

# Study of Maternal and Perinatal Outcome in Patients in High Dependency Unit (HDU) in a Tertiary Care Centre

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## Abstract

**Background:** It was a retrospective observational study to know demographic factors, indication of High Dependency Unit (HDU) admission, course of stay, maternal and perinatal outcome in patients admitted in HDU in a tertiary care centre. **Introduction:** Pregnancy and delivery are physiological events. But, they have the potential for life threatening complications. Maternal mortality is an important indicator that reflects quality and adequacy of health care services. Timely intervention and early treatment in patients with high risk pregnancy may reduce further complications i.e. Need of intensive monitoring, morbidity and mortality. **Methodology:** Total 213 cases with high risk pregnancy admitted in HDU, were included in present study after satisfying inclusion and exclusion criteria. We studied demographic factors, indication of HDU admission and course of stay as well as maternal and perinatal outcome. **Results:** Majority of the patients i.e. 99 patients (46.48%) were in the age group of 21-25 years. 85 patients i.e. 39.91% were Primigravida while 74 patients i.e. 34.74% were second gravida. Maximum numbers of patients i.e. 173 patients (81.22%) were unregistered. A majority of patients i.e. 136 patients (63.85%) admitted in the HDU had gestational age <37 weeks while 68 patients i.e. 31.93% had gestational age between 37 to 40 weeks. Out of 213 patients, 146 patients i.e. 68.54% had obstetric complications while 67 patients i.e. 31.46% had medical complications. Pre-eclampsia, seen in 74 patients i.e. 34.74%, was the commonest obstetric indication for admission to HDU. Anemia seen in 22 patients i.e. 10.32% was the most common medical indication for HDU admission. Out of 213 patients, 101 patients i.e. 47.42% delivered vaginally, 84 patients i.e. 39.44% underwent caesarean section, 11 patients i.e. 5.16% had abortion whereas 11 patients i.e. 5.16% had ectopic pregnancy. Out of 185 deliveries 131 neonates were perfectly healthy, 37 had still births, 17 needed NICU admission and 9 had Neonatal deaths. Mean HDU stay was 3.31 days. 14 patients out of 213 required ICU care for further management. Mean ICU stay in medical complication group was 0.36 and that for obstetric complication group was 0.19. Out of 213 patients, maternal mortality occurred in 3 patients. **Conclusion:** Lack of health awareness and delayed referral to tertiary care centre seem to be a major reason for HDU and ICU admission and further maternal and neonatal morbidity and mortality. Timely antenatal registration, antenatal follow ups, prophylactic intervention and anticipation of intensive care can change the scenario hence leading to a decreased maternal morbidity and mortality.

**Keywords:** High Dependency Unit (HDU), ICU, Maternal Morbidity, Maternal Mortality

## 1. Introduction

Pregnancy and delivery are physiological events. But, they have the potential for life threatening complications<sup>1</sup>. Maternal mortality is an important indicator that reflects quality and adequacy of health care services<sup>2</sup>. Maternal mortality rate globally is 216 deaths per 1,00,000 (1 lakh) live births despite of all programmes<sup>3</sup>. Whereas, the maternal mortality ratio of India (2014-16) is 130 per 1,00,000 live births<sup>3,4</sup>.

According to UNICEF India, annually 44,000 women die due to preventable pregnancy related causes in India<sup>5</sup>. Globally, this ratio is 830 maternal deaths daily according to a WHO newsletter from 2018<sup>6</sup>. Lack of health awareness, reluctance and delay in treatment increase maternal morbidity and mortality<sup>7</sup>. Timely intervention and early treatment in patients with high risk pregnancy may reduce further complications i.e. need of intensive monitoring, morbidity and mortality<sup>8</sup>. This indicates need of health care services higher than the traditional obstetric care units<sup>9</sup>.

High Dependency Unit (HDU) is a specially staffed and equipped section of intensive care complex that provides a level of care intermediate between intensive care and general ward care<sup>10</sup>.

HDU facility provides simultaneous expert obstetric care and critical medical care under one roof<sup>11</sup>. The concept of HDU was introduced as a bridge between routine obstetric care and ICU in order to bypass and decrease the ICU burden<sup>12,13</sup>.

HDU care is required for women requiring more detailed observation, intervention including basic support for a single failing organ system, extended post-op care and those stepping down from higher levels of care<sup>14,15</sup>. Awareness regarding HDU care and its benefits need to be improved.

This study was conducted to study the various demographic characteristics, reason for HDU admission, course of stay, maternal and perinatal outcome in patients admitted in HDU in a tertiary care center.

## 2. Aims and Objectives

1. To study indications of admission to HDU.
2. To study maternal outcome in patients admitted in HDU.
3. To study perinatal outcome in patients admitted in HDU.

## 3. Materials and Methods

### 3.1 Methodology

Retrospective observational study was conducted in the Department of OBGY at Dr. Vasantrao Pawar Medical College and Research Centre from 1<sup>st</sup> July 2016 to 31<sup>st</sup> March 2018. Total 213 patients with high risk pregnancy were included in the present study after satisfying the inclusion and exclusion criteria.

**Inclusion criteria:** In this study all pregnant women with either medical or obstetrical complications were included.

All patients with obstetrics complications with secondary/associated medical complication were included in obstetric group. Whereas, patients having pure medical complications were included in medical group.

### 3.2 Obstetric Complications

1. Antepartum haemorrhage
2. Post-partum haemorrhage
3. Severe pre-eclampsia
4. Eclampsia
5. HELLP
6. Multiple gestation with complications
7. Hydatidiform mole
8. Ruptured ectopic
9. Post-op patients requiring haemodynamic monitoring or intensive nursing care
10. Obstetric hysterectomy

### 3.3 Pregnancy with Medical Complication

1. Pregnancy with severe anaemia Hb < 7gm%
2. Pregnancy with Gestational Diabetes Mellitus
3. Pregnancy with Heart disease
4. Pregnancy with Jaundice
5. Pregnancy with renal complications
6. Pregnancy with Dengue/Malaria
7. Pregnancy with respiratory complications
8. Pregnancy with DIC
9. Pregnancy with sepsis

### 3.4 Exclusion Criteria

#### 3.4.1 Complications in Pregnancy Involving 2 or More Organ Systems

Patients were admitted to HDU:

1. Directly from ward, recovery or emergency areas.

2. From ICU as a step down prior to transfer to the ward.

All patients were observed from admission to HDU till discharge from our hospital. Demographic characteristics as age, prior registration, parity were noted. Maternal outcome was assessed by gestational age at the time of delivery, mode of delivery, maternal morbidity and maternal mortality in both obstetric and medical group. Perinatal outcome was assessed by noting birth status, birth weight, and need of NICU admission.

**Table 1A.** Demographic characteristics

Variables	Frequency	Percentage
Age group		
upto 20	28	13.15%
21-25	99	46.48%
26--30	58	27.23%
31-35	18	8.45%
36-40	10	4.69%
Total	213	100%
Registration		
Registered	40	18.78%
Unregistered	173	81.22%
Total	213	100%
Parity		
Primigravida	85	39.91%
Gravida 2	74	34.74%
Gravida 3	33	15.49%
Gravida 4	15	7.04%
Gravida 5	5	2.35%
Gravida 6	1	0.47%
<b>Total</b>	<b>213</b>	<b>100%</b>

All pregnant women were monitored and assessed for number of days of HDU stay, need of ICU transfer, average stay in HDU & ICU.

Relevant data was collected. After completeness was checked, data was coded, entered and analyzed statistically using fractional percentage and chi square test by computer data analysis software programme (SPSS version 23).

## 4. Results

Our study included 213 patients admitted in HDU between 1<sup>st</sup> July 2016 to 31<sup>st</sup> March 2018.

In our study, majority of the patients were in the age group of 21-25 years i.e. 99 patients (46.48%) with a mean age of 25.39 years (Table 1A).

Majority of patients i.e. 173 (81.22%) were unregistered (Table 1A).

85 patients out of 213 (39.91%) were primigravida while 74 patients (34.74%) were second gravida. Mean parity in our study was 2.01 and 1.89 respectively for medical and obstetric indication groups (Table 1B).

**Table 1B.** Mean parity and gestational age according to indication

	Medical Group	Obstetric Group
Mean parity	2.01	1.89
Mean gestational age	31.94	33.73

A majority of patients i.e. 136 patients (63.85%) admitted in HDU had a gestational age of <37 weeks. While, 68 patients (31.93%) had a gestational age between 37-40 weeks and 9 patients (4.28%) went beyond 40 weeks. However, the mean gestational age in the sample was 32.31 weeks. Mean gestational age in our study group was 31.94 weeks for medical group and 33.73 weeks for obstetric group (Table 2).

**Table 2.** Distribution of HDU admission according to gestational age

Distribution according to Gestational age	Frequency	Percentage
< 37 weeks	136	63.85%
37-40 weeks	68	31.92%
> 40 weeks	9	4.23%
<b>Total</b>	<b>213</b>	<b>100%</b>

According to indications of admission to HDU, the study group was divided into two broad categories:

- Patients with obstetric complications, and
- Patients with medical complications.

146 (68.54%) patients out of 213 patients had obstetric complications while 67 (31.46%) patients had medical complications. Pre-eclampsia was the commonest obstetric indication for admission to HDU accounting

to 74 (34.74%) patients. While Eclampsia i.e. 20 (9.39%) patients and Placenta Previa i.e. 16 (7.51%) patients followed it.

Anaemia was the commonest medical indication with 22 (10.32%) patients for HDU admission followed by heart disease in pregnancy with 16 (7.51%) patients and Jaundice in 6 (2.82%) patients (Table 3A-B).

**Table 3A.** Admission to HDU according to indication

Medical indication	Frequency	Percentage
Anaemia	22	32.83%
Heart disease	16	23.88%
Jaundice	6	8.9%
Thrombocytopenia	4	5.9%
CNS	4	5.9%
Dengue	3	4.47%
Chronic	3	4.47%
Hypertension		
Renal	3	4.47%
Pneumonia	2	2.98%
GDM	2	2.98%
Haematological	2	2.98%
<b>Total</b>	<b>67</b>	<b>100%</b>

**Table 3B.** Admission to HDU according to indication

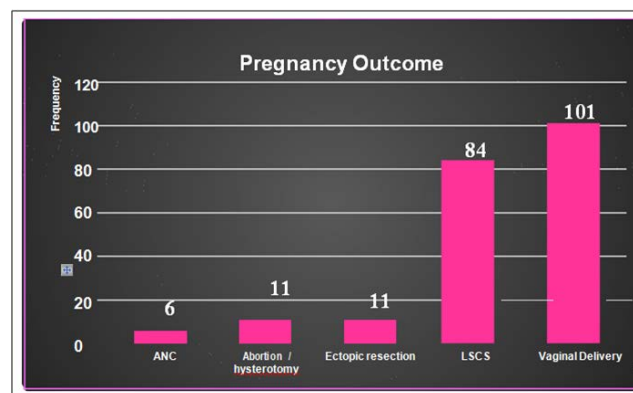
Obstetric indication	Frequency	Percentage
Pre-eclampsia	74	50.68%
Eclampsia	20	13.69%
Placenta previa	16	10.95%
Ectopic pregnancy	11	7.53%
Abruption	8	5.47%
HELLP	5	3.42%
PPH	5	3.42%
Multiple gestation	3	2.05%
H Mole	2	1.36%
Sepsis	2	1.36%
<b>Total</b>	<b>146</b>	<b>100%</b>

In our study group out of 213 patients, 101 patients delivered vaginally (47.42%), 84 patients underwent a caesarean section (39.44%) with total number of deliveries as 185. 11 patients were of abortion (5.16%) while another

11 patients (5.16%) had ectopic pregnancy and they were managed either laparoscopically or by exploratory laparotomy followed by salpingectomy. However, the remaining 6 patients were conserved and discharged in antenatal period (2.82%) (Table 4 and Diagram 1).

**Table 4.** Outcome of HDU admissions

Pregnancy outcome	Frequency	Percentage
ANC	6	2.82%
Abortion	11	5.16%
Ectopic resection	11	5.16%
LSCS	84	39.44%
Vaginal Delivery	101	47.42%
<b>Total</b>	<b>213</b>	<b>100.00%</b>



**Diagram 1.** Pregnancy outcome.

In our study out of 185 patients who delivered, 148 had live births and 37 had still births (20%). Out of 148 neonates, 131 were perfectly healthy and did not require NICU admission. 17 neonates required NICU admission due to some neonatal complication like prematurity, birth asphyxia and septicaemia. While, 9 out of 17 morbid neonates faced neonatal death despite intensive medical management. (Table 5)

**Table 5.** Birth status according to indication of admission

Birth Status	Type of diagnosis		Total
	Medical	Obstetrics	
Still Births	3(7.69%)	34(23.28%)	37(20%)
Live Births	33 (84.61%)	106(72.60%)	139(75.14%)
NND	3(7.69%)	6(4.10%)	9(4.86%)
<b>Total</b>	<b>39</b>	<b>146</b>	<b>185</b>

127 out of 185 neonates of the mothers within our sample had a birth weight of  $\leq 2.5$  kg while 58 out of 185 had a birth weight of  $>2.5$  kg (Table 6).

**Table 6.** Average stay in HDU according to indication

	Average stay (days)	Mean stay for patients with Medical complications (days)	Mean stay for patients with Obstetric complications (days)
HDU	3.31	3.59	3.3
ICU	0.18	0.36	0.19

The HDU stay for the sample population ranged from 1 to 7 days with a mean stay of 3.31 days. Mean HDU stay in medical complications group was 3.59 and that for obstetric complications group was 3.3.

Maximum of the patients i.e. 199 out of 213 did not require an ICU. Only 14 patients of the total sample size transferred to the ICU for further management. Therefore, 199 out of 213 i.e. 93.42% patients were saved from ICU burden. The ICU stay for the sample population ranged from 0 to 5 days with a mean stay of 0.18 days. Mean ICU stay in medical complications group was 0.36 and that for obstetric complications group was 0.19.

Out of the sample size of 213, maternal mortality occurred in 3 patients.

## 5. Discussion

In our study, majority of the patients were in the age group of 21-25 years i.e. 99 patients (46.48%) with a mean age of 25.39 years. Study done by Dr. Raksha Sharma et al., found similar incidence of majority patients in the age range of 21-25 years i.e. 45.58% i.e. 31 patients<sup>16</sup>.

In our study, 173 patients i.e. 81.22% were unregistered while 40 patients i.e. 18.78% were registered. This goes in correspondence with the study conducted by Dattatray et al., where 84.21% patients were unregistered and 15.79%

were registered<sup>1</sup>. This signifies that essential antenatal care and timely intervention is necessary to prevent maternal morbidity.

In our study, 129 patients i.e. 60.09% were Multigravida and 84 patients i.e. 39.91% were Primigravida. While in study by Dattatray et al., showed more incidence of HDU admission in Primigravida 68.4% (39 patients)<sup>1</sup>.

Mean parity in our study was 2.01 and 1.89 respectively for medical and obstetric indication groups. While, the mean parity observed in the study by Alaa Masood et al., was 2.2 and 2.4 respectively in medical and obstetric groups<sup>9</sup>.

Mean gestational age in our study group was 31.94 weeks for medical group and 33.73 weeks for obstetric group. While, in study conducted by Alaa Masood, mean gestational age for medical group was 34.3 weeks and obstetric group was 36.5 weeks<sup>9</sup>. Both studies show, that patients develop medical complications at an earlier gestational age as compared to obstetric complications. So, anticipation of complications and vigilant monitoring is required in patients with pre-existing medical disorders.

In our study group out of 185 delivered patients, 101 delivered vaginally (54.6%), 84 underwent a caesarean section (45.4%). In the study conducted by Dattatray et al., 61.4% patients delivered vaginally while 33.3% underwent Caesarean section<sup>1</sup>.

In our study group 34 patients (22.82%) and 3 patients (8.33%) had still birth in obstetric and medical group respectively. 106 patients(71.14%) in obstetric group and 33 patients(91.67%) patients in medical group had good perinatal outcome. whereas, 6 patients(4.10%) in obstetric group and 3 patients(7.69%) in medical group had neonatal death.

In the study conducted by Alaa Masood et al., 4 patients(1.96%) and 14 patients(9.86%) had still birth in obstetric and medical group respectively<sup>9</sup>. patients(95.1%) in obstetric group and 112 patients(78.87%) patients in medical group had good perinatal outcome. whereas, 6 patients(2.94%) in

**Table 7.** Comparison with other study

	Our Study		Study by Alaa Masood et al.,	
	Medical Group	Obstetrics Group	Medical Group	Obstetrics Group
Still Birth	3(8.33%)	34(22.82%)	14(9.86%)	4(1.96%)
Good Perinatal Outcome	33(91.67%)	106(71.14%)	112(78.87%)	194(95.1%)
Neonatal death	3(7.69%)	6(4.10%)	16(11.27%)	6(2.94%)
Total	39	146	142	204

obstetric group and 16 patients (11.27%) had neonatal death. High still birth rate found in our study group was probably because of greater percentage of unregistered patient which were referred late (Table 7).

In our study, out of 213 patients only 14 patients i.e. 6.57% required transfer to ICU and further care. 199 patients were managed successfully in HDU. Thus HDU helps in reducing morbidity, burden on ICU and financial burden on patients.

## 6. Conclusion

Obstetric indications remain the leading cause of HDU admissions. However, undiagnosed medical indications act as a trigger. Lack of timely ANC registration seems to be a major reason behind non anticipation of obstetric complications. Timely antenatal registration, antenatal follow ups, prophylactic intervention and anticipation of intensive care can change the scenario hence leading to a decrease in maternal morbidity. Early anticipation of further maternal deterioration and timely intervention or referral to higher centre will reduce the unfavorable outcome. Lack of health awareness and delayed referral to tertiary care centre seem to be a major reason for HDU and ICU admission and further maternal and neonatal morbidity and mortality. The study is limited by its retrospective nature and comparative analysis between the cost of therapy in HDU care and ICU care needs to be considered

## 7. References

- Dattaray C, Mandal D, Shankar U, Bhattacharya P, Mandal S. Obstetric patients requiring high-dependency unit admission in a tertiary referral centre, International Journal of Critical illness and injury Science. 2013 March; 1:31-35. <https://doi.org/10.4103/2229-5151.109416>. PMID: 23724382, PMCID: PMC3665116.
- Pattanaik T, Samal S, Behuria S. Obstetric admissions to the intensive care units: A five year review, International Journal of Reproduction, Contraception, Obstetrics and Gynaecology. 2015 Dec; 6:1914-1917. <https://doi.org/10.18203/2320-1770.ijrcog20151285>.
- Park K. Park's Textbook of Preventive and Social Medicine. 25th ed. Mumbai: Bhanot; Feb. 2019 p.611-12.
- State statistics, Maternal Mortality Ratio. NITI Aayog, Government of India. Accessed on 2018 March. Available from <http://niti.gov.in/content/maternal-mortality-ratio-mmr-100000-live-births>.
- Maternal Health. UNICEF INDIA. Accessed on 2016 Oct. Available from <http://unicef.in/Whatwedo/1/Maternal-Health>.
- Fact Sheets. Maternal Mortality. World Health Organisation. Accessed on 2018 Feb. Available from <https://www.who.int/news-room/fact-sheets/detail/maternal-mortality>.
- Marques, Castenheira S, Periera L, Pinto F, Carvalhas J, Martires E. Obstetric high dependency unit admission: A four year retrospective study, European Journal of Anaesthesiology. 2014 June; 31:134-136. <https://doi.org/10.1097/00003643-201406001-00536>.
- Gilbert TT, Smulian JC, Martin AA, Ananth CV, Scorza W, Scardella AT, et al. Obstetric admissions to the intensive care unit: Outcomes and severity of illness, Obstet Gynaecol. 2003; 102:897-903. [https://doi.org/10.1016/S0029-7844\(03\)00767-1](https://doi.org/10.1016/S0029-7844(03)00767-1). <https://doi.org/10.1097/00006250-200311000-00004>.
- Masood A., Gaballah K., Omar Z. Maternal and Foetal Outcome among patients requiring High Dependency Unit admission: A Five Year Prospective Study, Obstetrics and Gynecology International Journal. 2018 Feb 26; 9(I-2018):89-93. <https://doi.org/10.15406/ogij.2018.09.00310>.
- Bevan R, Venkatesh B, Freebairn R. Intensive Care Medicine Training in Australia and New Zealand: A Clarification, Critical Care Medicine. 2015 Nov; 43(11):e540. <https://doi.org/10.1097/CCM.0000000000001242>. PMID:26468732.
- Ryan M, Hamilton V, Bowen M, et al. The role of a high-dependency unit in a regional obstetric hospital, Anaesthesia. 2000; 55:1155-8. <https://doi.org/10.1046/j.1365-2044.2000.01627.x>. PMID:11121922.
- Monsalve Germán A, Martínez Catalina M., Gallo Tatiana, González María Virginia, Arango Gonzalo, Upegui Alejandro et al. Maternal Critical Care: Outcomes and Patient Characteristics in a Combined Obstetric High Dependency Unit in Medellín, Colombia, Rev. Colomb. Anestesiología. 2011 July; 39(2):190-205. <https://doi.org/10.5554/rca.v39i2.96/suffix>.
- Saravanakumar K, Davies L, Lewis M, Cooper GM. High dependency care in an obstetric setting in the UK. Anaesthesia. John Wiley & Sons, Ltd (10.1111); 2008. <https://doi.org/10.1111/j.1365-2044.2008.05581.x>. PMID:18821887.
- Levels of critical care for adult patients, Nursing in Critical Care. 2003 Apr; 8(2):90. <https://doi.org/10.1046/j.1478-5153.2003.t01-1-00001.x>.
- Guidelines for the Critically Ill Woman in Obstetrics Version 1.1 2014, Aug: 7.
- Sharma R, Gupta BD, Dubey K, Kanash S. Why Do The Obstetric Patients Go To The ICU/HDU ? A Retrospective Observational Study, Imperial Journal of Interdisciplinary Research. 2016; 2(3):334-337.

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