Original Article

Quality Assessment of Maternal Death Review: A Pilot Study in 10 High Priority Districts of Odisha State, India

Sushree Samiksha Naik, Nirmal Kumar Mohakud[1], Abhipsa Mishra[2], Mirabai Das[3]

Department of Obstetrics and Gynecology, AIIMS, Departments of [1]Pediatrics and [2]Department of Obstetrics and Gynecology, Kalinga Institute of Medical Sciences, KIIT Deemed University, [3]Department of Medical, Kalinga Institute of Social Sciences, Bhubaneswar, Odisha, India

Abstract

Background: Maternal death review (MDR) is a strategy that helps in identifying gaps in the care of a pregnant mother. **Objectives:** The objective is to assess the quality of MDR, causes of maternal mortality, and finding corrective action in 10 high-priority districts of Odisha. **Materials and Methods:** MDR was undertaken by our team in 4-month timeline (August to November 2014). It included the development of tools, desk reviews, training of staffs, and data handling. The maternal deaths were estimated from the Annual Health Survey. It was compared to estimated maternal death of each district to get the under reporting/over reporting districts. A report was generated on MDR process indicators and program indicators after completion of the assessment. **Results:** Only 129 (52%) of the 247 deaths found suitable for community-based MDR. The proportion of maternal death reported versus estimated was 247 versus 367. Correct diagnoses were reported in 120 cases. The classification of deaths was not mentioned in 74 cases. Maximum deaths (55%) were in 18–25 years of age group (the most common cause being anemia). Majority (50%) of the deaths occurred during the postnatal period and majority (67%) at the health facility. Only 61 (47%) had received antenatal check-ups. Facility-based MDR showed, Type 1 delay (denotes about seeking care) being the most common (53%). Inaccurate and incomplete information available was also found to compound the above problems in addition. **Conclusions:** The present study could contribute to a larger extent to address some of the gaps in the MDR process in the Odisha state.

Keywords: Maternal mortality, death review, SWOT analysis, process indicators, prevention

Introduction

Maternal mortality is an important preventable vital statistics that has still not achieved full control. However, the ratio has been declining from 167 in 2011–2013 to 122 in 2015–17, registering a 26.9% decline since 2013.[1,2] Most mortalities can be still averted if the following factors could be handled timely delays in seeking obstetric care, delay in reaching and receiving treatment in the health facility.[3,4] Maternal death review (MDR) is a strategy that helps in identifying gaps in the care (medical and social) of a pregnant mother, which need to be addressed to make the service provision or utilization much better.[4-6] Various approaches for MDR include – (i) clinical audit, (ii) facility/hospital-based MDR (FBMDR), (iii) community-based MDR (CBMDR)/verbal autopsy, (iv) confidential enquiries, and (v) surveys of severe morbidity (near miss).[5] With high maternal mortality rate (MMR), both FBMDR and CBMDR, with low MMR, surveys (confidential and near-miss), and with least MMR, clinical audit is used.[7-9] Various pilot-projects on CBMDR have been undertaken in different parts of the country.[10-14] In the year 2011, the Government of India implemented FBMDR and CBMDR in all the states.[15] Our objective was to assess the quality of MDR, causes of maternal mortality, and finding corrective action in 10 high-priority districts (HPDs) of Odisha.

Materials and Methods

Study design

This was qualitative study of MDR process.

Access this article online

Quick Response Code:

Website: www.ijcm.org.in

DOI: 10.4103/ijcm.IJCM_321_19

Address for correspondence: Dr. Nirmal Kumar Mohakud, Department of Pediatrics, Kalinga Institute of Medical Sciences, KIIT Deemed University, Bhubaneswar, Odisha, India.
E-mail: nirmal.mahakud@kims.ac.in

How to cite this article: Naik SS, Mohakud NK, Mishra A, Das M. Quality assessment of maternal death review: A pilot study in 10 high priority districts of Odisha State, India. Indian J Community Med 2020;45:184-8.

Received: 05-08-19, **Accepted:** 24-02-20, **Published:** 02-06-20.

Study setting

Ten HPDs of Odisha state. Odisha is an Eastern Indian state bounded by West Bengal, Jharkhand, Chhattisgarh, Andhra Pradesh, and the Bay of Bengal. Odisha has a population of 4.19 crore. There are 30 districts, 314 blocks, and 51349 villages. The MMR in the state during 2010–2012 censuses was 235 (against 178 of the national average) per 100,000 live births.

Routine community-based maternal death review process in Odisha

The health workers record and notify the maternal deaths routinely to the Medical officer of the Primary Health Centre (MO PHC) within 24 h. MO PHC then informs the Senior Public Health Officer (SPHO) within the next 24 h. The line-list of maternal deaths is maintained by SPHO and then submitted to district authorities every month. In addition, SPHO within 3 weeks of a death conducts verbal autopsy, as per the standard procedure laid down by the Government of India. Data are then compiled and investigated by the District Nodal Officer (DNO) for MDR and MDR Committee (chaired by the Collector). District MDR Committee includes obstetricians, nursing professionals, health administrators, nongovernmental organizations (NGOs), and ambulance services. The committee reviews and recommends interventions, and then submits it to the State MDR committee. State MDR committee also provides feedback and conducts training of SPHOs and DNOs.

Methodology

In 2011, Odisha initiated CBMDR. As the program was not getting implemented properly, the Government of Odisha, along with UNICEF sought technical support from a team at Kalinga Institute of Medical Sciences (KIMS), Bhubaneswar, for operationalizing MDR. The support soughted were guideline development, technical assistance in operationalization, and analysis of MDR findings in 10 HPDs of total 30 districts. The HPDs included Bolangir, Boudh, Gajapati, Kalahandi, Kandhamala, Koraput, Malkangiri, Nabarangapur, Nuapada, and Rayagada. These districts had moderate to high MMR and comprised of large tribal populations. The total population of these districts was around 98 lakhs (23.3% of total Odisha population), and the MMR was 305 (against 235 average of Odisha state) per 100,000 live births.

For the present study, the technical audit team consisted of six experts (medical/public health), and seven assistants. During 4 months (August 2014–November 2014), study timeline, development of tools (data entry application using softwares-EPI INFO version 7 and Microsoft Excel 2007), desk reviews (state level desk research and analysis of available MDR data), training of staffs, and data handling (starting from data collection at facility level to data sharing with Government) were done. A report was generated on MDR process indicators and program indicators after completion of assessment in 10 HPDs. Training of the DNOs and SPHOs was conducted by the State Government.

Role of technical audit team: The team from KIMS Bhubaneswar helped in operationalization and MDR process assessment in the following two steps:

a. Step one: In-depth analysis (SWOT analysis) was done [Table 1]. The gaps were rectified after meeting with the concerned officials. A framework for monitoring data collection, reporting, and monitoring quality was developed
b. Step two: The team helped DNOs in analyzing and interpreting the data. Review meetings were attended with documentation of proceedings that helped in making recommendations as well as monitoring of the plans.

Ethical approval

Ethical approval was provided by the Ethics Committee of KIMS Bhubaneswar. Before verbal autopsy, informed, written consent was obtained. The confidentiality of data was maintained as per the policy. The present study methodology is similar to other studies on MDR process.[16]

Results and Assessment

As per the data source, the reported data from the different sources were unequal when collected form ICDS, Health

Table 1: Strengths, weaknesses, opportunities and threats analysis at baseline

Strengths	Weaknesses
The Odisha state administration is committed for proper MDR with provision of support, and inter-sectorial coordination (in case needed)	Monitoring of maternal deaths in the state is not fully operational
Government of India guidelines and tools for MDR are there for implementation at state level	No mechanism for assuring quality of MDR process including that from private facilities existing in the state
The electronic and print media in Odisha state are reporting the maternal deaths thereby putting pressure on the Government for taking steps to reduce the MMR	There is no provision of technical guidance to districtsby the state government to report and monitor MDR (e.g., health staffs not sensitised regarding reporting, district level program officers not clear about their roles)
Trained health staffs are already there for conduct of verbal autopsies	Fear of punitive action among health staffs
	There is an overall poor record keeping, and HMIS in the state
Opportunities	**Threats**
Greater oppurtunity in the area of maternal death surveillance present	There is a nonconfidentialexistence of MDR process at district level due to various reasons
There is opportunity to regulate private sector service quality for better MDR, and MMR reduction	Electronic and print media hyping and blaming hospitals and dramatizing the events

MDR: Maternal death review, MMR: Maternal mortality rate, HMIS: Health management information system

Management Information System, and MDR. The maternal deaths were estimated from the Annual Health Survey. It was compared to estimated maternal deaths of each district to get the under reporting/over reporting districts. It was observed that under reporting of cases were found in the eight districts, except Bolangir and Boudha.

The indicators used to assess implementation are described here in detail. It was noticed that all the 16 Level 3 facilities were eligible institution for conducting FBMDR, but surprisingly, no facility-based review meetings were conducted in spite of having the committee. District level meetings were going on under the chairmanship of district magistrate, quarterly or monthly. The line listing of maternal deaths should be equal to reported maternal deaths; however, of 247 line listing, only 129 cases were reported in the MDR format. Only 129 (52%) of the 247 deaths found suitable for CBMDR. The proportion of maternal deaths reported versus estimated was 247/367 (67%). The number of deaths investigated through district meetings was 123/129 (95%). Seven of the 10 districts (70%) were reporting >60% of estimated maternal deaths as well as conducting monthly MDR meetings. Six of the 10 districts (60%) were investigating the deaths in detail. There was not a single planned intervention that was implemented successfully and no involvement of community through organizations and NGOs. The number of actionable interventions planned was five. Regarding the quality of diagnosis in 129 cases, 120 reported correct diagnosis, 2 reported incorrect diagnosis, and in 7 cases diagnosis were not mentioned. Regarding the classification of deaths in 129 cases, there was no mention in 74 cases, incorrect in 31 cases, and correct in 24 cases. Regarding the classification of indirect obstetric causes of death in 129 cases, no mention was there in 53 cases, incorrect in 26, and correct in 50.

Challenges faced and action initiated for enhancing the MDR process are shown in Table 2. Our team conducted 22 (17%) verbal autopsies to validate SPHOs observations (16 were correct diagnosis, but the incompletely written verbatim put hindrance to understand various factors that contributed to the deaths). Measures were suggested to improve the deficiencies.

Maternal death profile: Of 129 cases, maximum number of deaths were in the age group of 18–25 years (n = 70, 55%). The causes were: anemia (n = 49, 38%), postpartum hemorrhage (PPH) (n = 21, 16.3%), hypertensive disorders (n = 16, 12.4%), obstructed labor and ruptured uterus (n = 11, 8.5%), infection/sepsis (n = 10, 7.8%), not mentioned (n = 6, 4.7%), antepartum hemorrhage (n = 5, 3.9%), pulmonary embolism (n = 5, 3.9%), heart disease (n = 2, 1.6%), abortion (n = 2, 1.6%), sudden death (n = 1, 0.8%), and jaundice (1, 0.8%). Majority (50%) of the deaths occurred during the postnatal period followed by antenatal period (29%). Nearly, two-third of deaths occurred during the 1st week after delivery and majority (67%) at the health facility. Of 129 death cases, only 61 (47%) had received antenatal check-ups (ANCs). In the majority (32%), case sheets were not filled up regarding the ANC. From the FBMDR sheet, the classification delay noticed that the maximum number of deaths due to delay (Type 1) in seeking care was 68 (53%), and 23 (18%) were secondary to delay (Type 3) in receipt of care. Home delivery, inappropriate referral, and poor transport system contributed to the delays. The ambulance service had a poor access to the tribal areas. A pregnant woman went to 2–3 facilities prior to reaching the target. Neither there was any standard referral protocol nor slips were given from referring facilities.

Key intervention areas were pointed out. These were identified based on CBMDR, and included – (a) training sessions for nurses and midwives for picking up danger signs postpartum; (b) education of mothers regarding mandatory postpartum care (including home based) prior to discharge; (c) provision of injectable iron through PHCs; (d) training of health staffs in periphery regarding the protocols for anemia, PPH, and hypertensive disorders; and (e) tribal area community

Table 2: Challenges faced and action initiated for enhancing the maternal death review process

Challenges faced	Measures to address the challenge
Lack of understanding among nodal officers about MDR process	Repeated visits, organization of orientation sessions, and facilitation by helping in interview conduction
Error in the diagnosis and recording	Organization of orientation sessions, and evaluation of each case at district level with clearance of doubts
Incorrect/incomplete filling of MDR formats	Organization of orientation sessions
Death review of all cases not being done with missing of some death cases	Organization of orientation sessions with emphasis on importance of covering all deaths to all the health staffs, and involvement of vital registration system
Focus on on medical causes and ignoring nonmedical causes of death	Re-orientation sessions conductedfor identifying nonmecical/social causes
Blaming of staff and private practitioners	Repercussions of this problem explained, and advise given to take a supportive/supervisory role
Under and nil reporting due to the fear of punitive action	Organization of orientation sessions
Under reporting from tribal areas	Organization of orientation sessions, and approached community volunteers and social activists for support
Lack of private sector participation	Approached obstetrics and gynecology societies for support

MDR: Maternal death review

mobilization programs. These suggestions by the technical audit team were implemented in problem districts.

Discussion

Maternal mortality

The present study found a large discrepancy in the line-listing and reporting of maternal deaths including reporting in improper MDR formats. Nearly half of the deaths reported were found suitable for CBMDR, and the classifications were not mentioned in nearly 60% cases. There was a high death rate (55%) reported in the reproductive age group with less than half receiving ANCs. FBMDR showed Type 1 delay (denotes about seeking care) being there in more than half cases.

In the present study, the profile of maternal mortality was similar to previously published studies.[7,16-18] Regarding the types of delays, Bangladesh has Type 1 and 2,[17] whereas Indonesia has Type 1 and 3 being common.[19] Unlike other studies, in the present study, almost all death cases had received some ANCs. The transport system to health facilities in tribal regions was found to be problematic. High-risk pregnancy diagnosis was missed, and there was few improper referral. The present study emphasizes improving the quality of these parameters.

Maternal death review operation in 10 high-priority districts

The 10 HPDs were at various levels of progress in implementing MDR at the end of the study period. MDR is an important activity that needs to be completely ingrained in the health system to produce maximum impact.[20] Although India's success story was penned from one of its state (i.e., Tamil Nadu), other states still struggle to achieve this.[18,21] A state level expert team can help provide adequate supports to the districts for using information efficiently and developing appropriate interventions. One brilliant example is Indonesia that reported success of MDR because of the following reasons – (a) health-care provider and policy-maker accountability, and (b) better working relationships among health-care providers at different levels including the one between the community and the provider.[19] One important point to remember is that MDR has tremendous impact only if investment is made in addition to the above to assess data accuracy and reporting completeness.[22]

There have been reports of submitting inaccurate or inadequate MDR formats, and then putting the blame on junior staff for the same.[19,23] This can be prevented or eliminated by third party involvement and sensitization of health-care personnel.[20] As per the observation, though the staff were recording all reproductive age group deaths, still there was chance that early pregnancy deaths and deaths after illegal abortion (women are not usually aware of them) could have been missed. The technical audit team advised that the SPHOs and PHC MOs should be included in the review meetings conducted at district level and be provided with supports whenever necessary to allay the fear of disciplinary actions. Regarding incorrect diagnosis and recording, and incomplete or incorrect filling of MDR formats, frequent orient sessions should be organized. The involvement of obstetricians in private sector is also important, and to strengthen the same the private associations should be approached. To increase reporting from tribal areas, orient sessions need to be organized with social activists and community volunteers. Last but not the least, besides focusing on medical causes, nonmedical causes (e.g., social) should also be focused on.

Data confidentiality

The findings of the review process were kept strictly confidential, and as per the policy, the detailed proceedings were not shared with any media. The interventions consisted mostly of existing program strengthening by identifying solutions at local level. The problem in the referral system, transportation, and communication in tribal areas would require state rather than district level planning.

Limitations

Although our team provided good technical support, still some of the processes could not be changed. Around one-third of reported MDR could not be done. In spite of sensitizations and review meetings, the SPHOs could neither provide feedback nor involve NGOs or community leaders in the planning and assessment of said interventions. Finally, other sectors including road and communication system were not involved to redress the factors related to the system other than the health.

Conclusions

The present study could contribute to a larger extent to address some of the gaps in the MDR process in Odisha state. The MDR impact on the health system cannot be sustained unless the capacity of staffs is enhanced, and the information accuracy as well as completeness is ensured at district level. Last but not the least, resource investments in addressing concerns hampering effective implementations should be done at the state level.

Acknowledgements

The authors are grateful to the Government of Odisha, Heath, and Family Welfare Department for providing financial assistance toward this MDR study. Authors are also thankful to the MDR audit team for their hard work together the information and our heartfelt thanks to Dr. A.K.Sen, UNICEF for coordinating all the work with the Government of Odisha. We are thankful Mr. Rajesh Kumar Nayak for his help in audit process.

Financial support and sponsorship

This study was supported by Government of Odisha, Health and Family Welfare Department.

Conflicts of interest

There are no conflicts of interest.

References

1. Rai RK, Tulchinsky TH. Addressing the sluggish progress in reducing maternal mortality in India. Asia Pac J Public Health 2015;27:NP1161-9.
2. Registrar General, India. Special Bulletin on Maternal mortality

in India 2008-2017. Sample Registration System Bulletin; 2017. Available from: http://censusindia.gov.in/vital_statistics/SRS_Bulletins/SRS_Bulletin-Rate-2017-_May_2019.pdf. [Last accessed on 2020 Jan 24].
3. Gupta N, Kumar S, Saxena NC, Nandan D, Saxena BN. Maternal mortality in seven districts of Uttar Pradesh – An ICMR task force study. Indian J Public Health 2006;50:173-8.
4. WHO. The World Health Report 2005: Make Every Mother and Child Count. Geneva: WHO; 2005.
5. WHO. Beyond the Numbers: Reviewing Maternal Deaths and Complications to Make Pregnancy Safer. Geneva: Department of Reproductive Health and Research, WHO; 2004.
6. Pearson L, deBernis L, Shoo R. Maternal death review in Africa. Int J Gynaecol Obstet 2009;106:89-94.
7. Kongnyuy EJ, Mlava G, van den Broek N. Facility-based maternal death review in three districts in the central region of Malawi: An analysis of causes and characteristics of maternal deaths. Womens Health Issues 2009;19:14-20.
8. Hoffman JJ, Ndemera SM. Review of community based maternal deaths in Mangochi district. Malawi Med J 2005;17:81-4.
9. Mathai M. Reviewing maternal deaths and complications to make pregnancy and childbirth safer. WHO Reg Health Forum 2005;9:27-9.
10. Barnett S, Nair N, Tripathy P, Borghi J, Rath S, Costello A. A prospective key informant surveillance system to measure maternal mortality – Findings from indigenous populations in Jharkhand and Orissa, India. BMC Pregnancy Childbirth 2008;8:6.
11. UNICEF. Maternal and Perinatal Death Inquiry Response: Empowering Communities to Avert Maternal Deaths in India; 2008. Available from: http://www.unicef.org/india/MAPEDIR-Maternal_and_Perinatal_Death_Inquiry_and_Response-India.pdf. [Last accessed on 2019 Jun 20].
12. Raj SS, Maine D, Sahoo PK, Manthri S, Chauhan K. Meeting the community halfway to reduce maternal deaths? Evidence from a community-based maternal death review in Uttar Pradesh, India. Glob Health Sci Pract 2013;1:84-96.
13. Prakasamma M. Maternal mortality-reduction programme in Andhra Pradesh. J Health Popul Nutr 2009;27:220-34.
14. Tayade S, Bagde M, Shivkumar PV, Tayade A, Bagde N. Maternal death review to know the determinants of maternal mortality in a district hospital in central India. IJBR 2012;3:157-63.
15. Maternal Health Division, New Delhi. Maternal Death Review: Guidebook. Government of India. New Delhi: Ministry of Health and Family Welfare; 2010. Available from: http://www.nrhmorissa.gov.in/writereaddata/Upload/Documents/MDR%20Guidebook.pdf [Last accessed on 2019 Jun 20].
16. Singh S, Murthy GV, Thippaiah A, Upadhyaya S, Krishna M, Shukla R, *et al*. Community based maternal death review: Lessons learned from ten districts in Andhra Pradesh, India. Matern Child Health J 2015;19:1447-54.
17. Khanam RA, Khan M, Abdul Halim M, Begum K, Jahan S. Facility and community based maternal death review in Bangladesh. Bangladesh J Obstet Gynaecol 2009;24:18-21.
18. Kongnyuy EJ, van den Broek N. The difficulties of conducting maternal death reviews in Malawi. BMC Pregnancy Childbirth 2008;8:42.
19. Supratikto G, Wirth ME, Achadi E, Cohen S, Ronsmans C. A district-based audit of the causes and circumstances of maternal deaths in South Kalimantan, Indonesia. Bull World Health Organ 2002;80:228-34.
20. Berg CJ. From identification and review to action – Maternal mortality review in the United States. Semin Perinatol 2012;36:7-13.
21. SAMA. Maternal Deaths and Denial of Maternal Care in Barwani District, Madhya Pradesh: Issues and Concerns; 2011. Available from: http://www.esocialsciences.org/Articles/showArticle.aspx?acat=Reports &aid=3724. [Last accessed on 2019 Jul 14].
22. World Health Organization. Time to Respond: A Report on the Global Implementation of Maternal Death Surveillance and Response (MDSR). Geneva: World Health Organization; 2016. Available from: http://www.who.int/maternal_child_adolescent/documents/maternal_death_surveillance_implementation/en/. [Last accessed on 2019 Jul 14].
23. George A. Persistence of high maternal mortality in Koppal district, Karnataka, India: Observed service delivery constraints. Reprod Health Matters 2007;15:91-102.