Maternal Near Miss – An Approach To Evaluate The Quality Of Care For Severe Pregnancy Complications At Tertiary Care Centre

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Abstract
Objective:
To determine the frequency of maternal near-miss (MNM) by determining Maternal Near Miss incidence ratio (MNMR) and Mortality ratio and to study the most prevalent causes of Near Miss events
Method:
A Retrospective observational study was conducted from May 2020 to April 2022 at MGM Medical College & Hospital, Navi Mumbai. All the IPD patients who fall under the WHO criteria of Maternal Near Miss were evaluated. The outcome was measured in terms of frequency and cause of maternal near miss and ratio between maternal mortality and near miss cases.
Results:
Out of 5937 live births, 337 patients were identified as maternal near miss cases. Thus, the incidence of MNM cases observed in the present study was 5.6%. Severe preeclampsia (35.3%) and eclampsia (19.3%) remained the most common etiology. Other causes included Placenta previa (11.9%), Ruptured ectopic (7.7%), HELLP syndrome (5.9%), Abruption (4.4%), Acute Kidney Injury (4.4%), DIC (3.5%), cardiac disease (3.3%) and Postpartum haemorrhage (1.2%). Transfusion of blood and blood products was required in 43.3% cases. A total of 8% and 8.6% patients required exploratory laparotomy and vasopressor support respectively. Intubation was required in 10.6% patients while more than 5 units of transfusion was needed in 2.6% cases. Out of the total 337 cases, 113(75.4%) patients were referred cases while only 24.6% patients were from hospital registered cases.
Conclusion:
Hypertensive disorders such as preeclampsia and eclampsia were found to be the major reasons for maternal near miss cases, but timely intervention could prevent maternal mortality in majority of cases.

Keywords: Maternal near-miss, Maternal mortality, WHO Near Miss Criteria

Introduction

The ideal result of the childbirth is a healthy mother in possession of the healthy child. The systematic supervision of the woman during pregnancy constitutes the antenatal care which is a preventive branch of the obstetrics. Its aim is to preserve the physiological aspect of pregnancy, labour and puerperium and to prevent or detect as early as possible all that is pathological. The objective of antenatal care is to assure that every wanted pregnancy culminates in the delivery of a baby without impairing the health of the mother.[1] Maternal mortality is an important indicator used for the measurement of maternal health. Improvement of

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maternal health is one of the millennium development goals, MDG 5 with Target 5 that calls for the reduction of maternal mortality ratio by three quarters between 1990 and 2015.[2] Maternal mortality is unequally distributed among the developed and developing countries and the developing countries account for 99% of all known maternal deaths in the world.[3]

Maternal mortality is "just the tip of iceberg" with a vast base of maternal morbidity remains unevaluated.[4] WHO has setup many guidelines in view of reducing maternal mortality ratio and to improve the quality of care within the health system. It is observed that in recent years the number of maternal deaths in many countries has come down, such that it is no longer meaningful to audit only maternal death.[5] Maternal Near Miss, as defined by WHO is "**a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy".**[6] The major complications that account for nearly 75% of all deaths are postpartum haemorrhage, pre-eclampsia and eclampsia, anaemia, heart disease, infection, unsafe abortion, obstructed labour, ectopic pregnancy, embolism and anaesthesia complications. This approach determines the frequency of severe maternal complications, maternal near-miss cases and maternal deaths. It determines the frequency of usage of key interventions for the prevention and management of severe pregnancy related complications. It raises awareness about, and promote reflection of, quality-of-care issues and foster changes towards the improvement of maternal health care.

The WHO maternal near miss criteria; It is the most frequently used criteria and involves three approaches to identify MNM cases. There are 11 clinical, 8 laboratory based and 6 management based criteria which are enlisted in Table 1

Material And Methods

1. A Prospective, observational study was conducted from May 2020 to April 2022 at MGM Medical College & Hospital, Navi Mumbai.
2. All the IPD patients who fall under the WHO criteria of Maternal Near Miss were enrolled and evaluated.

3. The outcome was measured in terms of frequency and cause of maternal near miss and ratio between maternal mortality and near miss cases.

Results

Most of the patients were between the age of 21-25 years of age(39.4%) and only 13.3% were patients more than 30 years of age. (Table 2) (Figure 1)

Out of the total 337 cases, 254(75.4%) patients were referred cases while only 24.6% patients were from hospital registered cases. (Table 3) (Figure 2)

Out of total 337 cases, 56.7% were primigravida and rest 43.3% were multigravida. (Table 4) (Figure 3)

A total of 141 cases (42%) required Caesarean Section while Laparotomy for rupture uterus was done only in 2 cases. Vaginal delivery was conducted in 49.2% cases. There were 28 cases of ruptured ectopic pregnancy. (Table 5) (Figure 4)

Most common etiology associated with Maternal Near Miss patients was severe preeclampsia (35.3%) eclampsia (19.3%). Other causes included Placenta Previa(11.9%), Ruptured ectopic(7.7%), HELLP syndrome(5.9%), Abruption (4.4%), Acute Kidney Injury(4.4%), DIC(3.5%) and Postpartum haemorrhage(1.2%). (Table 6) (Figure 5)

Transfusion of blood and blood products was required in 43.3% cases. A total of 8% and 8.6% patients required exploratory laparotomy and vasopressor support respectively. Intubation was required in 10.6% patients while more than 5 units of transfusion was needed in 2.6% cases. (Table 7) (Figure 6)

Out of 5937 live births, 337 patients were identified as maternal near miss cases. Thus, the incidence of MNM cases observed in the present study was 5.67%. MNMMR for the present study is 13.48:1 (Table 8)

Discussion

Maternal Near Miss has emerged as an adjunct to investigation of Maternal Death, as the two represent similar pathological and circumstantial factors leading to adverse maternal outcome.

Present study was conducted at Obstetrics and Gynaecology Department of MGM Medical College & Hospital, Navi Mumbai, to determine the

frequency of maternal near miss, by determining Maternal Near Miss incidence ratio (MNMR) and Mortality Ratio and to study the most prevalent causes of near miss events.

Out of 5937 live births, 337 patients were identified as maternal near miss cases.

The patients were classified as near miss based on disease specific, organ dysfunction and management criteria.

Thus, the incidence of MNM cases observed in the present study was 5.67%, which is in accordance with the findings of the literature[7-11]

A systemic literature review published on this subject indicated a prevalence that ranged from 0.04% to 15% depending on the criteria used to define it[12].

Maternal near miss mortality ratio (MNMMR) refers to the ratio between maternal near miss and maternal deaths. Higher the ratio, better is the care[13-14]. MNMMR for the present study is 13.48:1

25 maternal deaths occurred despite all our efforts and support, the most common cause being Eclampsia. Other causes included post-partum haemorrhage, chorioamnionitis, disseminated intravascular coagulation, peripartum cardiomyopathy and septic shock.

Less education and low socioeconomic status also highlights the delay in deciding to seek care by the women and/or her family as they are unaware of the need for care, this occurs as the danger signs are not recognized or there is lack of support of the family. In the present study, 75.4% were referral cases with maximum cases being referred from the PHC and subcentres. It highlights the importance of the delay that occurs in receiving adequate care at that facility resulting from errors in diagnosis and clinical decision making or lack of medical supplies and of staff proficiency in the management of obstetric emergencies.

In the present study, hypertensive disorders were the most common cause of maternal morbidity and mortality. This indicates that strict maternal surveillance with more frequent BP checkups and urine examination for albuminuria have to be strictly adhered to for early detection of preeclampsia. This finding suggests to advocate strict screening protocols from the very first antenatal visit at all levels to identify the various risk factors and to initiate appropriate treatment modalities in conjunction with appropriate specialists as early as possible.

Conclusion

As the number of maternal near miss cases is more than the maternal deaths and the cases are alive to directly inform on problems and obstacles that had to be overcome during the process of health care, they provide useful information on quality of health care at all the levels. The addition of near miss audits will allow the care of critically ill patients to be analysed, deficiencies in the provision of care to be identified, and comparison within and between institutions and countries to be carried out overtime. This will, ultimately, improve the quality of obstetric care and further reduce the maternal morbidity and mortality.

According to our findings, it is clear that for the reduction of maternal morbidity and mortality, we need a good sensitisation of the population about surveillance in remote areas. Planning for delivery and speedy referral as soon as there is any cause for concern must improve. Adhering to the National Guidelines and training of caregivers, especially the medical officers, labour room nurses and midwives at regular intervals should be planned. Strict protocols must be advocated to identify various risk factors and to initiate correct treatment as early as possible.

Thus, the "Maternal Near Miss" concept can also be used for the assessment of quality of maternal care in a tertiary care centre.

References

1. Marsh Geoffrey, Mary Renfew(1998), Community Based Maternity Care. Oxford University Press. ISBN-0-19-262768-6
2. UN General Assembly, United Nations Millennium Declaration, Resolution Adopted by the General Assembly, 18 September 2000, A/RES/55/2, available at: https://www.refworld.org/docid/3b00f4ea3.html
3. Hogan MC, Foreman KJ, Naghavi M, Ahn SY, Wang M, Makela SM, Lopez AD, Lozano R, Murray CJ. Maternal mortality for 181 countries, 1980-2008: a systematic analysis of progress towards Millennium Development Goal 5. Lancet. 2010 May 8;375(9726):1609-23. doi:

10.1016/S0140-6736(10)60518-1. Epub 2010 Apr 9. PMID: 20382417.

4. Stones W, Lim W, Al-Azzawi F, Kelly M. An investigation of maternal morbidity with identification of life-threatening 'near miss' episodes. Health Trends. 1991;23(1):13-5. PMID: 10113878.

5. VP Paily, K Ambujam, V Rajasekharan Nair, B Thomas. Confidential review of maternal deaths in Kerala: a country case study. BJOG: Int J Obstet Gynecol. 2014;1;121(4)L:61-6

6. WHO(2005), Regional Health Forum, Vol.,No.1,2005.

7. Allen VM, Campbell M, Carson G, Fraser W, Liston RM, Walker M, Barrett J. Maternal mortality and severe maternal morbidity surveillance in Canada. J Obstet Gynaecol Can. 2010 Dec;32(12):1140-1146. doi: 10.1016/S1701-2163(16)34737-5. PMID: 21176325.

8. Rabenasolo H, Raobijaona H , Rasolofondraib E. Near-miss: epidemiologie et prise en charge. 100 cas vus au chu de Tananarive.Médecine d'Afrique Noire 2006 ; 53 (11) :81-86.

9. Ouedraogo C, Testa J, Sondo B, and al. Analyse des facteurs de risque de morbidité maternelle severe à Ouagadoudou, au Burkina Faso, Médecine d'Afrique Noire 2001; 48 (10) :67-9

10. Olufemi T. « Near-miss » obstetric events and maternal deaths in sagamu, Nigeria: a retrospective study. Reproductive Health 2005; 2(9):45-8

11. Patankar A, Uikey P, Rawlani N. Severe acute maternal morbidity (near miss) in a tertiary care center in Maharashtra: A prospective study. Int J Sci Study. 2016;4:134–40. [Google Scholar]

12. World Health Organization 2006. Guidelines for the treatment of Malaria. Geneva 240.

13. Cham M, Sundby J, Vangen S. Availability and quality of emergency obstetric care in Gambia's main referral hospital: women-users' testimonies. Reprod Health. 2009 Apr 14;6:5. doi: 10.1186/1742-4755-6-5. PMID: 19366451; PMCID: PMC2672064.

14. World Health Organization. Evaluating the quality of care for severe pregnancy complications: the WHO near-miss approach for maternal health

Table 1 : WHO Maternal Near Miss Criteria

CLINICAL CRITERIA	LABORATORY CRITERIA	MANAGEMENT BASED CRITERIA
Acute cyanosis	SpO2 <90% for >60 min	Use of Vasoactive drugs
Gasping	PO2/fiO2 <200mmhg	Hysterectomy following infection/haemorrhage
RR>40 or <6/min	Serum creatinine ≥3.5mg/dl	Transfusion ≥5 units
Shock	Serum bilirubin ≥6mg/dl	Intubation ≥ 60 min
Oliguria not responsive to fluids or diuretics	pH <7.1	Cardiopulmonary Resuscitation
Failure to form clots	Lactate >5 mmol/L	Dialysis for acute renal failure
Loss of consciousness lasting for >12 hours	Acute thrombocytopenia	
Cardiac arrest	Loss of consciousness and presence of glucose and ketoacids in urine	
Stroke		

Uncontrolled   fits/total
paralysis

Jaundice   in   presence   of
preeclampsia

Table 2 : Distribution of patient as per Age group:

Age group(years)	N	%
≤20	88	26.1%
21-25	133	39.4%
26-29	71	21%
≥30	45	13.3%
Total	337	100%

Figure 1: Distribution of patient as per Age group:
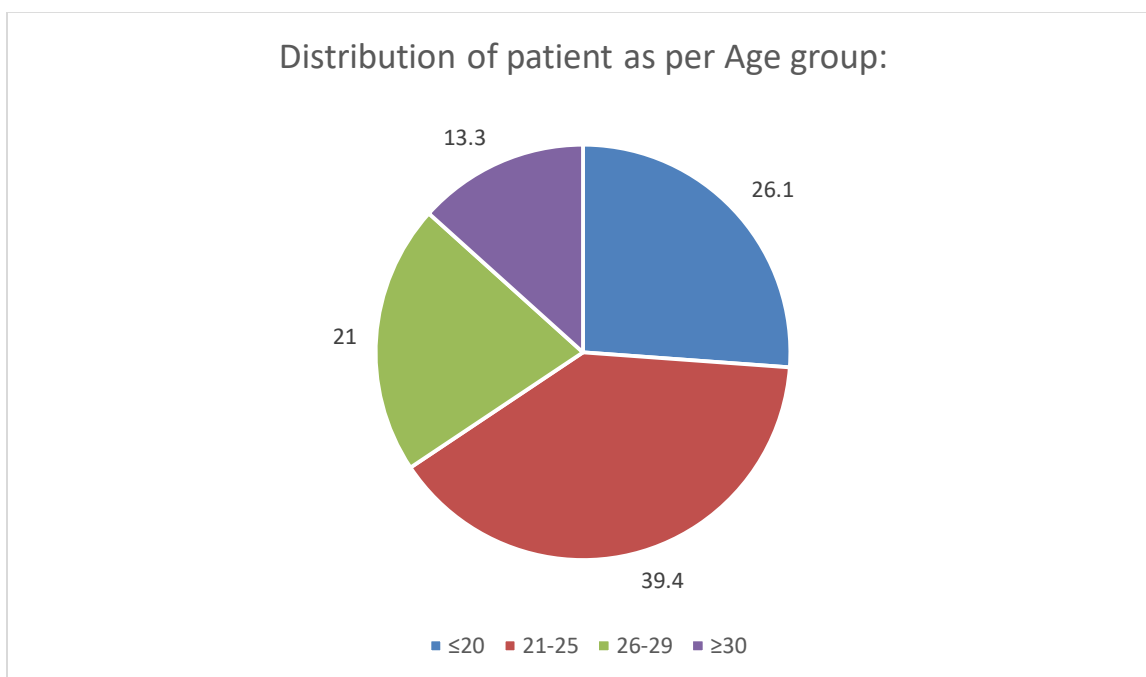
Table 3: Distribution of patients as per Registered/Referred cases:

Types of Cases	N	%
Referred	254	75.4%
Registered	83	24.6%
Total	337	100%

Figure 2 : Distribution of patients as per Registered/Referred cases:

Distribution of patients as per Registered/Referred cases:

24.6

75.4

■ Referred ■ 2nd Qtr
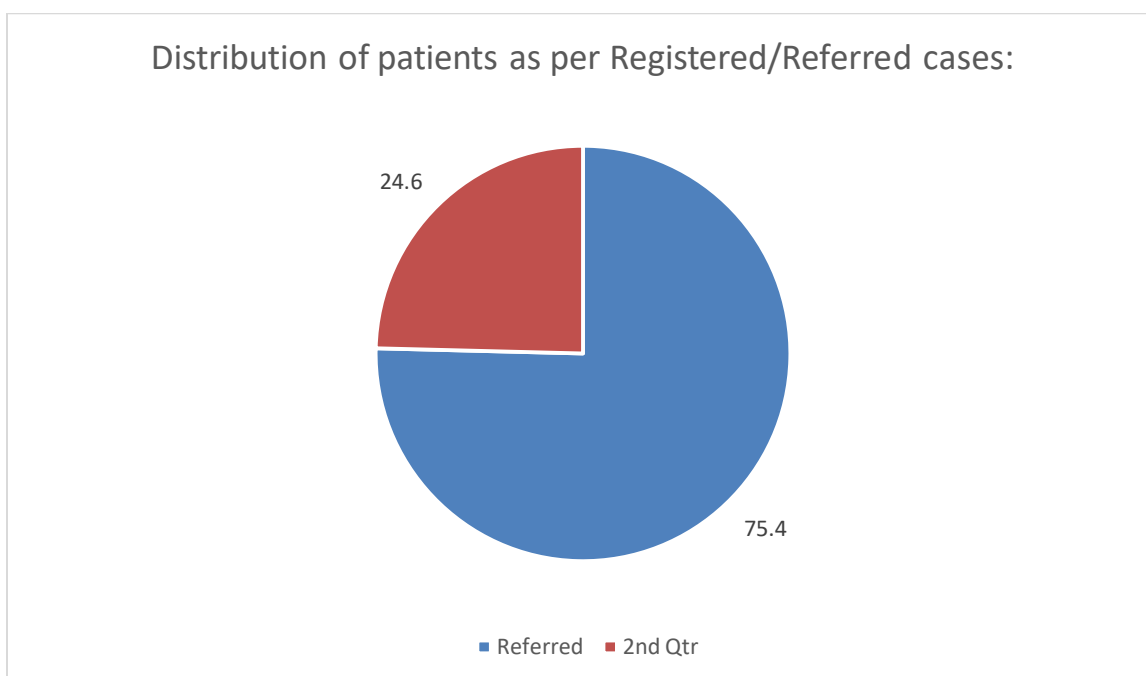
Table 4 : Distribution of patients as per gravida:

Gravida	N	%
Primigravida	191	56.7%
Multigravida	146	43.3%
Total	337	100%

Figure 3 : Distribution of patients as per gravida:

Distribution of patients as per gravida:

43.3

56.7

■ Primigravida ■ Multigravida
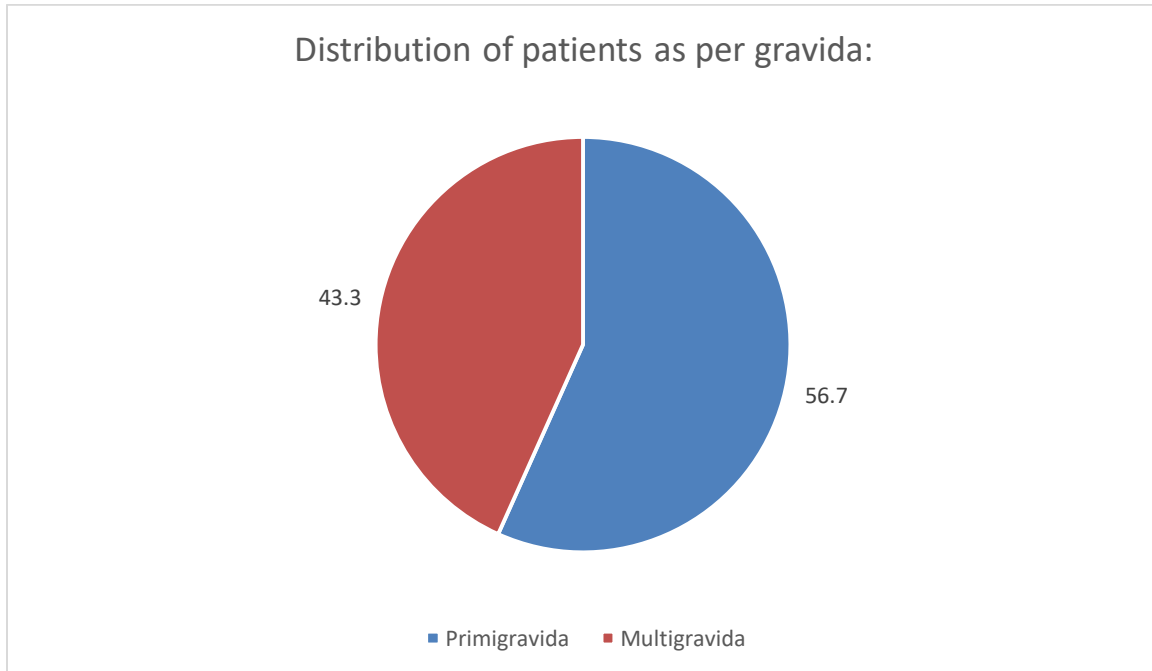
Table 5 : Distribution of patients as per Type of Delivery:

Type of Delivery	N	%
Normal Vaginal Delivery	157	46.6%
Assisted Vaginal Delivery	9	2.6%
LSCS	141	42%
Laparotomy for uterine rupture	2	0.6%

Figure 4 : Distribution of patients as per Type of Delivery:
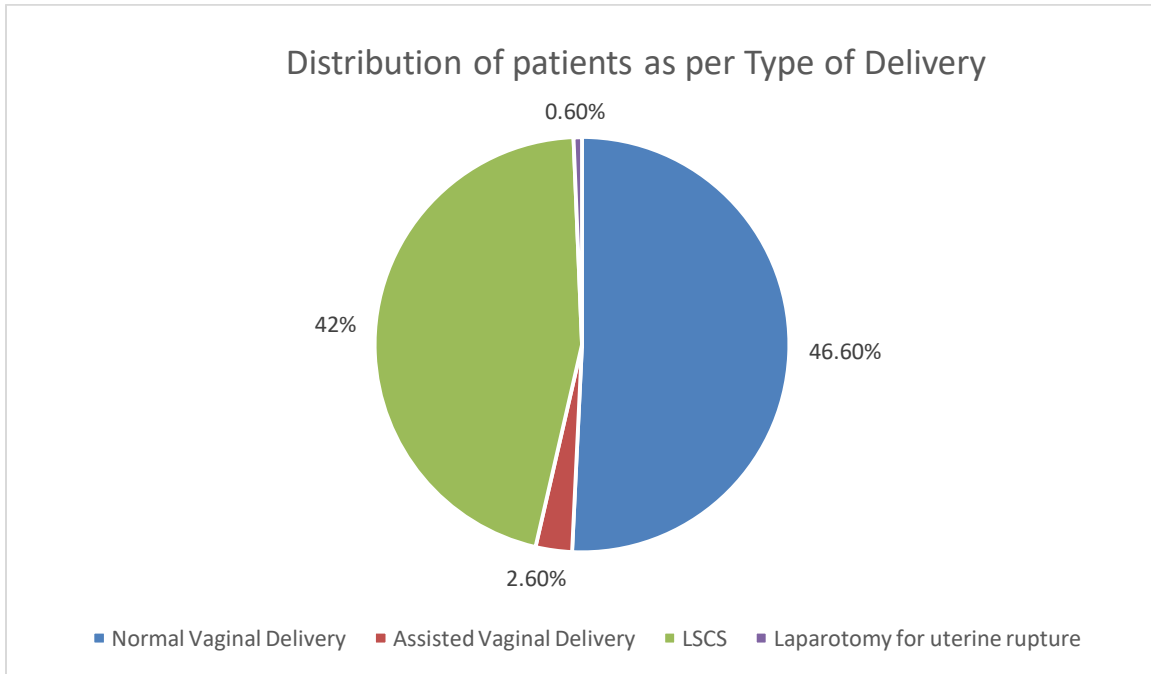
Table 6 : Distributions of patients as per etiologies:

Etiology	N	%
Severe Preeclampsia	119	35.3%
Eclampsia	65	19.3%
Infection	3	0.9%
Ruptured Ectopic	26	7.7%
Abruption	15	4.4%
HELLP syndrome	20	5.9%
PPH	4	1.2%
Severe Anemia(<5 gm%)	5	1.5%
Rupture Uterus	2	0.6%
Heart Disease	11	3.3%
Placenta Previa	40	11.9%
Acute Kidney Injury	15	4.4%

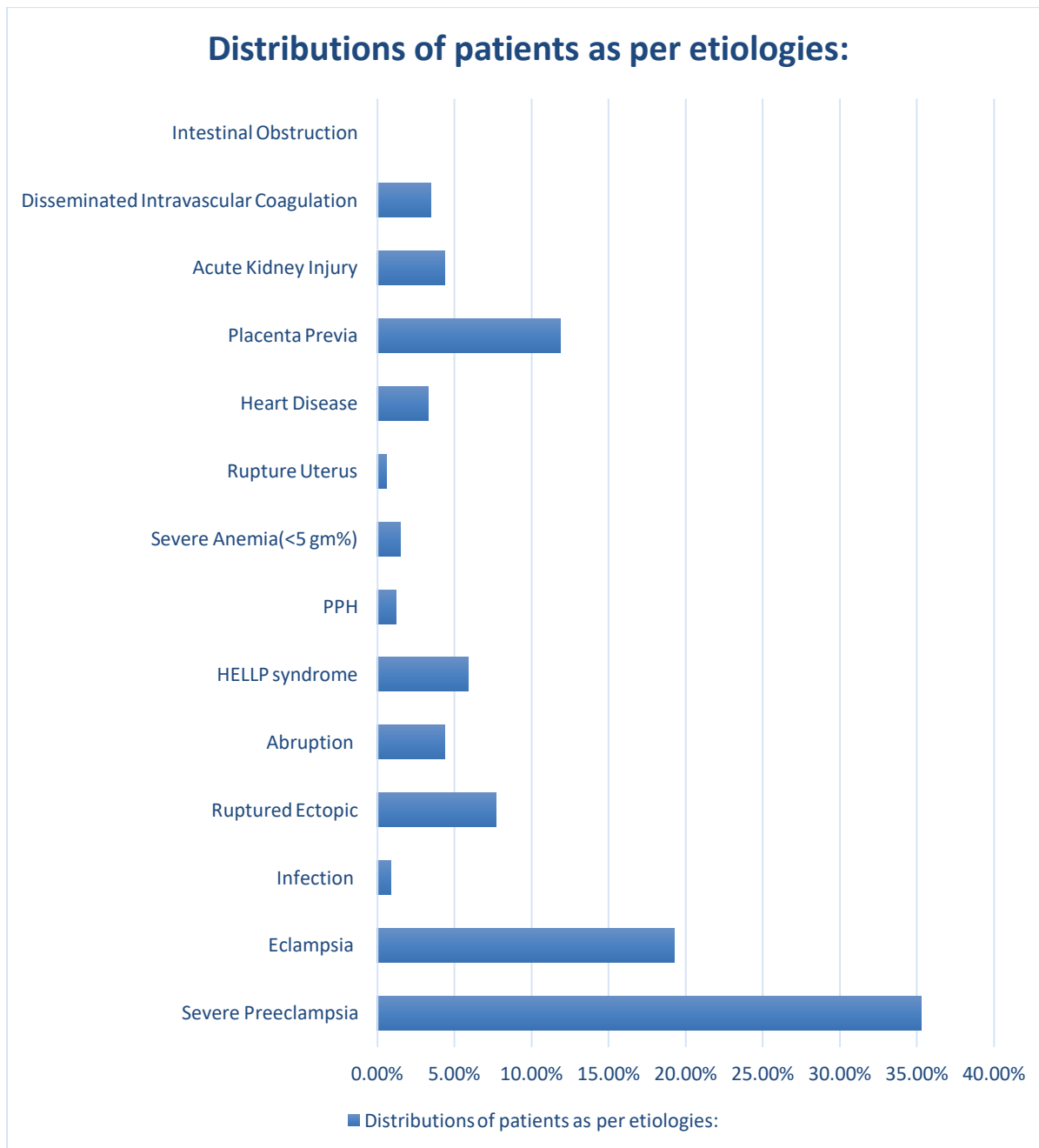|		
Disseminated Intravascular Coagulation	12	3.5%
Intestinal Obstruction	-	-

Figure 5 : Distributions of patients as per etiologies:

Distributions of patients as per etiologies:

Table 7 : Distribution of patients as per Interventions:

Interventions	N	%
Blood and Blood product transfusion	146	43.3%
Exploratory laparotomy	27	8%
Vasopressor support	29	8.6%
Intubation/mechanical ventilation	36	10.6%
Transfusions (>5 pints)	9	2.6%
Dialysis	8	2.3%
Obstetric Hysterectomy	10	3%

Figure 6 : Distribution of patients as per Interventions:

Distribution of patients as per Interventions:
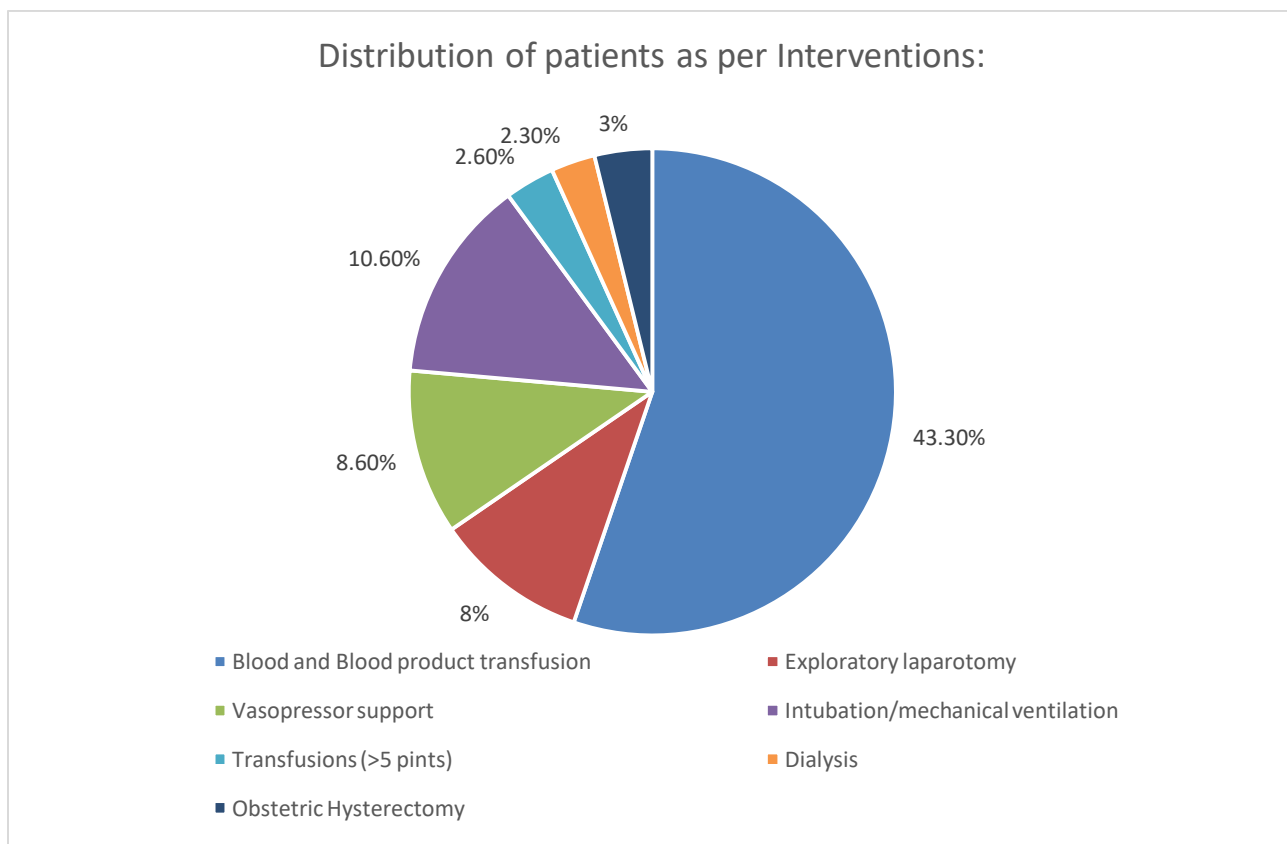
Table 8 : SUMMARY

Variables	N	%
Total deliveries during the study process	5937	

Total Maternal Near Miss patients	337	
Total Maternal Deaths	25	
Maternal Near Miss Incidence Ratio	337/5937	5.67%
Maternal Mortality Ratio	421	
Maternal Near Miss Mortality Ratio (MNMMR)	13.48:1	