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"A Cross Sectional Study of Maternal Near Miss Associated with Obstetric Haemorrhage and Hypertensive Disorders of Pregnancy at a Tertiary Care Centre"

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KEYWORDS

Antenatal care, Birth, Health services, Maternal death, Morbidity

ABSTRACT:
Back ground: Near miss, the assessment will help in the accurate epidemiological analysis of maternal morbidity. This will help in increasing awareness among people regarding the importance of seeking health care before, during and after child birth.
Objectives: To determine the frequency and evaluate near-miss cases associated with obstetric hemorrhage and hypertensive disorders of pregnancy.
Materials and methods: A cross-sectional study is done to identify near-miss cases caused by ante and postpartum hemorrhage and Hypertensive Disorders of Pregnancy (HDP), evaluate contributing clinic-social factors. Women who suffered a maternal near-miss associated with obstetric haemorrhage and HDP, from pregnancy, labour or puerperal complications, coming to department of OBG, BMCRI who meet Maternal Near Miss Review inclusion criteria were included in the study.
Results: Among the study population, clinico-social factors responsible for maternal near-miss events were lack of awareness in participants(98.52%), lack of transport between facilities for participants(26.67%), lack of communication network for participants(92.59%), infrastructural issues at a referral facility and lack of medications, instruments, equipment or consumables at referral facility for participants (36.29%) each and lack of blood/ blood products
at referral facility for participants(24.44%).
Conclusion: The study concluded that hemorrhage and HDP are leading causes of maternal near-miss events, and the main socioeconomic determinant for the maternal near-miss event is identified as the absence of antenatal care.

INTRODUCTION:

A decreasing trend is observed in maternal mortality rate globally by 44% over the past two decades. It is also observed that 99% of maternal deaths occurring globally are from developing countries of Asia and Africa. 38% of maternal deaths are found to be caused by obstetric hemorrhage, 11% due to sepsis, and 5% due to obstructed labor and these are preventable by proper antenatal care and institutional deliveries.[1]

The main reason for the highest maternal mortality rate in developing countries is found to be a lack awareness and access or availability of maternal health care services. [2]

It is established by studies that for every woman who dies due to direct or indirect effects of pregnancy, many more women experience life-threatening complications.[3] More than 50% of global maternal deaths are found to be caused due to hemorrhage and hypertensive disorders which are also contributing to major maternal morbidity.[4]

Estimating the number of a woman experiencing severe morbidity and preventing severe maternal

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morbidity will help to improve maternal and infant outcomes and in reduction
of long-term poor health consequences.[5]

Severe maternal morbidity is defined by WHO with the term " Maternal Near Miss," and a woman who develops one or more signs of organ dysfunction as described by 25 clinical, laboratory, or management criteria is classified under this category.[6]

The need of the hour is a better understanding of maternal morbidity and its impact on well-being of women. Assessment of maternal near-miss cases will help in getting a
comprehensive profile of the maternal health system of the country.

WHO recommends maternal near-miss assessment approach for developing national plans for improving maternal health care.[7]

This study will evaluate the association of obstetric hemorrhage and hypertensive disorders in pregnancy and maternal near-miss cases.

MATERIAL AND METHOD:

Objectives: To determine the frequency and evaluate near-miss cases associated with obstetric hemorrhage and hypertensive disorders of pregnancy.

This cross sectional study was conducted in the department of OBG, Bangalore Medical Collegeand Research Institute, Bengaluru from January 2017 to December 2017. The study was approved by the institutional human ethics committee(BMCRI/PG/352/2019-20). Women who suffered a maternal near-miss associated with obstetric haemorrhage and hypertensive disorder of pregnancy, from pregnancy, labour or puerperal complications, coming to department of OBG, BMCRI, Bangalore who meet Maternal Near Miss Review inclusion criteria were considered as the study population. Based on the previous study by Archana D Rathode et al.[8]

Analysis of near-miss and maternal mortality at tertiary referral centre of rural India, the sample size obtained is 120 but included 135 patients.

Inclusion Criteria:

1. Informed written consent to participate in the study.
2. Maternal Near Miss Review Criteria(NHM-2014)

In this study, patients admitted with pregnancy-specific obstetric and medical disorders with respect to obstetric hemorrhage due to antepartum hemorrhage and postpartum hemorrhage and hypertensive disorders of pregnancy-pregnancy induced hypertension, preeclampsia, eclampsia, and HELLP syndrome are included, identified by a minimum of 3 criteria:
(Minimum 1 from each of the following must be met).

- Clinical findings (s/s)
- Investigations
- Interventions

OR

Any single criteria which signifies Cardio respiratory collapse

Exclusion criteria:

Patients are not willing to provide informed written consent.

Methodology:

Pregnant women admitted in antenatal, labour, emergency wards, or intensive care unit who meet the Inclusion criteria were taken under this study after obtaining their consent. Data about these patients were retrieved from case sheets, registers, and interviews of patients and responsible attenders.

Relevant data were collected in the Facility Based Maternal Near Miss Review Form. Patients were categorized by final diagnosis with respect to haemorrhage and hypertension.

Association of clinico-social parameters such as antenatal visits, gravid status, etc was analyzed.

STATISTICAL METHODS:

Descriptive analysis was carried out by mean and standard deviation for quantitative variables, frequency, and proportion for categorical variables. coGuide version V.1.0 was used for statistical analysis.[9]

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RESULTS:

Table 1: Descriptive analysis of antenatal parameters in the study population (N=135)

Parameters	Frequency	Percentage
Condition at Admission		
Patient admitted with serious illness	126	93.33%
Admitted with no disorder, became near miss	2	1.48%
Admitted with the disorder, became near miss	7	5.19%
Type of Admission		
Referral	126	93.33%
Self	9	6.67%
Obstetric score		
Primi	36	26.67%
*G2	35	25.93%
G3	34	25.19%
G4	14	10.37%
≥G5	11	8.15%
Number of ANC visits		
1	5	3.7%
2	108	80%
3	14	10.4%
4	3	2.2%
5	5	3.7%

*Gravida

In this study, most of the participants of near miss were patients with serious illness for 126 (93.33%) participants and 126(93.33%) patients were being referred from other health care facility. Transportation was provided to a majority of 91 (67.40%) participants. Most of the patients were primi for 36 (26.67%), G2 for 35 (25.93%) participants and 108 (80%) participants had 2 ANC visits (Table 1).

Table 2: Descriptive analysis of the mode of delivery and complications in the study population (N=135)

Parameters	Frequency	Percentage
Mode of delivery		
Elective LSCS	6	4.4%
Emergency LSCS	54	40.0%
Instrumental delivery	9	6.7%
Full term Vaginal Delivery	30	22.2%
Laparotomy	4	3.0%
Preterm Vaginal Delivery	32	23.7%
The phase of pregnancy at the time of near-miss		
<34 weeks	34	25.2%
>37 weeks	45	33.33%
34-37 weeks	40	25.19%
Post delivery	16	11.9%
Factors causing near-miss		

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HDP	**67**	**49.62%**
Severe Pre-eclampsia	2	2.98%
Impending Eclampsia	8	11.94%
Antepartum Eclampsia	42	62.68%
Postpartum Eclampsia	6	8.95%
HELLP	9	13.43%
Obstetric hemorrhage	**66**	**48.89%**
Atonic PPH	18	27.27%
Abruptio placentae	15	22.72%
Placenta Previa	18	27.27%
Placenta accreta spectrum	8	12.12%
Rupture uterus	4	6.06%
Traumatic PPH	3	4.54%
Both (HDP+ Abruption)	**2**	**1.48%**

In this study, 54 (40%) near miss cases underwent Emergency LSCS and they were of gestatinal age >34 weeks. The factors causing near-miss were HDP for 67(49.62%), Obstetric hemorrhage for 66(95.65%) participants, 2 (1.48%) had both HDP and Abruption.(Table 2)

Table 3.: Descriptive analysis of neonatal outcomes in the study population (N=135)

Parameters	**Frequency**	**Percentage**
Birth details		
Fresh still birth	25	18.5%
Live birth	110	81.5%
NICU admission	48	35.6%
Outcome- Discharged	125	92.6%
Outcome-Death	10	7.4%

The birth details was fresh still birth for 25 (18.5%) participants and live birth for 110 (81.5%) participants.(Table 3)

The most common system involved was Cardiovascular system for 68(50.37%) participants. Among them, 85(63%) participants had interventions at previous facility.(Table 4)

Table 4: Descriptive analysis of systems involved and interventions done at previous facility in the study population (N=135)

System involvement		
Single	64	47.41%
Multiple	71	52.59%
System involvement		
Cardiovascular system	68	50.37%
Central nervous system	62	45.93%
Respiratory system	7	5.19%
Haematological system	76	56.29%
Hepatobiliary system	9	6.67%
Renal system	2	1.48%
Interventions at previous facility	85	63.0%
ICU admission	94	69.6%

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Medical ventilation	65	48.1%
Vasopressors	63	46.7%
Urine artery litigation	38	28.1%
Urine compression sutures	16	11.9%
Internal iliac litigation	34	25.2%
Hysterectomy	22	16.3%
Anticonvulsants	67	49.6%
Mannitol	67	49.6%
Anticoagulants	128	94.8%

Table 5: Descriptive analysis of the cause of maternal death in study population (N=53)

Cause of maternal deaths	**Frequency**	**Percentage(%)**
HDP	31	34.5%
Obstetric haemorrhage	18	20%
Combined	4	4.5%
Maternal deaths due to HDP (N=31)		
SPE *	7	22.58%
APE†	10	32.26%
Status ecclampticus	4	12.9%
Post-partum eclampsia	4	12.9%
HELLP syndrome	6	19.36%
Maternal deaths due to Obstetric haemorrhage (N=18)		
Atonic PPH	5	27.78%
Traumatic PPH	1	5.56%
Rupture Uterus	2	11.11%
Abruption	5	27.78%
Placenta Previa	5	27.78%
Maternal deaths due to Obstetric haemorrhage + HDP (N=4)		
SPE with abruption	2	50%
Impending eclampsia with abruption	1	25%
SPE with Placenta Previa	1	25%

*Severe pre eclampsia † Antepartum eclampsia

Among the study population, the most common cause of maternal death was HDP 31 (34.5%) participants followed by Obstetric hemorrhage for 18 (20%) participants. (Table 5)

DISCUSSION:

A total of 135 participants were included in the final analysis. The age of study participants ranged between 18 to 40 years, with the majority of them (80%) belonging to the age group of 18 to 30 years most of them were primi and second gravid patients 27% and 26% respectively. 80% of patients had only visits and that suggests there is lack of antental awareness. 93.33% Patients admitted with serious illness and they were being referred similar to a study by Archana et al.[8]

40% of the women underwent emergency caesarean section, 24% had preterm delivery, similar to that reported in a study by Yasmin, G. et al.[10] in which nearly 42.6% near-miss admissions were delivered by LSCS and 23% delivered by vaginal route.

The factors causing near miss were hypertensive disorders of pregnancy for 49.6% participants,

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Obstetric hemorrhage for 48.9% participants similar to a study by Singh, V., et al.[11] in which hemorrhage (40.5%) And hypertensive disorders (25.5%) were the leading cause of morbidity. Several other studies, including a study by David, E., et al.[12], Study by Nelissen, E, J, T., et al.[13], Oladapo, O, T., et al.[14], Jabir, M., et al.[15], on maternal near-miss report hypertensive disorders and hemorrhage being the leading causes for maternal near-miss cases.

But in most of the Indian studies, hemorrhage accounts for a greater number of maternal near-miss cases than hypertensive disorders of pregnancy, while in the present study, the percentage of participants with hypertensive disorders of pregnancy was more than participants suffering from maternal near-miss due to obstetric hemorrhage.

In the study, 81.5% of participants had live births, and 18.5% of participants had still births.
This observation is slightly different from that noted in a similar study by Yasmin, G. et al.,[10] in which 48.4% of the babies were live births, and 28.7% were still births. The majority of participants accounting to 97.8%, were referred to an appropriate facility in the study, which might be the reason for a greater number of live births. Reference to appropriate facility helps in timely intervention helping in the improvement of outcome.

The organ dysfunction involved was single for (47.41%) participants and multiple for (52.59%) participants. The involved systems were the Cardiovascular system for (50.37%) participants, Central nervous system for (45.93%) participants, hematological system for (56.29%) participants is similar to that reported in studies by Shreastha, J., et al.[16], Mustafa, R., et al.[17], Shrestha, N, S., et al.[18] and Rana A et al[19] all of which reported d hematological dysfunction to be the most predominant followed by neurological involvement. This observation is in contrast to that found in a study by Yasmin, G. et al.[10] in which neurological dysfunction (10.7%) was the most common, seen especially in patients with eclampsia followed by hematological dysfunction (9.8%).

Hypertensive disorders of the pregnancy are the leading causes of maternal death, followed by Haemorrhage in contrst to study by Rathode A et al[8] where Haemorrhage and septicaemia are the leading causes of death, followed by hypertensive disorders of the pregnancy.

CONCLUSIONS:

The study concludes that hemorrhage and hypertensive disorders of pregnancy are leading causes of maternal near-miss events. The main socioeconomic determinant for the maternal near-miss event is identified as the absence of antenatal care, which in turn is due to a lack of awareness about the importance of antenatal care. This can be prevented by proper antenatal care and good communication network.

LIMITATIONS:

This study was done on a limited sample size in a single hospital and hence requires data from other similar multicenter large sample studies for generalization of results.

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