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Incidence and predictors of severe obstetric morbidity in a teaching hospital

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Abstract

Background: Evaluation of severe obstetric morbidity is an important aspect of optimum maternal health. Towards this, the Waterstone and Mantel criteria have been used to know the incidence, predictors and causes of severe obstetric morbidity.

Objectives: The study aimed to estimate incidence, predictors and causes of obstetric morbidity at Kathmandu Medical College and Teaching Hospital.

Methods: A hospital-based prospective study was carried out from 1st September 2014 to 31st August 2015. All cases of severe obstetric morbidity according to the Mantel and Waterstone criteria were identified. The socio-demographic and healthcare characteristics of extremely severe cases were compared with controls which included women who were admitted before and after the indexed cases.

Results: There were 2270 deliveries during the study period, out of which 74 cases of severe obstetric morbidities were identified i.e. an incidence of 32.5 per 1000 deliveries. During the study period, there were three maternal deaths attributed to conditions studied. Disease-specific morbidities per 1000 deliveries were 18.9 for haemorrhage, 9.2 for severe pre-eclampsia, 0.88 for eclampsia, 0.44 for haemolysis elevated liver enzyme and low platelet count and 3.08 for sepsis. A total of 26 patients were admitted in Intensive care unit which was 1.145 per 100 of total deliveries.

Conclusion: Severe obstetric morbidity and its relation to mortality may be more sensitive measures of pregnancy outcome than mortality alone. In this study, most events are related to obstetric haemorrhage and severe pre-eclampsia.

Key words: Eclampsia, Intensive care unit, Obstetric morbidity, Postpartum haemorrhage

INTRODUCTION

World Health Organization (WHO) estimated that there were more than 500,000 maternal deaths worldwide in 2005, of which, 95% occurred in developing countries[1]. Maternal mortality has been used as a measure of the success of obstetric intervention but at present, it is too rare for use in local practice in the developed world[2]. In view of inadequate qualitative and quantitative data on maternal mortality and decreasing maternal mortality rates, new indicators have been developed to evaluate maternal health issues more effectively[3]. Severe obstetric morbidity is a newly described condition that has been investigated for the last 20 years. There have been several studies on obstetric morbidity both in developing and developed countries and the spectrum of its causes overlaps to that of obstetric mortality, especially hypertensive conditions and hemorrhage[4]. Although it is a highly relevant issue, it has been scarcely investigated. Most studies have used Mantel and Waterstone criteria[5]. Obstetric morbidity is gaining interest as a new indicator of the quality of obstetric care. In view of inadequate data in our setting, this study is undertaken to know the incidence, predictors and causes of severe obstetric morbidity encountered at Kathmandu Medical College and Teaching Hospital (KMCTH).

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METHODS

A hospital based descriptive observational study was conducted in the Department of Obstetrics and Gynaecology, KMCTH from 1st September 2014 to 30th August 2015. KMCTH is a 750 bedded tertiary care hospital which includes maternity ward, surgery centre,

adult and neonatal Intensive Care Unit (ICU). Disease specific criteria as described by Waterstone and Mantel were enrolled in the study[5]. Six specific disease groups are given in the box:

EXCLUSION CRITERIA

1. Haemodynamically stable patients with haemorrhage not requiring resuscitation or acute blood transfusion.
2. Patients with stable cardiac or respiratory disease not requiring ICU admission.

Definition of severe obstetric morbidity

Severe preeclampsia (Severe PE)
Blood pressure 170/110 mm Hg on two occasions 4 hours apart or
> 170/110 mm Hg once plus >0.3 g in 24 hours proteinuria or
>++ on dipstick or
Diastolic blood pressure >90 mm Hg plus proteinuria (as above) on one occasion plus one of the following signs/symptoms:
Oliguria (< 30 ml/h for 2 hours)
Visual disturbances (flashing lights or blurred vision)
Epigastric/right upper quadrant pain or tenderness
Thrombocytopenia (< $100x10^9$/l)
Pulmonary oedema

Eclampsia
Convulsions during pregnancy or in the first 10 days postpartum together with at least two of the following features within 24 hours after the convulsions:
Hypertension (>170/110 mm Hg)
Proteinuria (>+ on random dipstick analysis or >0.3 g in 24 hours)
Thrombocytopenia (< $100x10^9$/l)
Increased aspartate aminotransferase (>42 U/l)

Haemolysis elevated liver enzyme and low platelet count (HELLP) syndrome
Haemolysis (abnormal peripheral smear or raised total bilirubinconcentration (>20.5mol/l), raised liver enzyme activity (raised aspartate aminotransferase (>70U/l) or raised αglutamyl transferase (>70 U/l) and
Low platelets (< $100x10^9$/l)

Severe haemorrhage
Estimated blood loss>1500 ml, peripartum fall in haemoglobin concentration>40 g/l or acute transfusion of 4 or more units of blood

Severe sepsis
Sepsis is systemic response to infection manifested by two or more of the following features:
Temperature >38°C or <36°C (unless after prolonged caesarean)
Heart rate >100 beats/minute
Respiratory rate >20/min or $PaCO_2$<32 mmHg
White cell count >$17x10^9$/l or < $4x10^9$/l or >10% immature forms
Plus bacteraemia (i.e. positive blood culture or positive swab culture)
Severe sepsis is sepsis associated with one of the following:
Organ dysfunction-for example: acute renal failure
Hypoperfusion-for example: lactic acidosis, oliguria, or acute alteration in mental state
Hypotension-i.e. systolic blood pressure < 90 mm Hg or drop of >40mm Hg in the absence of other causes of hypotension

Uterine rupture
Acute dehiscence of the uterus leading to emergency delivery of the infant.

All cases of severe obstetric morbidities as defined by Mantel and Waterstone criteria were taken from admission and delivery records. Patient characteristics such as age, parity, antenatal care, co-morbidities, mode of delivery and details of disease-specific conditions and their management were recorded. Data retrieved included age, parity, co-morbidity and mode of delivery. Risk factors like age, parity, previous co-morbidities and mode of delivery were assessed by comparing the cases and controls. Control included women who got admitted before and after the indexed case. Data was entered into computer through Statistical Package for Social Sciences (SPSS) version 20 and was analysed by descriptive statistics. The quantitative variables are presented as mean± standard deviation (SD). P value< 0.05 is taken as significant.

RESULTS

There were 2270 deliveries during the study period. The mean age of women in the study was 28.50±5.36 years. Most of them were primigravida.

Seventy four cases were identified as having severe obstetric morbidities i.e. an incidence of 32.5 per 1000 deliveries. During the study period, there were three maternal deaths attributed to conditions studied (one from haemorrhage, two from sepsis). Table 1 shows the incidence of severeobstetric morbidity by condition diagnosed. Haemorrhage was the most common cause of obstetric morbidity. Predictors of obstetric morbidity are shown in Table 2. The mean gestational age, lower segment caesarean section and associated co-morbid condition like previous history of postpartum haemorrhage (PPH) varied significantly.

Table 1: Severe acute obstetric morbidity by clinical conditions

Category of morbidity	Frequency	Percent
Obstetric Haemorrhage*	43	58.1
PPH	32	43.2
Incomplete abortion	6	8.1
Ruptured ectopic	5	6.7
Hypertensive disorder of Pregnancy	24	32.4
Severe PE	21	28.3
Eclampsia	2	2.7
HELLP	1	1.3
Sepsis	7	9.5
Total	**74**	**100.0**

*12 cases needed transfusion of ≥4 pint blood

HELLP syndrome: Haemolysis elevated liver enzymes and low platelet; PPH: Postpartum haemorrhage; PE: Pre-eclampsia

Table 2: Comparison of predictors in cases of severe obstetric morbidity and controls

Characteristics	Cases(n=74)		Controls (n=148)		p-value
	Mean	SD	Mean	SD	
Age (years)	28.50	5.36	27.28	5.55	0.816
Parity	1.53	0.65	1.42	0.5	0.328
Gestational age (weeks)	35.28	4.6	39.04	1.7	<0.001
Mode of delivery					
	Frequency	Percent	Frequency	Percent	
Lower segment caesarean section	35	47.2	45	30.4	0.026
Normal Delivery	25	33.7	76	51.3	
Co-morbidities					
Hypertension	18	24.3	14	9.45	0.003
Gestational Diabetes Mellitus	6	8.1	6	4.05	0.208
Cardiac disease	1	1.3	0	0	0.156
Previous history of PPH	2	2.7	0	0	0.045

DISCUSSION

This study found the incidence of severe obstetric morbidity to be 32.5 per 1000 live births. The finding is consistent with those reported in the literature, 0.7 to 101.7 cases per 1000 births[6]. Souza et al found a severe maternal morbidity rate of 15 to 42 cases per 1000 births[4]. Luz et al found the rate of severe morbidity of 44.9 per 1000 live births[7]. Mantel et al showed maternal mortality rate of 20% which is consistent with data from our study using the same criteria[8]. These data corroborate evidence reported in the literature[9]. Fillip et al in a study in Africa identified haemorrhage and hypertensive disorders of pregnancy as the most common condition of obstetric morbidity[10].In this study the most common cause of obstetric morbidity was obstetric haemorrhage (58.1%) which occurred in 43 women as identified by Waterstone criteria[11]. The second common cause is hypertensive disorder of pregnancy (32.4%). Similar results were observed in a study done at our hospital in 2010 where haemorrhage (41.66%) was the commonest cause of obstetric near miss[14]. Likewise in a big multicentre study done in Nepal by Rana et al, PPH (40%) was the commonest cause of maternal near miss followed by hypertensive disorder[15].

The main predictors of severe obstetric morbidity in this study were gestational age, associated morbidities like hypertension, diabetes mellitus, previous history of PPH and emergency caesarean section. The main indications for caesarean section were severe pre-eclampsia and eclampsia resulting into haemorrhage. Duration of hospital stay was prolonged in cases as compared to control group. These predictors are amenable to change with obstetric intervention like reducing the rapidly rising rate of caesarean section.

Twenty six patients were admitted to the ICU. This gives the incidence of 1.14% of all deliveries during the study period, which was low compared to a study done in one of the largest maternity hospital of Nepal which showed an ICU admission rate of 2.3% of all deliveries[12]. The major indications for ICU admission were hypertensive disorder and obstetric haemorrhage[13]. Three mortalities were noted during the study period among the admitted patients. One death was due to sepsis leading to multi organ failure. The second case was from direct complication of delivery and PPH. The third mortality was also from multi organ failure which was a case of infective hepatitis E in a pregnant patient. There were two cases of Caesarean hysterectomy during the study.

CONCLUSION

This study concludes that the incidence of severe obstetric morbidity is 32.5 per 1000 live births. Haemorrhage being the most common cause of obstetric morbidity followed by hypertensive disorder and caesarean section were found to increase the risk of morbidity. Development and evaluation of ways of predicting and reducing risk are required for the management of haemorrhage and pre-eclampsia.

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