Social Audits

to

Study the Gaps Contributing

to

Maternal Mortality

in

Rural Chhattisgarh

Draft Report

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State Health Resource Centre, Chhattisgarh

Kali Badi, Raipur

ACKNOWLEDGEMENTS

INDEX

ABBREVIATIONS

ABBREVIATION	
ANC	Ante-Natal Care
ANM	Auxiliary Nurse Midwife
APH	Ante-Partum Haemorrhage
BP	Blood Pressure
CHC	Community Health Centre
DH	District Hospital
FRU	First Referral Unit
Hb	Haemoglobin
HIV/AIDS	Human Immuno Virus/ Acquired Immuno Deficiency Syndrome
ICMR	Indian Council For Medical Research
MAPEDIR	Maternal And Perinatal Death Inquiry And Response
MDR	Maternal Death Review
MMR	Maternal Mortality Ratio
NRHM	National Rural Health Mission
PHC	Primary Health Centre
PPH	Post-Partum Haemorrhage
RCH	Reproductive And Child Health
RGI	Registrar General Of India
RMA	Rural Medical Assistant
SC/SHC	Sub-Centre/ Sub Health Centre
SHRC	State Health Resource Centre
SRS	Sample Registration Survey
UNICEF	United Nations International Children's' Emergency Fund
WHO	World Health Organization

Executive Summary

Objectives: Chhattisgarh has higher maternal mortality than the national average. As per SRS (Special Bulletin 2013) Maternal Mortality Ratio (MMR) for India is 178 and for Chhattisgarh is 230 (data period 2010-12). While the medical causes of maternal deaths are well-known, there is a need to understand the systemic gaps that contribute to maternal deaths

As per national guidelines, Chhattisgarh state has a system of Maternal Death Reviews (MDR) through which Medical Officers conduct MDR of maternal deaths happening at facilities (facility based MDR) as well as at community level (Community based MDR). Both the above forms of MDR are carried out by Government Medical Officers.

In order to augment the MDR system and to understand the gaps from community's perspective, the National Health Mission decided in 2013 that community-led audits of maternal deaths should be initiated with help of SHRC. After consulting with Ministry of Health and Family Welfare, Government of India, NHM Chhattisgarh instructed SHRC to carry out this initiative on 3rd September 2013.

The objectives of the study were:

1) To identify gaps contributing to maternal deaths in rural Chhattisgarh in:
   a. Health seeking behaviour of the family
   b. Access to referral transport
   c. Provision of healthcare services at community level and at facility level
2) To identify probable medical causes of maternal deaths.
3) Suggest a strategy to address the systemic gaps thus identified.
4) Suggest a cost-effective surveillance system on maternal deaths which takes into account the community's perspective and can be scaled-up

Methodology: Chhattisgarh government has promoted 19,100 Village Health Committees supported by a network of 66,200 Community Health Workers (CHW) called *Mitanins*, covering 19 million rural population. Since 2011, village committees record deaths and discuss them in monthly community meetings. Verbal autopsies of maternal deaths were started in 2013 to enable community based death audits. 170 existing local facilitators in Mitanin programme were trained to conduct verbal autopsies of maternal deaths. The information collected on each death was reviewed and summarized by a technical team in discussion with the facilitators.

Study period and coverage: 402 maternal deaths during October 2013-September 2014 were covered. Thus, the system designed for the study was able to capture around 40% of the expected rural maternal deaths in the state.

Results: The verbal autopsies showed that

a) **Medical causes**: Hypertension-disorders, PPH and anaemia were leading probable direct causes while Malaria, Jaundice and sickle-cell-disease were key indirect causes.

Inadequate birth interval, poor nutrition status of pregnant women and pre-term delivery were leading risks identified.

b) **Gaps in healthcare during ante-natal period**: 42% of cases received less than 3 ANC check-ups and 10% had received none. Complications were identified in 54% cases during ante-natal period. 70% of them sought treatment but treatment was perceived as successful for half of them.

c) **Gaps in healthcare seeking:** A vast majority of cases had sought medical care from health facilities. However, some gaps were identified in healthcare seeking behaviour of community as 17 % didn't consult Mitanin, 15 % wanted home delivery and 29 % delayed in seeking care as they could not realise the seriousness of the problem in time.

d) **Gaps in referral transport:**

Home to facility: 63% of the women who called 102/108 received its services.

Inter-facility transport: 53% of the women, who were referred from one facility to another and actually went to the referred facility, got Govt. transport for inter-facility transport.

e) **Healthcare seeking:** 88 % of the cases tried reaching a facility and out of them 82% actually reached. CHC (45%) was seen as first common choice and PHC (23%) as second most common choice for the first visit. District Hospitals (62%) was first common choice for facility to facility referral followed by CHC (34%). Amongst the cases who reached some kind of facility, 80% had gone to a government facility

f) **Gaps in facility level healthcare:** 62% of cases had to go to more than one facility. 38 % cases have to visit minimum two facilities and 24 % cases visited three or more facilities before they could get appropriate service. Amongst intra-partum or post-partum deaths, 78% of the cases were delivered in institutions. 40% of the cases required some service or procedure that was unavailable at the facility. Of these, more than 60% cases required blood transfusion but the service was not available.

The out-of-pocket expenditure was very high in private facilities. The out-of-pocket expenditure even in Government facilities was considerable through lower compared to private facilities.

RECOMMENDATIONS

1. *Changes in ANC*

- Introduce more frequent BP check-ups in third trimester for pregnant women with history of hypertension.
- Sickle cell test for all pregnant women during antenatal check-ups.
- Rapid test for malaria during antenatal checkups. Improve training of ANMs on use of RD tests and availability of RD test kits with them.

2. _**Identification of High Risk Pregnancies:**_
   - Need to bring back the priority on high risk pregnancies
   - Improve identification of high risk pregnancies through Mitanins and ANMs.
   - Improve availability of RD tests with Mitanins. Consider all malaria cases as high risk.
   - Clearly designate cases as high risk during ANC.

3. _**Treatment/further check-up during ante-natal period for high risk cases identified**_

   - Mandate at least one ANC check-up at PHC/CHC level for high risk pregnancies.

4. _**Changes in Referral protocol**_ to _**avoid multiple referrals**_: Clearly designate functional FRUs and instruct Mitanins, ANMs and 102 to directly take high risk cases there. For pregnancies identified as high risk after reaching a SC, PHC or CHC, they should be sent directly to a functional FRU.

5. _**Creation of waiting rooms in functional FRUs**_ for high risk cases (in order to reduce delay) especially in areas where transportation is difficult.

6. _**Make FRUs functional in critical locations**_ **keeping geographical distribution in mind.** Most of the districts need at least one functional FRU. Some districts have functional FRUs but conduct very few c-sections and therefore need intervention. The location of functional FRUs is crucial – e.g. Gorella, Balrampur, Jashpur, Dantewada, Bijapur, Sukma. Availability of blood needs improvement. It is desirable to have two gynecologists in each functional FRU to ensure round the clock services.

7. _**Reduce out of pocket expenditure**_ in public facilities and RSBY-empanelled private hospitals.

8. _**Further assessments needed:**_
   - The capacity of 102 transport service vis-s-vis the volume of transportation needed by the state should be assessed. Its capacity should be expanded accordingly. Till the expansion happens, prioritise high risk cases for transportation.
   - Assess the current system of - Fixed-day ANC check-up clinics in PHCs by sending women doctors/RMAs from CHCs. Also assess the quality of services in this in terms of measurements of BP, Hb and urine-albumin.
   - Assess geographical distribution of functional FRUs and availability of emergency obstetric services during night.

In a situation of limited availability of critical obstetric services in health-facilities, the recommendation is to focus on identification of high risk pregnancies and ensuring availability of required transport, treatment and emergency obstetric care for them.

INTRODUCTION

Objectives of the Study:

Chhattisgarh has higher maternal mortality than the national average. As per SRS Maternal Mortality Ratio (MMR) for India is 167 and for Chhattisgarh is 221 (data period 2011-13). While the medical causes of maternal deaths are well-known, there is a need to understand the systemic gaps that contribute to maternal deaths.

As per national guidelines, Chhattisgarh state has a system of Maternal Death Reviews (MDR) through which Medical Officers conduct MDR of maternal deaths happening at facilities (facility based MDR) as well as at community level (Community based MDR). Both the above forms of MDR are carried out by Government Medical Officers.

In order to augment the MDR system and to understand the gaps from community's perspective, the National Health Mission decided in 2013 that community-led audits of maternal deaths should be initiated with help of SHRC. After consulting with Ministry of Health and Family Welfare, Government of India, NHM Chhattisgarh instructed SHRC to carry out this initiative on 3rd September 2013(1).

The objectives of the study were:

1. To identify gaps contributing to maternal deaths in rural Chhattisgarh in:
   a. Health seeking behaviour of the family
   b. Access to referral transport
   c. Provision of healthcare services at community level and at facility level
2. To identify probable medical causes of maternal deaths.
3. Suggest a strategy to address the systemic gaps thus identified.
4. Suggest a cost-effective surveillance system on maternal deaths which takes into account the community's perspective and can be scaled-up

METHODOLOGY

1. <u>Study period</u>: The study covered rural Maternal Deaths which happened between the one-year period - October 2013 to September 2014. Cases covered during pilot testing have also been included.

2. <u>Sampling</u>:

    i.   Village Health Sanitation and Nutrition Committees (VHSNCs) in Chhattisgarh maintain death registers in which maternal deaths are recorded each month. Mitanin trainers (MTs) supervise the maintenance of death registers.

   ii.   These deaths are further compiled at block level each month in a Block Death register

  iii.   All maternal deaths thus listed were selected for study every month from each block (145 blocks out of total 146).

The sample size needed for 95% confidence was calculated as 241 maternal deaths spread over a year. The total expected annual maternal deaths in rural population of the state were around 1150 (based on MMR of 230 as per SRS 2013). The study was able to conduct 402 verbal autopsies, thus covering around 37% of total maternal deaths in rural Chhattisgarh.

3. <u>Method of data collection and tools:</u>

- Verbal autopsy: The study used verbal autopsy to collect data. A verbal autopsy is a method of finding out the cause of a death based on an interview with next of kin or other caregivers.
- A pre-designed questionnaire is used for recording the chronological events of maternal deaths. Questionnaire has 4 parts
    - Questionnaire A - death during pregnancy
    - Questionnaire B- death during abortion or within 42 days (induced)
    - Questionnaire C- death during delivery
    - Questionnaire D- death within 42 days of delivery.

<u>Process of data collection:</u>

    i.   Block surveyors (Swasth Panchayat Coordinators) are trained to conduct verbal autopsies and fill up this questionnaire. They have good rapport in community and are familiar with local context and dialect, terms etc. used there.

   ii.   These questionnaires are then submitted to SHRC every month for analysis.

4. <u>Analysis method</u>

    i.   Every filled questionnaire is checked by a team of trained **<u>Technical Reviewers</u>** and discussion is done with each surveyor for getting complete information about the case.

   ii.   Data from the questionnaire is entered in computer.

iii.   A descriptive Case Summary is prepared for every case by a reviewer that captures the key events, gaps and medical cause/s.

iv.   Based on data on key variables, the reviewer interprets and enters the categories of gaps for each case

v.   Probable medical causes of deaths were assigned using [6]International Classification of deaths (ICD)-10. Family members were asked about the disease history and symptoms which they observed and diagnosis was assigned accordingly.

vi.   Quantitative analysis of these entries is done.

A total of 402 verbal autopsies were completed for maternal deaths.

RESULTS & FINDINGS

SECTION A-PROFILE OF THE DECEASED

1.1 Education of the mother: As per Chhattisgarh Census report 2012-13, Female literacy rate is 60%.Out of the total respondents, only 5% women were found to be illiterate. 75% of deceased women had undergone at least primary level of schooling.

TABLE 1: EDUCATION OF MOTHER		
S#	CATEGORY	% of deaths
1	Illiterate	5%
2	0-4th standard	7%
3	5th- 7th	25%
4	8th-9th	24%
5	10th-11th	12%
6	11th above	5%
7	No response	22%
	TOTAL DEATHS	402

1.2 Category of deceased population: 52% of study sample consist of schedule cast and schedule tribes which is quite similar to state's overall population profile.

TABLE 2: CATEGORY OF DECEASED MOTHERS		
S#	CATEGORY	% of deaths
1	General	4%
2	OBC	37%
3	SC	21%
4	ST	31%
	No response	8%
	TOTAL DEATHS	402

1.3 Stage of Death: Out of the total deaths, more than 2/3rd occurred during delivery or within 42 days of it. Proportion of abortion related cases covered under the study was very low. It is likely that the social stigma surrounding abortions resulted in only 5 cases of abortion related deaths.

TABLE 3: STAGE OF MATERNAL DEATH		
S#	CATEGORY	% of deaths
1	During Antenatal period	23%
2	During abortion or 42 days after	1%
3	During delivery	15%
4	Within 42 days after delivery	61%
	TOTAL DEATHS	402

1.4 Order of Pregnancy of the deceased women: More than 50% of women who died were carrying their second or higher order child.

TABLE 4: ORDER OF PREGNANCY		
S#	**ORDER**	**% of deaths**
1	1ST	45%
2	2ND	24%
3	3RD	15%
4	4TH OR MORE	13%
5	NO RESPONSE	3%
	TOTAL DEATHS	**402**

1.5 Stage of death- For the 91 deaths during ante-natal period, 3/4th of them occurred in third trimester of pregnancy.

TABLE 5: STAGE OF DEATH		
S#	**TRIMESTER**	**% ANC DEATHS**
1	1ST TRIMESTER	3%
2	2ND TRIMESTER	22%
3	3RD TRIMESTER	75%
4	TOTAL ANC DEATHS	91(23%)

SECTION B - RISK FACTORS IDENTIFIED AND PROBABLE MEDICAL CAUSES OF DEATHS

2.1 Risk factors identified

About 39% of women were affected by risk factors during pregnancy, amongst which less birth interval and poor nutrition status are the leading reasons.

TABLE6: RISK FACTORS IDENTIFIED DURING PREGNANCY			
S#	CATEGORY	Total Cases having the risk factor	% of cases involving risk factors
1	Interval less than 3 years	52	13%
2	Weight less than 40kg	44	11%
3	Height less than 4ft 10 inch	22	5%
4	Age less than 18years or more than 35 years	13	3%
5	Weight more than 60 kg	4	1%
6	Abortion or still birth previously	23	6%
	Total cases with identified risk factors	**158**	**39%**
	Total deaths	**402**	**100%**

2.2 ANC check-ups: Only 58% of deceased women underwent 3 or more ANC checkups. 11% women did not undergo any check-up throughout pregnancy.

TABLE 7: Number of cases undergoing ANC Check-ups amongst those dying during labour/ post partum			
S#	Status of check-ups	Number of cases	%
1	Women who did not undergo ANC check-up	30	10%
2	1 ANC check-up	50	16%
3	2 ANC check-ups	47	15%
4	3 or more ANC check-ups	179	58%
	TOTAL DEATHS	**306**	

2.3 Type of complications identified during pregnancy:

S#	Category	Proportion of deaths involving the specific complication
1	Hypertension	11%
2	Anaemia	41 %
3	Bleeding through vagina	3 %
4	Convulsions during pregnancy	6 %
5	Spasmodic abdominal pain	10 %

6	T.B.	2 %
7	Diarrhoea	6 %
8	Fever	9 %
9	Malaria	7 %
10	Jaundice	5 %
11	Typhoid	1 %
12	Others	6 %
	Total deaths	402

2.4 Probable causes of maternal deaths: In verbal autopsy, the next of kin of the deceased could provide some information regarding specific symptoms. No medical records could be examined.

PROBABLE CAUSES OF MATERNAL DEATHS		
DIRECT CAUSES		% Deaths involving the cause
1	Hypertension disorders of pregnancy	32%
3	PPH	28%
4	Eclampsia	9%
5	Prolonged labour	9%
6	APH	4%
7	Ruptured uterus	4%
8	Puerperal sepsis	2%
9	Obstructed labour	2%
10	Ectopic pregnancy	0%
11	Septic abortion	0%
12	Direct Others	
O99.0	Severe anaemia	25%
O67.0	Intra-partum bleeding	2.2%
O90.4	Renal diseases	1.7%
O73.0	Retained placenta	1.5%
	Dry labour	0.2%
O86	Uterine infection	0.2%
X-60- X-84	Direct self-inflicting causes (without obstetric code)- suicide	0.7%
INDIRECT CAUSES		
1	Jaundice	12%
2	Fever	10%
3	Malaria	4%
4	Diarrhoea	3%
5	Sickle cell anaemia	2%
6	Typhoid	2%
7	TB	1%
9	Other	15%
9.1	Chest pain	1.5%
9.2	Reaction after transfusion	0.2%

9.3	Hydrothorax	0.2%
9.4	Brain Tumour	0.2%
9.5	Leprosy	0.2%
9.6	Stroke	0.5%
9.7	SEPSIS	1.0%
9.8	Vomiting	0.7%
9.9	Hernia	0.2%
9.10	Abdominal pain	0.7%
9.11	snake bite	0.7%
O-95	Unknown	20%
Y-85	Coincidental causes- accidents	1%
	TOTAL	402

Based on the information available, the key medical causes from the table seem to be:

- The most prominent direct causes were hypertension disorders, PPH/excess bleeding and severe anemia.
- Other significant causes were prolonged labour, APH, ruptured uterus, sepsis, obstructed labour.
- Amongst indirect causes – Jaundice, Malaria, Diarrhea, Sickle-cell disease were the main causes.

2.5 Cases dying during abortion or within 42 days

- 3 of 5 women dying due to abortion, were of age group of 19-25 years
- 3 of the 5 deaths occurred in the second trimester
- 3 of 5 women died at home without seeking any treatment.
- 2 women who went to a facility had to go to multiple facilities.
- 3 out of 5women had third or higher order of pregnancy. Also they had history of abortion or still birth previously.
- 3 out of 5 had complications identified during pregnancy. 2 of them sought treatment which was not successful.
- Hypertension (4 out of 5) and Bleeding post abortion (3 out of 5) were the leading causes of death

SECTION C- SYSTEMIC GAPS

3.1 Gaps at community level healthcare:

- About 42% cases did not get full ANC
- Around 15% chose home delivery
- 83% cases came in contact with Mitanin. 99% of them were referred by Mitanin to a health facility.
- 29% of families sought treatment with delay due to reasons like not realizing the seriousness of problem

	TABLE 10 : GAPS AT COMMUNITY LEVEL HEALTHCARE	
S#	**GAPS AT COMMUNITY LEVEL HEALTHCARE**	**% of deaths**
1	Gaps in ANC check-up	42%
2	Delay in seeking treatment due to inability to identify seriousness of the problem	29%
3	Family did not approach Mitanin	17%
4	Mitanin did not give right advice to the family (referral)	1%
5	Family chose to have home delivery	15%

3.2 Access to referral transport

3.2a Transport from Home to Facility

About 79% cases wanted to use transport for reaching a healthcare facility and 80% of them tried calling a govt. transport. Amongst those who tried calling, 63% were finally able to use a govt. transport.

	TABLE 11 : ACESS TO REFERRAL TRANSPORTATION (From home to healthcare facility)	
S#	**CATEGORY**	**% of cases**
1	Total cases	402
2	Cases wanting Govt. transportation	79% (319)
3	Of these, proportion of women who tried to call 102/108	80% (254)
4	Of women who called 102/108, proportion who got 102/108 transport	63% (161)

3.2b Inter-Facility referral Transport

Amongst the cases that went to a referred facility, 53% of cases got inter-facility government referral transport.

TABLE 12 : PROVISION OF INTER FACILITY REFERRAL TRANSPORT		
S#	CATEGORIES	TOTAL
1	Women who were referred by one facility to another facility for treatment	222
2	Of above, Women who actually went to referred facility	90% (199)
3	Amongst the women who actually went to referred facility, proportion who got government transport for referral	53% (105)

3.2c Problems faced in accessing government referral transportation:

TABLE 13: NUMBER OF CASES FACING PROBLEMS IN ACCESSING GOVERNMENT. TRANSPORTATION		
S#	Type of problems in Govt transport	No. of cases
1	Came late after call	9%(30)
2	Did not come	5%(15)
3	No phone/ network coverage	6% (19)
4	Money taken by driver for transportation	11% (34)
	Total women wanting transportation	**319**

3.3 HEALTHCARE SEEKING

88% women tried approaching a facility. 82% of deceased women managed to reach a health facility for treatment. 53% died in a healthcare facility and 17% deaths occurred during inter-facility transfer when they were referred.

TABLE 14 : Number of cases with place of death		
S#	CATEGORY	Total
1	At home	11%
2	On the way to hospital	6%
3	During inter facility referral	14%
4	At the healthcare facility	50%
5	After returning home from hospital	11%
6	Others	5%
7	no response	2%
	TOTAL	**402**

3.4 Gaps in Services provided by Health Facilities:

Amongst the cases seeking treatment/delivery in a facility, 62% of them had to go to more than one health facility during the episode. 24% had to go to 3 or more health facilities.

TABLE 15 : Number of facilities a women visited for seeking services
S#	CATEGORY	Total	ANC Deaths	Deaths during delivery	Post-partum deaths	Abortion related deaths
1	One	38%	47%	36%	35%	0%
2	Two	38%	31%	32%	42%	100%
3	Three or more	24%	22%	32%	23%	0%
	Total cases seeking treatment	299	68	44	185	2

82% of women were able to reach a health facility. Of these, 4/5th used a government facility at some stage or other.

TABLE 16: CASES ACCESSING DIFFERENT TYPES OF HEALTHCARE FACILITIES
S#	CATEGORIES	TOTAL CASES	Deaths during ANC period	Deaths during delivery and within 42 days	Abortion related deaths
1	Did not use any healthcare facility	18%	15%	18%	60%
2	Women who used only government facility	39%	40%	39%	20%
3	Women who used only private facility	16%	22%	15%	20%
4	Women who used both government and pvt facilities.	19%	21%	19%	0%
5	No Response	7%	2%	9%	0%
	Total Deaths	402	91	306	5

3.4a Level of Government healthcare facility accessed:

Amongst cases using a govt. facility, 45% initially went to a CHC. 62% of the inter-facility referrals were to district hospitals.

	TABLE 17 : Number of cases using different types of government institutions		
S#	INSTITUTION	1ST Facility accessed	2ND Facility accessed (1ST REFERRAL)
1	SHC	14%	0%
1.1	PHC	23%	3%
1.2	CHC	45%	34%
1.3	DISTRICT HOSPITAL	17%	62%
1.4	TOTAL CASES GOING TO GOVT. FACILITY	234	125

3.4b Treatment of complications identified during pregnancy:

Out of total 402 deaths, 268 (66%) were identified with complications during pregnancy. 73% of them took treatment but it was successful for half of them.

	TABLE 18: NUMBER OF CASES SEEKING TREATMENT FOR ANC RELATED COMPLICATIONS	
S#	CATEGORY	Total
1	YES	73%
2	NO	25%
3	NO RESPONSE	2%
	TOTAL	268

	TABLE 19 : NUMBER OF CASES WERE TREATMENT WAS SUCCESSFUL	
S#	CATEGORY	Total
1	YES	50%
2	NO	48%
3	No response	2%
	TOTAL	196

3.4c Place of Delivery: Home vs. Institutional

Amongst the intra-partum or post-partum deaths, 78% cases had delivered in an institution.

TABLE 20 : Proportion of cases as per place of delivery		
S#	CATEGORY	Total cases
1	Home	20%
2	Institution	78%
3	During transportation	2%
	Total deliveries	**284**

3.4d Issues faced at the facility:

Around 40% cases faced the problem of unavailability of services in a govt. hospital. Unavailability of blood transfusion was very common.

TABLE 21 : Number of cases facing problems in a healthcare facility			
1	PROBLEMS AT HEALTHACRE FACILITY LEVEL	IN GOVT. FACILITY	IN PVT FACILITY
1.1	The required service/procedure was not available at the appropriate level.	40%	10%
1.2	Blood not available	24%	13%
1.3	Delay in treatment	10%	2%
1.4	Sent back without treatment	0%	1%
1.5	Referred to private facility	16%	3%
1.6	Bad behavior/ no proper attention	12%	2%
	Total cases who went to a facility	**252**	**143**

3.4e Out of pocket expenditure:

Almost 3/4th of cases seeking treatment at any hospital had to incur a minimum cost of Rs.1000. Half of cases seeking treatment at private facility and 36% of cases going to a government hospital had to incur cost of more than Rs. 5000.

S#	Expenditure (Rs.)	TOTAL	GOVT. FACILITY	PVT. FACILITY
	TABLE 22: OUT OF POCKET EXPENDITURE INCURRED IN HOSPITAL FOR TREATMENT			
1	Up to Rs.100	5%	10%	0%
2	Rs.101-200	5%	6%	3%
3	Rs.201-500	7%	10%	4%
4	Rs.501-1000	9%	14%	3%
5	Rs.1001-5000	32%	25%	39%
6	More than Rs.5000	42%	36%	50%
	TOTAL	**209**	**115**	**94**

CONCLUSIONS

Medical causes, complications and risk factors identified:

❑ Cause of death:

- Direct Causes - Hypertension disorders, PPH and anaemia were the three leading causes of maternal deaths. Other significant causes were prolonged labour, APH, ruptured uterus, sepsis, obstructed labour

- Indirect causes - Jaundice, fever, malaria, diarrhoea, sickle cell disease top the list among the indirect causes.

❑ Complications identified during pregnancy and labour:

- Anaemia, hypertension and spasmodic abdominal pain were found as most prominent complications identified during antenatal period

- Prolonged labour, sudden cessation of labour pain and excessive bleeding were prominent complications identified during labour.

❑ Risk factors identified:

- Inadequate birth interval, poor nutrition status of pregnant women and pre-term delivery were leading risks identified.

Gaps in ANC checkups:

42 % gaps in ANC observed i.e. who had less than 3 ANC check-ups.

Gaps in healthcare seeking:

A vast majority of cases had sought medical care from health facilities. However, some gaps were identified in healthcare seeking behaviour of community:

- 17 % didn't consult Mitanin

- 15 % wanted home delivery

- 29 % delayed in seeking care as they could not realise the seriousness of the problem in time.

Gaps in referral transportation:

Home to facility: 63% of the women who called 102/108 received its services.

Inter-facility transport: 53% of the women, who were referred from one facility to another and actually went to the referred facility, got Govt. transport for inter-facility transport.

<u>Healthcare treatment sought by women</u>

Seeking Healthcare in Health Facilities:

- 88 % of the cases tried reaching a facility and out of them 82% actually reached.

- CHC (45%) was seen as first common choice and PHC (23%) as second most common choice for the first visit.

- DH (62%) was first common choice for facility to facility referral followed by CHC (34%).

18% of the maternal death cases could not reach any kind of facility and 16% went to only private service providers. Amongst the cases who reached some kind of facility, 80% had gone to a government facility

<u>Gaps at healthcare facility</u>

- Amongst cases in which complications were identified during antenatal period, 73% sought treatment, out of which half were perceived as treated successfully.

- 62% of cases had to go to more than one facility. 38 % cases have to visit minimum two facilities and 24 % cases visited three or more facilities before they could get appropriate service.

- Amongst intra-partum or post-partum deaths, 78% of the cases were delivered in institutions. 40% of the cases required some service or procedure that was unavailable at the facility. Of these, more than 60% cases required blood transfusion but the service was not available.

RECOMMENDATIONS

1. *Changes in ANC*

- Introduce more frequent BP check-ups in third trimester for pregnant women with history of hypertension.
- Sickle cell test for all pregnant women during antenatal check-ups.
- Rapid test for malaria during antenatal checkups. Improve training of ANMs on use of RD tests and availability of RD test kits with them.

9. *Identification of High Risk Pregnancies:*
- Need to bring back the priority on high risk pregnances
- Improve identification of high risk pregnances through Mitanins and ANMs.
- Improve availability of RD tests with Mitanins. Consider all malaria cases as high risk.
- Clearly designate cases as high risk during ANC.

10. *Treatment/further check-up during ante-natal period for high risk cases identified*

- Mandate at least one ANC check-up at PHC/CHC level for high risk pregnances.

11. *Changes in Referral protocol* to *avoid multiple referrals*: Clearly designate functional FRUs and instruct Mitanins, ANMs and 102 to directly take high risk cases there. For pregnances identified as high risk after reaching a SC, PHC or CHC, they should be sent directly to a functional FRU.

12. *Creation of waiting rooms in functional FRUs* for high risk cases (in order to reduce delay) especially in areas where transportation is difficult.

13. *Make FRUs functional in critical locations* keeping geographical distribution in mind. Most of the districts need at least one functional FRU. Some districts have functional FRUs but conduct very few c-sections and therefore need intervention. The location of functional FRUs is crucial – e.g. Gorella, Balrampur, Jashpur, Dantewada, Bijapur, Sukma. Availability of blood needs improvement. It is desirable to have two gynecologists in each functional FRU to ensure round the clock services.

14. *Reduce out of pocket expenditure* in public facilities and RSBY-empanelled private hospitals.

15. *Further assessments needed:*
- The capacity of 102 transport service vis-s-vis the volume of transportation needed by the state should be assessed. Its capacity should be expanded

accordingly. Till the expansion happens, prioritise high risk cases for transportation.

- Assess the current system of - Fixed-day ANC check-up clinics in PHCs by sending women doctors/RMAs from CHCs. Also assess the quality of services in this in terms of measurements of BP, Hb and urine-albumin.
- Assess geographical distribution of functional FRUs and availability of emergency obstetric services during night.

Annexure 1: Illustrative Case Studies

Case # 1

Block: Shankargarh District: Balrampur

The victim was 23 year old. She was in her first pregnancy. She had fever during ANC check-up in eight month but could not be tested or treated for malaria. She went to CHC where she was diagnosed with malaria. She was referred to District hospital. She died on reaching the district hospital.

Case #2

Block: Gorella, District: Bilaspur

The victim was 20 years old and pregnant with her first child when she died. During Ante-natal check-ups anemia and high blood pressure were detected. Mitanin had taken her to local PHC for treatment. She was asked by the PHC doctor to go to district hospital for blood transfusion but the family could not go. Blood transfusion was not available in CHC and District hospital was around 130 km away. One day she complained of difficulty in breathing and Mitanin took her to PHC by 108 vehicle. After BP check-up in PHC, she was brought to CHC. CHC referred her to District hospital but the vehicle was not available for transferring her immediately. She died at CHC.

Case #3

Block: Pratappur, District: Surajpur

The victim was 21 years old and had delivered her first child after which she died. She had undergone 3 ANC check-ups. She was taken to CHC for delivery. After one day of getting admitted in CHC, she was referred to a private hospital. No inter-facility transport was provided by CHC. The family hired a private vehicle and went to the private hospital. Mother delivered with excessive bleeding. Private hospital could not do blood transfusion and the mother died.

Case # 4

Block: Khadgawan District: Koriya

The victim was 24 years old and had her first pregnancy. At completion of 8th month of pregnancy, she had fever for three days and started having labour pain. There was no one at home when the labour pain started. Once family members came back, they called 102 and took her to CHC. The CHC referred her to district hospital as she needed blood transfusion. She died before reaching the district hospital.

Case # 5

Block: Chhuikhadan District: Rajnandgaon

The victim was 23 years old and in her first pregnancy. She had fever and anaemia during pregnancy for which she got treatment from PHC. She had another episode of fever which was tested as Pf malaria. Mitanin took her to CHC. CHC did not admit as it did not have facilities like oxygen. She was taken to a private hospital where she died.

Case # 6

Block: Bilaigarh District: Balodabazar

The victim was 27 years old and was in her 4th pregnancy. She had three ANC check-ups. At nine months, she had labour pain with bleeding. She was taken to CHC Bilaigarh. She had prolonged labour and bleeding. The family reported poor behaviour by CHC staff. CHC referred them to district hospital Raigarh as CHC did not have blood transfusion facility. No inter-facility referral transport was arranged by CHC. The family hired a private vehicle to go to Raigarh but she died on the way.

Case # 7

Block: Lodam District: Jashpur

The victim was 28 years old and was in her third pregnancy. She had three ANC check-ups and anaemia was detected. She was taken for delivery to District hospital. District hospital referred her to an NGO hospital in Kunkuri. She delivered a still born baby in the NGO hospital and had excessive bleeding. She died before the blood transfusion could be arranged.

Case # 8

Block: Patan District: Durg

The victim was 19 years old and was in her first pregnancy. She got full ANC check-ups and was found anaemic. As labour pain started, the family called 108 but the call was not picked up. The family took her to CHC after arranging a private vehicle. She delivered a still-born child in CHC and had excessive bleeding. CHC referred her to District Hospital. She was declared dead when she reached District hospital.

Case #9

Block: Dhamtari District: Dhamtari

The victim was 24 years old and was in her first pregnancy. She had regular ANC check-ups. She had anaemia and high blood pressure. She had convulsions during 8th month.

102 was called and she was taken to CHC. They referred her to a private hospital. She was declared dead on arrival at the private hospital.

Case # 10

Block: Basna District: Mahasmund

The victim was 26 years old. It was her second pregnancy after a gap of 2.5 years. She had undergone three ANC check-ups. The delivery was done at home by traditional Dai. The mother developed fever. Mitanin called 108 and took her to CHC. CHC referred her to a private hospital but no referral transport was provided. It took a long time to find private transport. She died on the way to private hospital.

Case # 11

Block: Pamgarh District: Janjgir Champa

The victim was 30 years old and she delivered her fourth child. She had undergone three ANC check-ups. There were no complications during pregnancy. She was taken to ANM on onset of labour pain. She delivered twins. She had excessive bleeding at child birth. Her family was asked to take her to Medical College hospital. She died on the way.

Case # 12

Block: Bilha District: Bilaspur

The victim was 22 years old and she delivered her first child. She had complete ANC check-ups. She was taken to District hospital where she delivered normally. She started bleeding after delivery. The district hospital referred her to CIMS Medical College hospital. She died in CIMS.

Case # 13

Block: Palari District: Balodabazar

The victim was 25 years old and she delivered her fourth child. She had incomplete ANC check-ups. She had history of still-birth in her first pregnancy. On onset of labour, she went with Mitanin to sub-centre. She started bleeding after delivery. ANM called 102 but vehicle was not available. The family hired a private vehicle and took her to CHC. She was being treated in CHC when she died.

Case # 14

Block: Podi Uproda District: Korba

The victim was 28 years old and she delivered her second child. During her ANC check-ups, she had swelling. On onset of labour, she was taken to PHC by 102. She had normal delivery but started bleeding. She died before any referral transport could be arranged.

Case # 15

Block: Pendra District: Bilaspur

The victim was 20 years old and she delivered her first child. During her ANC check-ups, she had swelling. On onset of labour, she was taken by Mitanin to PHC. She had prolonged labour and started bleeding. She was referred by PHC to Civil hospital. After 12 hours in Civil hospital she had not delivered and bleeding continued. The Civil hospital referred her to CIMS. She delivered in CIMS but died while she was being given blood transfusion.

Annexure 2: REVIEW OF LITERATURE

Maternal Death is defined as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes."

As per Annual Health Survey 2012-13 (RGI) MMR for Chhattisgarh was 244 per 1lakh live births (data for 2009 to 2011)(2) . As per SRS (Dec 2013) MMR for India is 178 and for Chhattisgarh is 230 (data collection period 2010-12)(3).

The WHO notes (in 2014) that-

- The major direct causes of maternal deaths globally are: severe bleeding/hemorrhage (27%), infections (11%), unsafe abortions (8%), high blood pressure during pregnancy (pre-eclampsia and eclampsia) (14%), obstructed labour (9%), blood clots/embolism (3%) and pre-existing conditions (28%)(4).

- Indirect causes are malaria, anemia, HIV/AIDS, and cardiovascular disease all of which may complicate pregnancy or be aggravated by it(4).

According to a pilot study conducted by ICMR in 2003(5), 50 per cent of maternal deaths occurred before the age of 25 years of which 15 % had parity one and about 43% with parity three or more. About 48 % deliveries were conducted at home by untrained dais. About 69 % of maternal deaths occur during postnatal period. It was observed that about 59 % of the women died in hospital and 16 per cent died on the way. This may be due to the late referral of women to hospital by untrained dais.

The main causes of deaths were observed as post-partum haemorrhage (17%), septicaemia and anaemia (13%). Also 8.6% deaths occurred due to non-obstetric reasons(5).

For far too long, the magnitude of the problem of maternal mortality remained unclear to policy makers because such deaths in many instances remained 'invisible'. As in other developing countries where many maternal deaths are unrecorded, statistical estimates in India too tell only part of the story. Very often, no one knows how or why the women died(5).

The recognition that these deaths are not just unfortunate but unnecessary has come with better understanding among policy makers and public health practitioners of what contributes to maternal mortality. Globally, there is evidence that most maternal deaths can be averted but for the 'three delays'.

In their seminal 1994 paper, Thaddeus and Maine group the factors into three broad categories, using a classic, pathways-based framework(6). Known as the 'three delays model', it has been used extensively in studies of maternal mortality in developing countries (Figure 1).
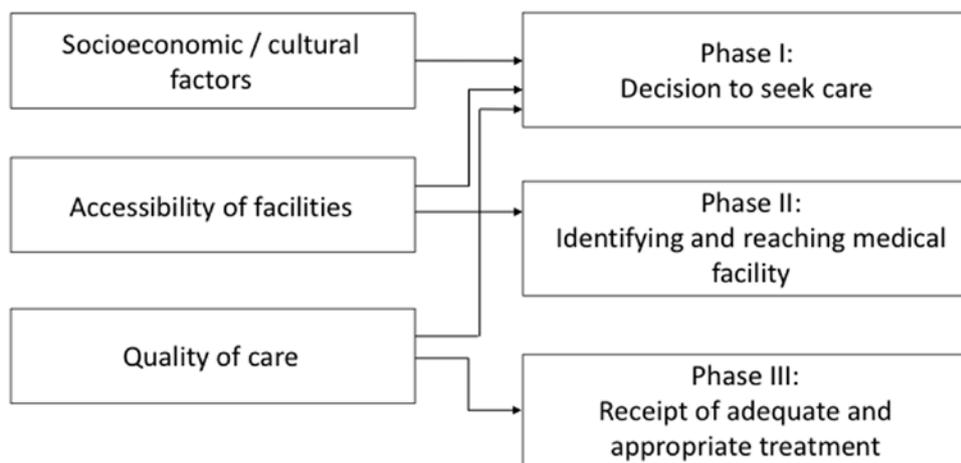
(i) Delay in decision to seek professional care, (ii) delay in reaching the appropriate health facility, and (iii) delay in receiving care after arriving at a hospital.

Tackling and averting this trio of delays will help the world as also India to reduce the burden of maternal mortality(5).

'Maternal and Perinatal Death Inquiry and Response '(MAPEDIR)(7), this more recent initiative, incorporates the best practices and concepts from within India and elsewhere and attempts to translate them into action at the community level – sparking genuine change in understanding and tackling maternal mortality at the family, community, health service, and policy-making levels.

The MAPEDIR initiative underscores the need for information about the underlying causes of maternal deaths in remote and inaccessible villages. It grew out of UNICEF's decision to support maternal death inquiry as a component of the ongoing second phase of the Reproductive and Child Health Programme (RCH II) and the unfolding National Rural Health Mission.

The MAPEDIR initiative puts in place a process that uses a confidential inquiry tool to examine maternal deaths, generate local evidence, sensitise communities and health officials, and galvanise them into taking action to reduce such deaths.

Typically, medical records capture only the immediate, biological causes of maternal deaths. The personal, familial, socio-cultural, economic and environmental factors contributing to these deaths are left out. MAPEDIR seeks to restore and record these missing links.

The findings from their structured questionnaire (translated into the local language), enquiring minutely into the circumstances of the maternal death, have been widely shared with communities and with local health authorities, leading to a gratifyingly active response.

As per Global causes of maternal deaths- a WHO systematic analysis(4), about 73% of all maternal deaths between 2003 and 2009 were due to direct obstetric causes and deaths due to indirect causes accounted for 27·5% of all deaths. Haemorrhage

accounted for 27·1% hypertensive disorders 14·0% and sepsis 10·7% of maternal deaths. The rest of deaths were due to abortion embolism and all other direct causes of death (9·6%). Between 2003 and 2009, haemorrhage, hypertensive disorders, and sepsis were responsible for more than half of maternal deaths worldwide.

They estimated that 7·9% of all maternal deaths were due to abortion. This finding is lower than the previous assessments, which estimated mortality due to unsafe abortion at 13%. Classification of maternal deaths due to abortion, and more specifically unsafe abortion, is associated with a risk of misclassification, which might lead to underreporting. Even where induced abortion is legal, religious and cultural perceptions in many countries mean that

Women do not disclose abortion attempts and relatives or health-care professionals do not report deaths as such. Under-registration of deaths might be the result of stigmatisation of abortion affecting what information is reported by relatives and informants or intentional misclassification by providers when abortion is restricted.

Deaths that happen after obstructed labour and its consequences are hard to measure because they can be coded as uterine rupture, haemorrhage, or sepsis. This is especially problematic in settings where verbal autopsies are used to establish cause of death. Verbal autopsy methods do not have consistent case definitions, which creates confusion regarding hierarchical assignment of causes and subsequently affects the validity of the study data.

There is framework of three delays which is used to analyze maternal deaths. There is growing body of global literature using the 3 delays framework. While the medical causes of maternal deaths are well-known, there is a need to understand the systemic gaps that contribute to maternal deaths

A verbal autopsy study on maternal deaths in Jharkhand in 2008(8) studied 403 maternal deaths and explored the missed opportunities to save maternal lives, besides probing into the socioeconomic factors contributing to maternal deaths in Jharkhand, India.

The mean age of the deceased women was 27 years, and 85% of them had no education. Majority (72%) of the deceased did not receive any antenatal care in the pregnancy that ended in their deaths. Only 28% of the deceased received at least one antenatal care visit, which included 7% of cases where the respondents did not remember the number of antenatal care visits. Merely 16% of the deceased had given birth in health facilities. Majority of the women (81%) died at home, 12% died in hospital (7.4% in Government and 4.2% in private hospitals), and the rest (7%) died on their way to the hospital/clinic.

Of the 403 maternal deaths, narratives of family members indicate that, in three-fourths of the deaths, delays were responsible for death. The major types of delays that subsequently resulted in maternal deaths were: delay in decision-making about treatment seeking after recognition of the complications, delay in arranging means of transport/road connectivity to the health facility, and delay in receiving the actual treatment after reaching the health facility or facilities visited.

Majority (70%) of the cases took less than two hours to search for a transport facility while 23%could arrange the transport in 2-5 hours, and 8% took 5 hours or more. Time elapsed to reach hospital/ clinic took 2-5 hours in 41% of the cases while 17% took 5 hours or more.

Arrival at the health facility does not ensure that a woman will receive appropriate treatment to save her life. Data further reveal that 37% of the cases went to a facility where the required care was not available. They then decided to go or were referred to another facility, with substantial delay resulting in death.

More often than not, multiple delays lead to maternal deaths, indicating the need for a properly functioning health system, along with community awareness to reduce maternal morbidity and mortality.

According to a study conducted as systematic reviews of the third delay(9), reasons have been explored worldwide that why women die even when they manage to reach a health facility on time. The most commonly cited barriers were inadequate training/skills mix (86%); drug procurement/logistics problems (65%); staff shortages (60%); lack of equipment (51%) and low staff motivation (44%). The World Health Organization estimates that at least 88–98% of maternal deaths can be averted with timely access to existing, emergency obstetric interventions.

Human resource issues were the most common barriers reported across the literature, mentioned by 41 of the 43 papers. Within this category, it would seem the greatest problems relate in one way or another to training of personnel, as this barrier was cited in 37 articles. There were several accounts of inadequate training resulting in fatalities or near-miss events.

Several studies(10)(11) reported that educational opportunities for health workers were overwhelmingly deficient due to the absence of continuing education programmes, adequate formal training and a habit of self-learning, as well as poor access to up-to-date educational resources. The next most cited barriers were staff shortages followed by staff motivation issues.

Amongst drugs and equipment, Lack of safe blood supplies for transfusion was also a major problem identified. Articles mentioned appropriate storage facilities for drugs and blood were not available, and so products became spoiled due to storage at incorrect temperatures.

Many articles stated inadequate clinical guidelines or poor policy environment as a factor contributing to sub-standard maternal care for e.g.: improper or no use of partogram.

In terms of facility's infrastructure, poor hospital infrastructure was identified and the most frequent barrier explicitly reported within this category was a shortage of power and/or water. It was also seen that the major factor causing delay to treatment is theatre-related (12). Not all hospitals have a theatre but even in those that do, surgical services may be irregular and not accessible 24 hours per day.

Another delay related to transfusion facilities. Many articles stated that the lack of blood delayed treatment, but some papers found that a number of hospitals did not even have

a blood bank. The proportions of blood banks have been particularly found low in poor regions of Ghana, India and Kenya.

Another barrier which was identified was poor referral facilities. It is alarming that even when conditions are identified that require more sophisticated care, providers are sometimes unable to, or worse, unwilling to arrange referrals. Many articles highlighted referral-related issues reported that inadequate emergency transport contributed towards maternal mortality.

It was very evident and clear from this study that over the years encouragement given to institutional deliveries won't sustain if quality of care is not improved for women who are reaching the door steps of healthcare facility. Indicators such as the 'time from arrival to definitive treatment' or the 'percentage of women with obstetric complications treated within two hours at a health facility' have been proposed. Simple, replicable tools to assess facility-level barriers are badly needed to assist health managers in identifying facilities that deliver sub-optimal care, and in both making and monitoring the required improvements.

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