Original Research Article

Determinants of maternal near miss at tertiary care hospital: a retrospective study

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ABSTRACT

Background: A woman who experienced a severe complication and she nearly died, but she survived the severe health condition during pregnancy, childbirth or postpartum is considered as maternal near miss. The investigation of near miss cases not only gives the superior information about disease burden but also the quality of care received by the mother.

Methods: A hospital based retrospective study carried out on 120 pregnant women seeking treatment at the hospital were included in the study. Mothers who met the criteria for maternal near miss were identified by review of records.

Results: In the present study, out of the 120 near miss cases studied, 60 (50.0%) cases belonged to the age group 18-24 years which forms about half of the population studied. 38 (31.66%) cases belonged to 25-29 years group, 15 (12.50%) cases in 30-34 years group and 7 (5.83%) cases in 35 years and above age group. Also, 104 (86.66%) cases from rural area whereas only 16 (13.33%) cases came from urban area.

Conclusions: In this study, the most common causes of maternal near misses were haemorrhage (48.33%), hypertension (20%), severe anaemia (13.33%), sepsis (10%), cardiac dysfunction (3.33%), renal dysfunction (0.83%), respiratory dysfunction (0.83%) and liver dysfunction (0.83%).

Keywords: Maternal near miss, Hemorrhage, Risk factors for MNM

INTRODUCTION

A woman who experienced a severe complication and she nearly died, but she survived the severe health condition during pregnancy, childbirth or postpartum is considered as maternal near miss or severe acute maternal morbidity (SAMM). Maternal near miss is defined as "a women who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy" (World Health Organization, WHO).

The investigation of near miss cases not only gives the superior information about disease burden but also the quality of care received by the mother. Maternal death audit is the mainstay of evaluation of maternal health services in countries where there is high rate of maternal mortality.[1] Unfortunately, most maternal deaths occur in unbooked emergency cases that present late to hospital so isolated maternal death audit is grossly inadequate. Maternal near miss situations tend to mirror the causes of maternal Death, hence review of these cases has been found to help in the assessment of maternal health services.[2]

NMAs provide useful information for policy makers and health practitioners regarding the gaps and flaws in the obstetrics emergency situations and helps us in revising the policies and practices to be followed in antenatal health care.

Maternal death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy or its management irrespective of the site of pregnancy but

not from accidental or incidental causes.[4] WHO has crafted guidelines to reduce the maternal mortality ratio and to improve the quality of health care given to antenatal mothers. Due to vigilant monitoring and skill full management, there is drop in maternal death but since the number has decreased it seems to be inadequate. As compared to number of maternal deaths number of maternal near miss is more, study of maternal near miss can provide better information for policy making.[5] Reviewing of maternal morbidity is in trend now. Women who develop life threatening complications during pregnancy have the same pathological causative factors, in which some die and some survive by near escape, so evaluating those factors with the outcome, the present care received by antenatal mothers can be assessed and improved for betterment.[6]

METHODS

Type of study

It was a retrospective type of study.

Place of study

The study was conducted at the department of obstetrics and gynaecology, Rohilkhand Medical College and Hospital.

Duration of study

The duration of the study was from 01 March 2022 to 28 February 2023.

Study population

The study population consisted of pregnant females.

Objectives

The objectives of the study were: to study the correlation of maternal near miss with respect to associated medical conditions, socioeconomic status, health care access, and antenatal care.

Ethical consideration

The cases of this retrospective clinical study has been taken from, department of obstetrics and gynaecology, Rohilkhand Medical College after obtaining the approval from institutional approval committee.

Statistical method

The statistical analysis was performed using the Epi Info 3.5.1 (Atlanta GA). Some WHO indicators of maternal care quality were used.

Rohilkhand Medical College and Hospital, Bareilly is a tertiary care center where complicated cases from the neighbouring districts are referred. A retrospective hospital based study was conducted in the department of obstetrics and gynaecology, Rohilkhand Medical College and Hospital, Bareilly during the period 01 March 2022 to 28 February 2023. A total of 120 pregnant women seeking treatment at the hospital were included in the study.

Inclusion criteria

Mothers who met the criteria for maternal near miss were identified by review of records.

By review of records, diagnosis of maternal near miss were done on the basis of: clinical findings (either symptoms or signs), investigations and interventions done or any single criteria which signifies cardio-respiratory collapse. It could be either pregnancy specific obstetric and medical disorders which includes haemorrhage, sepsis, hypertension, postpartum collapse, liver dysfunction or cardiac dysfunction. Pre-existing disorders aggravated during pregnancy which includes anaemia, respiratory dysfunction, cardiac dysfunction, respiratory dysfunction, hepatic dysfunction, endocrinal disorders like diabetic ketoacidosis or thyroid crisis, neurological dysfunction and renal dysfunction. Incidental or accidental causes in pregnancy which includes accident, anaphylaxis, infections, embolism and infraction.

RESULTS

The present study was conducted among all the high-risk maternal cases who presented to Rohilkhand Medical College and Hospital, Bareilly during the time period 01 March 2022 to 28 February 2023.

The following results and observations were noted in this study: total number of deliveries: 6480, total number of live-births: 6388, total number of maternal near miss cases: 120, and maternal near-miss incidence ratio-18.78/1000 live births.

Table 1 shows that out of the 120 near miss cases studied, 60 (50.0%) cases belonged to the age group 18-24 years which forms about half of the population studied. 38 (31.66%) cases belonged to 25-29 years group, 15 (12.50%) cases in 30-34 years group and 7 (5.83%) cases in 35 years and above age group. Also, 104 (86.66%) cases from rural area whereas only 16 (13.33%) cases came from urban area. 48 (40.00%) cases belonged to Hindu, 66 (55.00%) cases belonged to Islam and 6 (5.00%) cases belonged to other religion. Besides that, 88 (73.33%) cases are from the lower socioeconomic status. 29 (24.16%) cases are from middle socio-economic status and 3 (2.50%) cases belonged to upper socio-economic status. 80 (66.66%) cases are literate and 40 (33.33%) cases are illiterate.

Table 1: Distribution of patients according to socio-demographic variables.

Characteristics	No. of patients	%
Age (in years)		
18-24	60	50.00
25-29	38	31.66
30-34	15	12.50
35 and above	7	5.83
Residency status		
Rural	104	86.66
Urban	16	13.33
Religion		
Islam	46	55.00
Hindu	48	44.00
Others	6	5.00
Socio-economic class		
Upper	3	2.50
Middle	29	24.16
Lower	88	73.33
Literacy status		
Literate	80	66.66
Illiterate	40	33.33

Figure 1 shows that 40 (33.33%) patients were primigravida.

53 (44.16%) patients had one or two children, 22 (18.33%) patients had three or four children and 5 (4.1%) patients had five or more children.
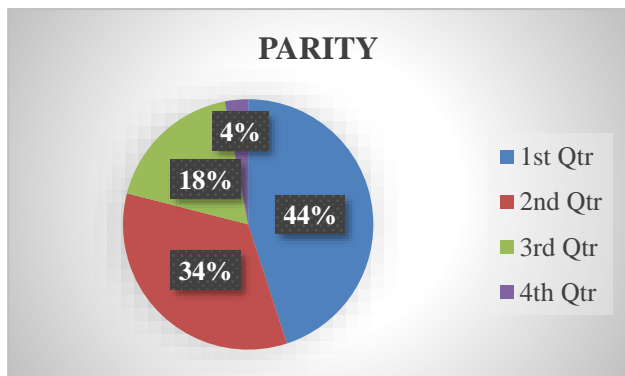

Figure 1: Distribution of near miss cases according to parity.

Table 2: Distribution of cases according to antenatal check-ups and referral.

Characteristics	No. of patients	%
Booking status		
Unbooked	89	74.16
Booked	31	25.83
Referred		
Yes	99	82.50
No	21	17.50

Table 2 depicts that 89 (74.16%) patients had less than four antenatal check-ups and the rest, that is 31 (25.83%) patients had four or more antenatal check-ups. Besides that, most of the near miss cases i.e. 99 (82.50%) cases were referred from nearby places and only 21 (17.50%) cases reported directly to this tertiary centre.

Table 3 shows that out of the 120 near miss cases, 58 (48.33%) were due to haemorrhage followed by 24 (20.0%) cases due to hypertension, 16 (13.33%) cases due to anaemia, 12 (10.00%) cases due to sepsis, 15 (6.2%) cases due to cardiac dysfunction, 7 (5.83%) cases due to liver dysfunction, 1 (0.83%) cases due to renal dysfunction and 1 (0.83%) case due to respiratory dysfunction.

Table 3: Distribution of cases according to cause of near miss.

Disorder	Number	%
Pregnancy specific obstetric and medical disorders		
Haemorrhage	58	48.33
Sepsis	12	10.00
Hypertension	24	20.00
Liver dysfunction	1	0.83
Cardiac dysfunction	4	3.33
Pre-existing disorders aggravated during pregnancy		
Anaemia	16	13.33
Cardiac dysfunction	3	2.50
Renal dysfunction	1	0.83
Respiratory dysfunction	1	0.83

Table 4 shows various interventions done to prevent maternal death. The most common intervention is blood transfusion which was received by 72 (60.0%) of the patients. This was followed by use of cardiotonics or vasopressors in 54 (45.00%) cases, laparotomy in 37 (30.83%) cases, ventilator support in 17 (14.16%) cases, evacuation of uterus in 15 (12.50%) cases, hysterectomy in 11 (9.16%) cases and dialysis in 1 (0.83%) cases.

Table 4: Different interventions in near miss cases.

Intervention	Number	%
Vasoactive drugs	54	45
Ventilatory support	17	14.16
Laparotomy	37	30.83
Evacuation	15	12.50
Hysterectomy	11	9.16
Dialysis	1	0.83
Blood transfusion	72	60.0

Figure 2 shows that, out of 120 near miss cases, 24 patients got admission in ICU. The most common reason of ICU admission was eclampsia which constitute 9 (37.5%) patients of the near miss ICU admissions. This was followed by sepsis where 4 (16.66%) patients and cardiac disorder where 3 (12.50%) patients were admitted.

Thus, it can be seen that only 20.00% patients of the near miss cases got admission in ICU. The rest who have not got an ICU seat were managed in the high dependency unit (HDU) in our department.
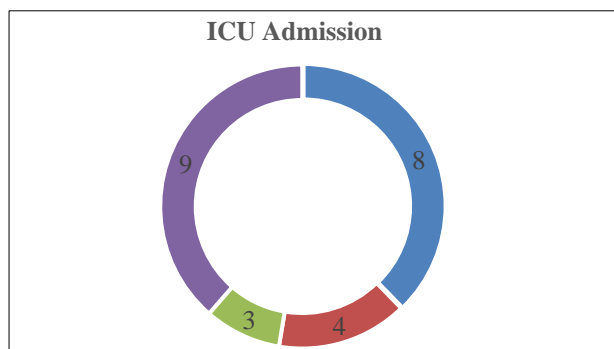

Figure 2: Distribution of different near miss cases according to ICU admission.

DISCUSSION

The maternal near miss incidence ratio in developing countries shows the same trend and vary between 15 to 40 per 1000 live births, which is comparable to the studies mentioned above except Kamal et al, which have got a better ratio. In our study, the maternal near miss incidence ratio is 14.86/1000 live births. This is comparable with the studies conducted by Bansal et al, Behera et al, Kamal et al, and Sahijwani et al.[7]

Most of the near miss cases belong to the age group of 18-24 years, which coincides with the studies of Sharma et al, and Bansal et al, because most of the ladies in this part of the country get married of at an early age and also bears children early.[8] Majority of the women were from rural areas (86.66%) as there is lack of sufficient facilities in the health centres of the rural areas, thus most of the patients were coming to this tertiary hospital for seeking medical help whenever there is an obstetric emergency. This is in concordance with the study of Behera et al, where 93% of the cases were from rural areas.[9]

Most (72.61%) of the women belonged to lower socio-economic status, which is in concordance with the studies of Behera et al, and Sharma et al because in our hospital most of the women from poor socio-economic background come for treatment.[10]

In present study it has been seen that, 80 (66.66%) maternal near miss cases are multiparous, this is in concordance with Shrestha et al, and Reena et al.[11] In multiparous near miss cases observed to be more because of increased medical risks, advanced age, associated medical disorders like DM, HTN and cardiac diseases are more. They also become busy in household work, late turn up to hospital for antenatal care.[12]

Haemorrhage is the most common cause accounting for 48.33% followed by hypertension in 20.0%. In this study, it can be seen that most of the near miss cases have antenatal check-ups less than 4. This is in concordance with the studies conducted by Sujata et al, Behera et al, Kamal et al and Anuradha et al, where the two most common causes of near miss are haemorrhage and hypertension.[13]

In comparison to Kamal et al and Sujata et al, the number of ICU hospitalisations is significantly lower. This is because there are fewer ICU beds in the hospital than there is separate obstetric ICU.[14]

CONCLUSION

In this study, the most common causes of maternal near misses were haemorrhage (48.33%), hypertension (20%), severe anaemia (13.33%), sepsis (10%), cardiac dysfunction (3.33%), renal dysfunction (0.83%), respiratory dysfunction (0.83%), and liver dysfunction (0.83%).

The main reason behind maternal near miss (MNM) cases are due to incomplete management of obstetric emergencies at peripheral hospitals, lack of specialist doctors, delay in referral, inefficient transport system, limited availability of blood products and poor utilization of health care services at the peripheral hospitals. Therefore, for lowering the instances of maternal near miss and improving the maternal outcome the above mentioned issues can be addressed by collective efforts of administration and medical professionals.

Maternal near-miss cases were observed to be significantly more in patients of rural areas, who had lack of antenatal care visits, patients with lack of education and unemployment.[15] Even if all the socioeconomic factors were favourable and health care facilities are optimum, risk of MNM were seen to be more in patients with high risk pregnancy.

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