

Original article

Indicators of maternal 'near miss' morbidity at different levels of health care in North India: A pilot study

Bakshi RK¹, Aggarwal P², Roy D³, Nautiyal R⁴, Kakkar R²

Abstract:

Introduction: Maternal morbidity and mortality in India continues to remain high despite concerted efforts during the past decades. Objective of this study was to determine the prevalence and indicator of Potentially Life Threatening Conditions (PLTC) and 'near miss' obstetric cases at different tiers of health care. **Material and Methods:** A cross-sectional epidemiological study was carried out over a period of 12 months as per the WHO criteria for 'near miss'. Probability sampling was done to systematically and randomly select health facilities i.e. two primary health centers (PHC), one community health centre (CHC) and a tertiary hospital all from Doiwala block of Dehradun, Uttarakhand, India. The study included all the women attending health-care facilities, who were pregnant, in labour, or who had delivered or aborted up to 42 days ago arriving at the facility. A convenient sampling was done (a hundred percent enumeration of eligible study subjects) for the audit. **Result:** A total of 937 pregnant women who accessed health care had 688 live births and 231 women had one or more of the Potentially Life Threatening Conditions (PLTC). Among them, 61 women had Severe Maternal Outcome (SMO) - 51 with maternal 'near-miss' and 10 maternal deaths. The Severe Maternal Outcome Ratio (per 1000 live births) was 88.66. The Maternal 'near miss' Mortality Ratio (MNM-MR) and Mortality Index (MI) were 5.1 and 16.39% respectively. **Conclusion:** The WHO 'near miss' approach has been found to be an effective measure to assess quality of care in maternal health across countries including India.

Keywords: near-miss, Potentially Life Threatening Conditions; PLTC

Bangladesh Journal of Medical Science Vol.14(3) 2015 p.254-257

DOI: <http://dx.doi.org/10.3329/bjms.v14i3.18453>

Introduction

Maternal mortality has recently become yet another indicator of disadvantage within and between the developing and developed countries². Women die as a result of childbirth or childbirth related injuries or illness due to multiple causes, such as postpartum hemorrhages, or uncontrolled bleeding from the uterus after pregnancy, preeclampsia, or pregnancy induced hypertension, infections, unsafe abortion, or failure to get emergency caesarean sections³.

Of the estimated total of 5,36,000 maternal deaths

worldwide in 2005, developing countries accounted for 99% (5,33,000) of these deaths. An estimated 2,87,000 maternal deaths occurred in the year 2010 globally⁴.

One of the eight Millennium Development Goals (MDG) adopted following the Millennium Summit involves improving maternal health (MDG5) and Maternal Mortality Rate (MMR) was assumed a key indicator set for monitoring progress towards the achievement of MDG5⁵. Reducing maternal mortality worldwide by 75 percent from 1990

1. Ravleen Kaur Bakshi, Post Graduate Resident

2. Pradeep Aggarwal, Associate Professor

3. Debabrata Roy, Professor

Department of Community Medicine, Himalayan Institute of Medical Sciences, HIHT University, Swami Ram Nagar, Doiwala, Dehradun – 248140 Uttarakhand.

4, Ruchira Nautiyal, Associate Professor

Department of Obstetrics & Gynecology, Himalayan Institute of Medical Sciences, HIHT University, Dehradun – 248140 Uttarakhand.

5. Rakesh Kakkar, Associate Professor, Department of Community Medicine, Himalayan Institute of Medical Sciences, HIHT University, Swami Ram Nagar, Doiwala, Dehradun – 248140 Uttarakhand.

Corresponds to: Pradeep Aggarwal, M.D. Department of Community Medicine, Himalayan Institute of Medical Sciences Swami Ram Nagar, P.O. Doiwala, Distt. Dehradun - 248140, Uttarakhand, India

through 2015 is thus a key target of MDG adopted by the United Nations in 2000. Though progress has been slow in most countries that have high maternal mortality ratios, solution to this global problem are urgently needed³.

The WHO advocates a maternal 'near-miss' approach for monitoring the implementation of critical interventions in maternal health care and proposes a systematic process for assessing the quality of care. This approach is based on the concept of criterion-based clinical audit. The principles that guided its development include ease of use, actionable results and cost-effectiveness. The approach is founded on the assumption that all maternal deaths involve at least one life-threatening condition (organ dysfunction) ⁶.

'Near miss' are not easy to define, and definitions have relied on a variety of approaches, including criteria of organ dysfunction; criteria of clinical management such as admission to intensive care; signs and symptoms; or clinical entities such as eclampsia or uterine rupture ¹.

In view of the above perspective, the present study was conducted to measure the prevalence and indicators of maternal 'near miss' at three tiers of health care i.e., primary, secondary and tertiary care level in Doiwala Block of district Dehradun.

Material and Methods:

The present cross sectional study was carried out over a period of 12 months under the Department of Community Medicine, HIHT University that included all the women attending health-care facilities, at all levels of health care i.e. Primary, Secondary & Tertiary level in Doiwala block of Dehradun district, who were pregnant, in labour, or who had delivered or aborted up to 42 days ago arriving at the facility with any of the listed conditions or those who

developed any of those conditions during their stay at the health-care facility after taking written informed consent from incharge of the facility. Probability sampling was done to systematically and randomly select health facilities from first referral units (FRUs) i.e Primary & Community Health Centres (PHC, CHCs) and Tertiary facility. The facilities sampled were 02 PHCs (Chidderwala and Bhaniyawala), 01 CHC (Doiwala) and 01 Tertiary facility (Himalayan Hospital, Himalayan Institute Hospital Trust (HIHT)). In the present study a convenient sampling was done to recruit 937 consecutively reporting women fulfilling eligibility criteria (a hundred percent enumeration of eligible study subjects during the study period) for the audit. Data (base-line information) was generated quantitatively using a structured, pre-tested and pre-designed instrument adapted from the following standardized formats of WHO 'near-miss' protocol ¹. Since no direct contact was required with any patient at individual level but only records were followed at all the selected facilities, no informed written consent was taken from the patients included in the study. Epi-info was used for data analysis and was described in rates, ratios and proportions. Non-parametric test i.e. chi-square tests were employed to ascertain associations between study variables and statistical significance at p value <= 0.05.

Results:

There were a total of 937 pregnant women who accessed health care, 688 live births and 231 women had one or more of the Potentially Life Threatening Conditions (PLTC). There were 61 women with Severe Maternal Outcome (SMO) which included 51 women with maternal 'near-miss' and 10 maternal deaths.

Table 1: Distribution of women with Potentially Life Threatening Conditions (PLTC) by morbidity conditions and levels of health care facility (n=231)

Morbidity Conditions	Women with potentially life threatening condition			χ^2, ρ
	CHC(n= 49)	TH(n=182)	Total (n=231)	
	No(%)	No(%)	No(%)	
Severe postpartum haemorrhage	33(67.34)	70 (38.46)	103 (42.42)	11.89, <0.05
Severe pre-eclampsia	24(48.97)	38(20.87)	62(26.83)	14.13, <0.05
Eclampsia	0	19(10.43)	19(08.22)	04.28, <0.05
Sepsis or severe systemic infection	03(06.12)	50(27.47)	53(22.94)	08.78, <0.05
Rupture uterus	0	03(01.64)	03(01.29)	0.04, >0.05

CHC – Community Health Centre; TH – Tertiary Hospital
Percentage are mentioned in parenthesis

Table 2: Distribution of women with Severe Maternal Outcomes (SMO) by morbidity conditions and different levels of health care facility (n=61)

Morbidity Conditions	Women with SMO						χ^2, p
	Near-miss(n=51)			Maternal death(n=10)			
	CHC	TH	Total (%)	CHC	TH	Total (%)	
	No (%)	No (%)		No (%)	No (%)		
Severe postpartum haemorrhage	0	19(38)	19 (37.25)	0	4(40)	4(40)	0.04,>0.05
Severe pre-eclampsia	0	7(14)	7(13.72)	0	1(10)	1(10)	0.04,>0.05
Eclampsia	0	5(10)	5 (09.80)	0	00	0	-
Sepsis or severe systemic infection	1(100)	29(58)	30 (58.82)	0	6(60)	6(60)	0.08,>0.05
Rupture uterus	0	2 (4)	2 (03.92)	0	0	0	-

CHC – Community Health Centre; TH – Tertiary Hospital

Percentage are mentioned in parenthesis

Out of these 231 women with PLTC, women who presented with severe post-partum haemorrhage were 103 (42.42%) as the most common morbidity condition, followed by 62 (26.83%) with severe pre-eclampsia and 53 (22.94%) with sepsis (Table 1). The Severe Maternal Outcome Ratio (per 1000 live births) was 88.66. The Maternal ‘near miss’ Mortality Ratio (MNM-MR) and Mortality Index (MI) were 5.1 and 16.39% respectively.

Also at the levels of CHC and Tertiary facility, 33 (67.34%) and 70 (38.46%) women had presented with severe post-partum haemorrhage as the most common morbidity condition. However, the second most common cause at CHC level was severe pre-eclampsia i.e. 24 (48.97%) women and sepsis in 50 (27.47%) women at Tertiary level. Importantly, there was significant association seen between severe post-partum haemorrhage, severe pre-eclampsia, eclampsia and sepsis or severe systemic infections as morbidity conditions in women with potentially life threatening condition and levels of health care.

The Table 2 shows that morbidity conditions among the women with Severe Maternal Outcomes (SMO). Overall amongst ‘near miss’ cases 30 (58.82%) had sepsis or severe systemic infections as the commonest morbidity condition followed by severe postpartum haemorrhage 19 (37.25%). Similar were the findings in cases of maternal death where the rates of sepsis or severe systemic infections and severe postpartum haemorrhage were 60% and 40% respectively. There was no significant association seen between different morbidity conditions and any of severe maternal outcomes. Levels of health care and development of potentially life threatening condition were not found to be significantly associated.

Discussion

Out of all women with Potentially Life Threatening Conditions (PLTC), 103 (42.42%) women presented with severe post-partum haemorrhage as the most common morbidity condition, followed by 24 (26.83%) with severe pre-eclampsia and 03 (22.94%) with sepsis. Also at the levels of CHC and tertiary facility 33 (67.34%) and 70 (38.46%) women had presented with severe post-partum haemorrhage as the most common morbidity condition. However, the second most common cause at CHC level was severe pre-eclampsia i.e. 24 (48.97%) women and sepsis of 03 (27.47%) women at tertiary level. Importantly, there was significant association seen between severe post-partum haemorrhage, severe pre-eclampsia, eclampsia and sepsis or severe systemic infections as morbidity conditions in women with potentially life threatening condition and different levels of health care.

Comparable findings were demonstrated by Jabir et al from Iraq where severe PPH (39.62%) was the most common complication in women with PLTC, followed by severe eclampsia (20.28%), ruptured uterus (13.68%), sepsis (4.2%) and severe pre-eclampsia (1.89%) (1). In a study by Tuncalp et al from a teaching hospital at Ghana, it was observed that 41.5% women with PLTC had severe pre-eclampsia followed by severe PPH (13.4%), eclampsia in (5%), sepsis in (1.9%) and ruptured uterus in (0.6%)⁷.

The distinguishing feature of the present study in comparison to the above cited studies is the significant association that the morbidity conditions had with levels of care. As discussed earlier, available published literature did not consider ‘level of health care delivery’ as a study variable.

Our study reveals that in the 'near miss' cases, 58.82% had sepsis or severe systemic infections as the commonest morbidity condition followed by severe postpartum haemorrhage (37.25%).

Analogous studies by Akker et al from Malawi (2013), in sub-Saharan Africa, found infection (38%) to be the predominant morbidity condition followed by PPH (27%), eclampsia (18%), uterine rupture (12%) and pre-eclampsia (5%)⁸. In a similar study, by the same group of authors done in the year 2011 in a similar setting out, of a total of 375 'near-miss' cases 119 (32%) had severe infections or HIV-related complications, 119 (32%) were cases of major obstetric hemorrhage, 75 (20%) cases had eclampsia or severe pre-eclampsia and 43 (11%) had uterine rupture (9). Similar to our findings, sepsis was shown to be the most important cause of mortality in studies done by Tunçalp et al (45.9%) and Ali et al (35%)⁷. Further, in a study conducted by Ali et al from Sudan, hemorrhage accounted for the most common event (40.8%), followed by infection (21.5%), hypertensive disorders (18.0%), anemia (11.8%) and dystocia (7.9%). Roopa et al from south India showed that among the morbidity causes in 'near

miss' cases hemorrhage was present in 58 (44.2%) of women, hypertension in 31 (23.6%), sepsis in 21 (16%), cardiac causes in 6 (4.5%) and indirect causes were seen in 15 (11.4%) of women. Further in maternal death cases the causes of mortality were 4 (17.4%), 1 (4.3%), 12 (52.2%), cardiac causes being 4 (17.4%) and indirect causes were seen in 2 (8.7%) of women¹⁰.

Conclusions

It can be inferred from the above that the profile of morbidity conditions leading to Severe Maternal Outcome (SMO) among recruited women widely varied and justifiably so because of different study settings, client profile including socio-epidemiological parameters, and other variables affecting availability and accessibility of care.

The WHO 'near miss' approach has been found to be an effective measure to assess quality of care in maternal health across countries including India. The present pilot study findings re-enforce the fact that this approach can be feasibly adapted/replicated and even scaled up at our socio-epidemiological perspective and study settings.

Conflict of interest : Nil

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