Case Study

Obstetric and Gynaecologic Patients Requiring Intensive Care: A One Year Retrospective Study in a Tertiary Teaching Hospital in Bangladesh

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Abstract:

Background: Care of obstetric patients has always been a challenge for obstetricians and critical care physicians, because of the consideration of multidimensional pregnancy related diseases as well as foetal wellbeing.

Objective: The aim of the study was to evaluate the incidence, indications for admission, interventions and consequences of the obstetrics and gynaecologic patients admitted to the ICU.

Methods: A retrospective observational study was conducted in the multidisciplinary ICU of Enam Medical College and Hospital from January, 2020-December, 2020.All the obstetric and gynae patients admitted to the ICU were the study population. Data regarding demographic characteristics of the patients, indications for admission, associated medical disorders, interventions, length of ICU stay, and outcome were collected and analyzed.

Results: During the study period, total 870 patients were admitted to the ICU, among which the data of 90(10.3%) patients were analyzed. The mean age of the patients was 26.84±6.95years. Total 63% of the patients came from rural area. Obstetric cases were 72% and gynaecological cases were 28%. Among the obstetric cases 22% had post-partum Eclampsia, 12% cases had preeclampsia, another 12% had PPH, and 9%cases had APH. Among the gynaecological reasons, 52% cases were ruptured ectopic pregnancy, and 36% cases had post abortion complications. Majority (64.61%) admitted in their postpartum period. Inotropes were needed for 36.7%. Transfusion of blood and blood products were required for 51.1%. Mechanical ventilation was needed for 31.8%. The majority of the patients 63.3% stayed in the ICU for a period of 1-3 days. Maternal mortality was 12.2% (11). Most common cause for maternal death was MODS 4(36.36%).

Conclusion: Hypertensive disorders account for the most number of admission to ICU followed by obstetric haemorrhage.Early detection and speedy referral to the tertiary center with ICU facilities should be promoted among medical society to reduce the incidence of ICU admissions and maternal mortality.

Key words: ICU, Gynae&Obs critical patients, Eclampsia, PPH, Critical Care, Maternal Mortality.

Introduction:

Critically ill obstetric and gynae patients impose challenges to the intensive care staffs and obstetricians due to their altered physiology and concern regarding safety of both the mother and the foetus[1]. According to the World Health Organization (WHO)the vast majority of maternal deaths (94%) occurred in low-resource settings, most of which could have been prevented by experienced and skilled care during peripartum period[2]. In 2017, approximately 86% (254 000) of the estimated global maternal mortality occurred in Sub-Saharan Africa and Southern Asia[2].In 2017, the Maternal Mortality Ratio (MMR) was462 per 100 000 live births in low income countries versus

11 per 100 000 live births in high income countries[2].The WHO states that the major causes of all maternal deaths are: severe bleeding, sepsis, hypertensive disorder during pregnancy, delivery complications, and unsafe abortion[2]. The incidence of pregnant women admitted to ICU in developed countries is 2-4 per 1000 deliveries as compared with 2 to 13.5 per 1000 deliveries in developing countries[3].Admission of gynae and obstetric patients to ICU is considered as an objective indicator of severe maternal morbidity[4]. A better knowledge of variability, features, and consequences of the disease involving these group of patients is the first step towards accomplishing prevention and thereby reduction of both maternal morbidity and mortality[5]. Nevertheless, there is a scarcity of published articles about this in our settings. So, we conducted this study to evaluate incidence, indications, course, interventions and outcome of gynae&obstetric patients admitted to ICU.

Methods and Materials:

This Retrospective observational study was conducted in the Department of Anaesthesiology and Intensive Care Unit of Enam Medical College and Hospital, Savar, Dhaka. This hospital is a 1000 bedded tertiary care center with a multidisciplinary 17-bedded General ICU and is managed by a team of experienced ICU staff, ICU Residents, Consultants, Associate Professor, Professor and attending consultants from other departments. The nurse: patient ratio is 1:2. It provides a number of critically ill patients within the area, often referred from neighboring districts as well. After obtaining institutional approval, the study was conducted during the period of January, 2020 to December 2020.All antenatal or postnatal patients requiring ICU admission for obstetric and gynaecologic reasons irrespective of age, parity, mode of delivery, and co-morbid conditions were included. Non-obstetric, non-gynecologic patients were excluded from

this study. Data regarding demographic characteristics, indication of ICU admission, intervention, and outcome were collected from a preformed record sheet and analyzed with SPSS version 20.

Results:

Total 870 patients were admitted in the ICU during the study period. Among which 90(10.3%) patients who matched the inclusion criteria, were selected for the study. Regarding age group, highest age group was found between 25-34 years [Table: 1].The mean age of the patients was 26.84±6.95 years.

Table 1: Age distribution of Patients:

Age group in years	Frequency	Percentage (%)
15-24	39	43.3
25-34	40	44.4
35-44	10	11.1
45-56	0	0.0
>56	1	1.1
Total	**90**	**100%**

Majority of the patients came from rural area 57(63.3%) and minority came from urban area 33(37%)&were admitted for obstetric reasons 65(72 %), among the obstetric reasons14 (n=65, 22%) had post-partum Eclampsia, 8(12%) had preeclampsia, another 8(12%) had PPH, and 6(9%) had APH .Other Obstetric causes for ICU admission were retained placenta with haemorrhagic shock 4(6%), Covid-19 following LUCS 3(5%), ruptured uterus with haemorrhagic shock 3(5%), HELLP Syndrome 2 (3%), and complications following obstructed labor 2(3%).Among the associated medical disorders there were cardiomyopathy following LUCS 2(3%),un

controlled DM 2(3%),uncontrolled Hypertension 2(3%), pulmonaryoedema2(3%),anaemic heart failure1(2%)and mitral stenosis 1(2%).Among the gynaecological reasons 25(28%),13(n=25, 52%)had ruptured ectopic pregnancy,9(36%)had post abortion complications, complications following suction & evacuation2(8%) and Carcinoma of Cervix with pulmonary metastasis 1(4%) [Table 2].

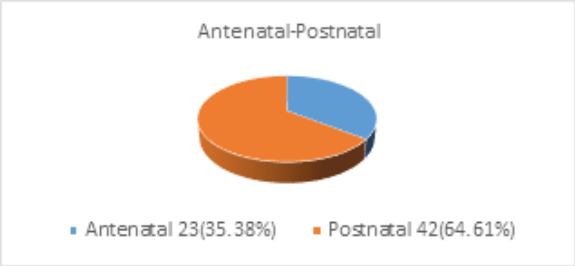
Table 2: Indications for ICU admission:

Indications for ICU admission	Frequency	Percentage
Obstetric n=65(72%)		
Post-partum Eclampsia	14	22%
Pre-eclampsia	8	12%
HELLP syndrome	2	3%
APH	6	9%
PPH	8	12%
Retained Placenta with haemorrhagic shock	4	6%
Cardiomyopathy following LUCS	2	3%
Covid-19 following LUCS	3	5%
FTP with severe Bronchial Asthma	5	7%
Ruptured Uterus with haemorrhagic shock	3	5%
Pregnancy with Anaemic heart failure	1	2%
FTP with Uncontrolled DM	2	3%
FTP with uncontrolled Hypertension	2	3%
Complication following obstructed labor	2	3%
FTP with mitral stenosis	1	2%
FTP with Pulmonary oedema	2	3%
Gynecologic N=25 (28%)		
Ruptured Ectopic Pregnancy	13	52%
Post abortion complication	9	36%
Complication following suction and evacuation	2	8%
Carcinoma Cervix with pulmonary metastasis	1	4%

*PPH- Post Partum Haemorrhage, APH-Antepartum Haemorrhage, DM- Diabetes Mellitus, FTP- Full Term Pregnancy, LUCS- Lower Uterine Caesarean Section, HELLP-Haemolysis (H), Elevated Liver Enzyme (EL) and Low platelet count (LP).

Among the obstetric patients, 23 (35.38%) came in their antenatal period, whereas 42(64.61%) came in their postnatal period which is shown in figure 1.

Figure: 1 Period of Patients' admission



Regarding the interventions in ICU, Inotropes were required for 33(36.7%) cases. 46(51.1%) cases received blood transfusion. Mechanical Ventilation was required for 28 (31.1%)[Table 3].

Intervention	Frequency	Percentage (%)
Inotropes	33	36.7
Blood and Blood products	46	51.1
Mechanical Ventilation	28	31.1

The majority of the patients 57(63.3%) stayed in the ICU for a period of 1-3 days; 23 patients (25.5%) who stayed for 4-7 days and 10(11.1%) patients stayed for 8-10 days [Table 4]. Mean duration of ICU stay was 3.57±2.21 days.

Table 4: Length of ICU stay:

Length of stay	No. of patients	Percentage
1 – 3 days	**57**	**63.3**
4 – 7days	**23**	**25.5**
8 -10days	**10**	**11.1**
Total	**90**	**100%**

There were 11 maternal deaths in the ICU; a mortality rate of 12.2% total79(87.8%) patients survived during the study period.

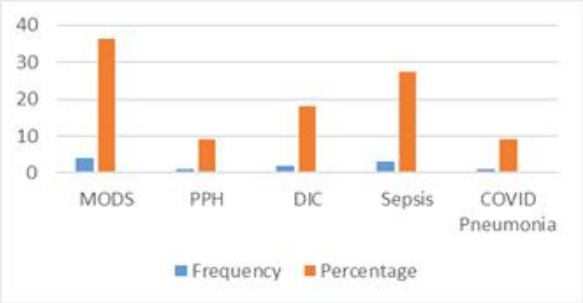
Table 5: Outcome:

Outcome	Frequency	Percentage
Survivor	79	87.8%
Non Survivor	11	12.2%
Total	**90**	**100%**

Most common cause of death in our study was Multi-organ dysfunction 4(36.36%). The second most common cause of death was sepsis 3(27.27%). The other causes of death were disseminated intravascular

coagulation 2(18.18%), Secondary to PPH 1(9.09%) and Pneumonia with Covid-19 1(9.09%) Figure-2.

Figure 2: Analysis of 11Cases of death:



MODS- Multiple Organ Dysfunction Syndrome, DIC-Disseminated Intravascular Coagulation.

Discussion:

In spite of the radical decline in maternal morbidity over the last few years, it is still a challenge in the developing world because of lack of intensive care facilities. In this study, 90 patients were admitted to ICU for obstetric and gynaecological reasons, accounting for 10.3% of total ICU admission. Whereas, it was 4.6% &4.32% in studies conducted by Shresta D. et al[6], Saha R. et al[7] and 1.1% in the study of Bahadur BR. et al[1].The higher rate of ICU admission in our study was explained by it being a tertiary referral center and due to lack

of intermediate care unit or ICU facilities nearby regions, where patients not suitable for ward observation were transferred to the ICU. The mean distribution of age of the patients in the current study was26.84±6.95, which was almost similar to the studies conducted by Karnadet al.[8](25.5±4.6yrs) and Ashraf et al.[9](27±4.9years) and little less than that of Lin et al.[10](31.74±2.23 years). Majority of our patients (63.3%) came from rural area which is similar to that of Gupta et al.[11](54.16%).

Regarding indication, in our study, obstetric reasons were the significant causes of morbidity and ICU transfer (72%) as compared to gynaecologic causes (28%).The main obstetric reason for ICU admission was postpartum eclampsia (22%) followed by pre-eclampsia (12%).In the study of Bahadur et al.[1] obstetric hemorrhage was the major cause (38.6%) followed by eclampsia (10.7%) and preeclampsia (9.3%).The presence of HELLP syndrome in preeclampsia is associated with poor maternal outcome[12]. In our study, only 2 patients (3%) developed HELLP Syndrome whereas it was 10.7% in the Bahadur et al.[1]&9.3% in Lataifeh et al.[13]study.Obstetric haemorrhage was the second commonest indications for ICU admission in this study. This is in accordance with the report of some other authors like Saha R[7]. et al &Lataifeh et al[13]. Shrestha et al.[6] found 18.75% cases of PPH whereas we found 12% cases. We found 9% cases of Antepartum haemorrhage, which is much higher than the study of Shrestha et al.[6] (3.75%) and Farzi et al.[14](1.03%). In our study, we found 5% cases of ruptured uterus which is closed to the study of Shrestha et al[6]. (3.7%) and Gombar et al[4](3.8%).3% of our cases were complications following obstructed labor, whereas, it found 1.9%.in that of Gombar et al[4].

During our study period, there is pandemic occurrence of Covid-19 worldwide. We found 3 cases (5%) with covid-19 positive that were

shifted to separate Covid ICU and was treated according to government Covid-19 protocol. Among the associated medical disorders Gombar et al.[4] found0.9% cases of cardiomyopathy, which is less than our study (3%). In our study, there were 3% cases of DM and 3% cases uncontrolled Hypertension, whereas Farzi et al.[14] found 5% of DM and 5.1% cases of HTN. In our study, we found 3% cases of Pulmonary oedema which is less than Saha et al.[7](6%).

Most of the cases admitted to our ICU were Postpartum (64.6%) that was opposite to the study of Ashraf et al.[9](76%). And Collop et al.[15](85%) the majority of their patients were admitted during antepartum period. However, supporting the current study most of the authors reported a higher incidence of postpartum admission like Gomber et al.(92.1%), Saha R[7]et al (70%)&Gupta et al[11](83. 33%).This could be attributed to the haemodynamic changes in the postpartum period which show increase in cardiac output, acute blood loss during delivery and decrease in plasma oncotic pressure.

Among the gynaecological reasons, ruptured ectopic pregnancy had the highest incidence14.4% (13/90) which is comparable to Shrestha et al.[6] (15%) and less comparable to Gomber et al.[4](4.8%)5/104, farazi et al [14](4.8%) 49/1019, Saha et al [7] (2%)2/50.

To correct haemodynamic instability, in our study, Inotropes were used for 36.7% of the patients which is close to the rate of studies by Bahadur et al.[1] (40%), and Bhatt et al.[16] (41.5%). However, Studies conducted by Saha et al.[7] (8%) and Shrestha et al.[6](10%) the rate is much lower than our study. In our study, 51.1% cases received transfusion of blood and blood products which is almost similar to studies Shrestha et al [6](47.5%)and Bhatt et al. (46.2%)[16] but much higher than Saha et al[7].(26%)and much lower than Bahadur et al.[1](74.6%).In our study, 31.1% (28) required

mechanical ventilation during their stay in ICU, which is higher than Shretha et al.[6] (11.2%), Saha et al.[7](12%), and lataiefh et al.[13] (18.6%), but lower than other reports where the necessity of mechanical ventilation were63% (Bhatt et al.)[16],41%(Cohen J)[17]and46%(Chawla S)[18].The most common indication for mechanical ventilation was acute respiratory failure and haemodynamic instability.

The majority of the patients 57 (63.3%) stayed in the ICU for a period of 1-3 days; 23 patients (25.5%) who stayed for 4-7 days and 10 (11.1%) patients stayed for 8-10 days. Longest duration of stay was 10days and the shortest duration was 1 day; indicating that many of the patients recovered early after getting ICU management, the mean duration of ICU stay was 3.57±2.2 days which were comparable to the study of Saha et al.[7](3.44±3.7days), but less comparable to Shrestha et al[6]. (2.13±1.3days).

Increased Maternal mortality ratio in developing countries have been attributed to irregular antenatal care, treatment by non-qualified person, low socioeconomic status, poor nutritional status in obstetric patients[19]. The maternal mortality in our study was 12.2%., which was comparable to study conducted by Ashraf et al.[9](13%), Bahadur et al.[1](16%), but less comparable to Heinonen Set al.[20](4.5%), Al-Suleiman SAet al.(9.4%)[21], Shrestha et al[6]. (5%), Saha et al[7].(6%), Verma et al.[19](19.1%). However, in a study in Iran, Farzi et al.[14] presented very small rate of maternal mortality (0. 3%).Most common cause of death in our study was MODS (36.36%) following complications of hypertensive disorders of pregnancy which was similar to the study of Bahadur et al.[1], whereas it was higher than Bhatt et al.[16](27%).The second most common cause of death in our study was sepsis (27.27%) which is closer to Bahadur et al[1].(25%).

Conclusion:

Hypertensive disorders account for the most number of admission to ICU followed by obstetric haemorrhage. Early detection and prompt referral to the Tertiary Centre with intensive care facilities to be promoted among the society to reduce the incidence of ICU admissions, maternal morbidity and mortality. Our recommendation is a prospective multi-center study including several regions of the country, is required to achieve the meaningful complete results for the entire country.

References:

1. Bahadur R, Kodey P, Tanniur J, Tirumala S. Study of outcome of obstetrics emergencies admitted to Intensive care unit. Int J Repord Contracept Obstet Gynecol. 2018;7(7):2909-2014 Doi:http://dx.doi.org/ 10.18203 /2320-1770 .ijrcog20182905
2. Maternal Mortality – WHO / World Health Organization. Available at : https://www.who.int/news- room/ fact-sheets/detail/maternal-mortality [Accessedon: 23,Jan, 2022]
3. Pollock W, Rose L, Dennis C-L. Pregnant and postpartum admissions to the intensive care unit: a systematic review. Intensive Care Med.2010;36(9):1465-74.DOI: 10.1007/s00134-010-1951-0
4. Gomber S, Ahuja V, Jafra A. A retrospective analysis of obstetric patients' outcome in intensive care unit of a tertiary care centre. J AnaesthesiolClin Pharmacol.2014;30(4):502-507. Doi: 10.4103/0970-9185.142843
5. Leung NY, Lau AC, Chan KK, Yan WW. Clinical Characteristics and outcomes of obstetric patients admitted to the intensive care unit: A 10 years' retrospective review. Hong Kong Med.2010; 16(1):18-25 [PubMed:20124569]
6. Shrestha D, Aryal S, Baniya S.Evaluation of clinical characteristics and outcomes of obstetric patients admitted to intensive care unit: A case control study. Journal of Lumbini Medical College.2018;6(1):11-16. DOI: 10.22502/jlmc.v6il.167.Epub:2018 may 23
7. Saha R, Shakya A. Study of obstetric patients admitted to Intensive care unit (ICU) at Kathmandu Medical College Teaching Hospital. Journal of Kathmandu Medical College, 2013;2(6):196 -200.DOI: http://dx.doi.org/10.3126/jkmc.v2i4.11777.

8. Karnad DR, Lapsia V, Krishnan A, Salvi VS. Prognostic factors in obstetrics admitted to an Indian Intensivecareunit.CritCareMed.2004;32(6):1294-9.[PubMed,PMID:15187509]. DOI: 10.1097/01.ccm.0000128549.72276.00

9. AshrafN, Mishra Sk, Kundra P, Veena P, Soundaraghavan S, Habeebullah S. Obstetric patients requiring intensive care: a oneyear retrospective study in a tertiary care institute in India. Anaesthesiol Res Pract.2014 ArticleID 789450.Doi: http;//dx.org/10.1155/2014/789450

10. Lin Y, Zhu X, Lieu F, Zhao YY, Du J, Yao GQ, et al. Analysis of risk factors of prolonged intensive care unit stay of critically ill obstetric patients: a five-year retrospective review in 3 hospitals in Beijing]. Zhongguo Wei Zhong Bing Ji Jiu Yi Xue.2011;23(8):449-53. [PubMed:21878165].

11. Gupta S, Naithani U, Doshi V, Bhargava V, Vijaya BS. Obstetric Critical Care: A prospective analysis of clinical characteristics, predictability, and fetomateranal outcome in a new dedicated obstetric intensive care unit. Indian J Anaesth. 2011;55(2):146-53. [Pubmed] DOI: 10.4103/0019-5049.79895

12. Sibai BM, Taslimi MM, el-Nazer A, Amon E, Mabie BC, Ryan GM.1986.Maternal perinatal outcome associated with the syndrome of haemolysis, elevated liver enzymes, and low platelets in severe preeclampsia-eclampsia.American journal of Obstetrics and Gynaecology.1986;155(3): 501-509.Doi:https://doi.org/10.1016/0002-9378(86)90266-8

13. Lataifeh I, Amarin Z, Zayed F, Al-Mehaisen L, Alchalabi H, Khader Y. Indications and outcome for obstetric patients' admission to intensive care unit: A 7-year review. Journal of Obstetrics and Gynaecology.2010;30(4):378-382. [Pubmed] Doi: 10.3109/01443611003646298.

14. Farzi F, Mirmansouri A, Roshan ZA, Nabi BN, Biazar G, Yazdipaz S. Evaluation of Admission Indications, Characteristics and Outcomes of Obstetric Patients Admitted to the Intensive Care Unit of a Teaching Hospital Center: A Five-Year Retrospective Review. Anesth Pain Med.2017;7(3): e133636. Doi:10.5812/aapm.13636.

15. Collop NA, Sahn SA. Critical illness in pregnancy. An analysis of 20 patients admitted to a medical intensive care unit. Chest.1993;103(5):1548-1552.DOI: 10.1378/chest.103.5.1548

16. Bhatt PBR, Navada MH, Rao SV, and Nagarathna G.Evaluation of obstetric admissions to Intensive care unit of a tertiary referral center in coastal India. Indian J of Crit Care Med. 2013; 17(1):34-7. doi: 10.4103/0972-5229.112156.

17. Cohen J, Singer P, Kogan A, Hod M, Bar J. Course and outcome of obstetric patients in a general Intensive care unit. Acta Obstetricia et Gynaecologica Scandinavica.2000; 79(10):846-850. Doi: https://doi.org/10.1034/j.1600-0412.2000.079010846.x

18. Chawla S, Nakra M, Mohan S, Nambiar BC, Agarwal R, Marwaha A. Why do obstetric patients go to the ICU? A 3-years study. Med J Armd Forces India.2013;69(2):134-7.Doi:10.1016/j.mjafi.2012.08.033

19. Verma D, Rathore AM. Obstetric admissions to the intensive care unit of a tertiary hospital in northern India. Int J Biomed Res.2014;5(9):539-42. Doi: https://doi.org/10. 7439/ijbr.v5i9.399

20. Heinonen S, Tyravainen E, Saarikoski S, Roukonen E.Need for maternal critical care in obstetrics: apopulation-based analysis. International Journal of Obstetric Anaesthesia2002; 11:(4)260-264. DOI: 10.1054/ijoa.2002.0985.

21. AL-suleiman SA, Qutub HO, Rahman J,Rahman MS.Obstetric admission to intensive care unit:a12 year Review. Archives of Gynaecology and Obstetrics.2006;274(1):4-8.DOI: 10.1007/s00404-004-0721-z