

Study of Obstetric Admissions to the Intensive Care Unit at PNS Shifa

Nusrat Noor¹, Rabiah Anwar², Khan Muhammad Yaqub³, Mobashir Ahmad Saeed⁴, Sidra Javed⁵

¹ Assistant Professor, Department of Gynaecology, PNS Shifa Hospital, Karachi.

² Assistant Professor, Department of Gynaecology, PNS Shifa Hospital, Karachi.

³ Associate Professor, Anesthetist, CMH, Rawalpindi.

⁴ Associate Professor, Anesthetist, PNS Shifa Hospital, Karachi.

⁵ Post Graduate Trainee, Department of Gynaecology, PNS Shifa Hospital, Karachi.

Author's Contribution

¹ Conception of study

^{1,2} Experimentation/Study conduction

² Analysis/Interpretation/Discussion

³ Manuscript Writing

³ Critical Review

^{4,5} Facilitation and Material analysis

Corresponding Author

Dr. Khan Muhammad Yaqub,

Anes and Intensivist,

CMH, Main Operation Theatre,

Rawalpindi

Email: dryaqub70@gmail.com

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Abstract

Objectives: To investigate the indications, interventions and clinical outcomes of pregnant and newly delivered women admitted to the multidisciplinary intensive care unit.

Study Design: Retrospective review / observational study.

Setting and Duration: Critical care unit of Pakistan Navy Ship Shifa hospital Karachi from 1st August 2017 to 31st July 2018.

Materials and Methods: This study was carried out in 13 bedded Intensive care units of PNS Shifa hospital Karachi, over a period of one year. All obstetrics admissions to ICU up to 42 days postpartum were included in the study, while those patients admitted after 42 days of delivery were excluded.

Results: During the study period, 2688 women delivered and 66 obstetric patients were admitted to ICU, which was 7.5% of all ICU admission and it accounted for 2.4% of all deliveries. The most common indication for admission to ICU was hypertension disorders of pregnancy 45.4% followed by obstetric haemorrhage in 42.4% cases. 75% of the cases belonged to the age group of 21-35 years. The parity of 60% of patients was in the range of P2-P4. During the stay in ICU, 9% of patients were put on ventilator support, 40.9% had blood product transfusion, while 45% received antihypertensive and anticonvulsant therapy. Maternal mortality was 4.5%.

Conclusion: Hypertensive disorder of pregnancy and obstetric hemorrhage were the main indications for admission to ICU. A multidisciplinary team approach and timely recognition of complications development can lead to a better maternal outcome. Universal availability of antenatal care can help in reducing serious complications and admissions to ICU.

Keywords: Intensive care unit, maternal mortality, obstetric haemorrhage.

Introduction

The obstetric patient usually belongs to a younger age group, so the need for critical care support and admission to an intensive care unit is rare.¹ A number of studies have reported that <1% of patients admitted to ICU belong to the obstetric department.^{2,3} While another study shows that the incidence of pregnant women admitted to the intensive care unit in developed countries is 2 to 4 per 1000 deliveries, in comparison to 2 to 13.5 per 1000 deliveries in developing countries.⁴ There are many maternal physiological adaptations occurring in pregnancy which pose a unique challenge not only to obstetricians keeping them on their toes all the time but also in case of complications development, the critical care unit and requires full attention and optimum management by critical care team and the involvement of multidisciplinary team can have a positive outcome. Maternal mortality is a single health indicator that shows the health care provision of a country. The maternal mortality rate in Pakistan is 178/100,000 live births. "There is a story behind every maternal death or life-threatening complication",⁵ according to WHO. Although obstetrics patients make a significant chunk of ICU admission in developing countries, there are only a few studies reporting on critical care admission during pregnancy.^{6,7}

Analysis of obstetrics ICU admission gives an idea about the pattern of attributable causes of critically ill obstetrics patients. The critical care unit serves as an objective indicator of the quality of care in that locality. The aim of the study was to investigate retrospectively the indication interventions and clinical outcomes of obstetric patients admitted in the ICU.

Materials and Methods

This retrospective review was done in PNS Shifa Hospital, a 782 bedded, tertiary care hospital. The intensive care unit is a 15 bedded facility that manages critically ill medical, surgical and obstetric patients. The study was conducted over a period of one year i.e. from 1st August 2017 to 31st July 2018. Permission from the Ethical review committee of the hospital was taken. A list of critically ill obstetric patients admitted to ICU was prepared from the ICU admission book. The list was sent to the Medical record department of the hospital for retrieval of history charts. A detailed review of the medical record of patients was done, including a collection of the demographic profile of

patients, indications for admission to ICU, intervention done in ICU, and outcome of patients. All critically ill antenatal and postnatal patients up to 42 days after delivery were included in the study. The overall mortality rate was calculated and the cause of death determined by the intensive care unit record. The statistical data were analyzed through SPSS version 20.

Results

The total number of deliveries was 2688 over the period of one year 61% were normal deliveries and caesarean sections were 38.7% Total number of ICU admissions were 873, out of which 66 were critically ill obstetric patients admitted to ICU, which came out to be 7.5% of the total ICU admissions. This comprised 2.4% of the total number of deliveries. 75% of the patients were in the age group of 21-35 years. Parity of 60% of patients was in P₂ – P₄ range. 63 patients admitted to ICU were post-partum (95.5%), while 3 patients were antepartum (4.5%). The main indication for admission to ICU was hypertensive disorders of pregnancy i.e., 45.4% followed by obstetric hemorrhage in 42.4% of patients. Other indications included molar pregnancy in 1.5% cases, sepsis 3%, and respiratory insufficiency 1.5% and 1.5% had hepatic dysfunction (HEV).

Intervention during the stay in ICU was mechanical ventilation in 9% of patients. CVP was passed in 69% cases, while oxygen supplementation was given in 60% cases. Blood product transfusion was done in 40.9% of patients. 45% of patients received antihypertensive and anticonvulsant therapy (MgSO₄), 9% were put on inotropic support. 1.5% of cases ended up in hemodialysis. Higher groups of antibiotics were used in 45% of patients. There were 3 obstetric deaths. Two cases were due to severe pre-eclampsia complicated by MODS, and one death was due to Acute Blood transfusion reaction (TRALI).

Table 1: Demographic Characteristics of Patients n = 66

Variable	Number	Percentage (%)
Age		
≤ 20 years	3	4.5%
21 – 35 years	50	75%
> 35 years	13	19.6%
Parity		
P ₀ – P ₁	18	27%
P ₂ – P ₄	40	60%
≥ P ₅	8	12%
Gestational age (weeks)		
≤ 24 weeks	1	1.5%
25 – 36 Weeks	30	45%
37 – 41 Weeks	35	53%
Antepartum	3	4.5%
Postpartum	63	95.5%

Table 2: Diseases Responsible for illness n=66

Disease	Number	Percentage
Hypertensive disorder of pregnancy	30	45.4%
Pre-Eclampsia	18	27.2%
Chronic hypertension with superimposed pre-eclampsia	2	3%
Eclampsia	6	9%
HELLP	3	4.5%
DIC	1	1.5%
Obstetric Hemorrhage	28	42.4%
Placenta Previa with morbidly adherent placenta	14	21%
Abruptio Placenta	13	19.6%
Ruptured uterus	1	1.5%
Molar Pregnancy	1	1.5%
Respiratory insufficiency	1	1.5%
Blood Transfusion reaction	1	1.5%
Thrombocytopenia	2	3%
Hepatic dysfunction (HEV)	1	1.5%

Table 3: Maternal Mortality / Causes

Causes	No. of Cases	Percentage (%)
Pre-Eclampsia with MODS	2	66.6%
Blood Transfusion Reaction (TRALI)	1	33.3%

Maternal Mortality = 4.5%

Table 4: Interventions Required in ICU

Procedure	No. of cases	Percentage (%)
Oxygen supplementation	40	60%
CVP	46	69%
Blood Product Transfusion	27	40%
Inotropic Support	6	9%
Mechanical ventilation	6	9%
Hemodialysis	1	1.5%
High dose antibiotics	30	45%
Anti-hypertensive therapy	30	45%
Anti-convulsant therapy	30	45%
Surgical intervention	2	3%

Table 5: The outcome of obstetric patients admitted to ICU

	Number	Percentage (%)
Shifted toward	61	92.4%
Shifted to other wards	2	3%
Mortality	3	4.5%

Discussion

Pregnancy although a physiological condition can be associated with serious morbidity leading to life-threatening complications necessitating admission to the intensive care unit for an optimum outcome. In developing countries like Pakistan because of poor antenatal attendance, lack of awareness regarding pregnancy complication and lack of primary health care facilities in rural areas, maternal morbidity, and mortality is on the higher side. 59.5% of rural women

lack facilities of antenatal care and 86.5% of deliveries are conducted by untrained birth attendants. This lacks safe and clean delivery rules and these untrained birth attendants are unable to predict and deal with complications of pregnancy, shortage of beds in hospitals and lack of well-equipped high dependency unit in obstetric wards are responsible for high maternal morbidity and mortality.¹⁶

In this review about 95.5% of patients admitted to ICU were post-partum and 95.5% were shifted after caesarean section. This observation is comparable to a study done by Ashraf⁸ et al and zwart⁹ et al, as they also have reported higher rates of post-partum admission in ICU. This may be due to significant hemodynamic changes in the post-partum period and in addition operative delivery is associated with an increased incidence of complications which necessitates ICU admission.¹⁰

A total of 66 patients were admitted during one year study which is 2.4% of all deliveries and 7.5% of total ICU admissions, which is comparable with the study done by Upadhyaya¹¹ et al. Our rate of admission in ICU was on a higher side in comparison to studies done in India.¹² This may be due to the fact that our hospital receives referrals from other hospitals and there is a lack of well-equipped high dependency units in the obstetrics ward. In addition, local protocols require intravenous therapy for pre-eclampsia monitoring.¹⁸ Extremes of age are classified as high risk in obstetrics. This review shows those classified as low risk i.e., age group of 21-35 years (75%) are potentially at risk. 19.6% were above 35 years of age, while 4.5% were at and below 20 years of age. This is similar to a study conducted by Lin et al¹⁸ where the mean age of 31 years was associated with more ICU admission, so our study shows that the need for obstetric critical care arises even in low-risk mothers. There was no direct association with advancing parity. The leading causes of severe morbidity worldwide in obstetrics are obstetric hemorrhage and hypertensive disorders of pregnancy.¹⁹ Our study shows hypertensive disorders of pregnancy as a leading cause of morbidity (45.4%) necessitating ICU admission. Obstetric hemorrhage (42.4%) was the second commonest indication for ICU admission. These statistics are comparable to various studies, where hypertensive disorders of pregnancy are the leading cause of morbidity and mortality.^{13,14,15,17} It is estimated that 5% - 10% pregnancies end up with pre-eclampsia. In developed countries with optimum facilities and good antenatal care, this incidence has reduced. Obstetric hemorrhage is reported as a leading

cause of death in Japan, Europe and the third commonest cause of death in the USA.²⁰ In this review, obstetric hemorrhage came out to be the second commonest cause of ICU admission, comparable to a study done by Leung¹⁶ et al. Hemodynamic instability and respiratory compromise were the main indication for using ventilator support i.e., 9% cases in our study. This rate is similar to the rate reported in other studies.^{1,11} Of the six patients put on ventilatory support, three expired and three were shifted back toward. Maternal mortality was 4.5% in this study. Two deaths were due to severe pre-eclampsia with multi-organ dysfunction and on death were due to acute Blood Transfusion reaction (TRALI). Our maternal mortality is comparable to study done by Upadhyaya¹¹ et al. Multi-organ failure was the common cause of death, which is comparable study done by Karnad et al.²² Ventilator support in developing countries is associated with high mortality except when mechanical ventilation is used in immediate post-operative patients.² 40% patients received Blood product transfusion, 45% received anti-hypertensive and anticonvulsants each, which is similar to study done by Anwari et al.²³

There are many reasons for higher obstetric morbidity and mortality, in Pakistan. Women are dependent on their husbands and in-laws and have no power to make their own decisions, poverty, illiteracy, gender discrimination, anemia, poor hygiene, and infections are contributory factors in most of the obstetric critical illnesses. Lack of structured public health services is an additional hurdle in improving obstetric morbidity and mortality.

Limitations

The limitation of this study is that it is a single-center, retrospective study, encompassing only a small portion of the population. There is a need for a multi-center, prospective study to have meaningful results.

Conclusion

This study has confirmed the hypertensive disorders of pregnancy and obstetric hemorrhage are the leading causes of ICU admission. Trained staff, early recognition of complications, good antenatal care programs can reduce obstetric morbidity and mortality. Establishment of well-equipped critical care units should be planned in the periphery so that those lives lost because of late referral, lack of transport and

lack of awareness of pregnancy complications can be saved. The establishment of High dependency units in the obstetrics ward can reduce ICU admission. A Multi-disciplinary team approach is required for early recognition and aggressive intervention. The audit of severe maternal morbidity is recommended to improve the quality of obstetric care. Trained Birth attendants should be posted in villages.

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