Research Article

Maternal near miss in EL-Minia Maternity and Children University Hospital: a prospective descriptive study in 2019.

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Abstract
Background: A maternal near-miss case is defined as "woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy" In practical terms, women are considered near miss cases when they survive life-threatening conditions (i.e. organ dysfunction). This study aims to evaluate the frequency of severe maternal complications, maternal near-miss cases and maternal deaths. **Patients & Methods:** There are no costs for this study; Patients' data were collected with the intent to review cases of maternal mortality and severe morbidity (near miss).
Keywords: maternal near-miss, pregnancy, childbirth

Introduction
Pregnancy and childbirth is a physiological process and in the majority of the women proceed uneventfully. However in a small proportion, it can pose major health risk ,the most extreme of which is maternal mortality (Jabir et al., 2013).

Maternal mortality traditionally has been the indicator of maternal health all over the world, but now it is too rare to reflect accurately the quality of obstetric care in the industrialized world (Studd et al.,2006). Therefore, it is important to investigate the causes of maternal deaths and maternal morbidities to reduce the materna[l]l mortality so more recently, review of the cases with near miss has been found to be a useful complement to investigate maternal mortality (Ali et al., 2011, Shrestha et al., 2010, Adeoye et al., 2013). In the developing countries the unacceptably high maternal mortality overshadows severe maternal morbi-dity (Mohammad et al., 2012).
MNM has gained international attention because:
1) It occurs more frequently than maternal death;
2) More information can be gained since women who had complications can be a source of data;

3) MNM and maternal deaths can be used to monitor the quality of comprehensive emergency obstetric care and can be useful for the identification of health systems failures; and
4) MNM data are a relevant source of information for policy makers in the selection of maternal health care priorities (Oladapo et al., 2009).

Aim of study
To calculate the ratio of maternal 'near miss' and associated factors.
 The primary outcome measure will be the MNM ratio in the study setting during the study period Secondary outcome indicators such as the MMR, Severe Maternal Outcomes (SMO) ratio, and the Mortality Index (MI).

Patients and Methods
Project title:
Maternal Near Miss in EL-Minia maternity & children University hospital: A prospective study in 2019
Affiliation:
El-Minia University, Egypt.
Study setting:
The study was carried out at obstetrics and Gynecology Department, EL- Minia maternity and children university hospital,EL-Minia governorate, Egypt during the period from 1st January 2019 till 31st December 2019.

Study funding:
There are no costs for this study; Patients' data were collected with the intent to review cases of maternal mortality and severe morbidity (near miss).

Data was collected by reviewing the patients' admission files of the Obstetric Department at EL-Minia University hospital and tracing questionnaires of maternal mortality cases at EL-Minia Directorate of health after getting the official approval from the Ministry of health and cases of maternal morbidity at Minia University hospital.

Ethical issues:
Ethical approval of the study was obtained from the local ethical committee of the department.
In our study, we sought advice from the authors of a previous work done in the same department who studied cases of maternal mortality in years (2015, 2016, 2017 & 2018) and we compared the findings of the previous 4 years (2015 - 2018) with this year 2019, also our colleges have got approval from the authorities in the Egyptian Ministry of health to have access to the medical records to maternal mortality cases which helped us to fill the gaps in the reports of mortality cases.
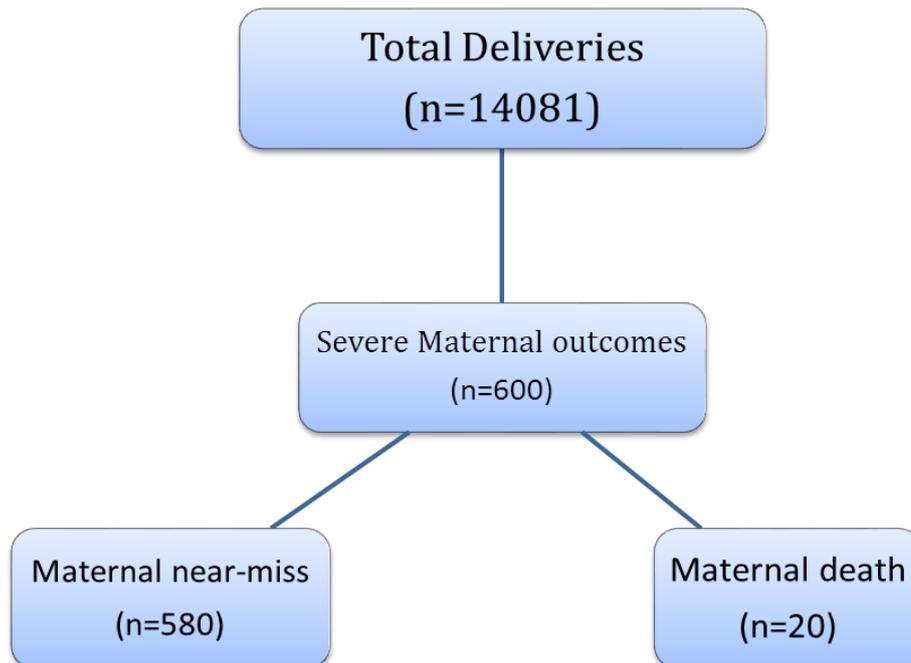
Study design:
This is an observational descriptive study
Study participants:
We studied the cases of maternal near misses that were admitted to our hospital during the study period (cases of severe maternal morbidity) in addition to 20 maternal mortality cases in 2019 compared to (41, 26,28,31) maternal mortality cases in (2015, 2016, 2017 & 2018).

Results

Table (2): Monthly deliveries, Proportional morbidity (near miss) & maternal mortality rate

Total deliveries	14081
Severe maternal outcomes (SMO), n	600
• Maternal deaths, n	20
• Maternal near-miss, n	580
Severe maternal outcome ratio (per 1000 deliveries)	42.6
Maternal near-miss ratio (per 1000 deliveries)	41.2
Maternal mortality ratio (per 100,000 live births)	14,2
Maternal near-miss: mortality ratio	29:1
Mortality index	3.3%

Month	Deliveries	Maternal near-miss (MNM)		Maternal death (MD)	
		N	Ratio per 1000 deliveries	N	Mortality rate per 10^5 live birth
January	1094	51	46.6	2	182.8
February	941	46	48.9	1	106.3
March	1119	49	43.8	2	178.7
April	962	47	48.9	1	104
May	1140	52	45.6	3	263.2
June	1194	49	41	2	167.5
July	1234	45	36.5	2	162.1
August	1343	48	35.7	2	148.9
September	1294	54	41.7	1	77.3
October	1276	40	31.3	0	0
November	1248	47	37.7	2	160.3
December	1236	52	42.1	2	161.8
Total	14081	580	41.2	20	142

Discussion

Maternal morbidity is part of a continuum from maternal good health to maternal mortality. In any setting, women who suffer severe maternal complications share many circumstantial and pathological factors related to their condition (WHO, 2011).

Some women die as a result of these complications, but a proportion of them narrowly escape death either by chance or due to the quality of care they receive. Maternal deaths (MD) can be likened to the 'tip of an iceberg' with the base being maternal morbidity, in that more women survive pregnancy complications than the ones who die (Kilpatrick et al., 2016).

The primary indicator of maternal health care and hence quality of obstetric care is Maternal Mortality Ratio (MMR). By monitoring only

maternal deaths at institutions, very few lessons can be learnt to prevent further deaths. This is further compounded by the fact that in maternal death review meetings most of the patient's records are either missing or incompletely filled. Quality of obstetric care can be assessed using either outcome indicators like maternal mortality ratio or MNM indicators or using process indicators such as the use of prophylactic antibiotics for the reduction of puerperal sepsis after caesarian section (Silva et al., 2014).

In 2009, the WHO introduced the concept of 'maternal near miss'(MNM) for evaluating the quality of care for severe pregnancy complications. A MNM is defined as a case of a woman who nearly died but survived a complication that has occurred during preg-

nancy, childbirth or within 42 days of termination of pregnancy. Studying MNM is increasingly being recognized as a useful means to improve the quality of obstetric care, particularly in low and middle income countries. It is estimated that for every woman who dies 20 or more survive severe maternal complications as a result of the pregnancy or delivery (Chikadaya et al., 2018).

Maternal mortality is a worldwide problem; however, over 99% of these maternal deaths (MDs) occur in developing countries, and many of these deaths can be avoided. Maternal mortality is 'Just the tip of iceberg'; the base to the iceberg is maternal near-miss (MNM) morbidity, which remains undescribed (Abdel-Raheem et al., 2016).

MNM is one of the related concepts to maternal mortality where women survive merely by chance, luck, or by good hospital care. MNM has emerged as an adjunct to investigation of maternal deaths, as the two represent similar pathological and circumstantial factors leading to severe maternal outcome (Chhabra, 2014).

Maternal near-miss women are a special category of survivors, whose stories provide unique insights and valuable information on maternal mortality. As near miss woman is still alive and precedes maternal death, the number of near-miss cases occur more often than the maternal deaths, thus may directly provide more information on obstacles that had to be overcome during the process of healthcare, and promote further understanding of the maternal mortality determinants as the woman herself can be a source of data (Filippi et al., 2005).

Maternal near-miss is a promising indicator to improve the quality of obstetric care. Therefore, measuring near misses beside maternal mortality and identifying its causes is essential, and should be calculated regularly for the purpose of planning, monitoring, and assessment of provided maternal healthcare (Souza et al., 2013).

The improvement of maternal health has made slow progress in most of the sub-Saharan African countries. According to the World Health Organization (WHO), the United Nations Children's Fund (UNICEF), the United Nations Population Fund (UNFPA) and the

World Bank (2014) estimate, globally, 289,000 maternal deaths occurred in 2013, with the highest burden being in sub-Saharan African countries (Liyew et al., 2017).

Despite the high number of maternal deaths in many of the institutions within these countries, the absolute number for each center classifies these events as rare, which leads to a reduced level of power to allow the studies to investigate the potential risk factors. Thus, in this situation, severe acute maternal morbidity or maternal near-miss could serve as a surrogate for maternal death to evaluate the quality of obstetric care in particular health institutions. A maternal near-miss event or severe acute maternal morbidity is currently defined by the WHO as 'a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy' (WHO, 2011).

Summary

The term "near miss" was recently defined by the World Health Organization (WHO 2009) as "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 ". maternal mortality and near miss causes are classified into direct and indirect causes, Direct causes as Hemorrhage, pregnancy induced hypertension, infection, Anesthesia and others (molar pregnancy and transfusion hemolysis

Indirect causes include cardiac diseases, vascular diseases as hypertensive vascular disease and vascular embolism, reproductive tract diseases (such as uterine and adnexal tumors), urinary tract diseases, hepatic diseases, Pulmonary diseases, metabolic diseases (such as Diabetes), others (such as appendicitis and peritonitis of non-puerperal origin).

The WHO has proposed a package of 25 severity markers including combined different criteria based on clinical signs, laboratory tests, and management parameters that met the need for consensus criteria, which can be used all over the world. Standardization of the MNM definition established by WHO

A prospective Observational descriptive study was carried out from January 1 2019 to 31 December 2019, using the WHO criteria for

maternal 'near miss' at Minia maternity & Children university hospital, a tertiary public hospital which receive referrals of all obstetric complications in Minia governorate, Egypt. lps in better description of the MNM, especially in undeveloped countries.

The study results was carried out on 14081total deliveries, 600 were sever maternal outcomes; 20 died and 580 were near miss, Severe maternal outcome ratio (per 1000 deliveries) was 42.6%, Maternal near-miss ratio (per 1000 deliveries) was 41.2%, Maternal mortality ratio (per 100,000 live births) was14,2 , Maternal near-miss: mortality ratio was 29:1 and Mortality index was 3.3%.

The current study revealed that there were several causes for sever outcomes as Sudden cardiac arrest, Severe hemorrhage, Hypertensive disorders, Severe sepsis, Shock , Uterine rupture, Cardiovascular dysfunction, Respiratory dysfunction, Renal dysfunction, Hepatic dysfunction, Multiple organ failure, Coagulation/hematologic dysfunction, Status epilepticus, Uterine dysfunction/hysterectomy, and Anesthesia complication, and the two most causes for MNM and maternal death were cardiovascular and respiratory dysfunction, while the least cause was anesthesia complication, the two most causes for MNM and maternal death were cardiovascular and respiratory dysfunction, while the least cause was anesthesia complication.

Cardiovascular causes were Heart failure 13 mortality cases (65%): which was there possible cause of death of them were HF, pulmonary embolism& cardiogenic shock,315 MNM cases (54%) respiratory dysfunction: 11 mortality cases (55%), 245 MNM cases (42%), second major cause was hemorrhage: 9 mortality cases (10,4%), 4 PPHge and 5 APHge cases, 233 MNM cases (40, 2%).

Some pregnancy-related complications leading to high-risk childbirth are almost unavoidable. The benefit of evaluating near-miss events in depth is that the records of these patients and the hindrances they had to witness can help in creating safer and more approachable obstetric healthcare for future patients. Some of these factors may be associated with things lacking at the patient's end such as desire for home delivery to maintain tradition, inadequate

antenatal care, non-compliance with healthcare practitioner's advice, disbelief in modern medicine, and others. Some factors are associated with delay in reaching a tertiary care institution due to longer distances, lack of transport or funds. Factors related to health system include delay in providing immediate relief and/or referral, lack of adequate intensive care facility, well-trained staff, and others).

From all aforementioned data, we rule out to that there is need for a nationwide study on the incidence of MNM to rule out regional variability and to include facilities that offer comprehensive emergency obstetric care in the sample. Well-equipped maternity HDUs and ICUs should be established to reduce the MI from obstetric emergencies. Further studies are urgently required based on the whole gover-norate not only minia university hospital but include all hospitals of Egypt and include more than one year. The results of which could provide the policy makers and healthcare authorities with a useful data to plan appro-priate interventions for reduction of maternal mortality.

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