hospital did not have a blood storage unit. However, a blood storage unit is necessary for saving women with hemorrhage, which is the leading cause of maternal deaths. The issue of access to blood banks is important, but blood storage units are not very common, especially in the private sector. We suggest that every block hospital (CHC) should have a blood storage unit to support emergency cases in public or private hospitals. This hospital did not use partograph for obstetric monitoring. However, maternal and fetal risk factors were used for tracking progress and predicting situations. The hospital had acquired a fetal heart sound Doppler in 1993 that enabled monitoring without a stethoscope or fetoscope. The other factors for intrapartum monitoring were presentation and rotation, cervical effacement, dilatation, head station, uterine contractions, fetal heart sounds, meconium (fetal feces) discharge and mother’s pulse and blood pressure. EmOC is now also easier with ultrasound diagnosis and prostaglandins for help. Also, there are better roads, cell phones and mobility of doctors. Health administrations can use incentives for motivating mobile teams. The district administration can either use in-service specialists or even hire private specialists. This
model should help us in the present situation of specialist shortages in most states of India.

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