Research Paper   **Medical Science**

Study of Maternal Morbidity and Mortality in Near Miss Cases in Government Maternity Hospital, Tirupati

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ABSTRACT

To assess the utility of near miss approach in understanding maternal morbidity and maternal mortality with special reference to contributory factors.

KEYWORDS   maternal near miss cases, maternal mortality,maternal morbidity, mean severity index.

Objectives:

The aim of the study is to assess the utility of near miss approach in understanding maternal morbidity and maternal mortality.

- To study all aspects of maternal near miss with special reference to contributory factors,
- To study all aspects of maternal deaths with special reference to contributory factors and to study health facility factors contributing to maternal near miss and maternal deaths.

Introduction

Everyday globally, approximately 800 women die from preventable causes related to pregnancy and childbirth. 90% of all maternal deaths occur in developing countries. In majority of cases, the complications during pregnancy are consequences of the same factors that cause death. This concept was recently defined by the WHO as NEAR MISS.

A woman who, being close to death, survives a complication that occurred during pregnancy, delivery or up to 42 days after the end of her pregnancy

The study was carried at tertiary care hospital, chittoor district, AP attached to Medical College. Since the present institute is a prototype teaching hospital, the study of Near Miss and maternal deaths is being conducted here so that level of care at the hospital can be improved and recommendations can be extended to other teaching hospitals in AP and other states

Materials and methods

Study method – prospective, observational study (adopted from WHO near miss approach)

Subject number – 789 cases fulfilling near miss criteria, total 78 maternal deaths in chittoor district of which 37 maternal deaths in institution.

Inclusion criteria

Women who are pregnant, or in labour, or who delivered or aborted upto 42 days ago or those who develop complications during their stay at the health-care facility would be eligible.

Women who are already dead when they are brought to the health-care facility or those ho die on arrival at the facility should be included because they are likely to represent cases involving a major delay in accessing care.

Exclusion criteria:

Women that develop those conditions unrelated to pregnancy.

For each woman data will be collected on

The occurrence of selected severe pregnancy-related complications.

Severe maternal outcomes

Use of critical interventions

Admission to ICU.

Results

Frequency of distribution of characteristics of maternal deaths

Among the booked cases of maternal deaths in chittoor district, total numbers of ANCs taken were recorded in 52 cases of which 50% had taken 4 ANCs and 26.5% had taken 3 ANCs in remaining cases the total number of ANCs data was missing. Among the total MDs, 10 deaths occurred in the transit period and 5 MDs at home. 13.5% of MDs were AN deaths, 13.8% were intra natal deaths, 11.25% abortion deaths while remaining majority were postnatal deaths.

Of the above 78 maternal deaths 37 MDs occurred at present institute.

Frequency of distribution of cases based on different near miss criteria

criteria	Number of cases
Total near miss criteria list	789
Potentially life threatening conditions	491
Life threatening conditions	225
ICU admissions	83
Critical interventions	348

Health indicators

Health indicator	result
Estimated maternal mortality	269/lakh live births
Maternal near miss ratio	16.37/1000live births
Maternal near miss: maternal death ratio	6.08:1
Mortality index(MI)	14.12%
Severe maternal outcome ratio21.25/100	21.25/1000 live births

Frequency of direct causes and indirect causes of maternal deaths in present study
Direct causes: 26
Indirect causes: 11`

direct causes of maternal mortality
- pph
- eclampsia,pre-eclampsia,
- placenta previa with hypovolemic shock
- abruption with MODS
- pulmonary embolism
- obstructed labor

indirect causes of maternal mortality
anemia with ccf
diabetic ketoacidosis
myocarditis with ARDS
Post mitral valve repair with cardiac failure
Myocardial infarction.

Reasons for unbooked status
For not taking ANC in near miss(n)

Lack of awareness 7, lack of funds 3, Lack of attendees 15,family problems 2.

Reasons for unbooked status for not taking ANCs in maternal deaths(n):

Lack of accessibility 1, Lack of attenders 2.

Frequency of distribution of severe complications:

Severe complications	PLTC (n)	Near miss(n)	Maternal deaths(n)r
Severe PPH	109	45	11
Severe PE	257	48	6
eclampsia	140	37	7
sepsis	79	46	9
Uterine rupture	18	14	2
Complication of abortion	18	18	2

Frequency of cases based on critical interventions:
In near miss cases 53% OF CASES REVEIVED MORE THAN 3 blood transfusions,13.7% underwent laparotomy for pph,ectopic and rupture uterus and for sepsis, 21 cases of maternal deaths were admitted to ICU.

Underlying causes and associated conditions in near miss and maternal deaths are as follows respectively:

Pregnancy with abortive outcome 8%,5.4%,obstetric haemorrhage 39.1%,19.7%, hypertensive disorders 37.7%,35.1%,pregnancy related infection 14.6%,24.3% medical and surgical disease 30.6%,29.7%.

Contributory associated conditions:
Anaemia in near miss(MNM) is 59.5% and maternal death(MD) is 67.5%,previous c/s MNM is 16%, MD is 13.5%,and HIV MNM is 2.6%,no MD.

Mode of delivery/ termination
Vaginal delivery in MNM is 99, MD 16.

Caesarean section MNM is 60, MD is 14,complete abortion MNM is 1, no MD,curettage/vacuum aspiration MNM is 13, MD is 1,laparotomy for ectopic pregnancy MNM is 4, no MD; laparotomy for rupture uterus MNM is 12,women still pregnant at death MNM is 36, and MD 6.

Mean severity index = 3.6% calculated from tools developed b the HO near miss approach to identify severity in morbid cases.

Expected deaths based on Mean severity index = 28

Observed deaths =37

Hospital standardised mortality ratio (SMR) = 1.37

95% CI = 0.85-2.21

Performance grade = low

Precision of assessment = low

Process indicators:
Prophylactic prevention of PPH: by active management of 3rd stage of labour protocol by WHO

Treatment of PPH
Eclampsia : all 140 members received $MgSO_4$. 81 of antepartum eclampsia were referred from outside,32 received $MgSO_4$ but 49 did not receive $MgSO_4$ from referral facilities and out of those 49 members all members were from PHC referrals.

Prophylactic antibiotic usage: given 1 hr before caesarean section .of all the cases 60 underwent cs and administration of antibiotics was not documented except for 13% of cases.

Treatment of severe infections and sepsis within 24-48 hrs of the onset of severe systemic infections.

Fetal lung maturation: all 152 preterm received at least one dose of corticosteroid for lung maturation but 35 were dead at birth,18 were dead at the time of discharge.

Delays
Delay in seeking care for MNM and MD are as follows respectively:

Unawareness of danger signs is 58 in MNM and MD is 13,illiteracy & ignorance MNM is 43, MDis 12 ; delay in decision making MNM is 21, MD is 13; no birth preparedness MNM is 13, MD is ;non availability of health care professional MD is 6; no delay MD is 2.

Delay in reaching first level health facility MNM is 37, MD is 17:

Delay in getting transport MNM is 37, MD is 10; delay in mobilizing funds MNM is 5, MD is 10;not reaching appropriate facility in time MNM is 31, MD is 7.

Delay in receiving adequate care in facility MNM is 77, MD is 16:

Delay in initiating treatment MNM is 23, MD is 13;substandard care in hospital MNM is 11;lack of blood equipment drugs MNM is 77, MD is 13; no delay MNM is 148, MNM MD is 21.

Discussion
The present study used the near miss approach proposed by WHO to study all the aspects of maternal near miss and maternal deaths. This approach helped to assess the contributory factors leading to near miss and maternal deaths fulfilling the objectives of the study. The MSI tool designed by the WHO also helped to study the health facility factors contributing to maternal near miss and deaths and helped in estimating the performance of the institute.

The WHO proposed near miss criteria were able to 789 total sever morbid cases. Potentially life threatening conditions criteria was able to identify 491 cases while life threatening conditions criteria was able to identify 225 cases and critical interventions were able to identify 348 cases and ICU admission criteria was able to identify 83 cases.MMR of the study is 269/100000 live births of India and far behind the goal of MDG i.e.,109/1lakh live births.

91.8% of maternal deaths in the study belong to rural areas. Among the total maternal deaths 32.4% were uneducated and 10.8% had primary school education.

Majority of maternal deaths occurred in booked cases. though the present study shows higher % of booking status it is questionable whether the ANC is adequate or not. Many cases booked at institute even do not have the basic investigations. Overcrowding at the institute can be attributed to this inadequacy of ANC.

60.4% of the near miss cases had condition developed before coming to the hospital or within 12 hours of the hospital stay. In MDs 14 cases developed complications and landed up in death during hospital stay.In remaining 23 cases complication developed before arrival at hospital stay.Being a tertiary care centre. this scenario is expected as the cases are shifted at the critical stage from PHCs and CHCs. But even considerable number of MDs occurred during hospitalisation that is14 cases which indicates over burdening with normal cases which could have been managed at primary or secondary level itself and preventing more attention towards critical cases.

Of the total 37 maternal deaths, 26 deaths i.e., 56.3% occurred due to direct causes and 11 MDs i.e.,43.2% due to indirect causes.

Among the MDs 29.7% occurred due to obstetric haemorrhage and obstetric haemorrhage still is the leading cause of death world-wide. Total severe PPH cases were 109 out of which 45 cases landed up with life threatening conditions and 7 cases landed up in death.the mortality index of the specific PPh is 13.46% means for 100 PPH cases with life threatening conditions 13.46 cases faced mortality.

Out of 307 women with severe eclampsia and eclampsia 85 cases had life threatening conditions and 13 deaths occurred giving mortality index of 13.2%.

Of the total 79 cases of severe sepsis 46 cases had organ dysfunctions and 9 MDs occurred giving mortality index of 16.3%.

Of the total 14 cases with rupture uterus 2 cases faced death and MI is 12.5%.

When women undergoing critical interventions are studied out of the entire near miss cases 53.7% received 5 blood transfusions and 45.9% of MDs received more than 5 blood transfusions, 13.7% underwent laparotomy for PPH,ectopic, rupture uterus and for sepsis cases of maternal near misses and 21 cases of maternal deaths were admitted to ICU.

Out of total women who underwent laparotomy in near miss cases i.e.,31 cases 22 presented with life threatening conditions at the time of admission, and out of 6 cases who underwent laparotomy 1 case had it done outside and referred here with severe uncontrolled PPH and shock while 2 cases were referred from outside with normal vaginal delivery outside and severe PPH and underwent laparotomy after coming to the institute.

Regarding organ dysfunction which is the main criteria for identification of nearmiss cases,225 cases had life threatening conditions.104 had haematological dysfunction is the most common cause. Near miss renal dysfunction has mortality index of 29.9% indicating more support needed for the man-

agement of renal system. Cardiovascular dysfunction has MI of 21.8% ,hence the use of mechanical ventilation is more.

In the present study the MNMR was 16.3% which was almost near to the study in Manipal college of 17.8/1000 live births.

The present institute and the Manipal college had maternal mortality rates of 269 and 313 per 1 lakh births respectively with similar maternal near miss rates of 16.3 and 17.8 and the maternal near miss to maternal death ratio turns out to be 6.08 :1 and 5.6:1 respectively.

The present study shows a severe maternal outcome ratio (SMOR) of 21.25/1000 live births. This multicentric surveillance in brazil by WHO shoed SMOR of 11.4/1000 live births. The present SMOR indicate higher incidence of severe maternal outcomes much more than inadequately performing centres which indicates the need for improvement of the care and resources at institute.

In the present study organ dysfunction was related to haematological in both eclampsia and preeclampsia . second frequently reported organ dysfunction being renal in preeclampsia followed by cvs in eclampsia.

Conclusion
Near miss approach is an effective tool in understand factors underlying maternal morbidity and mortality helped in assessing the clinical aspects, underlying ad associated factors of severe morbid cases and maternal deaths.

All the maternal deaths had at least one proposed criteria of the near miss approach.

The proposed Mean Severity Index (MSI) tool calculated to be 3.6% which indicates the probability of death of near miss case and expected number of deaths were observed to be 28 and observed deaths were 37.

Standardised Mortality ratio (SMR) of the institute estimated from MSI is 1.37 and performance needs to be improved.

Though the maximum maternal deaths,29.7% occurred due to haemorrhage, mortality index of sepsis is 18% indicating more probablity of deaths in sepsis and it warrants need for vigorous approach for treatment of sepsis.

The 3 delays model used identified the delays at various levels and the 3rd delay was 43.2% among maternal deaths, thus indicating the need for enhancement of human and material resources at tertiary centres.

The indicator of Severe Maternal Outcome Ratio was 21.26 and maternal near miss ratio was 16.37 /1000 live births and indicated the need of improvement in resources and equipment at the institute.

The process indicators helped in assessing the maternal care at the institute.

Poor documentation of the cases and socio demographic factors, time interval between the origin of symptom and initiating of treatment is observed which will hinder further studies or Maternal near Miss audit or Maternal death review.