Expert Opinion

Maternal Deaths Surveillance and Response System: A Case of Nepal

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Abstract

The objective of this paper is to share Nepali experience of maternal death surveillance and response in reducing preventable maternal deaths. Secondary data, mainly an assessment report of Maternal and Perinatal Death Surveillance and Response system, is used in developing this paper. To bridge the information gap, informal discussions were held with key informants. Reducing maternal mortality is an unfinished agenda of millennium development goals, which is carried over to sustainable development goals era. Nepal, building on an on-going initiative of Maternal Death Review, established a Maternal and Perinatal Death Surveillance and Response system. It comprises: (a) maternal death review and response in community; and (b) maternal death review and response in hospitals. Until 2019, 11 districts implemented the former component, while 77 hospitals practiced the latter. The main reason underlying maternal death was delay in getting adequate care. Social factors contributed to delay in 89.6% of cases, while in 10.4% of cases, it was attributed to factors in health care. The paper concludes that public health measures and improved service quality was key in preventing maternal deaths. It is, however, imperative to undertake an in-depth review and thereby define interventions for strengthening and upscaling the initiative.

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Introduction:

Countries, to reduce maternal and perinatal mortality rate, have implemented initiatives with varying degree of dividends. In Southeast Asia, for example, Bangladesh implemented MPDR (maternal and perinatal death review). This initiative facilitated data management for maternal mortality rate (MMR) and neonatal mortality rate (NMR), although difficulties were observed in capturing all deaths, and making distinction between stillbirths and new-born deaths. Indonesia introduced Maternal and Perinatal Death Surveillance and Response system (MPDSR), which contributed to the country's progress on key indicators. Likewise, in Myanmar, the community based maternal death review (CBMDR) and facility based maternal death review (FBMDR) was a major factor in reducing MMR from 453 per 100,000 live births in 1990 to 178 per 100,000 live births in 2015. It is in this vein that in 2015-16, Nepal Ministry of Health and Population (MOHP), building on Maternal Death Review (MDR) that was on-going in hospitals since 1990, established MPDSR system.[1]

The initiative is meant to ensure that all births are wanted, and while every new-born starts a healthy life, there is an end to the preventable maternal and new-born's deaths. It comprises the identification and notification of maternal and perinatal deaths, determining the cause(s), and

preparing an action plan for a health system's response. This initiative is important, because it is likely to impact country's progress towards SDG targets 3.1.1 (Maternal mortality ratio) and 3.2.2 (Neonatal mortality rate). This treatise, however, focuses on maternal deaths surveillance and response, i.e., perinatal mortality is not considered. To bring evidence, a rapid review of Nepal's health sector organisation and management was undertaken and secondary data, mainly from MPDSR system's assessment report is used.[2] This report analyses quantitative data, which was collected over three years (2016 to 2018). Furthermore, to bridge the information gap, informal discussions were held with key informants.

Maternal Deaths and International Response

A maternal death is "the death of a woman while pregnant or within 42 days of the 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".[3] It is measured as maternal mortality ratio (MMR) or "the number of maternal deaths in a calendar year divided by the number of live births for the same period, multiplied by 100,000".[4]

To accelerate progress towards reducing maternal mortality, the United Nations Secretary-General, in September 2010 launched a Global Strategy for Women's and Children's Health.[5] Following that, in December 2010, a Commission on Information and Accountability for Women's and Children's Health (CoIA) was set up for developing a framework to ensure the promises of resources for women's and children's health are kept and that the results are measured. This framework, with accountability at its centre, identifies a core set of indicators for results and resources, proposes an action plan to improve health information systems, and explores opportunities for improving access to information through technology.[6] Technical Guidance on Maternal Death Surveillance and Response (MDSR) was released in 2013[7]. This document builds on continuous learning and action cycle to bolster accountability for maternal health outcomes.[8] It requires, however, a system that measures and tracks maternal deaths in real time, helps understand factors contributing to deaths, and guides actions to prevent future deaths. MDSR is thus a continuous surveillance that links health information system and quality improvement processes from local to national levels.[9] It includes identification, quantification, notification, determination of causes as well as use of this information to respond with actions that will prevent future deaths due to similar causes.[10]

Maternal Deaths in SDGs Era: A Case of Nepal

Reduced MMR is an indicator of better health outcome, which is contingent on a strong and robust health system. Under MDG-5, target 5-A required reducing, between 1990 and 2015, by three quarters, the maternal mortality ratio. Allied target 5-B was to achieve, by 2015, universal access to reproductive health services.[11]

Nepal achieved, to a large extent, MDG-5 A. MMR decreased from 539 in 1996 to 259 in 2016, mainly due to the increasing rate of institutional births, which improved from 18% in 2006 to 57% in 2016[12]. Yet, as an unfinished agenda of MDG-5 A, it was carried forward as SDG-3.1.1 target.[13] It requires reduction, by two third, the global MMR in 2010. Nepal translated this target as reducing MMR to less than 70 per 100,000 live births, by 2030.[14]

In Nepal, maternal deaths occur in hospitals as well as in community. In three years (2016-18), hospitals participating in MPDSR initiative reported 241 maternal deaths, while other 88 were in community. 60% of deaths in community and 72% of deaths in hospitals occurred during post-partum. Major causes were the haemorrhage, pregnancy-related infections, high blood pressure, unsafe abortion, and obstructed labour[15]. According to mortality reviews conducted in hospitals, 70% of maternal deaths were preventable.[16] But, to end or reduce maternal deaths, accurate information on how many women, where, and how they died, is essential. MPDSR system fills this knowledge gap. It comprises surveillance cycle of identification, quantification, notification, and review as a continuum to interpret information and recommend actions to prevent future deaths.[17]

Evolution of MPDSR in Nepal

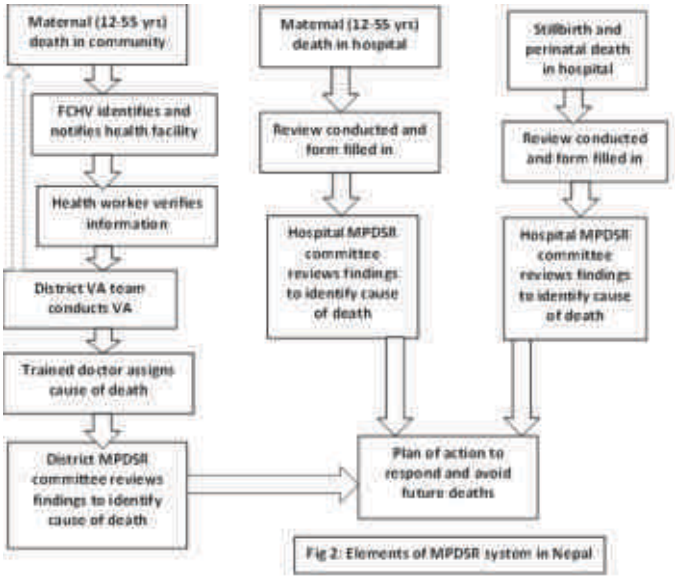
Nepal introduced hospital based maternal death review (MDR) in 1990s.[18] This initiative, after addition of perinatal death review, became maternal and perinatal death review (MPDR), and by 2013, it was implemented in 42 hospitals.[19] In 2015, it was redesigned as MPDSR system to also capture maternal deaths in communities, and response to prevent maternal and perinatal deaths.

The journey of establishing MPDSR system in Nepal involved adapting MDSR Technical Guidance as National Guidelines for MPDSR system.[20] Furthermore, World Health Organization's Verbal Autopsy (VA) tools were adapted for reviewing maternal deaths in community. Also, forms for notification, screening, assigning the cause of death, were developed. Likewise, based on feedback from service providers, tools used in hospitals were revised, and section on action plan was added. In the next step, National MPDSR Committee and a MPDSR Technical Working Group was constituted, and during 2015-16 community based MPDSR was rolled out in five districts.[21] District MPDSR Committees and VA teams were organised. Health workers were trained in conducting VA, while medical doctors were trained in assigning cause(s) of death, based on the information in VA forms. This is important as to reduce maternal deaths, in addition to the round-the-clock availability of emergency obstetric care, the key is to invest in training and skill building of midwives.[22]

The erstwhile MPDR initiative in 65 hospitals, which started reporting maternal and perinatal deaths review in 2017, was redesigned as MPDSR system. Trainings were held for staff in these hospitals to work on MPDSR system.[23] All along this journey, review workshops, supportive monitoring, using standardised checklists, and on-site coaching of District Public Health Officers/ District Health Officers (D(P)HOs and hospital staff were held.[24] A web-based system of recording and reporting mortality data from communities and hospitals was developed. Through this system, districts receive the data, entered at MPDSR system sites, regarding the notification, screening, and verbal autopsy from communities. Likewise, data of maternal and perinatal deaths uploaded at hospitals becomes accessible to (D(P) HOs. The data, both from communities and hospitals, aggregated at district level, is reported to provincial and national levels for analysis.[25]

Elements of MPDSR system in Nepal

Figure 2 is a schematic presentation of MPDSR system in Nepal. The MPDSR system comprises: (a) maternal death review and response in community; and (b) maternal and perinatal death review and response in hospitals. The former includes the Female Community Health Volunteers (FCHVs) identifying and notifying death of women aged 12-55 years to the local health facility, where health worker reviews and screens the information. Following that, the district VA team conducts verbal autopsy of pregnancy-related deaths, and the trained doctors assign cause of death. Finally, district MPDSR Committee reviews findings, and formulates and ensures appropriate response. The (D(P)HOs, with Public Health Nurse as focal person, leads the MPDSR system in districts.[26]

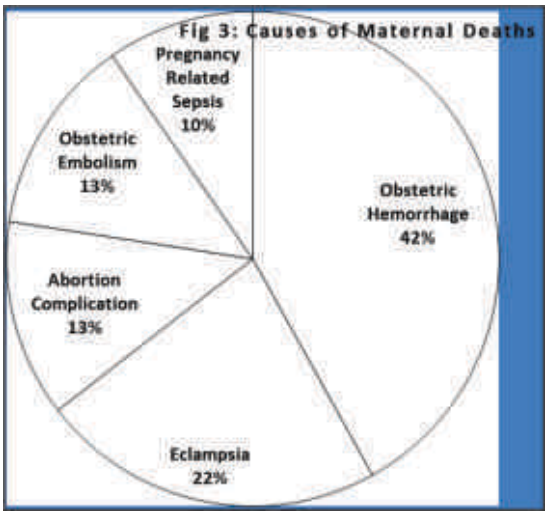


For maternal deaths in hospital, within 72 hours of occurrence, a review form is filled by the medical staff. The hospital MPDSR committee then reviews the causes and circumstances of death and identifies any avoidable factor that could have contributed to death. Also, committee develops an action plan to improve the quality of health care and prevent deaths (of similar nature) in the future. The hospital medical recorder, who is committee

secretary, is responsible to coordinate hospital MPDSR system[27]. However, for still births and early neonatal deaths in hospitals, which is not in the scope of this paper, the MPDSR committee conducts monthly review meetings to delve on the agenda akin to the maternal deaths.

MPDSR System in Practice: Findings of a Review

Physical expansion of initiative: Until 2019, 11 districts implemented community-based MDSR, while 77 hospitals were implementing facility-based MPDSR. The plan was to expand the initiative, by 2020, to 20 districts and 110 hospitals for community and facility based MPDSR respectively.[28]



Cause(s) of deaths: During 2015/2016 and 2016/2017, six districts implementing MDSR notified death of 192 women aged 12-55 years. The health facility staff screened the death reports. It was noted that out of 192 deaths, 48 (25%) were pregnancy related. This finding was verified by the respective D(P)HOs, who conducted verbal autopsy of deaths. As in figure 3, regarding the cause(s), 66% of these were direct, while 26% accounted for indirect maternal deaths, and another 8% were accidental. Out of the direct maternal deaths, 42% were due to obstetric haemorrhage, while eclampsia claimed 22% of deaths. Among other causes, abortion related complications and obstetric embolism each contributed 13% of deaths, and other 10% were due to the pregnancy-related sepsis.[29]

Maternal deaths in hospitals: hospitals implementing MPDSR reported a total of 241 maternal deaths in three years, i.e., 49 in 2015-16, 92 in 2016-17 and 100 in 2017-18. Out of these deaths, 53% of mothers had received antenatal care, while 24% did not, and for the remainder 23% it was not recorded. Also, MPDSR system did not capture the quality of antenatal care. With respect to timing of deaths, 72 % of mothers died during postpartum period, while other 20% died during antepartum period. Only about 6% of maternal deaths happened in the intrapartum period. Major causes of death were obstetric haemorrhage (23%), hypertensive disorder during pregnancy and childbirth (19%), non-obstetric causes (26%), other obstetric causes (15%), pregnancy-related infections (11%), pregnancy with abortive outcomes (5%), and cause for 1% of maternal deaths could not be determined.[30]

Causes of delay and their redresses: Delay in health care provision contributes to maternal deaths; and by virtue of MPDSR system, it was possible to identify the underlying causes of delay. The delay occurred at three stages: firstly, in recognising obstetric emergency; secondly, arranging logistics/transportation for reaching health facility; and thirdly, in the provision of appropriate care at health facility. First two stages relate to social factors, which were prevalent in 89.6% of cases, while health care related factors contributed 10.4% of maternal deaths. Out of the former, 49% (n=118) of deaths were due to delay in seeking health care, while in 41% (n=98) of cases death occurred on way to health facility. Regarding the latter, it was the delay, mainly in providing appropriate care to the pregnant mother, lack of blood and blood products and absence of critical human resource.[31]

The district MPDSR committees, deducing from the causes and circumstances of maternal deaths, devise action plan for avoiding the future deaths. The salient elements of action plan included: firstly, raising awareness at community level by disseminating information about danger signs during pregnancy; secondly, assuring coordination and advocacy for safe roads and bridges, particularly during rainy season, and distribution of calcium tablets to pregnant women and arranging stretchers for transportation; and thirdly, improving service quality at health facilities including strengthening referral system, and improving co-ordination between hospitals and ambulance service providers.

Impediments to implementing MPDSR system: In addition to an incomplete legal framework, the hard-to-reach geographical areas and inequities in health services provision, cultural norms and practices, there

is a weak monitoring and feedback mechanism, inadequate staff both in terms of their availability and capacity, and other resources – all impeding the implementation of MPDSR system. Furthermore, the delayed reporting and notification of cases, poor quality VA at community level in identifying hidden cases of deaths and the underlying causes, and unclear statement of cause(s) of death impede the success of MPDSR[32]. Specifically, regarding VA forms, those are lengthy and incoherent, and information posted in web-based system was often incomplete and rarely used in decision making. Iterating this, a senior government health worker noted, *"information that flows from lower level to the national server is incomplete and thus hard to analyse, and central level does not review/analyse comprehensively and does not provide feedback about the causes of these deaths".*

The principle of *'no name, no blame'* is an important element of maternal death reviews. But, in the case of mishap due to health care related factors, this is not abided by the staff. Confirming this notion, a public sector health facility worker said, *"Currently, we do not have a particular mechanism for ensuring the 'no name, no blame' principle. This principle only exists in paper, as blaming does take place. Hospitals and staff often blame each other."* This is important, particularly during the proceedings for identifying problem, committing themselves, and counselling to prevent such mishaps in the future. Also, coordination mechanism needs to be defined for district and hospital MPDSR committees to encourage participation in review meetings. In this regard, a private sector health worker noted, *"we and district team participate in each other's review meeting. The reports are also shared with each other, but nothing happens in terms of (the required) support and coordination."* Poor or no implementation of action plans and absence of focal persons for follow-up actions and lack of feedback and guidance from higher level are the other factors hindering the implementation status of MPDSR.[33] Vouching to this notion, a public sector health facility worker said, *"No member from the district MPDSR committee is involved is review process of hospital and I do not remember the district ever invited us."*

Discussion:

Nepal has come a long way in implementing MPDSR system. The tenets of the system and the required steps are identified. Also, several documents to provide theoretical basis and guidelines are developed and structures are brought in place. Training and on-site skill building activities has also been conducted, albeit inadequate, as a doctor noted, *"we have confusion regarding what to include in action plans. This shows how much we need refresher trainings at this time".* But there is no evidence that programme has an inbuilt element of professional development.

Despite programme was launched over last 30 years, physical coverage has not been substantive, i.e., by 2015 only 11 out of 77 districts and hospitals were involved in community MPDSR. An incremental approach was used in designing the initiative. Also, while design and development inputs were being made, implementation of initiative continued side-by-side. However, there is no evidence that implementation research or other means of learning lessons were employed to ensure smooth implementation. This, perhaps, contributed to the initiative, upon on ground implementation, had hiccups and teething problems.

The interventions under the initiative were integrated into the routine services delivery for maternal health and to oversee the process MPDSR committees were formed. But there were weak mechanisms for coordination and engagement between different levels: facility, district, province and national. Thus, as one of the consequences, the culture of learning and sharing the experience and feedback did not effectively evolve. In such a situation, the implementation research is a useful tool, but it was included neither in the project design nor in the task list of focal persons, where available.

The initiative, which took root in 1990, was properly documented in 2020. Its design also includes the annual reviews, using often joint government and donors' platform. The latest review conducted in 2018-19 is quite comprehensive and highlights several factors that has hindered the progress of MPDSR system in Nepal. This is potentially an indication of deficiency in 'reviewing the reviews' to draw lessons and devise plans for learning and improving the initiative. It was also noted at facility and district level, where the action plans (as part of

MPDSR system) were though formulated for avoiding the problems contributing to maternal deaths but were rarely implemented. The latter, most likely, is consequent to the trickling down of the former or other way round but needs to be determined.

The implementation of action plan developed as a follow up to maternal death review requires multisectoral collaboration. This is particularly important regarding the social factors responsible for delays in seeking and making services available to a woman in labour specially with complications. But the programme design lacks any mechanism to effectively (by committing resources) bring other sectors on board to improve and enhance results of MPDSR system.

Conclusions and Recommendations

Nepal, to reduce preventable maternal and perinatal deaths, and to contribute to achieving SDG targets, established a Maternal and Perinatal Death Surveillance and Response system. Until 2019, facility-based MPDSR was implemented in 77 hospitals, while 11 districts had implemented community-based MDSR. It revealed that delay in getting adequate care was a major contributor, the MPDSR system facilitated a health system's response to preventing maternal and perinatal mortality through public health measures and improved service quality. However, assessment conducted in 2019 identified strengths and weaknesses of initiative. There is therefore a need of an in-depth review of assessment report and defining and implementing interventions to strengthen and upscale the initiative. Specifically, a culture should be inculcated for accepting the responsibility and community becoming accountable for maternal deaths; and ensuring multi-sectoral approach to addressing social factors responsible for delay.

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