'Bleeding Mothers' A Sequel to Underutilization of ANC Package – A Community Based Cross Sectional Study from Central India

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Abstract

Background: Despite the large numbers of women who are estimated to have suffered maternal hemorrhage, little is known about their health effects, psychological, social and economic consequences. This study was carried to find out the magnitude and epidemiological determinants of Maternal hemorrhage through a community based cross sectional study.

Method: This cross sectional study was conducted in field area of a Primary Health Center of Central India. The study subjects were mothers who delivered a live baby or still birth, within the past one year from the date of interview. Thirty clusters of individuals recruited through cluster sampling method. From every cluster 12 subjects were selected using random walk method giving a total sample size of 360. Data collection was done by using pre-tested and pre-designed questionnaire. ANC card and/or any medical record if available were used to retrieve the relevant data. The data was entered and analysed by using Epi_info (Version 6.04d) software package.

Results: The prevalence of maternal hemorrhage was found 15% among study subjects. Out of those who suffered Maternal hemorrhage 30% suffered from Antepartum and 70% from postpartum hemorrhage. Maternal hemorrhage was significantly associated with ANC package utilization however, it was not found to be associated with age, caste, parity and birth order of mothers.

Conclusion: Maternal hemorrhage is significantly associated with the ANC services utilization. ANC services, in spite of being easily accessible to the mothers, are poorly utilized and this might be an important determinant of maternal hemorrhage and subsequently 'continuum of care'.

Key words: ANC package, Cluster sampling, Maternal hemorrhage

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Introduction

Maternal Morbidity has a potentially critical role to play in the successful outcome of pregnancy in terms of maternal and infant survival and wellbeing.[1] Universal access to reproductive health was a target of Millennium Development Goal (MDG) 5B and along with MDG 5A to reduce maternal mortality by three-quarters. Progress is currently too slow for most countries to achieve these targets by 2015.[2]

In developing countries, maternal hemorrhage continues to be a leading cause accounting for 25-43% of maternal deaths.[3,4] A systematic review has estimated the global prevalence of PPH to be from 2.8% to 10.8% depending upon the severity, and study setting.[5] While there are no national data on the magnitude of Maternal hemorrhage in India but based on the global estimate, it may be inferred to be very high.[6-9] It was observed that there was considerable inter study variation in the levels of Maternal hemorrhage in these studies. These studies were based upon self-reported histories as well as clinical examination. In a few studies laboratory investigation was also done. Despite the large numbers of women who are estimated to have suffered Maternal hemorrhage, little is known about their health effects, psychological, social and economic consequences.[10] In absence of well-designed community-based studies, it is rather difficult to know the true extent of Maternal hemorrhage in the community.

Community based prevalence data gives a robust picture of the magnitude of any disease which is essential for setting priorities for planning and resource allocation in the national programme. Considering the need for such information, the present study was undertaken to assess the magnitude and determinants of Maternal hemorrhage in Kharangna (Gode) Primary Health Center of Wardha district of Maharashtra State to find out magnitude and epidemiological determinants

of Maternal hemorrhage through a community based cross sectional study.

Methodology

The present cross sectional study was carried out in all 24 villages of Kharangna (Gode) Primary Health Centre in Wardha district of Central India. Study period was from 1st January 2012 to 31st December 2012. The population of Wardha district was 1,300,774 out of those 67.46 % population lives in rural area. Average literacy rate of Wardha district was 86.99%, male and female literacy were 91.92 and 81.81 per cent respectively.[11] Mothers who delivered a live baby or still birth, within the past one year from the date of interview were included in the study and those who did not give consent were excluded from the study.

Considering 50% prevalence of Maternal hemorrhage, to get the maximum sample size, at alpha error of 5% and 15% relative allowable error and design effect 2, the sample size required was 341. Thirty Cluster sampling method was used to select the study subjects.[12] From each of the cluster 12 subjects were selected using random walk method giving a total sample of 360.[13]

Being a community based cross sectional study, the real challenge was to ascertain the *operational definition* of maternal hemorrhage with reasonable validity and minimal recall bias. So, a pilot study was planned and executed in a cluster of study area to validate the *preliminary operational definition*. As the literacy rate in the district is reasonably high, it was observed that mothers were aware of their episodes of morbidity. In fact, most of them kept the record of the same at the time of interview. Subsequently following '*operational definition*' was used for the present study, after making appropriate corrections, along with that, ANC card and/or any medical record if available were used to retrieve the relevant data.

Measurement of Maternal hemorrhage: It encompasses Antepartum hemorrhage (APH) and Postpartum hemorrhage (PPH), so both are defined as follows.

APH: Any episode of bleeding during third trimester of pregnancy and PPH: – It includes

(a) Excessive bleeding on first day with or without hypothermia and/or unconscious as checked from any available Medical Records or perceived by any family member.[9]

(b) Secondary post-partum hemorrhage: Excessive bleeding persisted for five days after delivery, mother used more than five pads a day or increased vaginal bleeding once it has decreased.[9]

We interviewed 12 mothers from every cluster, who has delivered within last one year, and also had completed their PNC period before the date of interview, by visiting their respective houses.

After explaining the objective of the study, written informed consent in the local language i.e. *Marathi* was obtained from every subject. Data collection was done by using pre-tested and pre-designed questionnaire pertaining to socio-demographic profile, previous Maternal and gynaecological history, 'antenatal care (ANC) package utilization' during last pregnancy (prenatal, natal, postnatal). 'ANC package utilization' has been defined as 'mother who had more than 3 ANC visits, consumed minimum 90 Iron Folic Acid (IFA) tablets and taken 2 TT injections (1 TT injection for those who had taken 2 TT injections within 3 years from last pregnancy)'[14]. History of ANC package utilization was recorded through verbal conversation along with MCH (Maternal and Child Health) card and/or any medical record if available were used to retrieve the relevant data.

The data was entered and analysed by using Epi_info (Version 6.04d) software package. Frequency of all variables was derived to check completeness of data. 'Maternal hemorrhage' was considered dependent variable and age, caste, education, occupation, socio-economic status, age of marriage, gravida, birth interval, ANC package utilization, place of delivery and mode of delivery were independent variables. Odds ratio was calculated for different risk factors to test the association of dependent variable with independent variables.

An approval from Institutional Ethical committee was obtained before conducting the present study. Mothers were counselled regarding breastfeeding and complementary feeding (its need, proper technique and frequency). Mothers and babies who needed any medical assistance were further referred to appropriate health care facility for further management.

Results

Out of total 360 mothers interviewed in the present study, almost all of them were more than 20 years of age. Most of them either belonged to Schedule Tribe/Caste or OBC and more than half of them were educated more than 10th standard. Majority (74.4%) of them were housewives and only 22.2% mothers belonged to Below Poverty Line (BPL) families. Very few (1.4%) were married before the legal age of marriage while Almost all of them were married after 18 years of age, which is legal age of marriage in India for women.(Table 1)

Approximately half of the mothers had parity one, and out of 360, only 184 mothers had delivered a baby before the last pregnancy. Out of those, few (16.8%) had birth interval equal to or more than 36 months, which is recommended birth gap in India. (Table 1)

Only 25% mothers utilized complete ANC service package (more than 3 ANC visits, minimum 90 IFA Tablets and 2 TT injections or as per schedule). Almost all the deliveries (82.4%) were at tertiary care center i.e.; either at district hospital or at medical college. This might be the proxy indicator of better accessibility of health care services for the population of PHC. Only

5.3% deliveries conducted at PHC or SC level and only one delivery been conducted at home. About one third of deliveries were assisted deliveries (other than Normal Vaginal Delivery) i.e. assisted deliveries; it includes deliveries through LSCS, forceps and vetouse. (Table 1)

The most common indication for assisted deliveries was obstructed labour (37.3%), followed by decrease foetal heart sound or non-progression of labour (24.4%), meconium aspirate(8.1%), artificial rupture of membrane(7.3%), cord around neck (1.6%), Maternal hypertensive disorders (1.1%), elderly primi(0.5%) and Increase weight of baby (0.2%). Proportion of mothers who had more than one indication of assisted deliveries was 2.5%. (Fig. 1)

The prevalence of maternal hemorrhage was 15.2% in the present study. Out of total 54 mothers who suffered from Maternal hemorrhage, most of them 38(70%) suffered from postpartum hemorrhage. (Fig. 2)

In univariate analysis, it was found that, mothers who didn't utilize ANC package (OR 6.8, 95%CI 2.1-34.6)) and who's mode of delivery was other than normal vaginal delivery (NVD) (OR 1.8, 95%CI 1.0-3.3) had higher odds of 'Maternal hemorrhage' in comparison to their counterparts. Mother's age, caste, education, occupation, socio-economic status, age of marriage, parity, birth interval and place of delivery was not found significantly associated with maternal hemorrhage. (Table 1)

Table 1: Determinants of 'Maternal Hemorrhage'

Determinants		**"Total" number of Mothers N (%)**	**Mothers with " Maternal Hemorrhage" N (%)**	**OR (95% CI)**
Age (year)	<20	12(3.3)	1(8.3)	1.9(0.3-86.6)
	≥20	348(96.7)	53(15.2)	Reference
Caste	ST/SC	193(53.6)	27(13.9)	0.9(0.2-8.7)
	OBC	154(42.8)	25(16.2)	1.1(0.2-10.5)
	Open	13(3.6)	2(15.4)	Reference
Education (Standard)	≤10	145(40.3)	19(13.1)	0.8(0.4-1.4)
	>10	215(35)	35(16.3)	Reference
Occupation	House wife	268(74.4)	36(13.4)	0.6(0.3-1.2)
	Earning member	92(25.6)	18(19.6)	Reference
Socio-economic status	APL	280(77.8)	39(10.8)	Reference
	BPL	80(22.2)	15(18.8)	1.4(0.7-2.8)
Age at marriage (in years)	<18	5(1.4)	1(20)	1.4(0.02-14.7)
	≥18	355(98.6)	53(14.9)	Reference
Parity	Primi	176(48.9)	28(15.9)	Reference
	Multi	184(51.1)	26(14.1)	0.9(0.5-1.6)
Birth interval* (in months)	<36	153(83.2)	21(13.7)	Reference
	≥36	31(16.8)	5(16.1)	1.2(0.3-3.7)
ANC package utilization	Yes	90(25)	3(3.3)	Reference
	No	270(75)	51(18.9)	6.8(2.1-34.6)
Place of Delivery	PHC/SC	19(5.3)	3(15.8)	1.2(0.3-4.2)
	Private Nursing home	43(11.9)	10(23.3)	1.9(0.9-4.1)
	Medical College/DH	297(82.5)	41(13.8)	Reference
Mode of delivery	NVD	237(65.8)	29(12.2)	Reference
	Other than NVD	123(34.2)	25(20.3)	1.8(1.0-3.3)
	Total	360(100)	54(15.0)	

(Fig. in parenthesis denote percentages)
*There were 184 mothers who had delivered baby in past
** One delivery took place at home
ST: Schedule tribe, SC: Schedule Caste, Open: Other than ST & SC
APL: Above poverty line, BPL: Below poverty line
PHC: Primary Health Center, SC: Sub center, DH: District Hospital
NVD: Normal Vaginal Delivery, Other than NVD: assisted deliveries; it includes deliveries through LSCS, forceps and vetouse.

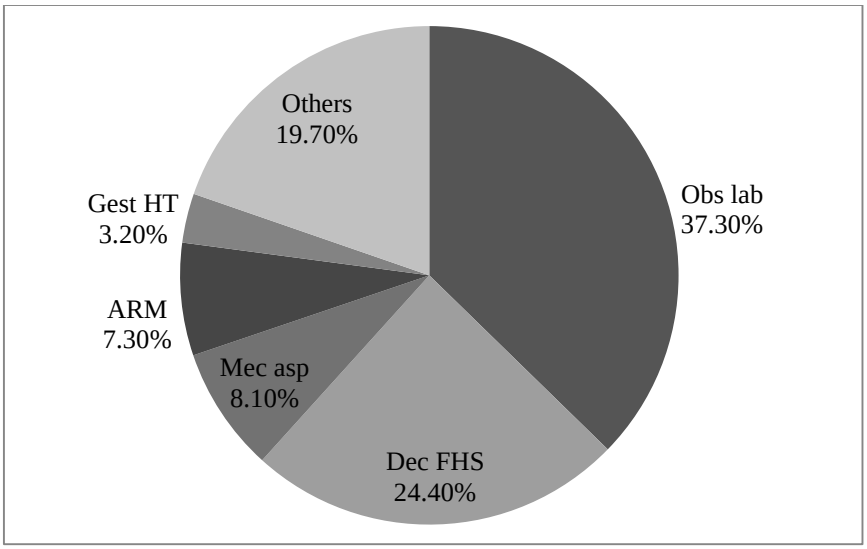

Fig. 1: Proportion of indications of LSCS and other assisted deliveries (N=123)

(Obs lab: Obstructed labour, Dec FHS: Decrease fetal heart sound, Mec asp: Meconium aspirate, ARM: Artificial rupture of membrane, Gest HT: Gestational hypertension, Others: Gestational diabetes mellitus, previous LSCS, Do not know etc.)

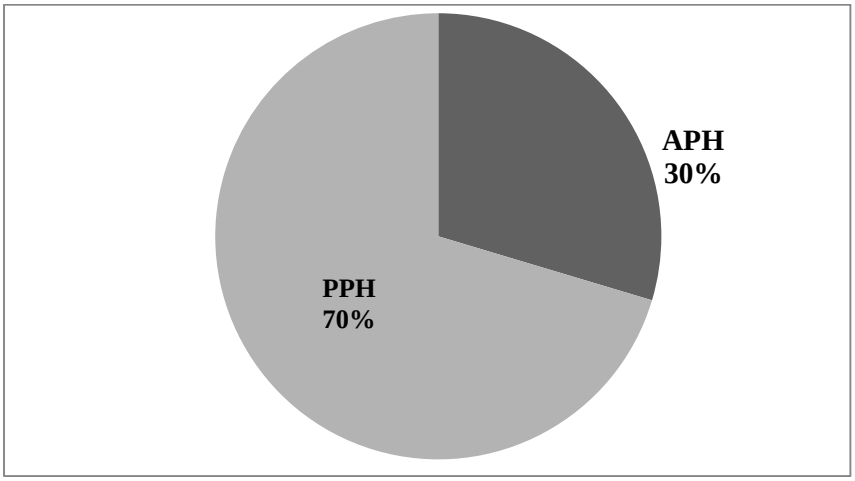

Fig. 2: Distribution of Maternal Hemorrhage N=54)

APH= Antepartum Hemorrhage

PPH= Postpartum Hemorrhage

Discussion

Because, Maternal Hemorrhage was measured through '*operational definition'*, it is difficult to compare these findings with others, still efforts have been made to compare it with the studies having comparable definitions and been reported from rural settings of India, however, the differences in definitions, study setting and time of study should be keep in mind while interpreting the findings of present study.

In present study, the age of study subjects were between 16 to 35 years (mean = 24.6 ± 3.4 years), various comparable studies finds similar age profile of mothers.[9, 14-17] Study finds 22.2% mothers belonged to below poverty line (BPL) families, which is consistent with the District Level Health Survey-3 (DLHS-3) finding, which reported 29.4% BPL families in the district.[18] However, a study from rural Karnataka reported that majority of study subjects (47.5%) had possessions worth less than 1000 Rupees.[19] This difference in socio-economic status of mothers could be because of different study settings.

The present study revealed that, majority of mothers (98.6%) had age at marriage more than 18 years, very few (1.4%) were married before the age of 18 years, it is consistent the findings of DLHS-3,[18] Study by Khatib, reported mean age at marriage for study subjects was 19.3 years (mean = 19.3 ± 3.6 years),[14] and Mayank reported 60.9% mothers married before the age of 19 years.[17] This difference may be attributed to differences in socio-cultural practices.

In the present study, approximately half of the mothers (48.9%) were primi, it is almost consistent with the findings of DLHS-3, which shows the proportion of multi gravida (more than two gravida) in rural area of given district as 15.7%.[18] Khatib et al, reported that majority of study subjects (56.9%) were primi gravida.[14] Bang et al, in their study reported, majority of study subjects (65.7%) had parity between1 to 4.[9] Study by Matthews et al reported that, 37.9% study subjects were primi gravida.[19] Study by Datta et al reported that, majority of study subjects (62.3%) were primipara.[16] Study by Mayank et al reported that, majority of study subjects (64.8%) had gravida between 1 to 4.[17] Study by Iyengar, in rural Rajasthan reported that majority of study subjects (43.6%) had parity between 2 to 3.[15] The difference may be attributed to the socio-cultural practices.

Present study shows only 25% of mothers had utilized ANC services package (more than 3 ANC visits, consumption of minimum 90 IFA Tablets and 2 TT injections or as per schedule) which is slightly higher than the findings of NFHS-3, according to that 65% of mothers received iron and folic acid supplements, but only 23 % consumed them for the recommended 90 days or more.[20]

Findings of few studies showed higher utilization of ANC services in different parts of India like; study in rural Wardha found 33.3%,[14] study in rural Varanasi reported 53%,[21] and from rural West Bangal 66.8%,[16] however study in rural Karnataka found that only 6% study subjects had more than 3 ANC visits.[19] These differences might be due to different study settings, sampling frame, different socio-cultural belief and accessibility of health care services. Apart from these factors, time of study has also very strong influence on the final result, as the indicators of maternal health have significantly improved since last one and half decades after the launch of National Rural Health Mission in India.[22]

The prevalence of pregnancy related maternal hemorrhage was 15% in the present study. Study from rural Maharashtra reported very high prevalence i.e. 28.4%, Prual et al reported 46% of Maternal hemorrhage in West Africa.[23] however most of the studies reported lesser prevalence than present study like studies from Karnataka reported 0.4%, and 10.8%, from Rajasthan reported 0.4% of maternal hemorrhage in rural setting.[1,9,15,19] A study from urban slum of New Delhi reported 4.7% prevalence ,[17] a multicentric study in Bangladesh, Egypt, India and Indonesia reported, 1.8% prevalence of Maternal hemorrhage.[24]

In the present study maternal hemorrhage was significantly associated with antenatal care package utilization. This finding was consistent with the finding of studies from rural area of Wardha, Andhra Pradesh, West Bengal and Karnataka.[1,6,14,16] Bloom et al from their hospital based study reported that, maternal hemorrhage was significantly associated with socio-economic status, education and parity of study subjects.[25] The finding of present study was consistent with the finding of a randomized controlled trial suggesting that fewer than 4 prenatal visits and lack of iron supplementation increased the risk for postpartum hemorrhage significantly.[8]

Present study also found Maternal Hemorrhage was associated with mode of delivery other than NVD. Mode of delivery may be cause or effect with respect to maternal hemorrhage however, considering effect, it may be due to underlying morbidities also e.g.; pregnancy related hypertensive disorders, obstructed labour and maternal hemorrhage.[26]

High prevalence of maternal hemorrhage in rural areas can be attributed to the combination of individual and household practices, nutritional status, socio culture believes, and health care seeking practices.[1,23] Determinants of maternal hemorrhage at individual level are age, parity, education and work status; household variables are type of family, possession of land and socio economic status. In addition poor infrastructure facilities such as access to villages and non-availability of health care facilities further added to the level of maternal hemorrhage. [1,15,16,19,23,25,27]

Since, it was a community based study; *operational definition of maternal hemorrhage* was used to ascertain the morbidities, which might have led to some degree of mis-classification.

Conclusion

Present study was carried in 24 villages of a Primary Health Centre. A total 360 mothers who had delivered a baby within the past one year from the date of interview were studied. The prevalence of maternal hemorrhage was 15% and it was significantly associated with antenatal care package utilization by mothers.

Considering the fact, that anaemia is very common in the given setting(28, 29) especially in pregnant mothers, continuum of outcome affecting lives of women, a girl born anaemic, remains anaemic till pregnancy and finally give birth to an anaemic girl child, need to be broken in an order to reduce maternal morbidity and mortality. However, further research should be undertaken to investigate the reasons for underutilization of IFA Tablet consumption and the methods that can improve the utilization.

Conflict of Interest: Nil

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