



## Original Research Article

# A prospective study of spectrum & outcomes of obstetric referral patterns in a tertiary care centre in central Karnataka

Bandamma Narendra S\*, Aditi Shree<sup>1</sup>

<sup>1</sup>Dept. of Obstetrics and Gynaecology, S.S. Institute of Medical Sciences & Research Centre, Davanagere, Davanagere, 577005, Karnataka, India

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## ABSTRACT

**Introduction and Objectives:** The women in reproductive age group of 15-45 years are vulnerable and at risk due to obstetric emergencies. 92% of maternal deaths are due to delay in referral and case management.<sup>1</sup> Hence for providing essential obstetric care, referral system needs to be strengthened. This study is aimed at reviewing the primary reasons and pattern of obstetric cases referred to a tertiary care centre and management of its complications.

**Design:** It is a prospective observational analysis of antenatal/post-partum patients over a period of 1-year in a multi-disciplinary intensive care unit (ICU) at a tertiary care centre. We studied 50 patients.

**Results:** 76% of the patients in this study were referred from peripheral health centres. 77.34% patients had obstetric complications. Commonest risk factor for ICU admission was hypertensive disorders of pregnancy and obstetric haemorrhage. Other major risk factors were heart disease and sepsis. Major cause of maternal mortality was multi-organ-dysfunction and sepsis secondary to massive obstetric haemorrhage.

**Conclusion:** The multi-disciplinary team approach in intensive care units, close monitoring, symptomatic treatment, prompt surgical intervention and safe motherhood initiative would reduce the current Maternal Mortality Rate. Development of standard referral protocol, availability of tertiary care, proper training in this regard is much needed.

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## 1. Introduction

22% of the population are constituted by women of child-bearing age group of 15-45 years in India. They are vulnerable risk group which is due to pregnancy and child bearing. Most of the maternal deaths occur in developing countries where health-care system is not well organised.<sup>2,3</sup> For providing access to essential obstetric care, the referral system is an essential component of health system which is important in pregnancy and child birth.

The current Maternal Mortality Rate of India is 130 per lakh live births.<sup>4</sup> The key factors contributing to adverse maternal outcomes are lack of trained birth attendants, lack of education in society, poor families, family dependency of women and delay in seeking medical treatment. The availability of emergency obstetric care is

an important indicator of health care system's readiness towards managing acute maternal morbidity and mortality.<sup>5</sup> With the launch of Janani Shishu Suraksha Karyakram (JSSK) in 2011, Government of India has taken initiatives by entitling free deliveries and caesarean sections to every pregnant woman coming for delivery at government health facility, drop back and any referrals between facilities is also free of cost. 92% of maternal deaths are due to delay in referral and case management. Hence the referral system needs to be strengthened in order to provide emergency obstetric care.<sup>6</sup> The study is aimed at reviewing the primary reasons and pattern of obstetric cases referred to a intensive care unit (ICU) in a tertiary care centre.

## 2. Materials and Methods

The study was a prospective observational study conducted in the Department of Obstetrics and Gynecology, SSIMS&RC, Davanagere, Karnataka. Study population

\* Corresponding author.

E-mail address: [dr.aditi1389@gmail.com](mailto:dr.aditi1389@gmail.com) (B. Narendra S).

of 50 un-booked obstetric cases referred from various centers from January 2018- January 2019 was analyzed. Selection criteria was the data collected from referral slips of all pregnancy related cases that were referred due to maternal/fetal complications. The data regarding the name of referral center, place of referral, date and time of referral, name and address of the patient, age of the patient, parity, chief complaints, vitals, indications of referral, pre-referral treatment was noted. Referrals other than pregnancy related causes was excluded from the study. Basic demographic characteristics, obstetric/medical history and diagnosis at admission, ICU course and length of stay, and treatment given and outcome were studied. The mode of delivery, maternal and fetal outcome were also studied and analyzed. Patients were admitted in ICU and were treated by a multi-disciplinary team consisting of Anesthesiologist & Critical Care experts, Neurologists, Cardiologists, Nephrologists along with obstetricians providing a daily consultation.

### 3. Results

All parturients and 42-day postpartum patients admitted to the ICU between January 2018-January 2019, were studied. In our study, 76% referrals has been studied whereas 24% patients were our booked cases. Amongst all the obstetric referrals, 57% patients were referred from Government hospitals who reached within half an hour. The private sector referrals were a total of 43%. 32% of private sector referrals reached within half an hour while 68% of them travelled for more than an hour for obstetric care. 45% of the total referral patients were in labour whereas 55% were not in labour.

The mean age of patients admitted was  $25.36 \pm 2.36$  years. 46% of the patients belonged to the age group between 20-25years. Out of 50 patients, 23 were primigravids (46%)(Table 1)

**Table 1:** Critical care in obstetrics: parity

Gravida	Number	Percentage
1	23	46
2	18	36
3	6	12
≥4	3	6
Total	50	100

Majority of the admissions were at term gestation (66%) when compared to preterm (34%). 30% patients were admitted in the gestational age of 28-37 week (n=15), whereas there were only two patients (4%) admitted in early abortion period(<28 weeks). Mean gestational age of admission is  $36.05 \pm 3.565$  weeks. The antecedent causes for admission to ICU are grouped into two - Obstetric and non -obstetric causes. The Obstetric causes accounted for 77.34% of the admissions in ICU and non-obstetric causes was 22.66% (Table 2) Patients admitted in the ante-partum

period were majorly for obstetric reasons.

**Table 2:** Critical care in obstetrics: Antecedent causes

Antecedent Cause	Number of Cases	Percentage
Obstetric causes	39	77.34
Non-obstetric causes	11	22.66
Total	50	100

Ante-partum hemorrhage and subsequent hemodynamic instability leading to multi-organ dysfunction and sepsis were the commonest cause of ICU admissions comprising total of 32%. 76% of the patients in our study were referred from peripheral health centers ill-equipped to manage obstetric emergencies, in terms of availability of blood components and ventilator support. Out of these 2 patients underwent surgical interventions including bilateral Internal Iliac artery ligation and post-partum hysterectomy. In one of these patients, re-laparotomy was done and about 1700g of clots and 1.2L of frank blood was evacuated after securing a venous oozier. She required prolonged hospital stay (11 days) with adequate support including blood and blood products, vasopressors, fluid management, proper drain care and nutrition in the form of TPN infusion. Hypertensive disorders of pregnancy were the second most common cause of admission (n=15, 30%). Six patients were admitted with eclamptic seizures and Glasgow coma score < 10. Two patients were admitted for management of HELLP syndrome. All these patients were managed medically with anti-convulsants, showed no signs of focal deficit and were discharged subsequently. The mean duration of ICU stay was recorded to be 2.5 days.

Among 50 cases, 29 patients required hemodynamic support, 13 required ventilator support, 22 required inotropic support whereas 11 of them required both. Dialysis was done in four patients in conjunction with hemodynamic and ventilator support (Table 4). Out of which one patient developed TRALI. She made an uneventful recovery. Amongst the medical causes rheumatic heart disease, cardiomyopathy and anemia leading to heart failure accounted for 22% of total admissions (n=11). ARDS and pulmonary embolism was noted in one patient (Table 3).

Majority of them delivered by cesarean section (76%) and the rest vaginally (11%) (Table 5). The indications of LSCS were Severe Pre-eclampsia, CPD, malposition & eclampsia.

Among the total patients, MMR was 10%, 86% improved whereas 4% weredischarged against medical advice. The main reasons for mortality were multi-organ-failure, sepsis, congestive cardiac failure and hemorrhagic shock following massive obstetric hemorrhage (Table 6). 20% of maternal deaths were in antenatal period while majority 80% were in post-partum period. The observed rate of neonatal mortality is 14%.

**Table 3:** Critical care in obstetrics: Analysis of antecedent causes

Antecedent cause	Diagnosis	Frequency	Total	Percentage	
Obstetric Causes	Hypertensive disorders of Pregnancy	Severe Preeclampsia with Hypertensive Crisis	9	15	30%
		Eclampsia	6		
		Help	2		
	Obstetric Hemorrhage	Antepartum Hemorrhage	8	16	32%
		Postpartum Hemorrhage	6		
Medical Causes	Sepsis	Ectopic pregnancy	2	6	12%
		Sepsis	6		
	Heart Failure	Anemia	3	11	22%
		Rhd/Cardio-myopathy	8		
	Respiratory disorder	Pulmonary Embolism	1	2	4%
ARDS		1			

**Table 4:** Critical care in obstetrics: Mode of intervention

Procedure	Frequency
Medical	9
Management-Anti-hypertensives	6
Anti-convulsants	
Ventilatory support	13
Ionotropic support	22
Or both	11
Surgical management- R/L	2
Salpingectomy	2
Post- partum hysterectomy/ B/L	
Internal Iliac Artery Ligation	
Blood or blood products	29
Dialysis	4

**Table 5:** Critical care in obstetrics: Mode of delivery

Mode of delivery	Frequency	Percentage
Vaginal	11	22%
LSCS	38	76%
Laparotomy	1	2%
Total	50	100%

**Table 6:** Critical care in obstetrics: Maternal mortality analysis

Antecedent cause	Death	Percentage
Hemorrhagic shock	1	2%
MODS, Sepsis	2	4%
CCF	2	4%
Total	5	10%

#### 4. Discussion

Maternal mortality in India is relatively higher owing to the socio-economic factors, lack of availability of healthcare facilities in rural areas and practises of unsafe motherhood largely due to lack of education.

The current Maternal Mortality Rate (MMR) of India is 130 per lakh live births. International epidemiologic findings suggests that 75% of maternal deaths are direct obstetric deaths due to obstetric complications such as hemorrhage, hypertension, sepsis and unsafe abortion. This study was done to analyze the reasons for maternal deaths in the Central Karnataka population subset. The results of the study corroborate the major diagnoses in obstetrics cases leading to life-threatening emergencies: haemorrhage (32%), hypertension (30%) and sepsis (12%). The lack of peripheral connectivity and inadequate primary, secondary and tertiary referral system leads to loss of precious time in management of critically ill pregnant patients which is a key factor responsible for maternal mortality. The availability of labour room facilities with trained staff, nurses with resuscitative skills, adequate peripheral blood bank facilities, strengthened referral system, evidence-based medicine practises, encouragement of institutional deliveries is required for reducing obstetric morbidity and mortality. Considering the high mortality rate coupled with high birth rate reflects the need of critical care of obstetric patients. Critical care in obstetrics is challenging with super-imposed underlying pathology such as pre-eclampsia, pulmonary oedema, congestive cardiac failure. Thus, multi-disciplinary input in an intensive care unit is required from physicians, obstetricians, anesthesiologists, neonatologists, fetal medicine experts and concerned specialist jointly involved in patient care and counselling to ensure improved maternal and fetal outcomes. The early assessment of poor prognosis and the need of intensive care of the parturient is the key for successful maternal and fetal outcomes. Prognostic indicators of morbidity such as Acute Physiological and Chronic Health Evaluation (APACHE) scoring and Sequential Organ Functional Assessment (SOFA) score may not be accurate in pregnancy due to

physiological changes in pregnancy. The delivery of the baby and the placenta can lead to drastic improvement of underlying pathology hence clinical assessment of maternal and fetal well-being is more important than relying on prognostic criteria. qSOFA is a combination of respiratory rate, mental status, and systolic blood pressure, named quick SOFA (qSOFA), had strong predictive validity for sepsis. The recently, obstetrically modified quick-SOFA score (omqSOFA) relies on clinical manifestations rather than biochemical and laboratory results,<sup>7</sup> and therefore may be particularly valuable in resource-limited settings. In our study, overall 27% patients had a qSOFA score of 0, 38% had 1, 25% had 2 and 10% had a score of 3.

Clinical parameter	Score
Systolic blood pressure $\leq 90$ mmHg ( $\leq 100$ mmHg in nonpregnant patient)	1
Respiratory rate $\geq 25$ /min ( $\geq 22$ /min in nonpregnant patient)	1
Altered mentation (any state other than alert) (Glasgow Coma Scale $< 15$ in nonpregnant patient)	1

SOFA – Sequential organ failure assessment; Infection + omqSOFA  $\geq 2$  – maternal sepsis; omqSOFA – Obstetrically modified Qsofa

Diagram 1:

#### 4.1. Obstetrically modified qSOFA score (obstetrically modified qSOFA)

After stabilisation of the mother, the assessment of imminent delivery should be done and the risks of preterm delivery, the availability of neonatal care should be ensured. The need of corticosteroid administration for fetal lung maturity, Magnesium sulphate loading dose for neuroprotection, management of associated medical disorders should be of prime concern. The role of tocolysis should be discussed jointly with the anaesthesiologist. The decision of timing of delivery and mode of delivery should be thoroughly discussed with the family along with explaining the need of emergency Caesarean section in view of declining maternal and fetal well-being parameters. The risks of post-partum hysterectomy due to massive obstetric haemorrhage should be discussed prior. The rising trend of caesarean section rates (76%) in our study has been significantly correlated with the pregnancy associated morbidities.

#### 5. Conclusion

The analysis of data collected prospectively in the intensive care units in the tertiary care centre helps in better understanding of the factors which lead to poor maternal and fetal outcomes and aids in its management. Any delay in seeking care or substandard care in cases of obstetric

emergencies causes fatality. Pregnancy is associated with unforeseeable and unavoidable medical complications which are preventable by timely and adequate medical attention. Hence accessibility of good obstetric care with availability of intensive care facilities is of utmost importance. The identification of at-risk patients and early referral reduces the morbidities associated with pregnancy like multi-organ failure. A multi-disciplinary team approach is necessary to ensure stabilisation of the condition of the mother. The decision of the immediate need of delivery of the baby, the mode of delivery should be decided based on the pre-existing maternal complications in pregnancy by a team of skilled obstetricians, paediatricians and neonatologists as discussed with the family. Timely interventions, close monitoring and symptomatic treatment reduces mortality.

#### 6. Source of funding

None.

#### 7. Conflict of interest

None.

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#### Author biography

**Bandamma Narendra S** Professor

**Aditi Shree** Post Graduate

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