# A Study on Obstetric Intensive Care in Dhulikhel Hospital, Kathmandu University Hospital

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## ABSTRACT

**Background**

Maternal mortality ratio in developing countries is high, depending upon the country and region. Many programmes have been launched in different parts of the world like “Safe motherhood Initiatives” under the WHO guidance. An alternative indicator of obstetric health care is obstetric transfer to an intensive care unit. Very few have been reported from developing countries in South East Asia.

**Objective**

To determine the intensive care unit (ICU) utilization by critically ill obstetric patients and to see the spectrum and outcome of disease.

**Method**

A prospective study performed on obstetric patients admitted to the intensive care unit of Kathmandu university hospital during a five year period (1st January 2010- 31st December 2015). A total of 56 patients were studied.

**Result**

The main cause of admission was hypertensive disorder in pregnancy (22 patients), bleeding disorders in pregnancy (18 patients), sepsis (8 patients), heart disease complicating the pregnancy (4 patients) and 4 others with respiratory problems encountered during delivery. These are the important causes of maternal mortality and morbidity.

**Conclusion**

In this study obstetric patients form a small percentage of the total patients admitted to ICU and majority of them were with preventable aetiology. In order to decrease the maternal mortality in developing countries better primary health care and efficient referral system is recommended.

## KEY WORDS

*Developing countries, Intensive care unit, Maternal morbidity, Maternal mortality, Obstetric patients*

## INTRODUCTION

Maternal mortality ratio in developing countries is about 480 to 1000 per one hundred thousand live births depending upon the country and region.[1] Many programmes have been launched in different parts of the world like "Safe motherhood Initiatives" under the World Health Organization (WHO) guidance to reduce this propotion.[2] An alternative indicator of obstetric health care is obstetric transfer to an ICU. Many different studies are done in different countries but very few have been reported from developing countries in South East Asia.[2] No studies have been published from Nepal yet.

The main aim of our study is to determine the intensive care unit (ICU) utilization by critically ill obstetric patients and to see the spectrum and outcome of the diseases.

## METHODS

This is a prospective study conducted in Dhulikhel Hospital, Kathmandu University Hospital, Dhulikhel from 1st January 2010 to 31st December 2015. All obstetric patients admitted in the ICU were included in the study. Our University hospital serves as a referral hospital for the surrounding 5 districts. The ICU of the hospital is managed by multidisciplinary unit like anaesthesist, internist and obstetric patients are taken care by obstetricians. Data obtained were classified into demographic data, obstetric data and ICU data.

This study has been approved by the ethical committee of the institution, consent was taken from all the patient who were able to give consent. Those who were not conscious consent was taken from their husbands.

For the statistical analysis, the Microsoft office Excel 2007 was used and results were expressed as percentage.

## RESULTS

A total of 2215 patients were admitted in the ICU in five years and of these 56 patients were with obstetric complication corresponding to 2.53%.There were a total of 15,142 deliveries conducted in the hospital during the study period, thus making the rate of ICU admissions as 1 per 369 deliveries. The duration of stay was 3 days to 10 days. The main reason for ICU transfer was predominantly bleeding and respiratory distress requiring ventilatory support. Hemodynamic instability needing ionotropic support was seen in 32% of ICU shifted patients. Other interventions included oxygen therapy, blood transfusion and antihypertensive therapy.

The causes of admission are shown in table 1. The main cause is due to complications of hypertensive disorder in pregnancy followed by hemorrhage during pregnancy.

Table 2 shows the cause of maternal deaths in the ICU and the contributing factors. In decreasing order of frequency there was hypertensive disorder in pregnancy in 3.5%, sepsis in 1.7% and medical disorder in pregnancy in 3.5%. Other 51 patients recovered and were shifted to the obstetric ward.

**Table 1. Causes of Obstetric ICU admission (N=56)**

| Diagnosis | N (%) |
|---|---|
| Hypertensive disorder in pregnancy | 22 (39.3%) |
| Hemorrhage | 18 (32.1%) |
| Puerperal sepsis | 7(12.5%) |
| Post abortal sepsis | 1 (1.8%) |
| Heart disease in pregnancy | 4 (7.1%) |
| Gestational trophoblastic disease | 1 (1.8%) |
| Tuberculous meningitis | 1 (1.8%) |
| Amniotic fluid embolism | 1 (1.8%) |
| Thrombocytopenia with pyelonephritis in pregnancy | 1 (1.8%) |

**Table 2. Causes of maternal death in ICU (N=56)**

| Diagnosis | N (%) |
|---|---|
| Medical disorder in pregnancy | 2 (3.5%) |
| Sepsis | 1 (1.7%) |
| Hypertensive disorder in pregnancy | 2 (3.5%) |

Table 3 shows the patients diagnosis and the related outcome, out of 56 patients 22 of them were admitted with diagnosis of hypertensive disorders in pregnancy, out of them 20 patients survived and two patients died. One of them had cerebral hemorrhage and the other died due to late arrival and multiple systemic disorders. Out of 56 patients eight had sepsis, seven of them survived and one died due to septicemia and multi organ dysfunction. Eight amongst 56 had medical disorder complicating pregnancy and two died. One had meningo encephalitis and the other patient had tuberculous meningitis.

**Table 3. Patient diagnosis related to outcome.**

| Diagnosis | Total patients | Patient survived(%) | Patient expired(%) |
|---|---|---|---|
| Hypertensive disorders in pregnancy | 22 | 20 (90.9%) | 2 (9%) |
| Sepsis | 8 | 7 (87.5%) | 1 (1.25%) |
| Medical disorder in pregnancy | 8 | 6 (75%) | 2 (25%) |
| Hemorrhage | 18 | 18(100%) | |

In table 4 we observed that 20 percent of the patients who died fall in the age group of >30 years, hence ladies more than 35 years are considered as high risk as they are more prone for preeclampsia, diabetes and other medical diseases that complicate pregnancy. We also observed that education plays a vital role in health seeking behavior of the patients. Amongst five patients who died, three of them had education level of less than primary school. Those who had higher level of education, those who had gone to college had no mortality. All patients who died were from rural areas. This is a very significant observation as there are less experienced health personnel in the rural

areas. Hence the detection of the disease is late and even referral is made late. This is the main reason for death in patients from rural areas.

**Table 4. Demographic data.**

| | No of patients (N=56) | Number of deaths (N=5) | Percentage of total death (%) |
|---|---|---|---|
| **Age (years)** | | | |
| <20 | 14 | 1 | 7.14 |
| 20-29 | 32 | 2 | 6.25 |
| >30 | 10 | 2 | 20 |
| **Parity** | | | |
| Primipara | 26 | 3 | 11.53 |
| Multipara | 20 | 1 | 5 |
| Grandmultipara | 10 | 1 | 10 |
| **Education** | | | |
| < Primary school | 25 | 3 | 12 |
| Secondary school | 11 | 1 | 9 |
| Higher Secondary | 10 | 1 | 10 |
| College | 10 | 0 | 0 |
| **Area of residence** | | | |
| Rural | 35 | 5 | 14.28 |
| Urban | 21 | 0 | 0 |

## DISCUSSION

Maternal mortality is the basic health indicator that reflects the health care adequacy. The majority of the maternal deaths occur in the developing countries.[1] Maternal mortality of Nepal is 217 per 100,000 live births, this ratio is almost 40 to 50 times higher compared to a developed nation like Sweden or United States of America.[2] Conditions like maternal hemorrhage, hypertensive disorders of pregnancy, sepsis, unsafe abortions and obstructed labour are the major causes of maternal mortality and morbidity.[3] All these conditions are preventable and if identified earlier can prevent maternal mortality and long term morbidity. Unfortunately we still have mortality due to such conditions which reflect inadequate health care facilities. The maximum ICU admission in our hospital was due to hypertensive disorder in pregnancy followed by maternal hemorrhage and sepsis like studies by Mehra et al. from India.[4] Considering the high maternal mortality in developing countries, WHO in 1987 conceived the idea of "Safe Motherhood Initiative" at a conference in Nairobi, Kenya. It was a big step, a global effort to reduce the maternal deaths to half by 2010 AD. as majority of the deaths are preventable.[2] Sibai et al. reported that 1% of women delivered at University of Tennessee were admitted to the obstetrical ICU.[5] Harris and Foley reported that only 0.4% of the obstetrical patients were transferred to the medical surgical ICU at the university of California, San Francisco.[3] Rajal et al. reported that 0.07-0.8% of all pregnant women will develop conditions that would require admission to ICU.[6] Another study by Kamad et al. found that pregnant and post partum women form up to 7% of admissions in Indian ICU in government hospitals.[7]

At the University of North Carolina from 1983 to 1990 only one out of 400 obstetric patients required ICU care, where as in our context 1 in 369 patients required ICU care in Nepal, we are observing a change for the cause of ICU admission.[8] Previously hemorrhage dominated the list and it was the leading cause of maternal death, now after the initiation of Safe Motherhood Programme, we observed that the leading cause of admission in ICU is hypertensive disorders in pregnancy like in developed countries. A systematic review published by Lancet found hypertensive disorders in pregnancy, induced abortions and hemorrhage as the main cause of maternal morbidity and mortality in developed countries.[2] It also reported that the cause of maternal death varied from different places. Hemorrhage was the leading cause of death in Africa accounting for 34% of maternal deaths and in Asia it accounted for 31% of death.[2] A retrospective study performed by Olufemi et al. revealed hypertensive disorders in pregnancy and hemorrhage being the leading causes of maternal morbidity and mortality in Nigeria.[9] Pulmonary embolism and hypertension remains the leading causes of maternal mortality in the United Kingdom.[10] Daniella et al. in their retrospective cohort study found that hypertensive disorders and hemorrhage were the leading causes of maternal mortality.[11] According to this study, death was mostly due to multiorgan failure in 11% of patients which is similar to our study where 10.25% succumbed to death due to multi organ failure.

In a study by Osinaike et al. 27% of patients admitted to ICU required mechanical ventilation, in our study 32% required mechanical ventilation.[12] A study in Netherlands by Wart et al. revealed a 34% of patients required assisted ventilation.[13] Ventilatory support and ionotropic support have been reported in various studies as a poor prognostic factor. In a country like Nepal, there are limited beds in ICU with mechanical ventilator, hence those who are very ill only get the facility compared to a developed nation where 66-73% of women in ICU do not require ventilatory support.[12,13]

Many of the studies used various ICU scoring systems to predict maternal mortality like APACHE (Acute Physiology and Chronic Health Evaluation), SAPS (Simplified Acute Physiology Score) etc. which were difficult in evaluating the likely outcome of critical illness in an obstetric population, largely because the scoring systems used to evaluate patients status during critical illness such as APACHE have not been properly validated in an obstetric population. Differences in the normal physiological changes in pregnancy may bias the scoring system. In this study 56 patients were admitted to ICU. The maternal mortality was 8.9%. The APACHE score was calculated and it was found that APACHE scoring system over predicted mortality in these patients.

To prevent maternal mortality and to decrease maternal morbidity there should be full adoption of safe motherhood programme initiated by WHO. Attempt should be made so that such a critical situation does not arise which requires ICU care and admission. Efforts should be made to improve the primary health care facilities, because most of these patients come from rural settings. We observed in our study that most of the patients were referred late and in which the precious time has already been lost. Doctors or mid wives should be available in the peripheral centre so that early detection of problem is established and patients are referred timely. They should be given regular refreshing courses such that they know the warning signs, basic resuscitation techniques and whom to refer, when to refer without any delay, before the critical situation arises. All the cases of maternal mortality we came across were preventable and if referred early could have been saved.

## CONCLUSION

A study like ours helps to give insight to assess the risk factors for patients requiring ICU admissions. It is high time that we recommend a separate obstetric ICU in developing countries. The cost benefit of such a set up will be viable as it will help in reducing maternal mortality and facilitate good treatment. However, it is possible to reduce maternal mortality significantly with better primary health care facility, effective referral systems and availability of good tertiary level care. It is important that statistics are maintained well and it will be useful in formulating preventive measures which will contribute to a great extent in reduction of maternal deaths in developing countries like ours.

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