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Implementation Status of Community-Level Maternal Deaths Surveillance and Response in Nepal

Sharad Kumar Sharma[1]*, Naresh Pratap KC[2] and Bikash Devkota[3]

[1]*National Tuberculosis Center, Nepal*

[2]*Ex-Director, Family Health Division, Nepal*

[3]*Ministry of Health and Population, Nepal*

***Corresponding Author:** Sharad Kumar Sharma, National Tuberculosis Center, Nepal.

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Abstract

Even though Maternal Mortality Ratio (MMR) has been declined substantially during the last two decades in Nepal with improved availability and accessibility of services, there is a substantial gap to achieve the Sustainable Development Goal (SDG) of 70 deaths per 1,00,000 live births by 2030. Government of Nepal started implementing Community-based Maternal Death Surveillance and Response (MDSR) from six districts in 2016 with plan to gradually expand across the country. As this is in very initial phase, there is need to document the process of implementation to identify the issues and challenges. Objective of this paper is to provide brief overview of current status of MDSR implementation, identify issues and challenges, explore causes of deaths and avoidable factors contributing to the deaths. Desk review was conducted to explore process, issues and challenges of implementation. Analysis of 66 pregnancy related deaths notified during 2016 to 2018 in 7 MDSR implementing districts was carriedout to explore causes of deaths and socio-demographic and health related factors associated with the deaaths. Qualitative information based on narrative part of verbal autopsy was explored to identify delays and avoidable factors. Out of 66 maternal deaths notified, about 77% of the deaths were among women age between 20 and 35 year. Most of the deaths (49) occurred during postpartum period and 6% of the deaths were due to abortion complication. Majority of maternal deaths were among women who are less educated and involved in domistic household activities. More than a half (53%) deaths occurred in healthfacility and about 6 in 10 (60%) deaths were due to direct obstetric causes (haemorrhage, eclampsis and sepsis). Types of delays, avoidable factors and response activities implemented are discussed.

Keywords: *Maternal Mortality Ratio (MMR); Maternal Death Surveillance and Response (MDSR); Nepal*

Background

Nepal has shown significant progress in reduction of maternal and perinatal mortality in the past with its commitment towards achieving targets set by periodic plans and global endeavors. The Maternal Mortality Ratio (MMR) in Nepal decreased substantially from 539 per 100,000 live births in 1996 [1] to 259 per 100,000 live births in 2016 [2]. Improvement in maternal health services has been the key factor in reducing the country's MMR and has contributed to the improvement of infant and child survival as well. Due to continued government encouragement through free delivery services and financial incentives for transportation, the percentage of births taking place in health

facilities has increased by three-fold in the past ten years (from 18 percentage in 2006 to 57 percentage in 2016) [2,3]. Despite its consistent and regular progress in maternal and child health indicators, maternal and child death continues to be a major public health problem. Most of these deaths are preventable if timely intervention had taken place.

In 2016, Government of Nepal redesigned Maternal and Perinatal Death Review (MPDR) implemented in hospitals into MPDSR to capture maternal deaths in the communities as well. National MPDSR guideline was developed based on the MDSR Technical Guidance from WHO [4]. MPDSR is a form of continuous surveillance process that links health information system and quality improvement processes from local to national levels. It includes routine identification, notification, quantification and determination of causes and avoidable factors of all maternal and perinatal deaths, as well as use of this information to respond with actions that will prevent maternal deaths in the future [5].

MPDSR takes into consideration key components of the UN Global Strategy for Women's and Children's Health and The Commission on Information and Accountability (CoIA) [6] One of CoIA's key points is to get better information for producing better results. It recommends setting up a health system that efficiently combines data from facilities, administrative sources and surveys. The concept of CoIA has been adapted in Nepal as Country Accountability Roadmap Nepal (CARN) [7]. MPDSR provides information about avoidable factors that contribute to maternal and perinatal deaths and uses the information to guide actions that must be taken at the community level, within the formal health-care system, and at the inter-sectorial level (i.e. in other governmental and social sectors) that are critical for preventing similar deaths in the future [5].

Community-based maternal death surveillance includes Verbal Autopsy (VA) to collect the information on events that occurred before death of a woman in the community. Based on the information in the VA, cause of death is assigned by a physician. The district level MPDSR committee then reviews the death to ascertain the personal, family, or community factors that may have contributed to the death and formulates action plans to prevent maternal deaths due to similar cause in the future [5]. As community-level MPDSR is in very initial phase, there is need to document the status and process of implementation to identify the issues and challenges.

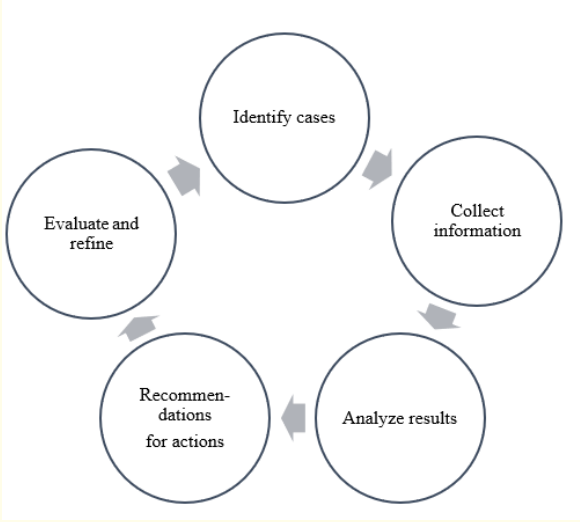

Figure 1: *MPDSR cycle.*

Objectives of the Study

The overall objective of the paper is to provide brief overview of current status of community-level MPDSR implementation in Nepal.

Specific objectives:

- To describe the status of implementing community-level MPDSR in Nepal including issues and challenges.
- To explore socio-demographic characteristics, health related factors contributing to maternal deaths.
- To identify causes of maternal deaths assigned from verbal autopsy based on ICD MM coding.
- To identify key actions taken to prevent maternal deaths in future at the community.

Methodology

We conducted desk review of existing policy and programmatic documents related to MPDSR to analyse and explore implementation status, process, key issues and challenges while implementing community-level MPDSR in Nepal. Further to this, quantitative method was used to analyse the data received from VA of maternal deaths that occurred in the seven MPDSR implementing districts during 2016-18 to identify socio demographic characteristics, health related factors, utilization of health services as well as cause of deaths. Additionally, qualitative information based on narrative part of the VAs was further explored to identify the events preceeding the deaths including avoidable factors. The ICD MM [8] approach was used to assign cause of death from VA to provide respective ICD codes.

Result and conclusion sections of this paper are structured as follows: we first described current status of implementing MPDSR in Nepal. Subsequently, we have reported findings from the 66 maternal deaths reported during 2016 - 2018 from seven MPDSR implementing districts. Finally the conclusions and recommendations bring together the various health system issues, recommendations and way forward.

Results

Status of implementing MPDSR in Nepal

The process of maternal death review was introduced in Nepal in the early 1990s which subsequently included review of perinatal deaths and was expanded into 42 hospitals by 2013 [5]. However, there were challenges in strengthening the process and gaps were observed in terms of regular review of the deaths occurring in the hospitals as well as consolidation and analysis of the data reported. Till 2013 few national review meetings were conducted and reports have been developed which include information on number and cause of maternal and perinatal deaths in the hospitals [9].

Building upon the already existent system of review, in 2015, Government of Nepal redesigned Maternal and Perinatal Death Review (MPDR) into MPDSR, to capture maternal deaths in the communities as well. The important component added in the system is the use of this information to respond with actions that will prevent maternal and perinatal deaths in the future [5]. With the modification of MPDR into MPDSR, there was need of development and alterations in guidelines, tools as well as orientations and trainings required for transformation of the system at field levels. The process has been summarized in 6 groups.

Development of guideline and tools

National Guidelines for MPDSR implementation was developed and endorsed in 2015 [5]. This guideline paved the way for GoN to implement the program. The technical guidance provided by WHO in 2013 [4] was the base for adopting MPDSR in the context of health system in Nepal. For reviewing maternal deaths at the community, the WHO Verbal Autopsy (VA) tool 2014 was adopted [10]. The tool was pretested, revised and translated in Nepali and made context specific to be used for interviewing the family of the deceased women. The VA tool caters to the information regarding demographic background, history of illness, services received at health facilities, issues

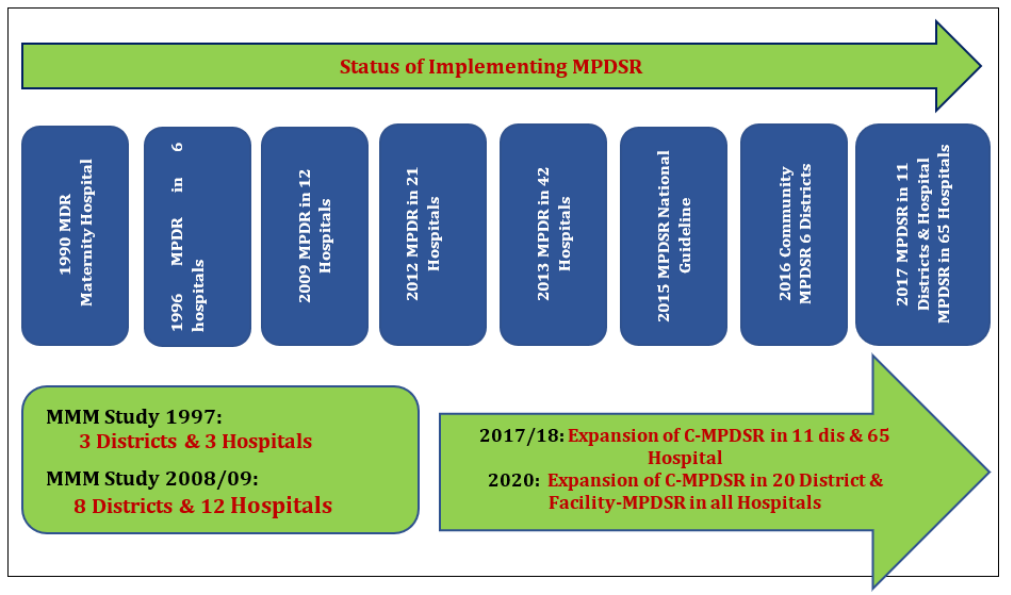

Figure 2: *Status of implementing MPDSR in Nepal.*

experienced while seeking care, cause of death as well as registration at local authority. Similarly, other tools for documenting the community-based MPDSR including notification form; screening form, cause of death assignment form were also developed. The tools used in the hospitals were also revised to incorporate sections for developing action plans. The opportunity was taken to revise the tool to make it more concise based on feedback received from the service providers who had used them previously.

Formation of MPDSR committees

Following the guideline, two national-level committees; the "National MPDSR Committee" chaired by the Director General, Department of Health Services and "MPDSR Technical Working Group (TWG)" chaired by Director, Family Health Division were formed. These committees comprised of members from MoHP, Divisions and Centers under DoHS as well as professional bodies and external development partners involved in the area of Maternal and Newborn health [5]. Districts implementing MPDSR have committees at district, hospital and health facility levels with separate VA team and trained medical doctor to assign cause of death from VA. Each hospital implementing MPDSR also has provision of forming MPDSR committee under the chairmanship of Medical Superintendent.

Orientation to health personnel and volunteer

GoN rolled out the community-based MPDSR into five districts in fiscal year (FY) 2072/73 (2016) with orientations and trainings for various levels of stakeholders including district stakeholders, health workers and medical recorders at hospitals, health workers at community health facilities and female community health volunteers (FCHVs) [11]. In FY 2073/74 (2017) the program was expanded to one more district (Baitadi) [12]. Separate trainings were conducted for the medical doctors at these districts for assigning cause of death based on the information available in VA forms. An international expert was mobilized for this training [13]. Similarly, GoN has also conducted trainings for strengthening and expansion of MPDR at the hospitals of the respective districts. With these trainings, 65 hospitals were reporting and reviewing maternal and perinatal deaths from FY 73/74 end (July 2017) [12]. MPDSR was scaled p in 5

more districts (Sunsari, Sarlahi, Surkhet, Rupandehi and Jumla) and additional 12 hospitals in FY2074/75 (2018) (Department of Health Services, 2018).

MPDSR implementation modality

The process of maternal death review and response in community includes identification and notification of death of women 12 - 55 years by FCHVs, screening for pregnancy related deaths by health workers at local health facility, verbal autopsy (VA) by district VA team for all pregnancy-related deaths, cause of death assignment by trained doctors in the district, review, formulation and implementation of response by district MPDSR Committee. The process is led by District Public Health Office (DPHO) with Public Health Nurse (PHN) as the focal person [5]. For each maternal death in hospital, review form is filled and the death is reviewed by the hospital MPDSR committee within 72 hours to identify avoidable factors and develop action plans to improve the quality of care and prevent similar deaths in the future. Similarly, for still births and early neonatal deaths occurred at hospital, review meeting is conducted every month by the hospital MPDSR committee. Medical Recorder, who is the member secretary of the MPDSR committee in hospital, is responsible for coordinating the process [5]. The process of implementing community-level MPDSR is as shown in figure 3.

Figure 3: *Community-based MPDSR cycle in Nepal.*

Development of Web-based MPDSR system

A web-based reporting system is developed by the Family Health Division for enhancing functional recording and reporting of the data related to the community and hospital-based mortality. The districts have now the option to regularly report the information and they can also consolidate the data within the districts regarding notification, screening and verbal autopsy. Additionally, the DPHOs also have access to the data entered by the hospitals within the district. Individual hospitals enter the data related to maternal and perinatal deaths within the hospital. The data entered by the sites are reviewed at the central level and can be aggregated and analyzed regularly (Department of Health Services, 2018).

Onsite coaching and mentoring

Family Health Division is also leading to conduct on-site coaching for supporting the districts and hospitals for implementing MPDSR. Standard checklists are used during the process of monitoring and on-site coaching is provided at individual hospitals and DPHOs (Department of Health Services, 2018).

Findings from maternal deaths reported during 2016 - 2018

Over the three year period between 2016 and 2018 a total of 66 maternal deaths were reported to Family Health Division from seven MPDSR districts (Baitadi, Kailali, Banke, Kaski, Dhading, Solukhumbu and Sarlahi). District-wise distribution of deaths has been presented in table 1 and figure 4. During the three year period, highest number of maternal deaths were reported from Banke (20), followed by Kaski, Baitadi, Dhading, Solukhumbu Kailali and Sarlahi.

Districts	Notification	Screening	Pregnancy Related Death	Verbal Autopsy
Baitadi	69	69	11	11
Kailali	134	134	6	6
Banke	64	64	20	20
Kaski	75	75	12	11
Dhading	20	20	7	7
Solukhumbu	12	12	7	7
Sarlahi			4	4
Total	374	374	67	66

Table 1: *Summary of notification of reproductive age deaths, screening, pregnancy related deaths and verbal autopsy conducted in seven MPDSR implementing districts in Nepal.*

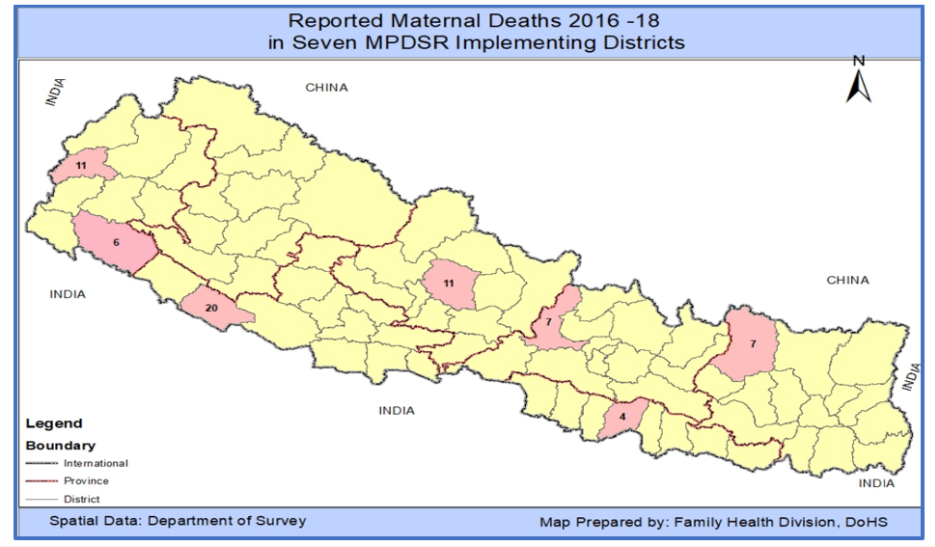

Figure 4: *Reported maternal deaths from 7 MPDSR implementing districts in Nepal.*

Who are the women who died?

Table 2 shows the socio-demographic information of the reported maternal deaths. The majority of the maternal deaths (76%) were in the 20 - 35 years age group, while about 14% of the deaths were in the age group below 20 years and 11% were in age group over 35 years. Ethnic distribution of the women showed that among the reported maternal deaths, almost one-third (29%) women who died are Dalit and Janjati, about a quarter (23%) are Terai/Madhesi and about one-fifth (19%) are Brahmin/Kshetri. Muslim accounted about 2% of the reported maternal deaths. However, this is just a reported number of deaths and do not mean that the maternal mortality ratio is distributed in same proportion in the population. Maternal death is more likely to be reported from the ethnic groups which share larger population proportion. With regard to the level of education among deceased, majority of the women (39%) did not have any formal education whereas about a quarter (26%) had primary education and slightly more than a quarter (30%) women had secondary level education. Only 5% had higher secondary education. Similarly, more than three-fourth (80%) women were involved in agriculture and domestic work. Six women were engaged in business and two were in service sector.

Socio-demographic Information	Frequency	Percent
District		
Baitadi	11	16.7
Banke	20	30.3
Dhading	7	10.6
Kailali	6	9.1
Kaski	11	16.7
Sarlahi	4	6.1
Solukhumbu	7	10.6
Total	66	100
Age		
< 20	9	13.6
20 - 35	50	75.8
> 35	7	10.6
Total	66	100
Ethnicity		
Dalit	19	28.8
Janjati	19	28.8
Terai/Madhesi	15	22.7
Muslim	1	1.5
Brahmin/kshetri	12	18.8
Total	66	100
Education		
No Formal Education	26	39.4
Primary	17	25.8
Secondary	20	30.3
Higher Secondary	3	4.6
Total	66	100
Occupation		
Unemployed	5	7.6
Domestic work and agriculture	53	80.3
Business	6	9.1
Service	2	3.0
Total	66	100

Table 2: *Socio-demographic information.*

Pregnancy status, health care utilization and timing of death

Table 3 shows that about a quarter (25%) women died during their first pregnancy and another 42 percent died during their second or third pregnancy. Slightly less than a quarter (23%) of the deceased women had four or more pregnancies and number of pregnancy was not known or missing among seven women. Most (89%) of the women who died had at least one antenatal checkup during their pregnancy. About one-third (30%) had sought antenatal care from hospital, while 59 percent had sought antenatal care from primary health care center or health post or outreach clinic. Majority (32%) had delivered the baby in Hospital while 15 percent had given birth at home. Mode of delivery was normal vaginal among 47 percent of the deceased women, followed by caesarean section (accounting for 18%).

Utilization of Health Services	Frequency	Percent
Gravida		
One	16	24.2
2 to 3	28	42.4
4+	15	22.7
Don't Know	5	7.6
Missing	2	3.0
Total	66	100
Antenatal care		
No	7	10.6
Yes	59	89.4
Total	66	100
ANC Place		
No ANC	7	10.6
Hospital	20	30.3
HP/PHC/PHCORC	39	59.1
Total	66	100.0
Place of delivery		
Home	10	15.2
Other facility	2	3.0
PHCORC/HP/PHC	7	10.6
Hospital	21	31.8
NA	26	39.4
Total	66	100
Mode of delivery		
Normal Vaginal	27	40.9
LSCS	12	18.2
Vacuum	1	1.5
NA	26	39.4
Total	66	100
Timing of death		
During Pregnancy	20	30.3

During Delivery	10	15.2
During Postpartum Period	32	48.5
Within 42 days After Termination of Pregnancy	3	4.6
54 Days After Abortion	1	1.5
Total	66	100
Place of death		
Home	26	39.4
The way to health facility	5	7.6
From one facility to other	2	3.0
Hospital/Other health facility	33	50.0
Total	66	100

Table 3: *Pregnancy status, health care utilization and timing of death.*

When and where did the deaths occur?

Table 3 further indicates that out of the 66 deaths reported during three year period from 2016 - 2018 from 7 districts, the majority (49%) deaths took place in the post-partum period while 30 percent deaths occurred in antenatal period. One death was late maternal death (died after 42 days of termination of pregnancy). As this death was occurred 54 days after abortion, and related to the pregnancy, it highlights a need to start documenting such deaths [14]. Majority (50%) of the death occurred at health facilities and more than one-third (39%) women died at home while 8 percent died on the way from home to health facility and 3 percent died on the way from one facility to the other. This indicates that, had they sought care at appropriate facility at the first place their life might have been saved.

Causes of maternal death

In all the MPDSR implementing districts, medical doctors are trained to assign cause of death from verbal autopsy using ICD10 MM approach. Table 4 presents the primary causes of 66 maternal deaths reported. The most common primary cause of reported maternal death was non-obstetric complication due to infectious diseases (24%), followed by postpartum haemorrhage (19%), hypertensive disorder (15%), other obstetric complication (12%) and non-obstetric complication due to non-communicable diseases (9%). Four (6%) maternal deaths were due to pregnancy with abortive complication and two (3%) deaths were due to antepartum haemorrhage. Similarly, three (5%) deaths were due to coincidental causes and cause was unknown among 4 (6%) of the reported maternal deaths. Out of total cause of death, about one-third (33%) of the deaths were indirect, more than a half (56%) deaths were direct obstetric, 5% were coincidental and 6% deaths were from unknown causes. The causes of reported maternal deaths is also presented in figure 5.

Table 5 shows the primary causes of maternal deaths reported by districts. Obstetric hemorrhage was the main cause of maternal death in Baitadi (4), Banke (4), Dhading (1) and Solukhumbu (6). Abortion complication was responsible for 2 deaths in Dhading and 2 deaths in Banke. Other obstetric complication was responsible for 1 death in Baitadi, 2 deaths in Banke, 3 deaths in Kaski and two death in Sarlahi. Pregnancy induced hypertension, non-obstetric complications with infectious and non-communicable diseases were the common causes of maternal deaths in all districts except in Sarlahi.

Three delay approach was used to examine the information collected from maternal death verbal autopsy for possible delays and avoidable factors related to the deaths. Trained medical doctors who assigned causes of death were also responsible to provide possible delays and avoidable factors along with the causes of deaths. Based on the expert suggestions, district MPDSR committee reviewed the causes, possible delays and avoidable factors and implement appropriate actions at the facility as well as at the community to prevent

Causes of Maternal Death	Frequency	Percent
Pregnancies with abortive outcome	4	6.1
Obstetric Haemorrhage (Antepartum)	2	3.0
Obstetric Haemorrhage (Postpartum)	13	19.7
Other Obstetric Complication	8	12.1
Hypertensive Disorder in Pregnancy and Childbirth	10	15.2
Non Obstetric Complications (Infectious Diseases)	16	24.2
Non Obstetric Complications (NCD)	6	9.1
Coincidental Causes	3	4.6
Unknown	4	6.1
Total	66	100
Type of death		
Direct	37	56.1
Indirect	22	33.3
Coincidental	3	4.6
Unknown	4	6.1
Total	66	100

Table 4: *Primary causes of maternal deaths from verbal autopsy.*

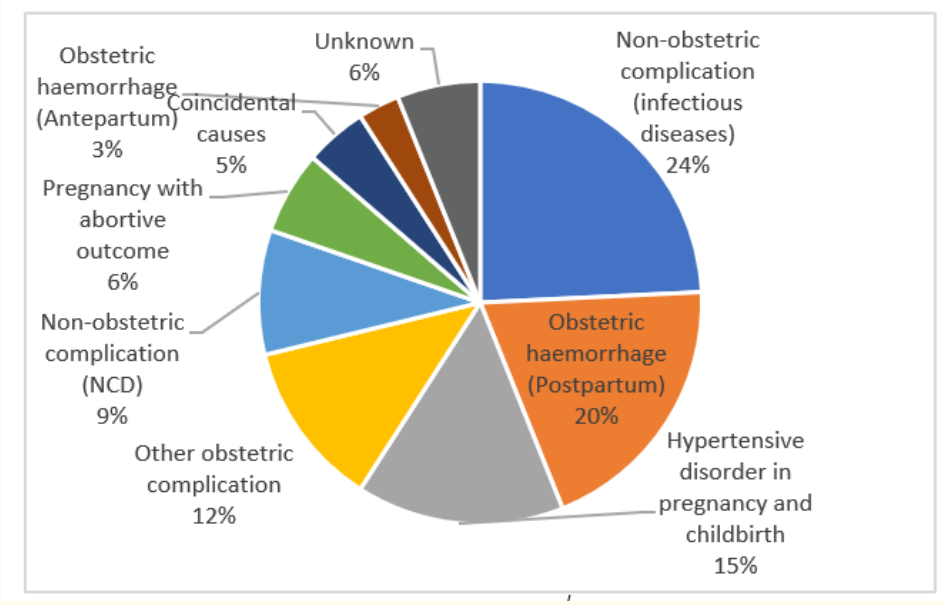

Figure 5: *Primary causes of maternal deaths.*

Causes of Maternal Death	Baitadi	Banke	Dhading	Kailali	Kaski	Solu	Sarlahi	Total
Pregnancies with abortive outcome	0	2	2	0	0	0	0	4
Obstetric Haemorrhage (Antepartum)	0	1	0	0	0	1	0	2
Obstetric Haemorrhage (Postpartum)	4	3	1	0	0	5	0	13
Other Obstetric Complication	1	2	0	0	3	0	2	8
Hypertensive Disorder in Pregnancy and Childbirth	1	3	1	2	3	0	0	10
Pregnancy Related Infections	0	1	2	0	2	0	0	5
Non Obstetric Complications (Infectious Diseases)	1	6	0	2	1	1	0	11
Non Obstetric Complications (NCD)	1	2	1	1	1	0	0	6
Coincidental Causes	2	0	0	1	0	0	0	3
Unknown	1	0	0	0	1	0	2	4
Total	11	20	7	6	11	7	4	66

Table 5: *Primary causes of maternal deaths by districts: from verbal autopsy.*

similar deaths in the future. Delays identified and related avoidable factors came up from the review of 66 maternal deaths are discussed in following section.

Types of delay

Table 6 shows the type of delays related to deaths. The delays are categorized according to three-delay approach. Out of all 66 reported maternal deaths, 60 women (91%) had experienced at least one type of delay. Majority (88%) of the deceased women experienced first delay (delay in decision to seek care). The majority of the deaths were due to delay in recognizing problem during pregnancy, accounting 24 in number. Ten deaths were caused due to lack of knowledge of adverse event, six deaths were caused due to seeking care form traditional healers (Dhami/Jhankri), four deaths were due to Delay in arranging money for treatment, and three deaths were due to not receiving delivery care from health facility. Other delays identified include: seeking care from local medicine shop and not telling anyone at home about the problem, not sharing about pregnancy to anybody, becoming pregnant against getting medical advice, not taking oral misoprostol at home, and lack of money to take the patient to hospital.

Second type of delays were noted in 7 deceased women (11%). Delay in reaching a health facility due to long distance was reported for 2 women. Late referral from lower-level to higher-level facility, referring without primary care from lower level facility, not getting referred from medical shop, lack of proper communication between facilities and delay in reaching appropriate facility due to public transport were the second delay reported for at least one women each.

Third delay was reported among 10 deaths (17%). Five deaths occurred due to delay in receiving appropriate care at health facility. two deaths occurred due to substandard care received from hospital and one death each occurred due to not being able to undergo surgery suggested at hospital, delay in getting admission at health facility and Unable to get admission at ICU in hospital [15-20].

Discussion and Conclusion

This paper intended to describe status of maternal death surveillance implemented in community, primary causes of maternal deaths, socio-demographic and health related factors contrinuting to the deaths, major implementation issues and challenges and to identify ac-

Delays	Number
Delay in decision to seek appropriate care	
Delay in recognizing problem during pregnancy	24
Delay due to lack of knowledge of adverse event	10
Sought care from traditional healers (Dhami/Jhankri)	6
Delay to arrange money for treatment	4
Did not receive delivery care from health facility	3
Sought care from local medicine shop	2
Did not tell anyone at home about problem	2
Did not share about her pregnancy to any body	1
Became pregnant against getting medical advice	1
Did not take oral misoprostol at home	1
Lack of money to take the patient to ho	1
Did not seek care due to shortage of money	1
Delay in reaching the appropriate facility	
Delay in reaching health facility due to long distance	2
Late referral from Dadeldhura to Kailali	1
Referred without examining from HP	1
Delay in getting referral from medical shop	1
Lack of proper communication between facility	1
Used public vehicle	1
Delay in receiving appropriate care in health facility	
Delay in receiving appropriate care at health facility	5
Substandard care received from hospital	2
Could not undergo surgery suggested at hospital	1
Delay in getting admission at health facility	1
Unable to get admission at ICU in hospital	1

Table 6: *Type of delays related to deaths.*

tions to be taken to prevent similar deaths in the future. Despite long history of implementing maternal death review, institutionalization of the process has been challenge in Nepal. No consolidated historical maternal death database found. DoHS, Family Welfare Division has redesigned the maternal and perinatal death review system inline with MPDSR guideline and started web-based MPDSR system to systematically collect and document the causes and contributing factors of maternal and perinatal deaths reported in the central system both from hospital and community-level MPDSR. Currently the facility based MPDSR is being implemeted in 65 hospitals and the community-level MPDSR is being implemented in 11 hospitals. This paper includes findings from 66 maternal deaths identified during 2016 to 2018 from 7 community-level MPDSR implementing distrits.

Out of 66 maternal deaths reported, highest number of the deaths were reported from Banke followed by Kaski and Baitadi. More than three-fourth of the deaths were of age between 20 to 35 year. Majority of the reported deaths were from Dalit, Janjati and Terai-Madhesi

groups. Most of the deceased women did not have any formal education and were mainly engaged in domestic work and agriculture sector. Majority of the deaths occurred during postpartum period and half of the deaths occurred in health facility. More than half of the deaths were direct, one-third were indirect. Majority of the deaths were due to Non-obstetric complication due to infectious diseases, followed by postpartum haemorrhage, hypertensive disorder, and other obstetric complictions. Abortion complication was also a notable primary cause of maternal death. Various delays were identified from through review of verbal autopsy. Delay in decision to seek care due to lack of knowoedge and seeking care from tradition healers were the leading community level delays responsible for the deaths. Poor transportation and communication system were the second delays leading to the deaths. Delay is getting appropriate care in the health facilities due to lack of appropriate human resources, medical equipment and drug were the major institutional delays identified.

One important aspect of MPDSR is to initiate response activities to prevent similar deaths in the future. MPDSR committee formed at the community-, district- and facility level reviews the verbal autopsy and hospital-level maternal death review form and prepare action plans to prevent future maternal death based on the recommendations made by clinician who assign clinical causes of maternal deaths. After reviewing the deaths notified in the MPDSR implementing districts, various response activities have been implemented in the community as well as in the facilities. Some key response activities include:

Awareness raising

- Awareness program on Sickle Cell Anemia among Tharu community.
- Mobilize local leaders to ensure institutional delivery.
- Mobilize mothers' group to create environment where pregnant women are comfortable for antenatal care and share their problems.

Coordination

- Advocate on need of road construction with local development offices for raising accessibility to health services.
- Advocate of Calcium tablets distribution for pregnant women.

Quality improvement of service

- Blood test for anemia among adolescents and newly married women in Tharu community with necessary referral.
- Ensure antenatal services in all primary health care outreach clinics.
- Proper recording of all cases in health facilities.
- Ensure presence of health workers during service hours at health facilities for antenatal check-up.
- Health facilities to take each case sensitively and give equal importance for proper management and referral.
- Orient health workers and female community health volunteers on referral mechanism with communication between health facilities.

Despite various response activities identified and implemented after the review of MPDSR in seven districts many challenges have also been faced during various stages of implementation. Few challenges reported from the MPDSR implementing districts include:

- Under reporting of suspected maternal deaths.
- Blame culture at some places that inhibits health professionals and others from participating fully in the MPDSR process.
- Inadequate legal frameworks for mandatory review and reporting of all maternal deaths as well as protection of health workers involved in the treatment and review process.

- Inadequate staff numbers, resources and budget.
- Cultural norms and practices that inhibit the operation of MDSR.
- Problems of geography and infrastructure that hamper the operation of MDSR.
- Delay/Incomplete notification, screening, VA, review, response and use of web-based MPDSR system.

Lessons learned:

- Increase in case notification with identification of hidden cases.
- Increased responsibility and accountability on maternal death at community level.
- Need of multi-sectoral approach to implement actions.

Major challenges

- Not all maternal deaths get notified and reported.
- Review form is not filled for all 'notified deaths'.
- Not all the forms filled are 'reviewed'.
- Quality of review needs improvement.
- Not all 'actions in the plan' are addressed effectively.
- Not all reviewed cases are entered into the Web portal, analyzed and findings disseminated.

Way forward

- At least one MPDSR Coordinator should be recruited in each district to facilitate implementation of MPDSR in all local level government.
- The MPDSR guidelines and manuals should be revised in the line of federal structure.
- Provincial- and Local-level capacity building activities play important role for effective implementation of MPDSR.
- Need based support from Local, Provincial and Federal governments should be provided to implement the response/action planned for improvement of quality of care at the health facilities.
- Provincial level academic institutions should take lead to provide technical support, onsite coaching and mentoring.

In the very short period of implementing, community-level MPDSR has been able to identify different factors associated with the pregnancy-related deaths and implemented various community- as well as facility-level quality improvement activities. Continue implementing community- as well as facility-level maternal death notification, review and responses by removing identified challenges, MPDSR has great potentiality to attain sustainable development goal of reducing maternal mortality by reducing it to less than 70 per 100000 live birth by the end of 2030 in Nepal.

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