

Obstetric Emergencies: Role of Obstetric Drill for a Better Maternal Outcome

Singh Abha · Nandi Lily

Received: 24 December 2009 / Accepted: 28 May 2012 / Published online: 17 August 2012
© Federation of Obstetric & Gynecological Societies of India 2012

Abstract

Objective To evaluate factors contributing to obstetric emergencies, analyze the fetomaternal outcome and role of obstetric drill in facing these emergencies effectively.

Material and Method Out of 10,892 deliveries, a total of 520 women were included in this prospective study. Analysis of emergency obstetric conditions was done by evaluating incidence, various contributing factors, and fetomaternal outcome. Obstetric drill was conducted among residents repetitively. Pre drill and post drill assessment of confidence in clinical, knowledge, and team work skills were compared by χ^2 test. Impact of drill on severe obstetric morbidities was noted.

Observations Incidence of obstetric emergencies was found to be 4.88 %. Maternal and perinatal mortality was seen in 4.23 and 37.11 %, respectively, of these emergency obstetric women. Impact of drill showed an increase in score in knowledge ($p < 0.019$), confidence ($p, 0.001$), and team work ($p < 0.001$).

Conclusion Active implementation of emergency obstetric care and incorporation of obstetric drill lays a strong foundation for safe fetomaternal outcome.

Keywords Obstetric emergency · Obstetric drill · Maternal morbidity

Introduction

Safe motherhood is one of the most cherished dreams of every woman and making this dream come true is the prime duty of all obstetric care providers.

While most childbirth-related complications allow time for proper management, a few present as obstetric emergencies, where successful outcome depends on prompt action and systematic rapid management. These emergencies are encountered not only in perinatal period as postpartum hemorrhage, ruptured uterus, sepsis, retained placenta, etc., but also in early pregnancy as ruptured ectopic, complications of abortion, and antepartum eclampsia, being equally fatal. With negligence and mismanagement of these grave conditions by unskilled persons, dreams of Safe Motherhood ends with morbidity and mortality of mother and the baby.

The magnitude of severity of the situation and irony of mothers in developing nations is clearly evident by a mega gap prevalent between developed and developing nations; developed nations have a low maternal mortality ratio as in Switzerland-5, Japan-6, UK-8, USA-11, while developing countries like India with maternal mortality ratio of 301 per 10,000 live birth have a low human developmental index [1, 2]. Chhattisgarh with a higher maternal mortality ratio of 379 per 100,000 live births is included among 8 empowered

Singh A. (✉), Professor and Head · Nandi L., Senior Resident
Department of Obstetrics and Gynaecology, Pt. J.N.M. Medical
College & Dr. B.R.A.M Hospital, Raipur, India
e-mail: ajab_2k@yahoo.com

action group states under the National health rural mission (NHRM) [2].

Maternal death is an avoidable tragedy and can be prevented by making emergency obstetric care an easy access to woman even in the most remote areas of India. Emergency obstetric care is one of the recent strategies promoted by World Health Organization's (WHO) for the reduction of maternal mortality and morbidity in developing countries.

Emergency "fire-drill" plays an integral role in training of all emergency care providers to deal with "at risk" situations. It is a rehearsed series of manoeuvres in planned and simulated environment, thereby allowing risks to be identified and tackled without real exposure of patient to inadequate care. These on-site simulations using Mannequins, actors, or dolls are helpful in identifying deficiencies in care of patients, and actions can be taken in correction of these problems. As Standardisation is important for increasing the efficiency and quality of care, development of laminated protocols providing full information about patient care is a necessary part of drill.

The main aim of the present study is to evaluate factors contributing to obstetric emergencies, analyze the fetomaternal outcome and the judicious use of obstetric drill to train residents in managing these emergencies in a more effective way—an initial and crucial step toward safe delivery.

Methods

Out of 10,892 deliveries, a total of 520 women came in emergency obstetric conditions to our department over a period of 2 years from July 2007 to Jun. 2009 and were included in this study on the basis of following clinical specific criteria as

Eclampsia
Antepartum hemorrhage:

- Abruptio placentae
- Placenta previa in shock

Postpartum hemorrhage
Rupture uterus
Rupture ectopic pregnancy
Retained placenta
Puerperal sepsis

Before beginning the study, an initial pre drill assessment of knowledge, confidence in clinical skills, and team work attitude in all the residents were done. Baseline assessment of knowledge was by a multiple-choice questionnaire (MCQ). There were 15 questions related to learning objectives in obstetric emergencies. Confidence level in clinical skills was done by a self-assessment

questionnaire on various emergency conditions. Team work assessment was done by external raters by means of five-point scale. Then, demonstration on dummies about emergency obstetrics case management and emergency obstetric care was given, as per formulated protocols. Fire drills were conducted for all the postgraduates where they had to rehearse in simulated environment. Post drill assessment was done on the same measures. Scores before and after the drills were compared by Chi square test and evaluation of statistical significance was done.

Supervision about the deficiencies in providing patient care was done and problems identified during the drill were subjected to correction. Repetition of drills was done leading to quick and decisive management—an important step toward reducing maternal mortality.

In real time situations, history taking and resuscitative measures, if necessary, were done simultaneously. Maintenance of ABC (Airway, breathing, and circulation)—1st life saving measure of CPR was done. Management was

Table 1 Demographic profile of cases

Demographic profile	No.	(%)
1. Age (in years)		
<20	42	8.07
20–29	358	68.84
30–39	106	20.38
≥40	14	2.70
2. Parity		
P ₀	248	47.70
P ₁	124	23.83
P ₂	92	17.70
P ₃	30	5.77
≥P ₄	26	5.00
3. Residence		
Rural	340	65.38
Urban	180	34.62
4. Education		
Illiterate	215	45.45
Primary school	168	35.52
Middle school	86	18.18
High school and above	4	0.85
5. Booking status		
Booked	90	17.3
Unbooked	224	43.07
Referred	206	39.63
6. Socioeconomic status		
I	00	00
II	00	00
III	12	2.32
IV	240	46.15
V	268	51.53

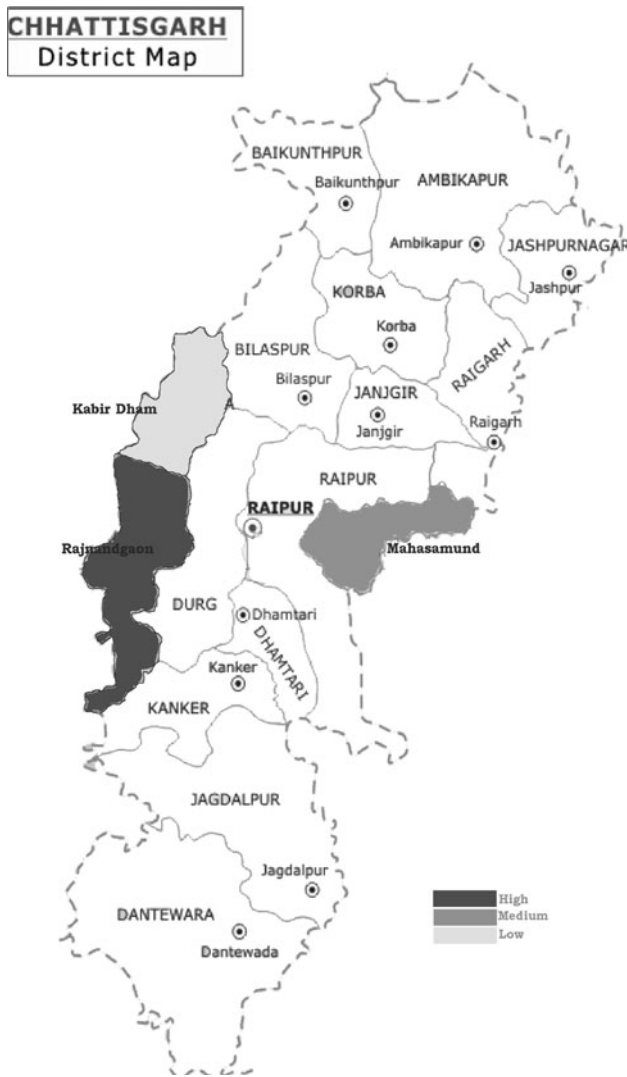


Fig. 1 Major zones of referral

done according to the standard protocols of emergency obstetrics care. Maternal and fetal outcome was noted.

Discussion

“Labor”—the act of giving birth—is one of the most dangerous procedures in the world. The gravity of the situation was clear when our study focused that at least 4.88 % of the pregnant women experienced life-threatening complications during pregnancy, childbirth, or after delivery. Nearly 1 out of every 23 of these women succumbed to obstetric risks and in the view of a higher maternal mortality ratio of Chhattisgarh (379); the present study was done to see the effect of exercising drills in residents to improve their skills in facing obstetric crisis.

Our results are comparable to the incidence of 0.8–8.23 % reported for hospitals in resource poor settings in the WHO

systematic review of severe acute maternal morbidity [3]. It was lower than that observed in a Nigerian study, where almost one in six women suffered life-threatening emergencies [4]. A much lower incidence of severe obstetric conditions has been reported from European countries and United Nation indicating an inverse association between incidences of emergency obstetric cases with the development status of a country [5].

Table 1 summarizes the demographic profile of all women in the study. Similar profile was demonstrated in other Indian studies by Bang et al. and Khosla et al. [6, 7]. 65.38 % of women belonged to rural areas and of lower socioeconomic status (grade IV and V). To meet the basic maternity facility even at the most remote part is thus of utmost importance.

Our hospital, being a tertiary center, caters all referred cases from various districts in our state. It was evident through the present study that majority of morbid cases were referred from Mahasamund (58 km), Rajnandgaon (70 km), Kabirdham (100 km), Abhanpur (25 km), and Rajim (45 km). Leading case referral zone, i.e., 24.75 % were from Rajnandgaon, followed by Abhanpur 22.33 %, Kabirdham 18.44 % cases, and Mahasamund 10.19 % (Fig. 1). Lack of tertiary health care facilities in these districts is one of prime reason for higher frequency of referral from these zones (Table 2)

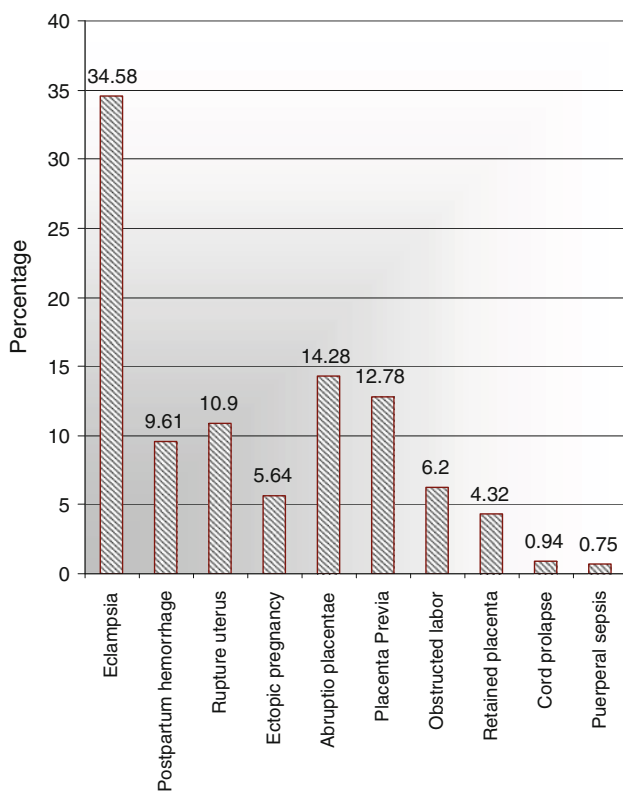
Figure 2 shows incidence rates due to specific emergency obstetric events. Eclampsia was the leading cause (34.58 %), followed by antepartum hemorrhage (27 %).

In about less than half of study group, the major intervention was normal vaginal delivery (41.97 %), followed by LSCS (31.05 %) (Table 3). Instrumental delivery was the intervention measure only in 8 cases for a better perinatal outcome. Nearly about 1 in every 27 emergency obstetric women faced a premature menopause in the natural process of labor due to cesarean hysterectomy. The results were comparable to a pilot study by Chhabra et al. [8] who reported 43.5 % of emergency obstetric women delivered vaginally and 55.5 % by LSCS. Hysterectomy was performed in 14.3 % women, mostly in obstructed labor.

In a WHO analysis, it was found that hemorrhage was the leading cause of deaths in developing countries [9]. Our study showed that leading cause of maternal deaths was postpartum hemorrhage (20.55 %), followed by eclampsia (15.38 %). Anemia was the leading cause among indirect causes (Fig. 3). The death pattern in our study closely resembles the Indian statistics by Sample registration system reporting hemorrhage (38 %) as the major cause of death-toll, followed by sepsis (11 %), hypertensive disorders (5 %), and obstructed labor (5 %) [2]. The higher hemorrhage percentage is also consistent with high background rates of anemia reported among Indian women.

Table 2 Comparison of clinical criteria-based studies on obstetric emergencies

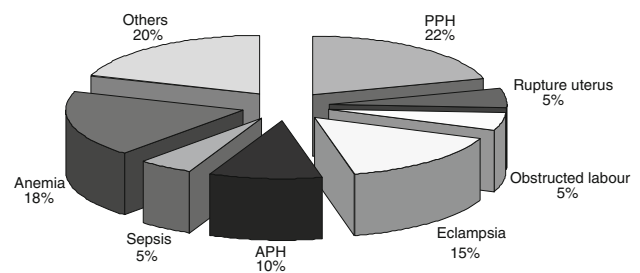
S. no.	Study population	Study period	Deliveries	No. of emergencies	Maternal deaths	Death to morbidity ratio	Reference
1	Six west African countries	1994–1996	19,694	1,307	41	1:32	Prual et al. [13]
2	39 villages in Gadchiroli district Maharashtra India	1995–96	772	118	0	0	Bang et al. [6]
3	South east Thames region UK	1997–98	48,865	588	5	1:118	Waterstone et al. [5]
4	Eleven regions of 9 European countries (MOMS-B Survey)	1995–98	18,2734	1,734	9	1:193	Zhang et al. [14]
5	Referral hospital Chandigarh India (Prospective)	July 2004–Dec. 2004	2,013	301	8	1:18	Khosla et al. [7]
6	Tertiary care hospital Delhi India (Pilot study)	2005 (1 month)	1,900	65	2	1:32	Chhabra et al. [8]
7	Nigerian tertiary center (retrospective study)	2002–04	1,501	211	44	1:4.8	Oladapo et al. [4]
8	Present study tertiary center Chhattisgarh	2007–2009	10,892	520	22	1:23	Singh and Nandi

**Fig. 2** Incidence of obstetric emergencies

In the present study, out of the total 10,892 deliveries during the study period, 220 live births and 165 stillbirths delivered belonged to obstetric emergency cases. Out of the 220 live births, 28 died within first 7 days of birth (early neonatal deaths). Total perinatal deaths in emergency

Table 3 mode of pregnancy termination

Obstetric outcome	No.	%
Normal vaginal delivery	196	41.97
LSCS	145	31.05
Forceps	7	1.50
Exploratory laparotomy	89	19.058
VBAC	3	0.642
Tear repair	3	0.642
Ventouse	1	0.214
MRP	23	4.925
Total	467	100

**Fig. 3** Causes of maternal deaths

obstetrics cases were found to be 193. Chhabra et al. [8] in a prospective study found that fetal outcome for 60.3 % of emergency cases were live births, while in our study it was only 42.3 %.

The study showed a significant improvement in MCQ score for all students following drill ($p < 0.019$). Mean

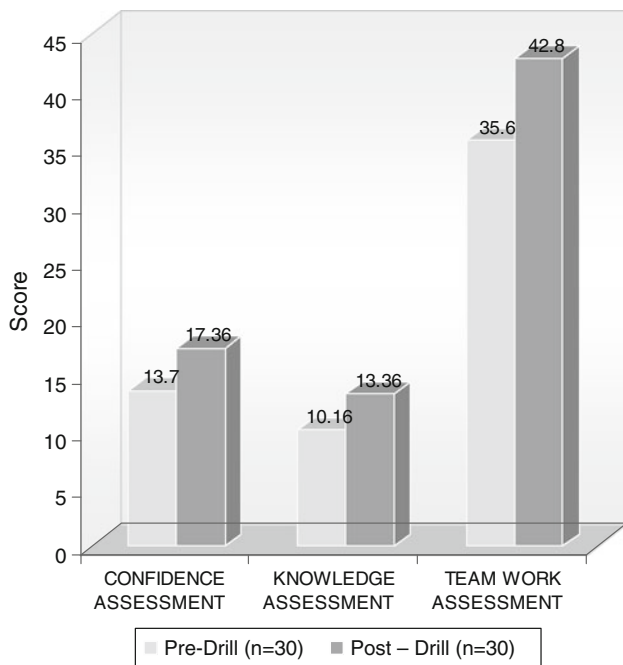


Fig. 4 Improvement in skills

increase in score after the drill was found to be 3.2 (Fig. 4). Level of confidence in clinical skills also increased significantly by score of 3.66 ($p < 0.001$).

In a randomised controlled trial (SaFE study), Crofts et al. [10] similarly showed a significant increase in

knowledge and individual clinical skills following training. Similarly, Johanson et al. [11], in a multidisciplinary MOET training reported the reliability of model-based scenarios with a highly significant improvement in obstetric emergency management.

On comparing severe obstetric morbidities before and after introduction of drill we found a reduction in the incidence of these morbidities after the drill, thereby depicting clearly the positive impact of obstetric drill in improving the fetomaternal outcome (Figs. 5, 6, 7, and 8). In an eight-year long study, it was reported that a 23 % reduction took place in adverse obstetric events following team training on obstetric outcome [12].

Conclusion

In our tertiary care center, maternal mortality was seen in 4.23 % of emergency obstetric cases admitted. A disproportionately high perinatal mortality of 37.11 % was observed in these cases, out of which still births were 31.73 % and early neonatal deaths were 5.38 %. In the view of soaringly high mortality in these high risk groups, it is a dire need that the attending team of doctors to these crisis situations should be not only well equipped but also trained to act promptly according to standard protocols to face any obstetric challenge efficiently for safe motherhood. Obstetric drill is a promising tool for such residents to acquire the required skills in a simulated environment without the real exposure of patient to the inadequate care.

Fig. 5 Comparison of severe obstetric morbidities

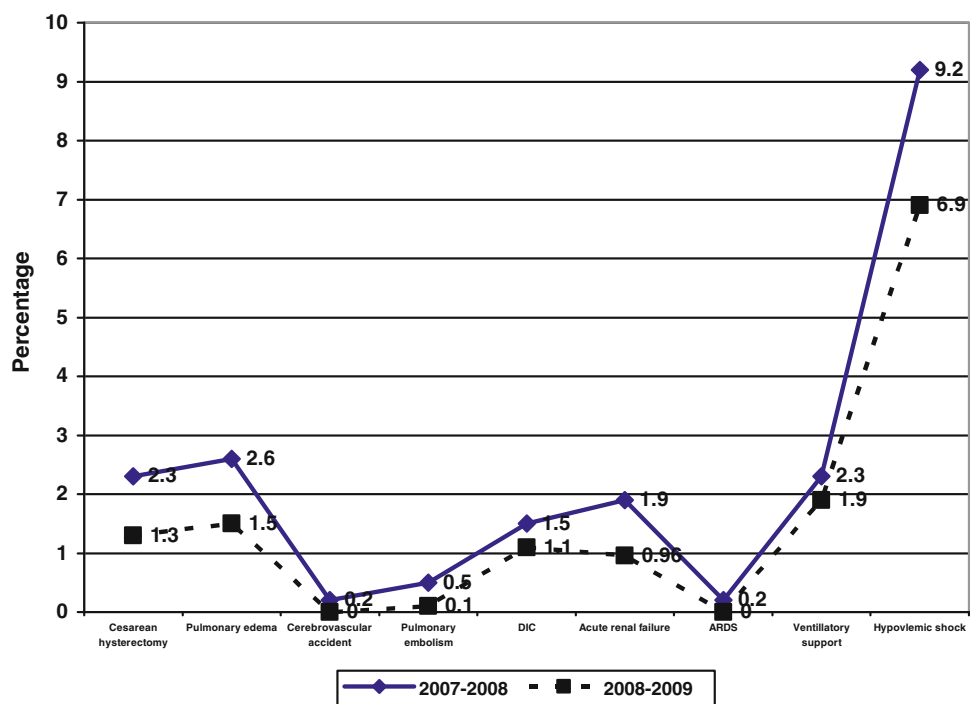




Fig. 6 LSCS scar rupture



Fig. 7 Retained placenta in a prolapsed uterus



Fig. 8 Obstetric drill

The improvement level in knowledge by an increased score of 3.2 in confidence level in clinical skills by 3.66 and effective team work attitude after repetitive emergency drills in our study gives the idea of systematically

embedding simulation in the learning curve, of medical curriculum, which proves to act as a catalyst for the learners to bridge the gap from novice to veteran expertise. It was observed that by practising together, barriers hindering communication and teamwork approach were improved to a mean score of 7.2.

Active implementation of critical and emergency obstetric care and incorporation of obstetric drill in the medical curriculum lays a strong foundation for the safe journey of both mother and the fetus throughout the pregnancy and labor.

References

1. WHO, UNICEF, UNFPA, Maternal mortality in 2005. Estimates developed by WHO, UNICEF and UNFPA (2005).
2. Govt. of India (Sample Registration system) maternal mortality in India: 1997–2003. Trends, causes and risk factors. New Delhi: Registrar General, India; 1997–2003.
3. Say L, Pattinson RC, Gulmezoglu AM. WHO systemic review of maternal mortality and morbidity: the prevalence of severe acute maternal morbidity (near miss). *Reprod Health*. 2004;1:3.
4. Oladapo OT, Sule-Odu AO, Olatunji AO, et al. Near-miss obstetric events and maternal health in Sagamu, Nigeria: a retrospective study. *Reprod Health*. 2005;2:1–7.
5. Waterston M, Bewley S, Wolf C. Incidence and predictors of severe obstetric morbidity: case-control study. *BMJ*. 2001;322:1089–94.
6. Bang RA, Bang AT, Reddy MH, et al. Maternal morbidity during labour and the puerperium in rural homes and the need for medical attention: a prospective observational study in Gadchiroli. *India BJOG*. 2004;111:231–8.
7. Khosla A, Nehra R, Dua D, et al. Maternal morbidity and mortality: an assessment of prevalence and etiological factors. *Obstet Gynecol Today*. 2006;11:447–9.
8. Chhabra P, Guleria K, Saini NK, et al. Pattern of severe maternal morbidity a tertiary hospital of Delhi India: a pilot study. *Trop Doct*. 2008;38:201–4.
9. Khan SK, Say L, Gulmezoglu AM, et al. WHO analysis of causes of maternal death: a systematic review. *The Lancet*. 2006;367:1066–74.
10. Crofts JF, Elis D, Draycott TJ, et al. Change in knowledge of midwives and obstetricians following obstetric emergency training: a randomized controlled trial of local hospital, simulation centre and teamwork training. *BJOG*. 2007;114:1534–41.
11. Johanson RB, Menon V, Burns E, et al. Managing obstetric emergencies and trauma (MOET) structured skills training in Armenia, utilising models and reality based scenarios. *BMC Med Educ*. 2002;2:1–7.
12. Pratt SD, Mann S, Salisbury M, et al. Impact of CRM-based team training on obstetric outcomes and clinicians' patient safety attitudes. *Jt Comm J Qual Patient Saf*. 2007;33:720–5.
13. Prural A, Bouvier-Colle MH, Bernis L, et al. Severe maternal morbidity from direct obstetric causes in West Africa: incidence and case fatality rates. *Bull World Health Organ*. 2000;78:593–601.
14. Zhang WH, Alexander S, Bouvier-Colle MH, et al. Incidence of severe pre-eclampsia, postpartum hemorrhage and sepsis as a surrogate marker for severe maternal morbidity in a European population-based study: the MOMS-survey. *BJOG*. 2005;112:89–96.