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Original Article

Clinical Profile and Outcome of Obstetric Patients Requiring Critical Care Support in a Tertiary Care Centre

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Abstract

Background

The maternal complications during pregnancy pose very serious challenge requiring multispeciality critical care approach. The objective of the study was to analyse clinical profile and outcome of these patients. Studies regarding above will add on existing knowledge that will help in improving patient outcome.

Materials and Methods

This was a prospective observational study conducted over a period of 1 year from April 2017 to March 2018 in the department of obstetrics and gynecology of Nobel Medical College, Biratnagar. All the consecutive patients requiring ICU care were enrolled.

Results

Among 7820 deliveries, 122 patients (1.56% of total deliveries) required critical care admission. Among them 61 (50%) have causes related to obstetrics problems and 61 (50%) have non obstetric problems. Obstretic hemorrgage (24.59%) and hypertensive disorders (11.47%) of pregnancy were common obstetric complications whereas isolated renal failure 18 (14.75%), cardiac disease 16 (13.1%), pulmonary disorders 11 (9.1%) and sepsis 10 (8.19%) were common non obstetric complications. Maternal mortality rate was 24.59%. Renal failure 9 (30%) was the commonest cause of death.

Conclusion

Obstetric hemorrhage and hypertensive disorders of pregnancy were the commonest risk factors requiring critical care support. Other risk factors requiring ICU were renal failure, cardiac disease, pulmonary disorders and sepsis.

Keywords: *Critical care outcome, Maternal mortality, Pregnancy*

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Introduction

Despite increased awareness and efforts from the part of the patient as well as the government about safe pregnancy outcome, the obstetric complications pose a serious challenge to society as well as obstetrician [1]. In our country, complication and death from obstetric causes is serious public health problem. These patents need multidisciplinary approach and well equipped critical care setting for better fetomaternal outcomes. Proper essential health care should be provided to mother and fetus during pregnancy, delivery and puerperium [2]. The number of obstetric patients requiring ICU care and their outcome largely depends upon availability ICU facilities, trained man power and socioeconomic status of the patients [3]. In developed countries because of good antenatal care and awareness, the requirement of ICU is less (0.08 to 0.76 %) [4-5] of the deliveries as compared to developing countries like ours where it is 0.84 and 0.87 respectively [6-7].

Our aim was to study the clinical profile and outcome of the obstetric patients requiring intensive care unit (ICU) in a tertiary care center of low income country like ours.

Materials and Methods

This prospective observational study was conducted in the department of Obtetrics and Gynaecology over a period of 1 year from April 2017 to March 2018 in Nobel Medical College, Biratnagar, Nepal. The study considered one sample proportion formula with 95% CI and 80% power and prevalence of obstetric hemorrhage 44.56% [8] then the sample size became 122. This hospital has 40 bedded well equipped intensive care unit (ICU) with superspeciality facility in pulmonary and critical care, cardiology, nephrology, neurology, gastroenterology and endocrinology and urosurgery. It caters almost all areas of province 1 including some parts of province 2. Obstetric complications during pregnancy were defined as the disorders occurring during pregnancy and within 42 days of delivery. Non obstetric complications were defined as the disorders that were medico-surgical and not related to pregnancy. Pregnancy and puerperal complications that required critical care support and admitted to intensive care unit were included in our study. This tertiary hospital has safe motherhood program launched by Government of Nepal. Large number of obstetric patients comes with complications. Age, parity, diagnosis, reason for ICU admission like obstetric and non obstetric disorders, the records of detail of antenatal care was recorded. We also recorded treatments received in ICU like mechanical ventilation, ionotropic support, blood transfusion, vital organ support including dialysis, total duration of ICU stay .The maternal outcome in the form death, neonates requiring NICU support also recoded. Informed consent was taken from each patient relatives and ethical approval was obtained from institutional ethical review committee before study.

Results

During one year study period, there were total of 7820 deliveries and 122 ICU admissions, (1.56%) of total deliveries. More than half of the patients admitted to ICU were between 20-30 (50.81%) years followed by 31-40 (22.95%). This means very young patients predominate our study population. Majority (48.62%) were primigravidas followed by second gravidas (36.06%). Amoong those, 60 patients (49.02%) were of third trimester and 20 of them (16.31%) were of puerperium. Majority (73.77%) of the patients admitted in ICU was postpartum and (13.11%) were on antepartum period. Although our hospital is located in capital of province 1, mostly it caters people from underprivileged and low income areas. On taking history and doing clinical examination majority (60%) of the patients

Table 1: Demographic parameters of obstetric patients admitted to ICU

Sociodemographic Parameters	Number	Percentage
Age group		
<20	18	14.75
20-30	62	50.81
31-40	28	22.95
>40	14	11.47
Socioeconomic status		
Lower	74	60.65
Middle	36	29.5
Higher	12	9.83
Antenatal Care		
Booked at other hospital	85	70.00
Booked at our hospital	24	20.00
Completely unbooked	13	10.00
Organ system affected		
Single	26	21.31
MODS	96	78.68

MODS: Multiple Organ Dysfunction Syndrome

Table 2: Gestational age on admission

Gestational age on weeks	Number	Percentage
<=13	10	8.19
14-28	8	6.55
29-36	18	14.75
37-40	60	49.18
41-42	6	4.91
Puerperium	20	16.39

had edema ranging from bilateral pedal to mild to severe anasarca. Previous history of exertional fatigue, palpitation, dyspnea were present in (45.0%) patients. Therefore majority of (60.65%) women are from lower socioeconomic status with inadequate antenatal care (54.09%) and from rural areas (67%). Most of them (70%) were not booked in our hospital. Our hospital is a tertiary care center with all superspeciality services that is why many patients from government health care facility and private hospitals with lower technical and human resource support come for emergency obstetrics and non obstetric complications. Common (49.1%) gestational age at presentation was 37-40 weeks. Most of them (75%) were not booked in previously. This condition resulted in severe financial constraint, shorter ICU stay and inadequate treatments in many patients. Majority (54.09%) patients stayed in ICU for less than 48 hours. During analysis 61 (50%) were obstetric causes of ICU admission and while equal cases were non obstetric causes. Major obstetric disorders were hemorrhage (24.59%), hypertensive disorder (11.47%) and unexplained coma probably due to amniotic fluid embolism or hypoxic ischemic encephalopathy, ectopic pregnancy (7.37%).

Among non obstetric disorders significant renal disease requiring dialysis (14.75%), heart disease (13.1%), lung disease (9.01%) were common causes of ICU admission. Most of the patients came to ICU after emergency LSCS (60%). Mechanical ventilation was needed in 65% of cases and 14.75% required hemodialysis. Patient also required whole blood and blood product transfusion, ionotropic support as per need. Regarding maternal mortality, unfortunately many pregnant women died 30(24.59%) in ICU. In analyzing the causes, renal failure requiring hemodialysis was the commonest cause of death in our setting.

Regarding neonatal outcome, 79 women (65%) gave live birth. Among them, 18 (15%) women had IUFD and 12 (10%) women needed induced abortion. Among them, 63 (80%) live births were admitted in NICU.

Table 3: Major obstetric and medical conditions requiring ICU admission

Conditions	Number	Percentage
1.Obstetric causes	**61**	**50.00**
a. Hemorrhage	**30**	**24.59**
PPH	18	14.75
Ectopic	5	4.10
Rupture uterus	2	1.64
Placenta prevea	3	2.46
Abuptio placentae	2	1.64
b.Hypertensive disorders of pregnancy	**14**	**11.47**
Eclampsia	10	8.19
Pre-eclampsia	2	1.63
HELLP syndrome	2	1.63
c.Septic abortion/Puerperial Sepsis	6	4.92
d.Unexplained Coma	11	9.01
2.Non obstetric causes	**61**	**50.00**
a.Isolated renal failure	18	14.75
b.Non puerperal infection (sepsis)	10	8.19
c.Heart disease		
Peripartum cardiomyopathy	10	8.19
Rheumatic heart disease	5	4.09
PAH	1	0.82
d.Lung disease		
Asthma	9	7.37
Pleural effusion	1	0.82
PTB	1	0.82
d.Others		
OP poisoning	2	1.63
GBS	1	0.82
Liver disorder	1	0.82
DKA	1	0.82
Post partum psychosis	1	0.82

PPH –post partum hemorrhage, PAH-Pulmonary Arterial Hypertension,DKA-Diabetic Ketoacidosis, GBS-Gullaine Barres Syndrome, OP-Organophosphate poisoning, PTB-Pulmonary Tuberculosis,HELLP-Hemolysis elevated liver enzyme,low platelets.

Table 4: Etiology of maternal mortality

Causes of death	Number (N=30)	Percentage
Renal failure	9	30.00
Hypertensive disorders	5	16.66
Unexplained coma	5	16.66
PPH /Shock	4	13.33
Post LSCS sepsis	4	13.33
Heart failure	3	10.00

Discussion

During one year period we prospectively studied 122 obstetric patients who required critical care for obstetric and non obstetric reasons. Of total deliveries, 1.56% patients required critical care support. During comparison with other studies in Nepal, Shrestha D *et. al*. [6], Saha R *et. al*. [7] reported 0.84%, 0.87% respectively but upadhyaya I *et. al*. [9] from Paropakar Maternity and Women's Hospital which is the single largest national obstetric center reported 2.23%. Another recent Indian study showed 1.29%.There is variation in studies because of study population catered. Ours is a tertiary level care center and we are having safe motherhood programe of Nepal government .Therefore the admission rate to ICU is higher than two above studies but lower than from Paropakar national obstetric care centre. Most of our patients requiring critical care were young primigravida with post partum status.

Our findings corroborate with the studies done by Chawala *et. al*. [10] and Saha R *et. al*. [7]. Most of the patients (73.77%) were postpartum who required critical care it may be because of the acute changes just before, during and after delivery which include acute blood loss, surgery and other abrupt physiologi-cal changes that tends to cope and adapt to new physiological situation [11]. Other reason could be due to late consultation with obstetric care center till symptoms troubles the patient. Of all the patients 70% were booked at other health centers where there is poor technical and manpower support. This finding corroborates with reports (60%) by Ashraf N *et. al*. [12]. Patients were referred late in disease course from other centrers because of various reasons educational, financial, geographical and socio-cultural reasons**.** Despite all efforts from different sectors for safe delivery and regular antenatal care there is still lack in timely referral to the large tertiary health care centers. Patients are referred at last when the complications occur, which are the key predictors in maternal mortality**.** Most of the patients (60%) presented to ICU were undergone LSCS. They were referred to ICU immediately after some form of complications. LSCS rate in other studies Ashraf N *et. al.* [12] (63.3%), Saha R *et. al*. [7] (70%) was similar to our studies.

In our study, of all patients, 50% were obstetric related causes referred to ICU for critical care. Bahadur B Rao *et. al*. [13] reported 68% obstetric related cases referred to ICU. Among them also, in our study, majority were obstetric hemorrhage (24.59%) and hypertensive disorders (11.47%) of pregnancy. Other Indian studies showed that Baby Sailaja K *et. al*. [14] obstetric hemorrhage (23.1%), hypertensive disorders (24.2%), Gupta *et. al.* [15] obstetric hemorrhage (62%) and hypertensive disorder (16%), similar results like ours. Post partum hemorrhage related to atonic uterus was common. Among 18 cases of PPH, 8 cases were treated with balloon temponade, 3 with hemostatic suture and 3 with peripartum hysterectomy. Most of the patients received magnesium sulfate for eclampsic fits. Our 11 patients developed unexplained coma following delivery for which we suspected amniotic fluid embolism, pulmonary embolism, CNS infections and some form of anesthetic complications. All related investigations and consultations with related superspecilities did not reveal any explainable etiology of coma. In many, neurologists suspected hypoxic ischemic encephalopathy of unexplainable etiology. Six patients with coma requested for discharge from ICU because of various reasons further studies are needed to find the etiology in these cases.

Analysis regarding non obstetric causes renal, cardiac, pulmonary disorders and sepsis were common causes of critical care unit admission. We do combined approach in managing our patients. We focus on predominant organ system affected and consult specialist. Renal injury occurred as a part of MODS in many patients and that recovered on it own. Our 18 patients required hemodialysis as renal replacement therapy. Despite our all combined effort to save these mothers 30 of the 122 women died (24.59%). The maternal mortality in other studies reported were, Verma *et. al.* [16] (19%), Chawala *et. al.* [10] (28%) and Gupta *et. al.* [15] (41.6%). Renal failure, hypertensive disorder and PPH were common causes of death. Very different scenario in our study was increase in number of non obstetric causes necessitating ICU admission. Renal, cardiac, neurological and pulmonary disease as cause of ICU admission and death was common in our study. Availability of specialist and good medical equipment probably picked up and diagnosed many cases which otherwise could have been diagnosed differently.

In our study, obstetric and non obstetric causes were in similar proportion requiring ICU admission. Other different studies reported obstretic cases as predominant one. In any case, maternal mortality occurred because of lack and ineffective antenatal care, poor socioeconomic status, poor education, poor nutrition, lack of manpower and technological resources in health care facilities. The incidence of live birth was 65% which is comparable with Bahadur BR et als (58.6%). 80% of them were admitted in NICU.

Conclusion

Obstetric hemorrhage and hypertensive disorders of pregnancy were the commonest risk factors requiring critical care support. Other risk factors requiring ICU were renal failure, cardiac disease, pulmonary disorders and sepsis. Patient's factors like socioeconomic status, education level and antenatal check up play role in maternal outcome and complications. On the part of health personnel, early anticipation, timely detection and management prevent complications. In tertiary care center, all combined approach with related specialities and obstetrician is vital in managing complications.

Limitation

This is a one year duration and small prospective study involving one region of the country.

Recommendation

Large prospective studies involving all country may generate more data that helps to validate this small study and formulate national guideline in managing complicated obstetric patients. Government and other related agencies should focus on making pregnant women aware of pregnancy related problems. Related health workers should be trained in managing critically ill patients.

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Conflicts of interests: None

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