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

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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.[1,4] 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).[7] 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.

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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 (chair 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 districts by 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 opportunity in the area of maternal death surveillance present | There is a nonconfidential existence 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 SPHOfs 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 following 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 antenatal 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 not 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 conducted for identifying nonmedical/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. Regarding the types of delays, Bangladesh has Type 1 and 2, whereas Indonesia has Type 1 and 3 being common. 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. Although India's success story was penned from one of its state (i.e., Tamil Nadu), other states still struggle to achieve this. 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. 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.

There have been reports of submitting inaccurate or inadequate MDR formats, and then putting the blame on junior staff for the same. This can be prevented or eliminated by third party involvement and sensitization of health-care personnel. 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.

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**Conflicts of interest**

There are no conflicts of interest.

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