NEAR MISS OBSTETRIC EVENTS AS A REFLECTION OF QUALITY OF MATERNAL HEALTH CARE

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ABSTRACT

Objective: To determine frequency and nature of near-miss cases in obstetric patients in a tertiary care hospital.

Study Design: Cross-sectional descriptive study.

Place and Duration of Study: The study was conducted in obstetrics unit of Combined Military Hospital (CMH) Kharian from Jan 2013 to June 2013.

Material and Methods: The WHO near miss criteria 2009 was followed including clinical, laboratory and management based criteria for case identification. Main outcome measures were frequency of near miss and maternal mortality cases, near miss on arrival and during hospitalization, ICU admission and total hospital stay, calculating the mortality indices, maternal mortality ratio, mortality to near miss ratio, near miss cases / 1000 deliveries were calculated.

Results: There were 76 near miss cases. Maternal mortality ratio was 676. Near miss cases were 70.3%. Maternal death to near miss ratio was 1:10. Mortality index for near miss cases was 8.4%. In near miss group most significant was cardiovascular 46% and hematologic system 32%. Interventions, renal, neurological and respiratory were 9.2%, 5.2%,3.9% and 2.6%respectively. In near miss cases 86% were referred and 14% booked.

Conclusion: This study showed that uniform criteria for identifying near miss cases can be used in a tertiary referral hospital setting especially for comparison of results and audit. Near misses provide relevant controls for maternal deaths since most women who die presumably pass through a phase of organ dysfunction before dying and evaluation of circumstances leading to this can help in formulating and revising health care protocols.

Keywords: Health Systems, Maternal Mortality, Near miss morbidity.

INTRODUCTION

A total of ten million women worldwide are estimated to experience severe complications of pregnancy every year and half a million of these die as a result mainly in developing countries[1]. About 99% of all maternal deaths occur in developing countries. Prevention of maternal mortality is obviously the aim of obstetricians, hence an outcome audit of near miss maternal deaths would be a useful adjunct to an assessment of maternal deaths and would concentrate on the management of morbidity once it has occurred[2]. According to the Pakistan Demographic Health Survey 2006-2007 the maternal mortality ratio was 371/100,000 live births in rural areas[3]. Traditionally the analysis of maternal deaths has been the criteria of choice for evaluating the women's health and quality of obstetric care. Due to success of modern medicines such deaths are now rare in developed countries and there is an increased interest in analyzing near miss events and the near miss statistics should be mentioned in national health indices as a means to improve health care delivery system to the population[4]. Millennium development goals in 2000 by the United Nations is the most significant "global health event" since the 1990's. MDG 5 is to improve maternal health and 75% reduction inglobal MMR from its1990 level[5]. So the concept of maternal morbidity as a continuum ranging between healthy pregnancy and death also called a near miss is the term

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used to identify a woman who experience a severe event during pregnancy, labor or within 42 days postpartum[6]. Although there are currently no internationally agreed criteria to identify or label near miss cases, a disease specific criteria based on fivemain diagnostic domains including hemorrhage,hypertensive disorders, sepsis, and severe anemia was used[7].

In 2009 the world health organization published a consensus on maternal near miss definition and set criteria for case identification[8]. Signs of organ dysfunction that follow life threatening conditions are used to identify maternal near- miss cases. The WHO technical working group recommends that the new maternal death classification system be adopted by all countries and the maternal near miss approach be considered in national plans for improving maternal health[9]. So by defining the criteria, timely and adequate treatment for obstetric complications can be sought. For Pakistan the most challenging MDG is that of reducing maternal mortality. It is so intertwined with other social factors that a comprehensive holistic approach is required. Substandard care is not the sole reason, patient related factors are also important[10]. Since 1980 it was recognized that timely and adequate treatment for obstetric complications was a major factor in reducing maternal deaths. Delay in deciding to get care by women and family, delay in reaching an adequate care facility and receiving adequate treatment are the three delays. Culmination of the three delays frame work with maternal near miss approach may offer an additional means of recognizing a critical event around child birth[11]. Studying near miss and auditing them could be a powerful tool for policy makers within the health care system[12].

This study was conducted to determine the nature and number of near miss cases in this tertiary care hospital in order to provide an insight into types of obstetric emergencies and outcome of care provided to them.

MATERIAL AND METHODS

This was a cross sectional descriptive study conducted between 1st Jan 2013 to 31st July 2013 in Combined Military Hospital (CMH) Kharian obstetrics unit. This hospital is the only tertiary referral center for all nearby areas of military as well as civilian population. Patients presenting to obstetrics unit fulfilling WHO criteria for near-miss were included in the study as shown in table-1. All healthy patients who had uneventful childbirth were excluded. There were total 9000 OPD cases and 1920 obstetric admissions in six months (21.3%). There were 1080 total births and 1035 live births. Of the total 630 ICU admissions 192 (30%) were obstetric cases. WHO nearmiss criteria includes dysfunctional system, clinical criteria, laboratory measures and management based proxies. Patients characteristics including age, parity gestational age, booked (>3 Antenatal visits), mode of delivery, ICU admission, duration ofICU stay, and surgical intervention to save mother were recorded. Patients whose diagnosis met the criteria were admitted to ICU. Investigations were done to assess organ dysfunction including hepatic, renal, respiratory and cardiovascular systems. Data was collected for the nature of complications, outcome and duration of admission for near miss and maternal mortality. MMR was calculated per 100,000 live births and NMMR was calculated using 1000 live births as the denominator. Mortality index was calculated by number of deaths due to a particular condition divided by sum of near miss morbidities and maternal deaths from this condition. Higher the index more women with life threatening conditions die. Descriptive analysis was done using SPSS 20 and descriptive statistics were used to describe the results.

RESULTS

There were 76 near miss cases, mean hospital stay was 10 days. WHO clinical, laboratory and management based criteria identified all cases. In some patients there was an overlap between different criteria and also more than one organ was affected. Most common intervention based criteria were use of vasoactive drugs and cardiopulmonary resuscitation, blood transfusion of more than five units in 15 patients, emergency hysterectomy in seven patients. Fits, loss of consciousness, failure to form clots and shock were the most important clinical criteria.

Reduced oxygen saturation and clotting failure were the most significant laboratory criteria. In near miss cases, most significant organ system to be effected was cardiovascular system 46% with a mortality index of 7.8% followed by hematologic system having mortality index of 10.7%. In maternal deaths group most common organ dysfunction was 42.8% each for cardiovascular and hematological system. Distribution of cases according to clinical, laboratory, and management criteria was 35.5%, 17.1% and 47.3%. In cases of near miss 86% were referred and 14% booked. In maternal death cases 100% were unbooked. The most disturbing were the patients who were brought to the hospital very late and were already dead on arrival. Five patients due to postpartum hemorrhage, and one due to eclampsia.

DISCUSSION

Maternal near miss comes in between the spectrum of normal pregnancy leading to complications, sometimes resulting in maternal death. Both maternal mortality and near miss are a predictor of the quality of care which obstetric patients receive but there are many other factors which are involved like patients access to facilities, basic knowledge of when to seek health care and the ability of primary health care providers to identify the high risk situations and refer them to hospitals equipped to handle these situations without further delay.

Table-1: The WHO near-miss criteria.

S.No	Dysfunctional system	Clinical criteria	Laboratory markers	Management-based proxies	Total (n)	Total (n) %
1.	Cardiovascular	Shock cardiac arrest	pH>7.1 Lactate>mEq/mL	Use of continuous vasoactive drugs Cardiopulmonary resuscitation	35	46%
2.	Respiratory	Acute cyanosis gasping respiratory rate>40 or <6 bpm	Oxygen saturation<90% for <60 min paO_2/Fio2<200 mm Hg	Intubation and ventilation not related to anesthesia	2	2.6%
3.	Renal	Oliguria nonresponsive to fluids or diuretics	Creatinine 300 umol/L or <3.5 mg/dL	Dialysis for acute renal failure	4	5.2%
4.	Hematologic / coagulation	Failure to form clots	Acute serve thrombocytopenia (<50,000 platelets/mL)	Transfusion of >5 units of blood/red cells	25	32%
5.	Hepatic	Jaundice in the presence of preeclampsia	Bilirubin>100 Umol/L or >6.0 mg/dL		0	
6.	Neurologic	Any loss of consciousness lasting >12 hr Stroke Uncontrollable fit/status epileptics total paralysis			3	3.9%
7.	Alternative Severity proxy			Hysterectomy following infection or hemorrhage	7	9.2%

In the present study we used WHO criteria to identify the near miss cases, maternal deaths and their causes. In tertiary hospital settings like ours WHO criteria fared well in identifying the cases. In other studies done in tertiary care this criteria identified nearly all cases and it was found to be 100% sensitive in identifying maternal deaths[13,8]. In poor resource settings like in Africa some parameters of WHO criteria were not applicable especially due to limitations of laboratory test availability[14]. In a study done in Nigeria where maternal mortality is highest in the world Pattison criteria was used to identify near miss cases[15]. But even in resource poor setting WHO based criteria identified acute maternal morbidity with few limitations[16]. Majority of patients in morbidity and mortality group were of lower socioeconomic status which correlates with other studies[17,18]. In near miss cases(86%) were referred and 14% booked and all patients in maternal mortality group were unbooked like in other studies[19-21]. The frequency of near miss cases was 7% and maternal deaths 0.64%.the maternal death to near miss ratio was 1:10 which means that for every ten woman who survived one died. Near-miss morbidity cases/1000 deliveries was 70.3% and mortality

Table-2: Criteria used for identifying near-miss cases.

Ser	**Clinical criteria**	**No of patients=n**
1.	Shock	10
2.	Acute cyanosis	0
3.	Oliguria	2
4.	Failure to form clots	6
5.	Jaundice	2
6.	Unconsciousness / fits	7
	Total Patients	27 (35.5%)
	Laboratory Markers	
1.	PH >7.1	0
2.	Oxygen saturation <90%	6
3.	Creatinine 300umol /lit	2
4.	Acute severe thrombocytopenia	4
5.	Bilirubin >100 umol / lit	1
	Total Patients	13 (17.1%)
	Management Based	
		No of Patients
1.	CPR / use of vasoactive drugs	10
2.	Intubation and ventilation	2
3.	Dialysis for acute renal failure	2
4.	Transfusion of >5 units of Blood	15
5.	Hysterectomy	7
	Total Patients	36 (47.3%)

Table-3: Frequency and characteristics of near miss cases and maternal deaths.

a.	Deliveries (n)	1080
b.	Live births	1035
c.	Near miss cases (n) o Booked o Unbooked	76 – (7%) 14% 86%
d.	Near miss cases/1000	70.3
e.	Maternal deaths (n)	7 (0.64%)
f.	Maternal mortality ratio	676
g.	Maternal death to near miss ratio	1:10
h.	Mortality Index	8.4
i.	Brought in dead	6 – (0.57%)

index for near miss was 8.4%. This compares with a study done in tertiary care hospital by Roopa where MMR: NMMR was 5.6:1 and MI14.9% and MMR was 313/100,000 live births[20]. In developed world MMR:NMMR is 1:117-223, whereas in Africa and developing world it is 1:11.20,4 The most significant organ system affected in our study was cardiovascular (46%) followed by hematological system (32%). In a study of immigrant population in Sweden frequency of near-miss was 2.9/1000, and most frequently occurring criteria was uterine rupture, preeclampsia and cardiovascular disease[22]. The same results were shown by other studies with hemorrhage as the leading cause followed by hypertension, sepsis and obstructed labour[22-25]. Total mean hospital stay in our study was 10 days which compares with other studies done in Pakistan[4,25] and also by Souza[26]. Another study done in Karachi Pakistan shows comparable results as our study considering study population and characteristics were same[4]. Karolinski et al showed that most significant criteria for identifying near miss was management based[1]. In another study 87% patients were identified according to management based criteria followed by clinical and laboratory criteria like in our study[27]. In a developing country like Pakistan where obstetric services are poor and still shrouded by myths the public health delivery system needs overhauling. A total of 80% of deliveries still occur at home by traditional birth attendants and emergency transfers in labor are very common[5]. In this study a very alarming proportion of six woman were already dead by the time they reached hospital. The same is shown by another study done in Pakistan in which 48% maternal deaths occurred at hospital, 27% at home and 22% on way to hospital[28]. These precious lives could have been saved if they seeked medical help in time or were referred in time. This is shown in a study of three delays[29]. Like in another study 93% arrived in critical condition having being referred from other hospitals[30]. The main contributing factors were poor clinical skills and competency of health care providers along with delay in reaching hospital[31].

CONCLUSION

This study showed that maternal deaths are the tip of iceberg. For every woman who dies, many will survive but with lifelong disabilities. In this study for every 10 women who survived one died and the most neglected group in this study was the one who were brought to hospital only to be declared dead. Exact nature or cause of their death is not known but without doubt is due to the first two delays in seeking help, and inability of the primary care providers to identify the high risk women.

So near miss events should be a part of hospital statistics as they are more common than maternal deaths and investigating the care received may be less threatening to care providers as the women survived. There is growing interest in application of near miss concept as an adjunct to maternal mortality. WHO criteria can help in systematic data collection and compare the rates over time and across regions so that hospitals havingsame facilities can compare data for improvement of obstetric care, and at the same time risk factors and substandard care identified.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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