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DEMOGRAPHIC DETERMINANTS OF MATERNAL "NEAR-MISS" CASES IN RURAL UTTARAKHAND

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ABSTRACT

Introduction: Maternal morbidity and mortality in India continues to remain high despite concerted efforts during the past decades.

Aim &Objective: To determine the prevalence of demographic determinants of maternal 'near miss' cases in rural Uttarakhand.

Material and Methods: A cross-sectional study, over a period of 12 months was conducted as per the WHO criteria for 'near-miss' by using Probability sampling for random selectionof health facilities. 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 selected health facility were included.

Result: A significant association between maternal outcome and age of study population was found. Out of total 937 pregnant women, there was a significant association between state of residence and development of PLTC. Majority 27 (52.94%) cases of the 'near miss' cases had gestational age ranging between 24-36 weeks. In the cases of maternal death 50% of the death occurred in women with more than 36 weeks of gestation.

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.

Key words: Maternal Near Miss; Potentially Life Threatening Conditions; Demography; India

INTRODUCTION

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 MDG5 [1]. Reducing maternal mortality worldwide by 75 percent from 1990 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 needed.[2] 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 approach is founded on the assumption that all maternal deaths involve at least one life-threatening condition (organ dysfunction).[3]

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

MATERIALS 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. (Figure 1).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 (3) 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.
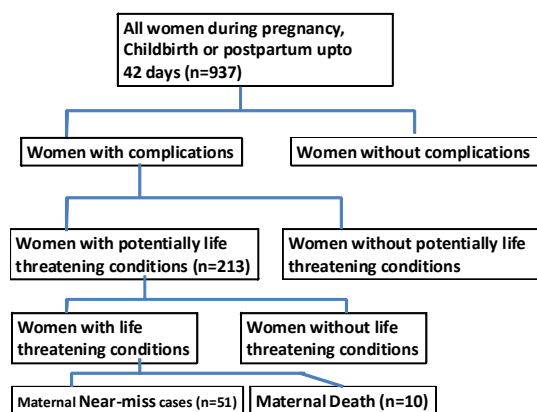
Table 1 Distribution of the study population by maternal outcome and age group (n= 937):

	Normal outcome	Developed PLTC*	Total
15-19	11 (01.55)	00 (-)	11 (01.17)
20-24	293 (41.50)	99 (42.85)	392 (41.84)
25-29	286 (40.50)	89 (38.53)	375 (40.03)
30-34	86 (12.19)	25 (10.83)	111 (11.85)
35-39	27 (03.83)	13 (05.63)	40 (04.26)
40-44	03 (0.43)	05 (02.16)	08 (0.85)
Total	706 (75.34)	231 (24.66%)	937 (100)

*Potentially Life Threatening Conditions; Percentage are mentioned in parenthesis

Out of 937 pregnant women, 898 (95.84%) study subjects were from the state of Uttarakhand while 39 study subjects were from the state of Uttar Pradesh. Majority 747 (79.72%) of the cases were from Dehradun district, followed by Haridwar district 109 (11.63%). There were 231 women who had developed PLTC, out of whom 204 (88.31%) were from Uttarakhand and 27 (11.68%) were from Uttar Pradesh, a significant association between state of residence and development of PLTC was found.

Looking into the month wise distribution of pregnant women seeking health care at different tiers in Doiwala block, it was observed that largest proportion of cases was seen in the month of August (18.03%) while the least was in the month of September (14.51%). In the present study there were maximum number of severe maternal outcomes in the month of June (18) followed by August (11) and September (10).

Majority 27 (52.94%) cases of the 'near miss' cases had gestational age ranging between 24-36 weeks. In the cases of maternal death 50% of the death occurred in women with more than 36 weeks of gestation. There was no statistical significance seen between differences in proportion of SMO , i.e. maternal 'near miss' cases and maternal death cases in relation to gestational age(Table 2).

Figure 1: Flow Chart defining study population

RESULTS

In the present study it was observed that out of 937 pregnant women 231 (24.66%) had one or more potentially life threatening condition (PLTC).Out of the total deliveries, majority of deliveries i.e. 81.87% and PLTC (81.38%) occurred in the age group from 20-29 years. A significant association between maternal outcome and age of study population was found for age groups 15-19 and 40-44 years. The mean age of 'near miss' in the study population was 25.94 and median age was 25 years. The mean age of maternal death cases was 26.1 and median age was 26.5 (Table 1)

Table 2 Distribution of the study population by gestational age (n = 61):

Gestational age in weeks	Severe Maternal Outcome		OR (CI)
	'Near miss' (n=51)	Maternal death (n=10)	
<24	08 (15.68)	02 (20)	1
24-36	27 (52.94)	03 (30)	0.44 (0.06 – 3.14)
>36	16 (31.38)	05 (50)	1.34 (6.24 – 7.53)

*Percentage are mentioned in parenthesis

Out of the total number of study population, majority (70.21%) of were either first (G1) or second (G2) gravid status. Only 4.29% of the study subjects were gravid 5 and above. In 'near miss' cases women with gravid status G1, G2 and G3 constituted 80.43% of all the cases, while pregnant females with gravid status G3 and G4 formed 70% of the maternal death group. There

was no significant association found between the gravid status and SMO.

The live births in the population under surveillance were 688. There were 51 cases of maternal 'near miss' and 10 cases of maternal death.

DISCUSSION

Searching through the published literature, categorical mention of age of study recruits in terms of range i.e. 18 to 43 was found in a study by Ranatunga et al from Srilanka.[4] Other available studies adapting / replicating WHO 'near miss' approach across study settings, though, have not categorically mentioned age profile of study population, it may be fairly assumed that the study population/subjects would belong to reproductive age group.[5,6,7]

Our findings are reinforced by Ranatunga et al where they showed that the mean age of women with near-miss was 30.1 years.[4]Wianwiset from Thailand found that majority (59.23%) of women with 'near miss' in their hospital were in the age group of 20-34 years.[10] In a study conducted by Nelissen from Tanzania, it was found that the percentage of women in the age group between 20-35 years was in cases of maternal near-miss and maternal death were 69% and 65% respectively.[6] Other studies also showed similar results.[8,11,12]

Comparable study conducted in Sudan by Ali et al[13], was in arid rural setting and though not similar to our study, his study subjects sought care at a tertiary hospital over a period of two years resulting in 9578 deliveries, 9262 live births, 205 near-miss cases and 40 maternal deaths. In another study conducted in Argentina by Karolinski et al, at Perinatal Network of Buenos Aires Metropolitan Area (tertiary facility) included study population from Buenos Aires (12.6%) (autonomous district), Buenos Aires Province (84.6%) and others (0.9%) with view to observe local & specific results.[14]

Another analogous study conducted in Northern Tanzania by Nelissen et al divided the women seeking health care according to the 'tribe' they belonged to and by severe maternal outcome (SMO) they suffered; it was observed that majority of women seeking health care belonged to 'Iraqw' tribe with 114 (53%) 'near miss' cases and 14 (44%) maternal death cases, the 'Datoga' tribe experiencing relatively more deaths than 'near misses' (not statistically significant).[6]

In an analogy with the study conducted by Roopa et al, women with 'near miss' outcome at gestational age 1-12, 13-28, >28weeks and post-natally were 17 (12.9%), 6 (4.6%), 75 (57.2%) and 33(25.1%) respectively. Further, in the same study, women with maternal death outcome at gestational age 1-12, 13-28, >28 weeks and post-nataly were 4 (17.4%), 2 (8.7%), 6 (26.1%) and 11 (47.8%). The study findings for 'near miss' at 24-36 weeks and maternal death at >28 weeks corroborate our study findings.[8]

Another study, by Nelissen et al shows that women with gestational age of <24, 24-36, ≥36 weeks and 'unknown' had 'near miss' outcome in 40 (19%), 40 (19%), 91 (42%) and 45 (21%) women respectively and maternal death outcome was observed in 7 (22%), 10 (31%) 8 (25%) and 7 (22%) women respectively for the said weeks. This study finding is comparable to our study findings for <24 weeks gestational age in relation to 'near miss' and maternal death.[6]

In another study conducted in Kathmandu by Shrestha et al, it was observed that pregnant women with gestational age of <13, 13-28, >28 weeks and post-partum period who belonged to 'near miss' category were 11 (30.5%), 6 (16.66%), 10 (27.77%) and 9 (25%) women respectively; and maternal death cases for the same gestational ages were 00, 2 (40%), 2 (40%) and 1 (20%) women respectively.[11] In the study by Ranatunga et al also, among women with Severe Acute Maternal Morbidity (SAMM) majority had a median gestational age of 35.1 weeks.[4]

Differences in findings by the cited studies vis-à-vis our study may be ascribed to varied study settings, socio-epidemiological perspective, available services, unmet and felt need for reproductive and child health (RCH) services and also sample size & study duration. Besides age at marriage and conception, inappropriate care during pregnancy including nutrition and timely identification and intervention of risk pregnancies are also important predictors.

A comparable study by Ranatunga et al from Srilanka found that majority (57.1%) of 'near miss' cases were gravida G2-G4.[4]Nelissen et al from Tanzania and Shreshta et al from Nepal also showed similar findings.[6,11] However, Roopa et al showed in their study from South India that 56.% of the 'near miss' cases were of gravid status G1.[8]

In our study, women who died pregnant, their gravid status had a direct variability with SMO, particularly maternal death i.e. higher the gravis status higher was the mortality. This was supported by Nelissen et al who showed that more than 50% of maternal deaths were in gravid G2-G4 (6). Analogous to these findings, Roopa et al and Shreshta et al also found that multiparous women were more likely to die in cases of life threatening conditions.[8,11]

CONCLUSION

In the present study we found a significant association between the maternal age and their development of PLTC; though, however no such association was found between other demographic determinants of maternal 'near-miss' i.e. age group and SMO, near-miss and maternal death in relation to age groups, proportion of Severe Maternal Outcome, i.e. maternal 'Near miss' cases and maternal death cases in relation to gestational age, the gravid status and severe maternal outcome.

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