

DOI: <http://dx.doi.org/10.18203/2320-1770.ijrcog20182481>

Original Research Article

A study to know clinical characteristics and outcome of obstetrics patients requiring ICU admission

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Received: 29 May 2018

Accepted: 04 June 2018

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ABSTRACT

Background: Pregnancy poses unique consideration for critical care and it is imperative that obstetrician and other members of health care team have a working knowledge of these factors because these are women are usually young and in good health, their prognosis should be better than that of many other patients admitted to an intensive care.

Methods: The present study was conducted in the Department of Obstetrics and Gynaecology, Gaja Raja Medical College and associate Kamla raja Hospital, Gwalior in the ICU from Oct. 14 to Oct. 15.

Results: 678 obstetric women were admitted into the ICU of Kamla Raja Hospital, over a period of 1 year study period. Maximum number of patients belong to age group 21-25 years (54.8%), 398 (58.7%) patients were uneducated, 343 (50.59%) came directly to Kamla Raja Hospital. 362 (53.39%) belongs to urban area. The mean length of stay in ICU was 3 days. Maximum number of patients were postpartum 580 (85.55%). According to mode of delivery maximum number of patients 348 (51.33%) underwent LSCS. Most common obstetric indication for admission in ICU was hypertensive disorder of pregnancy 472 (69.61%). Most common medical indication was severe anaemia 128 (18.87%). Various type intervention like pulse oxymetry, O₂ inhalation, BT, nebulisation and ventilation were done in ICU according to patients need. 43 maternal death happened during the study period with most common cause was cardiorespiratory arrest 9 (1.32%) and pulmonary edema 8 (1.17%).

Conclusions: Establishment of a dedicated obstetric ICU at tertiary care centre with knowledge familiarity, experience and expertise of an obstetrician and a special team would be best place to monitor and treat the critically ill obstetric patients which will reduce the maternal morbidity and mortality.

Keywords: Anemia, Hypertensive disorder of pregnancy, ICU, LSCS, Obstetric haemorrhage

INTRODUCTION

The principles behind the pathogenesis and treatment of critical care illness began to take shape in 1980s in the UK, joint training posts in critical care medicine were introduced in 1986.¹

Since late 1980s and 1990s, dedicated US, obstetrics intensive care has become well established in same maternity units in the South Africa and the Netherlands.²⁻⁴

Obstetric medicine is unique and complicated obstetric medicine is different from the general medicine because of various physiological changes occurring in pregnancy and only an experienced obstetrician who has good knowledge of obstetric medicine can interpret and understand complex conditions in pregnancy.

The threshold of an insult required for ICU admission is low in obstetric patients compared to nonpregnant population. The threshold for ventilator support also is low in pregnancy.

METHODS

The study was conducted in the Department of Obstetrics and Gynaecology, Gajra Raja Medical College and associate Kamla Raja Hospital, Gwalior in Obstetric ICU from October 2014 to October 2015 over a period of 1 year. Each patient's records were reviewed and detailed.

Inclusion criteria

- All pregnant women irrespective of the duration and site of pregnancy.
- Women during first 6 weeks of postpartum period irrespective of mode of delivery.
- Women within 6 weeks of abortion.
- Obstetrics patients with preexisting medical disorders requiring admission to ICU.

Exclusion criteria

- All non-obstetric patients.

The primary objective of present study was to review the characteristics and outcome of the obstetric patients admitted to ICU over one year for obstetric related causes.

RESULTS

In Table 1 the maximum number of patients in the study were in the age group of 21-25 years (54.87%).

Table 1: Age distribution of patient admitted to ICU.

Age group (years)	No. of cases	Percentage
18-20	68	10.03
21-25	372	54.87
26-30	176	25.95
31-35	46	6.79
> 35	16	2.36
Total	376	100

In the study 62 patients were above the age of 30 years of age (9.1%). According to Table 2 out of 678 patients, 398 (58.7%).

Table 2: Education status of patients admitted to the obstetric ICU.

Education	No. of cases	Percentage
Educated	280	41.30
Uneducated	398	58.70
Total	678	100

As per Table 3 out of 678, 343 (50.59%) came directly to Kamla Raja Hospital and 335 (49.41%) were referred from primary health centres, district hospitals and private hospitals. were uneducated and 280 (41.3%) were educated.

Table 3: Direct/referral status of patients admitted to ICU.

Direct/Referral	No. of cases	Percentage
Direct	343	50.59
Referral	335	49.41
Total	678	100

In Table 4 out of 678, 316 (40.61%) belongs to rural area and 362 (53.39%) belong to the urban area.

Table 4: Locality of patients admitted to ICU

Locality	No. of cases	Percentage
Rural	316	40.61
Urban	362	53.39
Total	678	100

According to Table 5 the mean length of stay in ICU was 3 days with a range of 1-12 days. 564 patients (83.18%) stayed for 2-4 days and 37 (5.46%) stayed for 5-7 days, 4 (0.58%) stayed for 8-10 days, 69 patients (10.27%) stayed for < 1 day and 4 patients (0.58%) stayed for > 11 days.

Table 5: Duration of stay of patients admitted to obstetric ICU.

Duration (days)	No. of cases	Percentage
≤ 1	69	10.2
2-4	564	83.18
5-7	37	5.46
8-10	4	0.58
≥ 11	4	0.58
Total	678	100

As per Table 6, out of 678, 580 (85.55%) patients were postpartum, 77 (11.36%) were antepartum and the remaining 21 (3.09%) were postabortal.

Table 6: Status of pregnancy in patients admitted to obstetric ICU.

Locality	No. of cases	Percentage
Potpartum	580	85.55
Antepartum	77	11.36
Postabortal	21	3.09
Total	678	100

As per Table 7 out of 678, 348 (51.33%) patients underwent LSCS, 158 (23.3%) delivered vaginally, 48 (7.08%) underwent laparotomy, 23 (3.39%) patients head suction and evacuation and 18 (2.66%) patients had cesarean hysterectomy. 5 (0.74%) patients had hysterotomy and 1 patient was there for MTP for some medical reason. The patients who were antepartum and did not undergo any mode of delivery were 77 (11.36%). According to Table 8 the most common indications for ICU admission was hypertensive disorder of pregnancy

472 (69.61%) of which eclampsia were most common i.e. 166 (24.48%). The second most common indication was obstetric haemorrhage 172 (25.36%). Ectopic pregnancy was 34 (5.01%), PPH were 37 (5.45%), 40 were placenta previa (5.89%), 5 patients (0.73%) were with retained placenta.

Table 7: Mode of delivery of patients admitted to obstetric ICU.

Locality	No. of cases	Percentage
LSCS	348	51.33
Vaginal delivery	158	23.30
Laparotomy	48	7.08
Suction and evacuation	23	3.39
Cesarean hysterectomy	18	2.66
Hysterotomy	5	0.74
MTP	1	0.14
None	77	11.36
Total	678	100

Table 8: Obstetric indications of patients admitted to obstetric ICU.

Obstetric indications	No. of cases (n=678)	Percentage
Hypertensive disorders of pregnancy	472	
Eclampsia	166	24.48
Preeclampsia	30	4.42
Obst. HTN	66	9.7
Obstetric haemorrhage	172	
PPH	37	5.45
Placenta previa	40	5.89
Abruptio placenta	12	1.76
Retained placenta	05	0.73
Placenta accrete	08	1.17
Ectopic pregnancy	34	5.01
Ruptured uterus	15	2.21
Uterine inversion	5	0.73
H. mole	6	0.88
Incomplete abortion	10	1.47
Others	7	
Septicemia	3	0.44
DIC	1	0.14
Psychosis	3	0.44
Observations	16	
Maternal tachycardia	6	0.88
Hypotension	5	0.73
Haematuria	2	0.29
Bradypnea	1	0.14
Abdominal distension	2	0.29

Rupture uterus were 15 (2.21%), H. mole were 6 (0.88%), 10 (1.47%) patients were admitted to ICU with incomplete abortion with very severe anaemia. Other indications were septicemia, DIC, psychosis 7 (1.83%). The remaining were for observation 16 (2.35%) patients

for causes like maternal tachycardia, hypotension, haematuria, bradypnea, abdominal distension.

Table 9: Medical indications of patients admitted to ICU.

	No. of cases	Percentage
Hematological	132	
Severe anaemia	128	18.87
Shock	4	0.58
Neurological disease	1	
Aneurysm	1	0.14
Respiratory disease	39	
Asthma	5	0.73
Pulmonary tuberculosis	3	0.44
Pulmonary edema	18	2.65
Lower respiratory tract infection	11	1.62
Acute respiratory distress syndrome	2	0.29
Hepatorenal disease	12	
Acute renal failure	4	0.58
Hepatitis	6	0.88
Hepatic encephalopathy	2	0.29
GI disease	1	
Pancreatitis	0	
Perforation peritonitis	1	0.14
Others	36	
DM	7	1.03
Malaria	8	1.17
Anaphylaxis	5	0.73
Heart disease	16	2.35

As per Table 9 most common indication for obstetric ICU admission was severe anaemia due to iron deficiency 128 (18.87%). Second most common medical indication was respiratory disease 39 (5.75%). Hepatorenal disease accounts for 12 patients i.e. 1.76%. Others were diabetes mellitus 7 (1.03%), malaria 8 (1.17%) and anaphylaxis 5 (0.73%) and heart disease 16 (2.35%).

Table 10: Intervention of patients admitted to obstetric ICU.

Oximetry	No. of cases	Percentage
O ₂	570	84.07
Nebulisation	93	13.71
BT	545	80.38
Inotropic drugs	75	11.06
Ventilator	12	1.76

According to Table 10, 100% patients were on pulse oximetry for monitoring and basic vitals and oxygen saturation whereas 570 (84.07%) patients needed oxygen supplementation. 545 (80.38%) required BT and inotropic supports were given to 75 (11.06%) whereas

93 (13.71%) patients required nebulisation, 12 (1.76%) patients needed ventilatory support.

Table 11: Outcome of patients admitted to obstetric ICU.

Outcome	No. of cases	Percentage
Shift to ward	609	89.82
Transfer out	24	3.53
Morbidity	43	6.34
LAMA	2	0.29
Total	678	100

As per Table 11, out of 678 patients, 609 (89.82%) were shifted to general ward and discharged, 24 (3.53%) were transferred out to other departments of our hospital whereas 43 (6.34%) mortalities occurred in obstetric ICU, 2 patients (0.29%) left against medical advice.

Table 12: Causes of maternal death of patients admitted in obstetric ICU.

	No. of cases	Percentage
Cardiorespiratory arrest	9	1.32
Pulmonary edema	8	1.17
Haemorrhagic shock with CR arrest	3	0.44
Multiorgan failure	3	0.44
Pulmonary thromboembolism	7	1.03
Congestive cardiac failure	5	0.73
Hepatorenal failure	1	0.14
Sudden postpartum collapse	5	0.73
Aspiration syndrome	1	0.14
Septic shock	0	0
Cardiogenic shock	1	0.14

According to Table 12, out of 678, 43 mortalities occurred in obstetric ICU with causes i.e. cardiorespiratory arrest, pulmonary edema, hemorrhagic shock with cardiorespiratory arrest, multiorgan failure, pulmonary thromboembolism, congestive cardiac failure, hepatorenal failure, sudden postpartum collapse, aspiration syndrome, cardiac shock were 9 (1.32%), 8 (1.17%), 3 (0.44%), 3 (0.44%), 7 (1.03%), 5 (0.73%), 1 (0.14%), 5 (0.73%), 1 (0.14%), 1 (0.14%).

DISCUSSION

The maximum number of patients in present study 21-25 years of age (54.8%). 62 patients were above the age of 30 years.

Reiz U et al reported a worse prognosis aged <20 years deceased. Waterson et al⁶ found that > 34 years was an independent predictor for maternal mortality in obstetric ICU patients.⁵

In present study out 678 patients 398 (58.71%) were uneducated, 335 (49.41%) were referral cases. Level of education, rural/urban background and poor antenatal care have been found to have a considerable effect on obstetric complications and outcome.

Waterson et al observed a worse prognosis for women of lower socio-economic conditions in UK. Okonofua in Africa reported that low socioeconomic status and poor antenatal care have considerable effects on obstetric complications and outcome.^{6,7}

In present study 100% patients required pulse oxymetry for close monitoring of pulse, BP, respiratory rate and oxygen saturation, whereas 570 (84.07%) needed oxygen supplementation. 545 (80.38%) required blood transfusion in the form of packed cell, WBR, blood products like FFP, PRP etc. Ionotropics were given to 75 (11.06%) patients and nebulisation was required by 93 (13.71%) of cases. Ventilatory support was given to 12 (1.76%) In their study Kilpatric SJ et al observed that hemodynamic and respiratory complications, needing ionotropic or ventilation support remain the most common reasons for ICU admission and need for support may predict poor outcome. Graham et al reported that 60% patients received mechanical ventilation.⁸⁻¹⁰

In present study the mean length of stay in ICU as 3 days with a range of 1-12 days.

The mean duration of ventilation and ICU stays as apparently less in present study than others which could have attributed to higher mortality rate in present study.¹⁰⁻¹²

In present study most, common indication for ICU admission was hypertensive disorder of pregnancy, 472 (69.61%) of which eclampsia 166 (24.48%), preeclampsia 30 (4.42%) and gestational hypertension 66 (9.7%).

The second most common was obstetric hemorrhage of which PPH were 37 (5.45%), placenta previa 40 (5.8%), abruptio placentae 12 (1.76%), retained placenta 5 (0.73%), placenta accreta, 8 (1.17%), ectopic pregnancy 34 (5.01%), rupture uterus 15 (2.21%), uterine inversion 5 (0.73%), H. mole 6 (0.88%), 10 incomplete abortion i.e. 1.47%. The other were septicemia, DIC, psychosis 7 (1.83%). The remaining 16 (2.35%) patients were for observation.

Hazelgrove and Coworkers reported an analysis of South West Thames data house where the primary reason for admission was hypertensive disorder of pregnancy (39.5%) followed by massive hemorrhage (33.3%).¹³

Umo-Etuk et al in a five-year review reported pregnancy induced hypertension as the major reason for ICU admission.¹⁴

Most common medical indication for admission was severe anaemia 128 (18.87%). Second most common was respiratory disease respiratory disease 39 (5.75%), hepatorenal disease account for 12 patients (1.76%).

According to Munner et al medical disease associated with pregnancy differ according to socio economic level and healthcare facilities for pregnant and postpartum women. Consequently malaria, viral hepatitis, venous thrombosis and poisoning in that order were the most diagnosed illness in India, whereas in United States of America, the most frequently diagnosed illness after placental anomalies were myocarditis, sepsis and drug abuse.¹⁵ In present study out 678 patients 348 (51.33%) underwent LSCS, 158 (23.305), delivered vaginally, 48 (7.08%) underwent laparoscopy, 23 (3.39%) had S and E, 18 (2.66%) underwent cesarean hysterectomy, 5 (0.74%) had hysterotomy, 1 had MTP. 77 (11.36%) patients did not undergo any mode of delivery.

Studies done so far report antepartum admission (Yuel VI et al and Ashraf N et al) and delivery admission (on the day of delivery) (Wanderrer JP et al, Stavens TA et al). According to Zwart cesarean delivery is an adjusted risk factors for ICU admission.¹⁶⁻²⁰

In present study out of 678, 609 (89.82%) patients were shifted to general ward and discharged. 24 (3.53%) cases transferred out to the other department of our hospitals such as medicine department whereas 43 (6.34%) mortalities occurred in obstetric ICU. 2 (0.29%) patients left again medical advice.

The mortality rate of our patients admitted in obstetric ICU was 6.34% which is similar to that reported by Hong Kong by Tang et al in 1997 (6%). 2.3% mortality rate was reported by Mahatte et al and Jenkins et al.²¹⁻²³

CONCLUSION

Establishment of a dedicated obstetric ICU at a tertiary care centre with knowledge at a tertiary care centre with knowledge familiarity, experience and expertise of an obstetrician and special team would be best place to monitor and treat critical ill obstetric patients which will reduce maternal obstetric morbidity and mortality.

The meticulous adaptation of safe motherhood initiative especially in remote area could help reduce the complications there by reducing ICU admission. Maternal morbidity and mortality in such cases can be further minimized significantly by early assessment and aggressive intervention by a team work involving obstetricians, intensivists and anaesthetist.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Garg P, Tripathi U. A study to know clinical characteristics and outcome of obstetrics patients requiring ICU admission. *Int J Reprod Contracept Obstet Gynecol* 2018;7:2639-44.