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A Study on Maternal Near Miss Cases in a Tertiary Care Centre in Western Rajasthan

Dr. InduBala Vishnoi[1], Dr. Indira Bhati[2]
[1]*PG Resident, Department of Obstetrics and Gynecology, Dr. S. N. Medical College, Jodhpur, RJ, India*
[2]*Senior Professor& HOD, Department of Obstetrics and Gynecology, Dr. S. N. Medical College, Jodhpur, RJ, India*
Corresponding Author: Dr. InduBalaVishnoi
PG Resident, Department of Obstetrics and Gynecology, Dr. S. N. Medical College, Jodhpur, RJ, India

The study was done during a period from July 2019 to December 2019

Abstract
Background –Obstetric near miss is an important indicator that reflects the quality of obstetric care in health facility. The aim and objective of the study was to find out the incidence the prevalence and the causes of maternal near miss due to severe of obstetric complication.
Method- This is a retrospective study done in the department of obstetrics and gynaecology in Umaid Hospital
Results-
In this study the hospital maternal near miss incidence ratio was 14.34%. In our study we found the most common morbidity was (30.18%) hypertensive disorder of pregnancy. These 159 near miss diagnoses were comprised of (30.18 %) cases of Hypertensive disorder of pregnancy, (27.67%) cases of major obstetric hemorrhage, (6.91) Severe systemic infection or sepsis, (4.40%) Labour related disorders. In Medical disorders very Severe Anemia, (1.88%) was most common cause of near miss. The most common cause of death was post-partum hemorrhage 37.5% and most of the patients referred from periphery in very critical condition. The median time taken to get clinical intervention among cases was 20-40 minutes after admission.
Conclusion- Hemorrhage and hypertensive disorders are the leading cause of maternal near miss. Prompt diagnosis and adequate management of near miss can reduce mortality rates.
Keywords:*Hypertensive disorders, maternal mortality, Obstetric hemorrhage*

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I. Background

Severe acute maternal morbidity(SAMM) also known as near miss is defined a" a very ill pregnant or recently delivered women who would have died had it not been that luck and good care on her side"[1]. WHO in 2009 defined near miss as a woman who nearly died but survived a complication during pregnancy childbirth or within 42 days after termination of pregnancy[2].

Social determinants and health system performance play a major role in the occurrence of maternal deaths and the target was to decrease the maternal mortality rate by 75% by 2015.

Maternal mortality rate of Rajasthan is16.8 . Maternal mortality is frequently described as" Just the tip of the Iceberg" already that there is a vast base to the Iceberg in the form of maternal near miss(MNM).

Advantages of investigating near events over events with fetal outcome are-

1-Near miss are common than maternal death .

2-One can learn from the women themselves as they themselves are interviewed .

3-They provide information regarding care received and possible means of prevention.

Maternal deaths merely are the tip of Iceberg of maternal disability.

This study examines factors related to severe morbidity and mortality or' near miss' in women with postpartum infection.

WHO maternal near miss classification –

WHO definition enables a common ground for the implementation of maternal near miss assessments across countries[3] .

The complete WHO near miss approach is best implemented in 3 steps[4]–

A) Baseline assessment (or reassessment)
B) Situation analysis
C) interventions for improving Healthcare.

Baseline Assessment-

1) Severe maternal complications which include severe postpartum hemorrhage, severe pre-eclampsia ,eclampsia, sepsis or serial systemic infection, ruptured uterus, severe complications of abortion.

2) Critical interventions/ Intensive Care Unit use includes admission to Intensive Care Unit , Interventional radiology and laparotomy(includes hysterectomy excludes cesarean section) and use of blood products.

3) Life-threatening conditions may be divided into-

a) Cardiovascular dysfunction such as shock, cardiac arrest, use of continuous vasoactive drugs , cardio pulmonary resuscitation and severe hypoperfusion.

b) Respiratory dysfunction such as a cute cyanosis, gasping, severe tachypnea (respiratory rate> 40/min) permanent bradypnea(respiratory rate < 6 /min) intubation and ventilation not related to anaesthesia and severe hypoxemia.

c) Renal dysfunction includes oligouria,non-responsive to fluids or diuretics, dialysis for acute renal failure and serial acute azotemia.

d) Coagulation for hematological dysfunction including failure to form clots, massive transfusion of blood / red cells(>5UNITS) and severe acute thrombocytopenia(50,000 plt/ml)

e) Hepatic dysfunction like jaundice in presence of preeclampsia severe acute hyperbilirubinemia (Bilirubin>100 micromole/l or >6.0mg/dl)

f) Neurological dysfunction- prolonged unconsciousness (lasting more than 12 hours),coma , stroke and controllable fits / status epilepticus total paralysis

g)Uterine dysfunction- Uterine hemorrhage or infection leading to hysterectomy

SITUATION ANALYSIS

Situation analysis involves the identification of opportunities for improving care.

INTERVENTION FOR IMPROVING CARE

Includes audit and feedback, engagement of opinion leaders and early adopters development and use of local protocols, prospective case identification, reminders and educational activities and use of evidence-based checklist.

The primary unit for implementation of near miss approach is the individual Healthcare facility. Ideally, it should be used as a part of comprehensive intervention for strengthening district health systems, specifically contributing to monitoring the quality of care assessing the implementation of key interventions, informing the mechanism of referred and strengthening all levels of Healthcare services.

Methods- This is a retrospective study done in department of obstetrics and gynaecologyUmaid Hospital Jodhpur from July 2019 to 2 December 2019.Ummed Hospital is the500 bedded hospital. It is a tertiary care centre provides 24 hour emergency Obstetric service for both low and high risk pregnant women. Data was collected from Medical records.

For each case, booking, literacy, socioeconomic status ,gestational age, parity, referred or self – referred ,mode of delivery, disease responsible for critical illness, mode of delivery, nature of obstetric complications, presence of organ or systems dysfunction, duration of hospital stay ,source of referral, requirement of blood, surgical intervention to save life of mother and other relevant information were collected from the medical records.

Different causes of maternal near miss were identified according to maternal near miss review operational guideline India December 2014(table)

All data was analysed using IBM SPSS

In this study, pregnant and recently delivered women up to 6 weeks postpartum with one or more of the following entities

a) Severe hypertension and hypertensive emergency are identified according to maternal near miss review operation guideline December 2014
b) Hemorrhage leading to shock ,emergency hysterectomy ,coagulation defects and blood transfusion more than 2 litres.
c) Uterine rupture defined as the occurrence of clinical symptoms, pain, fetal distress ,acute loss of contractions, hemorrhage /IUD that lead to laparatomy at which the diagnosis was confirmed or laparotomy for uterine rupture after vaginal birth
d) Severe sepsis according to maternal near miss review operation guideline December 2014
e) Very severe anaemia(hemoglobin<6)who require more than 3 unit of blood PRBC and multiple dose of injectable iron.

Table 1: Criteria for Identification of MNM Cases (Maternal near miss review operational guideline-India Dec 2014).[5]

For diagnosis of near Miss, the patient should meet minimum 3 criteria: one each from 1) clinical findings (either symptoms or signs, 2) investigations and 3) interventions done or any single criteria which signifies cardiorespiratory collapse

Haemorrhage			
Abortion, Ruptured ectopic, APH Placentprevia Placent abruption Rupture uterus Surgical injury, III stage compli., inversion of uterus, retained placent, cervical tear, PPH	Any bleeding from or into the genital tract leading to -Air hunger -Sycopal attacks	Altered conscious state Tachycardia > 120 / min Low volume pulse Bradycardia< 40/ min Tachypnea > 40/ min Bradypnea< 6 / min Blood pressure, Systolic < 90 mmHg, Diastolic < 60 mmHg Absent peripheral relexes Oliguria with output ,30ml/ hour	Acute fall Hb< 5 gm % or 30 % fall in (fall in hemoglobin so as to affect oxygen saturation), Fall in oxygen saturation below 90% PaO2: FiO2 < 200, PaCO2 > 50mmHg Platelet < 20000 (Acute Decline in platelet count more significant Clot observation time > 7 min or any other test done which proves deranged coagulation profile Serum cratinine> 3.5 mg/dl ECG -Ischemic changes, ST inversion elevation
Hypertension			
SEVERE (PIH) Preeclampsia, Eclampsia, HELLP Syndrome	Convulsions, diminution/ Blurring of viosion, severe epigastric pain, severe headache non responsive to pain killers, difficulty in breathing, palpitations	Altered conscious state, BP ≥ 160/110 mmHg, Deep Jaundice, Oliguria/ anuria/ haematuria, Coma, Coagulation failure, Pulmonary edema, Evidence of circulatory collapse	Proteinuria >1 gm/dl, S.Creatinine>3.5 mg/dL,, Elevated S Bilirubin (>6 mg/dl), ALT, AST (>100 UL/L), Thrombocytopenia < 20000, Haemolysis on peripheral smear, clot observation time > 7 min. or any other test done which shows deranged coagulation profile, Hypertensive retinopathy > GRADE II, Abnormal ECG (ST inversion , elevation/ arrhythmias, Cerebral hemorrhage on CT scan
Infections			
Severe systemic infection or sepsis, and others	Cases of puerperal sepsis, and post abortion sepsis Other severe infections	High grade fever (with/ without chills and rigor) Altered behavior Breathlessness Abdominal distension Unconscious state	Altered conscious state Persistent rise in Temp > 39.20 C, not responding to routine treatment Hypothermia Temp < 370 C Pulse Rate > 120 /min, Tachypnea >20 /min Coma, Bleeding from various sites
Postpartum collapse			
Amniotic fluid Embolism Uterine Inversion	Acute Collapse of patient after delivery	Pulse not recordable BP not recordable Cardiorespiratory arrest	Acute fall Hb<5 gm % (fall in hemoglobin so as to affect oxygen saturating) Fall in oxygen saturation below 90% PaO2 FiO2<<200 PaCO2 > 50 mm Hg Platelet < 20,000 (Acute decline in platelet count more significant) Clot observation time >7 min. done which proves deranged coagulation profile ECG- Ischemic changes, ST inversion, Elevation

Liver dysfunction / failure			
Acute fatty liver of pregnancy And others	Convulsions Altered behavior Bleeding from various sites (nose, gums, IV access ports, varices)	Unconsciousness Deep jaundice Hepatic flaps, tremors Abnormal bleeding sites - Haematuria, hematemesis, haemoptesis, bleeding gums etc.	Elevated serum Bilirubin (> 6mg/DL) Abnormal liver enzymes ALT, AST >100 IU/L) Abnormal ECG Coagulation profile deranged USG showing Showing changes of Acute fatty liver Fibro scan showing changes of acute fatty liver
Cardiac dysfunction/ failure			
RHD, CHD**,** Cardiomyopathy and others	Breathlessness specially at night Palpitations Chest pain	tachycardia pulse > 120bpm dyspnoea Organic Murmurs	Abnormal ECG Abnormal echocardiography X ray chest (with shielding of abdomen) showing gross

II. Results

This is a retrospective study done in department of Obstetrics and Gynecology in Dr.S.N.M.C,Ummed Hospital ,Jodhpur . The study was done during a period from 1st July 2019 to 31 December2019. During this period 13849 ANC cases were admitted in hospital, of which 11348 patients were delivered, 2342 patients required lower segment caesarean section (LSCS), giving a LSCS rate of 20.63 %. 11087 live birth were there. 159 cases were diagnosed as near miss.

I calculated intra Hospital maternal near miss incidence ratio (number of maternal near miss cases per 1000 live birth) (MNM IR = MNM/ LB). In my study the hospital maternal near miss incidence ratio was 14.34% per 1000 live birth. Table 2 shows the demographic details of these 159 women. In this study most women (55.34%) were of age of less than 25 years, (40.88%) were primipara, (55.97 %) were unbooked and were admitted in emergency.

Literacy level was low and majority (64.15%) were from low socio-economic group. Majority of the patients (50.94%) were in third trimester. (44.02%) cases were referred in cases and most of them (61.00%) were rural.

Table 3 shows summarizes the causes of near miss in my study group. In this study we found the most common morbidity was (30.18%) hypertensive disorder of pregnancy.

Figure 1: In this study very severe anemia (13.20%) was the commonest medical disorder found in near miss cases these women presented commonly with generalized edema weakness dyspnoea and unable to perform routine work.

Author could not find first delay (delay before seeking health care) and second delay (delay in reaching to health facility) because it was a retrospective study, but we tried to find third delay (delay in receiving care).

The median time taken to get clinical intervention among cases was 20-40 minutes after admission. Reduced time of intervention was due to preparedness and promptness of health staff after various training under LaQshyaProgramme. There was delay in receiving adequate and appropriate treatment (delay 3) in only in 17 (10.69%) women. Figure 2: During this period there was 8 maternal deaths were happened there. The most common cause of death was post-partum haemorrhage (37.5%)

Table 2: Socio- demographic variables, parity and gestational age of participants.

Variables	**Number**	**Percentage**
Age of mother (years)		
15-20	07	4.40
21-25	88	55.34
26-35	47	29.55
>35	17	10.69
Parity		
0	65	40.88
1	60	37.73
2	21	13.20
>2	13	8.17
Gestational age		
Variables	Number	Percentage
<12 wks	15	9.43
13-28 wks	07	4.40
29-36 wks	40	25.15
37-40 wks	81	50.94
>40 wks	09	5.66
Postpartum	07	4.40
Booking status		

Booked	70	44.025
Unbooked	89	55.97
Literacy		
Illiterate	80	50.31
Literate	79	49.68
Socioeconomic status		
Low	102	64.15
Middle	52	32.70
High	5	3.144
Residence		
Urban	62	38.99
Rural	97	61.00
Referral status		
Self	89	55.97
Referred from a health facility	70	44.02

Table 3: Causes of near miss cases n=159

Diagnosis	**N**		**%**
Hypertensive disorders in pregnancy	Chronic hypertension. severe PIH, severe preeclampsia with signs of organ dysfunction / eclampsia with organ dysfunction, HELP syndrome	48	30.18
Severe hemorrhage	Hemorrhage due to RPOC and inevitable abortion	44	27.67
Ruptured ectopic pregnancy with severe anemia and shock			
Placenta praevia			
Placental abruption			
intra operative hemorrhage			
Rupture uterus			
Severe post-partum hemorrhage			
Hemorrhage due to retained placenta			
Genital tract injuries and large hematomas			
Severe systemic infection or sepsis	Septic abortion	11	6.91
Chorioamnionitis			
Puerperal sepsis			
Postsurgical procedure severe infection (E.g. Cesarean section, laprotomy, evacuation, manual removal of placenta and others.			
Labour related disorders	Prolonged and obstructed labour with complications, Rupture uterus and others.	7	4.40
Postpartum collapse	Amniotic fluid embolism, inversion of uterus	3	1.88
Medical disorders		24.47	
Very aevere anemia	(>3 blood transfusion / PRBCs and multiple doses of iron sucrose)	21	13.20
Cardiovascular dysfunction	Valvular disease, arrhythmia, cardio myopathy, infarction,	3	1.88
Respiratory dysfunction	ARDS Pulmonary edema Post-operative pneumonia and others Severe tuberculosis with respiratory failure.	7	4.40
Renal dysfunction	Oliguria needed multiple doses of diuretics/ dialysis acute renal failure	4	2.51
Coagulation dysfunction	DIC	1	0.62
Diagnosis	**N**		**%**
Hepatic dysfunction	Acute fatty liver of pregnancy and others	1	0.62
Neurological dysfunction	Intracranial hemorrhage, non-eclamptic seizures,	1	0.62
Endocrine disorders	Diabetic keto acidosis, Thyroid crisis	1	0.62
Anesthetic complications	Allergic reaction, total spinal and failed intubation	5	3.144
Incidental/ Accidental Disorders E.g. Surgical including latrogenic, Trauma, Violence, etc.	2	1.25	
Total	159	100%	

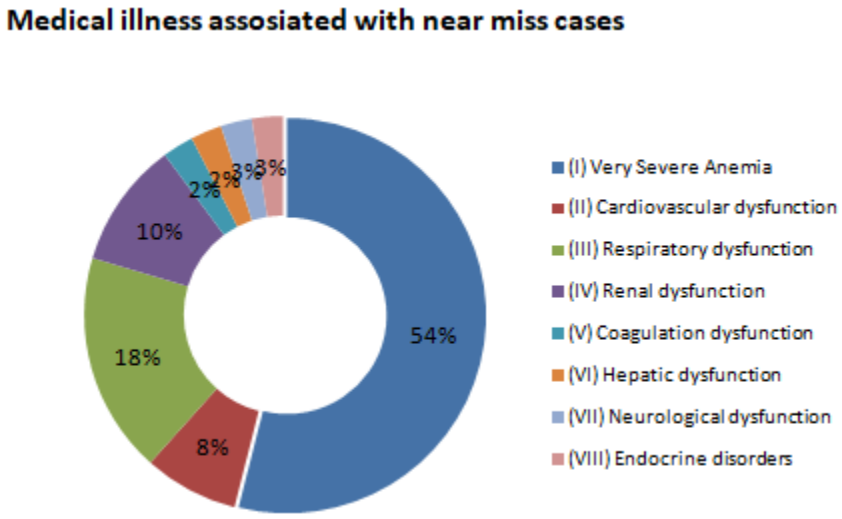

Figure 1: Medical disorders, as a cause of near miss cases

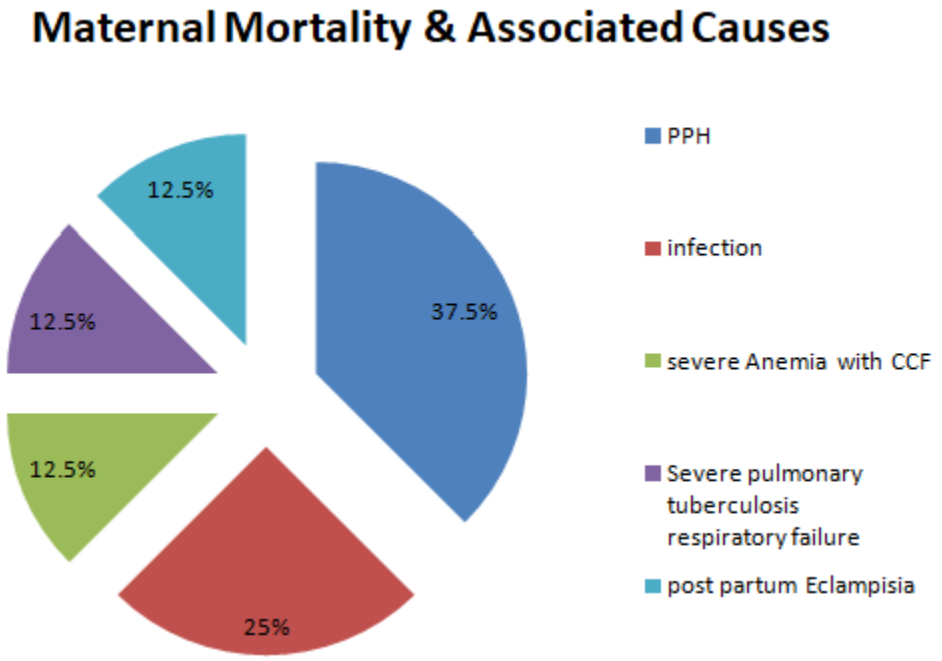

Figure 2: Two Causes of maternal mortality

III. Discussion

In this study- 55.34 % of women were in age group of 21-25, 55.97% were unbooked, 40.88 % were primipara, 50.94 % were term and 64.15 % were of low income group. My study was comparable with one another study, in which 53.3% of women with near miss in their hospital were in the age group of 21-25 year, 66.6% was primipara, 73.3% were term and 60% were from low income group[6]. In one another study most women 67.85% were age of <25 year, 64.28% were unbooked and were admitted in emergency, literacy rate was low and majority was from low social economic group[7].

The MNM IR was 14.34% in this study which is comparable to study of Roopa PS et al, with maternal near miss incidence ratio was 17.8/1000 live birth[8]. The incidence of SAMM was 15 and 17.8 per 1000 live birth in study of Moraes et al, and Ps et al, respectively[9,10]. The incidence of severe maternal morbidity was 3.3/1000 deliveries in study by Chhabra P et al, and Waterstone et al, reported a severe obstetric morbidity rate of 12.0/1000 live births, which was lower than my study[11,12]. In this study he found the most common morbidity was (30.18%) hypertensive disorder of pregnancy, second one was (27.67%) of severe hemorrhage. Upadhyaya and Chaudhary, Moracs et al, and Huseyin et al, also reported the hypertensive disorder in pregnancy as leading

cause of maternal illness[13-15]. Also, the Study by Souza JP et al, had incidence of severe preeclampsia in 36.3%, Eclampsia 9.7%, HELLP syndrome 5.6%. severe hemorrhage 10.5%, severe sepsis 6.4%[16].

Author study was not comparable with study of While Taly et al, Roost et al, and Manandhar et al, they reported hemorrhage 60%, 48% and 41.66% as most common cause of SAMM (near miss) respectively[17,18].

In this study severe anemia (13.20%) was the most common medical disorder found in near miss cases. The other studies form our country have also reported anemia as an important cause and contributor to maternal mortality and severe maternal morbidity[19]. Even after implementation of different programs for controlling iron deficiency anemia, the magnitude of this problem is still high.

During the study period 8 patients were died, out of which 3 (37.5%) patients were died due to PPH. It is comparable with study conducted by Mehta M et al, showed major cause of death in his study was hemorrhage[20].

There was delay in receiving adequate and appropriate treatment (delay 3) only in 17 (10.69%) near miss cases, that was lower than one another study in which delay was in (21.8%) women[21].

Globally, there has been a paradigm shift in the maternal care strategy since the 1990's. In India also there has been a policy change with promotion of institutional births, births by skilled birth attendants and provision of Emergency obstetric Care[22].

Reduction of maternal and neonatal morbidity and mortality is one of the key objectives of the National Health Mission. (NHM), so that India achieve the SDG target of MMR of less than 70 per Lakh live Births.

The JananiSurakshaYojana (JSY) a cash incentive scheme has been initiated to promote institutional deliveries. A recent study on impact of JSY has shown an increase in institutional deliveries among the vulnerable and high risk cases such as pre-eclampsia, eclampsia, hemorrhage, severe anemia etc. Several other interventions and programmed aids such as MNH Toolkit, Standardizations guidelines for the labour Rooms, 'Dakshata', MDR and CDR guidelines, National Quality Assurance Standards, establishment of skill labs, PMSMA etc. to achieve substantial reduction in maternal morbidity, maternal motility and newborn morbidity.

Ministry of Health and Family Welfare has recently launched the program 'LaQshaya' aimed at further improving quality of care pregnant women in labour room, maternity operation Theatre and obstetrics intensive Care Units (ICUs) and High Dependency Units (HDUs)[23]. The LaQshaya program is being implemented at all Medical College Hospitals, District Hospitals and First Referral Unit (FRU), and Community Health Center (CHCs) and will benefit every pregnant woman and new born delivering in public health institutions.

The program aimed at implementing 'fast track' interventions for achieving tangible results within 18 months. Under the initiative, a multi - pronged strategy has been adopted such as improving infrastructure up gradation, ensuring availability of essential equipment, providing adequate human resources, capacity building of health care workers and improving quality processes in the labour room. To strengthen critical care in Obstetrics, dedicated obstetric ICUs at Medical Colleges Hospitals level and Obstetric HDUs at District Hospitals are operationalized under LaQshya program. The quality of improvement in labour room and maternity OT will be assessed through NQAS (National Quality Assurance Standards).

The Objectives of LaQshya initiative

- To reduce maternal and newborn mortality and morbidity due to APH, PPH, retained placenta, preterm, preeclampsia and eclampsia, obstructed labour, puerperal sepsis, newborn asphyxia, and sepsis, etc.
- To improve Quality of care during the delivery and immediate post-partum care, stabilization of complications and ensure timely referrals, and enable and effective two-way follow-up system.
- To enhance satisfactions of beneficiaries visiting the health facilities and provide Respectful Maternity Care (RMC) to all pregnant women attending the public health facility.

Efforts geared towards improvements in the management of near-miss morbidities would definitely go a long way in reducing the present maternal mortality ratio.

IV. Conclusion

According to author study hypertension and hemorrhagic disorders are the leading cause of maternal near miss. Efforts must be made to improve maternal care for hypertension and hemorrhagic disorders. Other life-threatening conditions like severe anemia, infection, and uterine rupture should also be taken care of. It is well known that complication during pregnancy and child birth can occur at any point of time, and it is important to ensure that readiness in terms of infrastructure, HR, equipment etc, for timely management of complications are available at all the basic and emergency obstetric care health facilities. A regular audit of near miss cases and reporting of these cases to higher authorities should be done so that appropriate action can be taken at all care levels. Proper data management must be done for quick and effective treatment. Prompt diagnosis, appropriate action and timely intervention will reduce maternal morbidity and mortality.

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