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Maternal Near –Misses in a University Hospital

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Abstract: *Despite all the efforts that were done by the Egyptian government to achieve the Millennium Development goals, there is a question regarding the quality of care provided to the Egyptian women during pregnancy, labour and deliver. Maternal Near-miss has becomes an indicator for quality of the obstetrics care.*
The aim*: the study was aiming to investigate Maternal Near Misses in a University Hospital. World Health Organization (WHO) near-miss tool was used to identify the associated variables.*
Methods: *A descriptive retrospective study was applied using data from Mansoura University Hospital women's records during pregnancy and delivery between October 2012 and September2013.*
Results: *The study identified 80 cases with life threatening and morbidity conditions. The main morbidity conditions were severe pre eclampsia, severe hemorrhage, eclampsia and sepsis. More than 80% of women went through critical care such as ICU, blood products and laparotomy. Seventy nine percent of women experienced organs dysfunctions. The main associated risk factors were anemia, previous CS and obstructed labour. Cesarean Section was the main mood of delivery for the near misses (93%).*
Conclusion: *Studying near misses is important method to evaluate the quality of maternal healthcare and to improve maternal outcomes. The results of this study may help in establishing new policies and strategies aiming to decrease maternal morbidity and mortality.*
Keywords: *Near-miss, maternal morbidity, quality of care, pregnancy & delivery, WHO.*

I. Introduction And Background

In 2013, 289 000 women died by prevented causes in low resource countries during and following pregnancy and childbirth[1].In Egypt, a great effort has been made to decrease maternal mortality ratio from 120 in 1990 to 45 in 2013with, 62.5% reduction[2]. One of the Millennium Development Goals is to reduce the maternal mortality ratio by 3/4 by 2015especially in the sub-Saharan areas where the problems were more tragically[2].In year 2015,Egypt nearly reaching the Goal Five, MDG5.However,more maternal deaths could be prevented or avoided through a standardized management that are proven to be effective and affordable, even in the poorer countries of the world.[2,3,4]. The most dangerous birth complications have been shown to be infections [5,6], hemorrhage [7,8,9] and hypertensive disorders[10]. Adequate management of these conditions will reduce maternal deaths if healthcare system updates its management for emergency obstetric complications. In addition to other factors that should be addressed in order to improve maternal health [3,4].

Maternal death is one of the most devastating implications for the family, healthcare system and the community. Five percent of maternal deaths occur in the Arab countries and 390,000 women in the Middle East suffer from long life complications due to pregnancy and childbirth[4]. One of the reasons for improved maternal mortality rates in the developed countries is the understand of the causes of maternal mortality and thus a subsequent improvement in clinical care, which is called Confidential Inquiries of Maternal Deaths (CEMD), because it gives a better picture of the health problems in the health system, and provide a comprehensive assessment of the quality of healthcare and to propose improvements in clinical care [11,12].

Nowadays, in addition to studying the maternal deaths, the examination of women who survived a severe complication of pregnancy, childbirth or the puerperium (Near misses) is increasingly being recognized as a potentially useful tool in assessing the quality of healthcare as it reflects the scope of complications in maternity care and in improving maternal outcomes[13,14].

Near misses are defined as pregnant women with severe life-threatening conditions who nearly die but, with good luck or good care, survive [15].

Despite all the efforts done by Egyptian government to achieve the Millennium Development Goals, there is a question regarding the quality of care provided to the Egyptian women during pregnancy and delivery[16,17,18,19].Also, MMR in Egypt was (45 per 100.000 live births is still high if compared with other Arab countries. Maternal mortality in other Arab countries per 100.000 live birth were 6in Qatar, 8 in United Arab Emirates,14 in Kuwait,15 in Libya and 16 in Lebanon and Saudi Arabia[18,20]. Lack of accurate data for women who are at high risk of maternal death and what action will best reduce that risk is the main contributing factors for lack of maternal care.

1.1 Significant of the study: In Egypt, women exposed to serious complications during pregnancy and childbirth. Some of these women die and some of them survive.[21] MNM has becomes an indicator for quality obstetrics care and for better understanding of the causes of maternal morbidity as it occurs more frequently than maternal deaths and the women themselves can be the source of data by telling their stories[15]. Review the cases of maternal near miss has the potential to highlight both deficiencies and positive elements in the provision of obstetric care which will allow for more rapid reporting, more healthy conclusions and the comparisons made with maternal deaths will be a learnt lessons and can inform the hospital managers and policy makers for establishing requirements for intensive care, comprehensive emergency obstetric care for better maternal outcomes. Maternal mortality has been studied but near miss is not described yet[15].

II. Methods

2.1 Study aim: The study aimed to investigate Maternal Near Miss in a university hospital. **So the study aims to answer the study question of, do Mansoura university hospital has MNM? and what are the care provided for them?**

2.2 Setting: The data were collected from Department of Obstetrics and Gynecology of Mansoura University Hospital (MUH) located at Mansoura. The hospital receives patients from the entire Dakahlya Governorate. The pregnant women often arrive to Mansoura University Hospital as the third option as they first attend district based treatment which may consists of one basic delivery room and a nurse or from private clinics which are the second level of referral and often has a specialist. From these health systems the complicated cases are referred on to MUH, which therefore often receives the women when they are in critical conditions. MUH does have an intensive care unit (ICU) for constant monitoring and intensive care.

2.3 Methodology: A retrospective descriptive study was used to review the patient's medical records to identify the Maternity Near Miss cases that occurred during pregnancy and immediately after delivery. A total numbers of 700 medical records for women who were admitted during the period between October 2012 and September 2013 were reviewed and evaluated to identify the Maternal Near Misses by using the WHO Near Miss assessment tool. After reviewing and evaluating the medical records, eighty cases were identified as potential life threatening conditions.

2.4 Inclusion criteria: Any medical record for a patient who suffered from complications during pregnancy, delivery or during hospital stay**;** according to the WHO three main categories: (1) clinical criteria,(2) intervention based,(3) organs system dysfunction.

2.5 Ethical Consideration: An approval has been reached from the head of the obs & gyn department to retrieve patients records.

III. Results

Table one presents the general characteristics of 80 cases whom suspected to have a potential life threatening conditions. Among approximately 700 patient records examined for women admitted to hospital between October 2012 and September 2013, 80 cases were evaluated with suspected potential life threatening conditions. Their ages were ranging from 19 to 40 years old and their gestational ages at delivery were ranging from 18-43 wks.22% of the cases had previous CS either one time or five times. The majority of cases (83.7%) were referred to the hospital either from Ministry of Health Hospitals (44.8%), private clinics (29.6%) private hospitals (15.1%) and others from home or from primary health resources (10.5%).

Table 1.Characteristics of Suspected Women with Potential Life Threatening Conditions. (n=80)

Characteristics	Mean (Minimum-maximum)
Women's age	22.8 (19-40)
Gestational age	29.2 (18-43)
Previous CS (18, 22.5)	3 (1-5)
Referrals	(67, 83.75)
Private Obstetricians	20 (29.6)
MOH Hospitals	30 (44.8)
Private Obstetricians	20 (29.6)
Others	7 (10.5)

Table two shows that 80 (11.4) women were identified with life threatening complications. The majority of those women, (83.8%) admitted to hospital with life threatening conditions, of those women, more than half (51.3%)were suffering from severe pre eclampsia, followed by severe post partum hemorrhage 25%, eclampsia 5% and severe systemic infection 2.5%.While the rest of women (16.2%) experienced life threatening

conditions after 12 hours of admission such as, severe post partum hemorrhage 12.5% and sever preeclampsia 3.7%.

Table 2. Number and percent distribution of women with potential life threatening conditions according to the time of morbidity conditions.

Morbidity conditions	At arrival or within 12 hours		Developed after 12 hours	
1. Women with potentially life-threatening conditions	No	%	No	%
Severe postpartum hemorrhage	20	25	10	12.5
Severe pre-eclampsia	41	51.3	3	3.7
Eclampsia	4	5.0	0	0.0
Sepsis or severe systemic infection	2	2.5	0	0.0
Ruptured uterus	0	0.0	0	0.0
Total women with severe complications	67	83.8	13	16.2

Table three illustrates critical interventions provided for morbid women. It was clear that the majority of morbid women (81.2%) were admitted to ICU, the morbid cases admitted to ICU experienced sever preeclampsia and eclampsia (53.8%),sever PPH (29.2%), anemia(7.7%), multiple organ dysfunctions (6.2%), and hysterectomy with anemia (3.1%).Also, the table shows that 43.8%of cases had blood products and 16.3% went through labarotomy. There were more than one critical interventions were provided.

Table 3. Number and percent distribution of morbid women according to the critical interventions.

2. Women undergoing critical Interventions	No	%
Use of blood products	35	43.8
Interventional radiology	0	0.0
Laparotomy	13	16.3
Admission to intensive care unit	65	81.3

Table Four highlighted that of the total of MNM women (86.6%) experienced organ dysfunctions such as cardiovascular dysfunctions (29.8%),renal dysfunction (13.4%), respiratory dysfunction (7.5%),haematologic dysfunctions (11.9%), hepatic and neurologic dysfunctions (7.5%) and uterine dysfunction, hysterectomy (3.0%). Sadly, 4women died (6.0%) from multiple organ dysfunctions.

Table 4. Number and percent distribution of MNM and dead women who experienced organ dysfunctions.

2. Organ dysfunctions	maternal near-miss cases		Maternal death	
	No	%	No	%
Cardiovascular dysfunction	24	30.1	4	20.7
Respiratory dysfunction	9	11.3	4	20.7
Renal dysfunction	10	12.6	0	
Coagulation/haematologic dysfunction	8	10.1	2	10.3
Hepatic dysfunction	5	6.3	2	10.3
Neurologic dysfunction	5	6.3	0	
Uterine dysfunction/hysterectomy	2	2.6	4	20.7
Multiple organ dysfunction	0	0.0	4	20.7
Total organ dysfunction	63	79.3	4	20.7

Table five shows that underlying causes were almost the same among all studied women with potential life threatening and MNM. Hypertensive disorders were the highest direct cause (56.2%) followed by obstetric haemorrhage (36.2%), medical complications (17.5%), pregnancy with abortive outcomes (16.2%) and last cause was the pregnancy related infection (3.7%). Also, In relation to the associated conditions it was clear that anemia, previous CS and obstructed labour were the most common causes among women with potential life threatening condition (36.2%, 22.5, 8.7) and MNM (44.4,23.8, 7.9) respectively.

Table5. Underlying causes of life-threatening conditions and severe maternal outcomes

1. Underlying causes	Women with potentially life-threatening conditions		Maternal near-miss cases		Maternal deaths	
	No=80	%	No=63	%	No=4	%
Pregnancy with abortive outcome	13	16.3	2	3.2	1	25
Obstetric hemorrhage	29	36.3	20	31.7	2	50
Hypertensive disorders	45	56.3	35	55.5	0	0.0
Pregnancy-related infection	3	3.8	2	3.2	0	0.0
Other obstetric disease or complication	6	7.5	5	7.9	0	0.0

1. Underlying causes	Women with potentially life-threatening conditions		Maternal near-miss cases		Maternal deaths	
	No=80	%	No=63	%	No=4	%
Medical/Surgical/Mental disease or complication	14	17.6	11	19.1	1	25
Unanticipated complications of management	0	0.0	5	7.9	0	0.0
2. Contributory causes/associated conditions						
Anaemia	29	36.3	28	40.2	2	50
Previous caesarean section	18	22.5	15	21.7	0	0.0
Prolonged / obstructed labour	3	3.8	5	7.9	2	50

Table six shows that the majority of MNM of studied women (93.6%)and the majority of women with potential life threatening conditions had cesarean section.

Table 6. End of pregnancy and pregnancy outcome.

Pregnancy outcomes	Women with potentially life-threatening conditions		Maternal near-miss cases		Maternal deaths	
	No=80	%	No=63	%	No=4	%
1. End of pregnancy						
Vaginal delivery	3	3.8	2	3.2	0	0.0
Caesarean Section	61	76.3	59	93.6	2	50.0
Complete abortion	2	2.5	1	1.6	0	0.0
Curettage/vacuum aspiration	1	1.3	0	0.0	0	0.0
Medical methods for uterine evacuation	0	0.0	0	0.0	0	0.0
Laparotomy for ectopic pregnancy	12	15.0	1	1.6	1	25
Laparotomy for rupture uterus	0	0.0	0	0.0	0	0.0
Women still pregnant at discharge from hospital or at death	1	1.3	1	1.6	1	25

Table seven describes the process indicators for women with MNM. (1) for prevention of PPH Uterotonics and Oxytocin were used for all cases, 63 (100.0%). For treatment of PPH many medications were used such as Ergometrine (95.0%),Oxytocine (65.0%) and Mesoprostol (20.0%) also, other treatment regimens like Artery Ligation and Hysterectomy (45.0%, 10.0%) were applied respectively. For managing of Eclampsia, most of cases with related problems were given anticonvulsants, MgSO4,(88.9%).For the prevention of CS related infection prophylactic antibiotics during CS was given as a routine regimen during CS (98.4%) and for the treatment of sepsis (100.0%).Also, for managing the preterm birth, Corticosteroids were used for fetal lung maturation (100.0%).

Table 7. Process and outcome indicators related with specific conditions among women with sever maternal outcomes.

Indicators	No	%
1. Prevention of postpartum hemorrhage Target population: women giving birth in health-care facilities	64	100.0
Oxytocina use	26	40.6
Use of any uterotonic (including oxytocin)	38	59.4
2. Treatment of severe postpartum hemorrhage Target population women with sever PPH	20	100.0
Oxytocina use	13	65.0
Ergometrine	19	95.0
Misoprostol	4	20.0
Removal of retained products	4	20.0
Artery ligation	9	45.0
Hysterectomy	2	10.0
3. Anticonvulsants for eclampsia Target group women with eclampsia	45	100.0
Magnesium sulfate	45	100.0
4. Prevention of caesarean section related infection, Target population women undergoing caesarean section. Antibiotics	61	100.0
Prophylactic antibiotic during caesarean section	60	98.4
5. Treatment for sepsis Target population women with sepsis	2	100.0
Parenteral therapeutic antibiotics	9	450.0
6. preterm birth Target population women having a preterm delivery after 3 hours of hospital stay	6	100.0
Corticosteroids for fetal lung maturation	6	100.0

IV. Discussion

This retrospective study was carried out to assess MNM at Mansoura University Hospital. The aim has been achieved through the description of the results. A total number of 80 cases of suspected potential life

threatening conditions were investigated using WHO Maternal Near-Miss criteria under the following three categories, severe complications, critical interventions and organ dysfunctions (WHO). Investigating Maternal Near Misses would allow for more rapid reporting about care surrounding the management of maternal problems, reinforcing lessons learnt of doing good and achieving good quality care[1].

In this study, the majority of women with potential life threatening conditions were referred from private obstetrician clinics, private hospitals and Ministry of Health MOH hospitals. The high referrals is supported by other Arab and non Arab studies as the private system used to transfer the complicated cases to the tertiary level hospitals for emergencies and critical care [22,23,24].

The main life threatening conditions among women in this study were sever pre-eclampsia and sever post partum hemorrhage. Those life threatening conditions were similar to those found in other developed countries. However the causes of death among Egyptian women in Kasr al AINI hospital were obstetric heamorrhage and hypertension as well as Syrian women who experienced sever PPH and eclampsia[22,25].This result may be explained as the data analyzed in this study was for only immediate post partum during hospitalization also, it was noted that the majority of life threatening conditions were at arrival or developed within 12 hours of arrival. The Study result is similar to that reported in other Arab studies [22,23,24,25,29].In this study, the other healthcare facilities were referring cases with life threatening conditions to Mansoura University Hospital for better emergency and critical care. This may indicate that other health care facilities may be in need for adequate resources and facilities. Such as ICUs with adequate number of beds, blood bank and theater rooms.

The study presents different critical interventions, such as admission to ICU, using of blood products, and laparotomy. These critical interventions were matched with the standardized critical interventions for morbid women and contributed for better outcomes among women with potential life threatening conditions and MNM.[15,22].The majority of MNM cases developed organ dysfunctions which are one of WHO categories for classifying MNM. The results are similar to other Arab studies [24,26,27].

It should be noted that there is higher admission rate to ICU than that of other Arabian studies [22,24,28].Again it is reflecting adequate critical care with proper facilities for sever preeclampsia and eclampsia cases, organ and multiple organs dysfunctions, severe PPH, anemia and hysterectomy [21,24]. The results of the present study revealed that the vast majority of MNM women give birth by CS.This finding is similar to those of Arabian studies in which CS was the main delivery mood among MNM and sever maternal outcomes [22,23,24,25,29].

Investigating the underline causes of severe maternal outcomes, MNM revealed hypertensive disorders, obstetrics hemorrhage as the main causes similar to many Arabic and developing countries studies [22,23,24,29,30].The study also highlighted that nearly 50% of MNM women were anemic which put them at the risk for maternal complications during labour and delivery also, previous caesarean section was noted as the second contributory cause for MNM. These results are supported by Iraq study [22]while CS was the main contributory cause for Palestine MNM[24].Following WHO process and outcome indicators related with specific conditions among MNM, The effective interventions were adequately applied for the target populations, Oxytocin and its derivatives were used for the prevention and treatment of PPH, Magnesium sulfate for the treatment of eclampsia, prophylactic antibiotics during CS and Corticosteroid for fetal lung maturation, the study finding is in agreement with other recent studies by[22,24,31].

Conclusion: Few international studies assessed the factors associated with severe maternal morbidity or near miss. At national level, this study is one of the first to evaluate this issue. MNM has ben documented at Mansoura University teaching. The study highlighted to the care provided to such women. The findings from such a study would contribute towards clarifying some of the gaps that remains in the current knowledge related to near miss and maternal mortality. Studying near misses is important method to evaluate the quality of maternal healthcare and to improve maternal outcomes. The results of this study may help in establishing new policies and strategies aiming to decrease maternal morbidity and mortality.

V. recommendation

It can inform health policy decision makers to improve the quality of maternity care. A future prospective study should be conducted to acquire further information on the profile and on the risk factors of near miss women. Qualitative studies should be done to listen to the stories of women who experienced near miss and to investigate the situation in healthcare facilities from healthcare point of views.

Limitations of the study: (1) There were no consistency in the filing and documentation system, there were some records were kept according to the diagnosis, others by names and the rest by admission date,(2) Documentation of data and flow of information were poor,(3) The near-miss cases identified were hospital based.

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