A Retrospective Study for Analysis of Maternal Deaths by Using Verbal Autopsy in Gadag District Karnataka

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Abstract

Background: *Maternal mortality is one of the most sensitive indicators of the health disparities between poorer and richer nations. It is also one of the most difficult health outcomes to measure reliably. In many settings, major challenges remain in terms of both measuring and reducing maternal mortality effectively. In this study we have assessed the specific causes and evaluate local interventions in relation to efforts to reduce maternal mortality in Gadag district, Karnataka, India.*

Objectives: *To determine the causes of maternal mortality by verbal autopsy and suggest local intervention in Gadag district.*

Methodology: *A retrospective analysis of case records was conducted in Gadag district, Karnataka. After seeking permission from the district health officer and district reproductive child health officer of Gadag, district. A checklist (audit report) was used for collection of reports. Data was obtained by visiting the community based on the addresses given in the records and also investigated the case of Maternal Mortality Ratio (MMR), and Neonatal Mortality Rate (NMR) in the same community by interviewing the family members with the help of Verbal Autopsy.*

Result: *7 Cases were interviewed; all the maternal deaths had occurred in the age group of 21-30 years. The gravida distribution of these 7 cases (Primi-3, multi para-4). Among them 3 women had primary schooling, 2 had up to middle school and 1 was graduate and another women was illiterate. All the deceased were from Below Poverty Line families. Cause of the deaths Cardiac Respiratory Failure, Post-Partum Hemorrhage and Sudden Cardiac Arrest. While 4 deaths are attributed due to delayed decision and transport of complicated cases and 3 deaths occurred due to institutional inadequate facilities at health centres.*

Conclusion: *Study helped to understand the factors affecting maternal mortality in Gadag district. While poor hospital services contributed the maximum, timely transportation and decision making also majorly contributed to cause of deaths.*

Keywords: *Maternal mortality; VA-NHM model; Retrospective study; Maternal Mortality Ratio (MMR) Causes; Verbal Autopsy; Maternal Deaths.*

1. INTRODUCTION

Reducing maternal mortality has been a constant struggle globally. Although developed regions have shown a steep decline in maternal deaths, developing world continues to contribute inordinately to the total maternal deaths. The Millennium Development Goal (MDG) 'five' focused on reducing maternal mortality and achieving universal access to reproductive health care (1).

A 2010 review of maternal mortality in 181 countries spanning 1980–2008 revealed that in 2008, 50% of all maternal deaths occurred in only six countries (India, Nigeria, Pakistan, Afghanistan, Ethiopia, and the Democratic Republic of the Congo) all of which have experienced recent armed conflict. For over a decade, the 10 countries ranked lowest on the Save the Children's 'State of the World's Mothers Index' have been conflict and post-conflict states (2).

India is one of the countries with a high maternal mortality ratio (MMR) and the highest (136,000) estimated number of maternal deaths. The main causes of maternal mortality in India are hemorrhage, sepsis, abortion, hypertensive disorders, and obstructed labor.MMR for India was 407 by SRS 1997 estimates and came down to 301 per 100,000 live births by SRS 2003 estimates. Going by this pace we would achieve the MMR of 195 by the year 2012 and of 160 by 2015, far from the NRHM goal of 100 per 100,000 live births by 2012 or Millennium Development Goal of 109 per 100,000 live births by 2015. Orissa being an Empowered Action Group (EAG) state has a high MMR of 358 per 100,000 live births. (3)

A target was set by the millennium development goal to reduce MMR by 75% in the year 2015.2 During the year 2013 MMR in developed and developing countries was 16/100,000 and 230/100,00 live births respectively in which chief input of the global maternal deaths was from African region alone (62%) followed by Southern Asia (24%).(4)

Some of the national average key indicators as per DLHS2 have shown that 75.2% mothers had attended any ANC visit and 51.1% had seen 3 or more visits. 47% had institutional deliveries. 46.6% women have received iron folic acid tablets. Only 47.9% women undergo post natal checkup.According to Annual health survey 2010-11 maternal mortality ratio of Madhya Pradesh is 310. If we analyze the division wise data of MMR we found that Shahdol ranks highest among all 10 divisions with 435 MMR following Sagar (397), Rewa (336), Chambal (311), and Jabalpur (310). (5)

With an estimated 27 million annual incidents of maternal morbidity globally, how they are manifested or experienced is diverse and shaped by societal, cultural and personal influences. Using qualitative research to examine a woman's perception of her pregnancy, its complications, and potential long-term impact on her life can inform public health approaches and complement and inform biomedical classifications of maternal morbidities, historically considered a neglected dimension of safe motherhood (6, 11, 12).

 In 1996 maternal health services (safe mother hood) were combined with Reproductive and child health programs. This program was newly integrated with maternal health components with reproductive health programs (MOHFW:

1997 ;1998) to provide definite basic health services i.e. ANC cares, Institutional Deliveries or Home Deliveries assisted by skill birth attends, PNC: Post natal check-ups-three time after delivery (7,13,14).

Approximately 529,000 women die from pregnancy-related causes annually and almost all (99%) of these maternal deaths occur in developing nations. One of the United Nations' Millennium Development Goals is to reduce the maternal mortality rate by 75% by 2015. Causes of maternal mortality include postpartum hemorrhage, Eclampsia, obstructed labor, and sepsis. Many developing nations lack of adequate health care and family planning, and pregnant women have minimal access to skilled labor and emergency care (8,15,16).

The maternal mortality ratio (MMR) in Karnataka has come down consistently from 108 per lakh births in 2014 – 16, to 2016 – 17 and 62 in 2019 per lakh births, according to the data with the government. Our estimation of maternal deaths was 12 per year (Estimated number of maternal deaths in Gadag district with about 11 lakh population and CBR (Crude Birth Rate 2017) of 17/1000 population and the latest Maternal mortality ratio in Karnataka (62/100000 live births as per TOI report November 2019, Bengaluru) and reported maternal death are 7. (9)

In order to understand the maternal mortality situation in the country better and to map thechanges that have taken place, especially at the regional levels, States have been categorized into three groups namely, "Empowered Action Group" (EAG) States comprising Bihar, Jharkhand,Madhya Pradesh, Chhattisgarh, Odisha, Rajasthan, Uttar Pradesh &Uttarakhand and Assam; "Southern" States which include Andhra Pradesh, Telangana, Karnataka, Kerala and Tamil Nadu; and "Other" States covering the remaining States/UTs; as was done in the previous reports. It is heartening that the Maternal Mortality Ratio of India has declined to 113 in 2016-18 from 122 in 2015-17 and 130 in 2014-2016 (10).

2. MATERIAL AND METHODS

2.1. Study Settings

Gadag is district of Karnataka which has 60 villages and two towns. In which five talukas were selected for the study to conduct. Those five talukas were Gadag-Betageri, Shirahatti, Laxmeshwara, Mundargi, Ron. The data was

collected using both quantitative and qualitative method to determine the causes of maternal mortality by verbal autopsy and to suggest local intervention in Gadag district. Time period of this was from July 2019 to September 2019.

2.2. Study Design

A retrospective Study was conducted to determine the causes of maternal mortality by verbal autopsy in Gadag district, Karnataka.

2.3. Study Subject

Family members of the deceased mother, infant and neonate. Health Personnel involved during the delivery.

2.4. Variables

Independent variables are age, sex, gender, education and occupation, Dependent variable causes of maternal death.

2.5. Data Sources

- A list reported of maternal death in the selected year (1st January 2018 to 31st December 2018) was obtained from District Health and Family Welfare Office (DH&FWO)and Gadag Municipal Birth and Death Registration Office.

- Triangulation of maternal deaths was done by cross-checking DH & FWO numbers with those reported by registrar of births and deaths and major Hospital in the Gadag district headquarter and Towns both in Government and Private sector.

- Visited the communities of the reported 7 cases, checked community level Births & Death Registrar, interviewed birth attendants and community leaders for any additional deaths not reported.

- Standard GOI Verbal autopsy tool was used to find delay stages and causes of death in each case.

2.6. Study Size

Total 7 cases were interviewed in the study.

2.7. Statistical Analysis

The quantitative data was analyzed using SPSS software to generate frequencies and percentages. The qualitative data was analyzed using content analysis.

3. RESULTS

All the 7 maternal deaths had occurred in the age group of 21-30 years. The Gravida distribution of these 7 cases (Primi-3, multi para-4) among the women died 3 had primary schooling, 2 had up to middle school and 1 each was graduate and illiterate. All the deceased were from Below Poverty Line families. Cause of the deaths Cardiac Respiratory Failure, Post-Partum Hemorrhage, and Sudden Cardiac Arrest. While 4 deaths were attributed due to delayed decision and transport of complicated cases and 3 can be attributed to institutional failure.

Table1: *Socio demographic details of the women*

Demographic details	Frequency (no =07)	Percentage (%)
Age of the Mother/Pregnant Women		
<less than 20 years	0	0
20 – 30 years	7	100%
31 – 40 years	0	0
41 – 45 years	0	0
Education qualification -		
Illiterate	1	14.28%
Primary school	3	42.85%
Middle school	2	28.57%
Secondary school	0	0
Intermediate/diploma	0	0
Graduate	1	14.28%
Post graduate	0	0
Religion		
Schedule Caste	5	71.42%
Other Backward Classes	2	28.57%
Others (G)	0	0
Head of the family education		
Illiterate	5	71.42%
Primary school	1	14.28%
Middle school	1	14.28%
Secondary school	0	0
Intermediate/diploma	0	0
Graduate	0	0
Post graduate	0	0
Occupation of mother		
House Wife	1	14.28%
Agri. Labour	4	57.14%
Non-Agri Daily Wages	0	0
Govt. Employee	0	0
Pvt. Employee	0	0
Self-employee/ Business	2	28.57%
Others	0	0

Five of the deceased belonged to Schedule Caste and 2 to other backward communities. Head of the 5 families' education was illiterate. Majority of the women were agricultural workers.2 deaths occurred due to Post-Partum Hemorrhage and mainly due late decision and transportation

of the case to hospitals, 3 cases were reported to be Cardio-Respiratory Failure due to delayed decision and transportation, 2 women died of Sudden Cardiac Arrest post-delivery and one during delivery indicating inadequate institutional facilities and services.

Table2: *Distribution of causes of maternal deaths*

Taluk	ANC Deaths	PNC Deaths	CAUSES OF MATERNAL DEATHS					
			PPH	SCA	CRF	Eclampsia/ PESD VT	PID/ Multiple	APH/ Frequent Abortion
Gadag– Betageri	0	2	1(PNC)	0	1(PNC)	0	0	0
Mundargi	0	2	0	1(PNC)	1(PNC)	0	0	0
Laxmeshwara	0	0	0	0	0	0	0	0
Shirahatti	0	0	0	0	0	0	0	0
Ron	1	2	**1**(PNC)	**1**(ANC)	**1**(PNC)	0	0	0
Total =	1	6	**2**	**2**	**3**	0	0	0

Table3: *Distribution of Types of Delivery*

Times of Delivery (PNC)	Frequency
Vaginal Normal	6
Caesarean/LSCS	0

All the deliveries were vaginal (normal deliveries) among 7 women 6 were died after giving birth to the child but one mother died during her 1st trimester.

Table4: *Distribution of Place of Delivery*

Place of Delivery	Frequency
Home	0
Primary health centre	0
Secondary care centre	2
Private Tertiary care centre	3
Govt. Tertiary care centre	1
Transit	0

4 deliveries were occurred in the tertiary hospital, and 2 deliveries occurred in secondary care hospital. And one mother did not deliver but died during the ANC period.

Table5: *Distribution of Place of Death*

Place of death	Frequency
Home	1
Primary health centre	0
Secondary care centre	1
Tertiary care centre	3 (Pvt)
Transit	2

Findings revealed that 3 deaths occurred private hospital 1 in Secondary care centre government hospital (delay stage 3, service) 2 in transit (Delay stage 2-Transportation) and 1 in home (delay 1st stage in decision making).

3.1. Some Other Death Reasons From Head of the Family Member

These statements were taken either from the head of the family or husband. As per them all the 7 cases occurred had different issues for death. 2 cases according to the head of the family were unnatural. As per them she had personality disorder where in some times she would talk to herself, or shout in her sleep without any reasons. She did not mingle with her family member.

They feel her death might be due ghost possession. (But as per the medical report it was clear that the death was due to sudden cardiac arrest). The above said reasons as per the family members were due to their lack of awareness).

4. DISCUSSION

Trends in MMR among different groups, Gadag district as per the table 1, all the maternal deaths that have occurred in a span of 1 year is in the age group of 20 – 30 years, majority of the women just had the education level of primary and middle school. This was due to less education they were not aware about the complication that would occur during pregnancy or after in the PNC period.

As per the (Table 2) says that majority 6 of the death had occurred in the PNC period. Mostly the reasons were due to Post – Partum Hemorrhage and Sudden Cardiac Arrest and who used ambulances versus those who did not, and in the district who have mobile phone coverage versus those who did not were compared.

Distance to nearest district health center, presence or absence of mobile telephone coverage, whether ambulances were used to transport deliveries were also checked, and Impact analysis (deaths averted) of the ambulance program in the Gadag district were computed.

A capture-recapture assessment was undertaken aiming to compare three different data sources to better understand the performance of Family Folders for collecting community health information. Certain demographic, maternal

health and child health data elements were selected for comparison between the three data sources and defined in terms of a 1-year study period from January 1st, 2018 to December 31st, 2018. Patterns of completeness and accuracy of the selected data elements were compared between two data sources: (1) Data abstracted from the Family Folders of sampled households using a specifically designed data abstraction form; (2) Data from a two-part household survey of the sampled households on demographic information, reproductive and child health, using a specifically designed GOI Verbal Autopsy form used in the study.

4.1. Causes of Death

In the current study it was found that two deaths occurred due to post-partum hemorrhage, similar findings found in study conducted at Indonesia(17).

A similar study was conducted in Bangladesh on causes and contributing factors on Maternal deaths found that out of 571 maternal death 78.8% deaths occurred were in postpartum period. The most common cause of death was hemorrhage (38%), followed by eclampsia (20%) and sepsis (8.1%)(18).

Out of six deaths three deaths occurred due to cardio-respiratory failure, similar findings found in study conducted at Assam(19).

In our analysis two deaths occurred due to sudden cardiac arrest, a similar cause of death reason found in study conducted by Government of India in National Representative Survey(20).

4.2. Place of Death

In our analysis four deaths occurred in Tertiary care health centres i.e. three in private tertiary care health centre and one in Government health centre. A study conducted at Odisha found the similar findings(21).

4.3. Deaths Due to Lack of Transportation Facility

In our analysis two deaths occurred due to lack of transportation facility in healthcare centre, a similar findings found in study conducted at Assam, India.(22)

5. CONCLUSION

This study contributes to understanding the status of and factors affecting maternal mortality in Gadag district. Lack of hospital services contributed the maximum, timely transportation and decision making are the leading

contributions for causes of death. Therefore, they need to be fully prepared for shifting the complicated delivery case to a well-equipped hospital which has facilities for caesarian section and blood transfusion.

RECOMMENDATIONS

- Creating awareness among the pregnant women about pregnancy and its complications.

- Equipping the all health centers with basic services and facilities.

- Ensuring availability of EMOC services and human resource at all healthcare centres.

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