



REVIEW

Shifting paradigm of maternal and perinatal death review system in Bangladesh: A real time approach to address sustainable developmental goal 3 by 2030 [version 1; referees: 2 approved]

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Abstract

Recently, Bangladesh has made remarkable progress in reducing maternal and neonatal mortality, even though the millennium developmental goal to reduce maternal and neonatal mortality was not achieved. Sustainable Developmental Goal (SDG) 3 has already been set for a new target to reduce maternal and neonatal deaths by 2030. The country takes this timely initiative to introduce a maternal and perinatal death review system. This review will discuss the shifting paradigm of the maternal and perinatal death review system in Bangladesh and its challenges in reaching the SDG on time. This review uses existing literature on the maternal and perinatal death review system in Bangladesh, and other systems in similar settings, as well as reports, case studies, news, government letters and meeting minutes. Bangladesh introduced the maternal and perinatal death review system in 2010. Prior to this there was no such comprehensive death review system practiced in Bangladesh. The system was established within the government health system and has brought about positive effects and outcomes. Therefore, the Ministry of Health and Family Welfare of Bangladesh gradually scaled up the maternal and perinatal death review system nationwide in 2016 within the government health system. The present death review system highlighted real-time data use, using the district health information software(DHIS-2). Health managers are able to take remedial action plans and implement strategies based on findings in DHIS-2. Therefore, effective utilization of data can play a pivotal role in the reduction of maternal and perinatal deaths in Bangladesh. Overall, the maternal and perinatal death review system provides a great opportunity to achieve the SDG 3 on time. However, the system needs continuous monitoring at different levels to ensure its quality and validity of information, as well as effective utilization of findings for planning and implementation under a measureable accountability framework.

Open Peer Review

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Introduction

Death review systems for maternal deaths have been performed both in developed and developing countries for many years¹. The majority of the death reviews focus on maternal death at the facility level²⁻¹⁶, but there are small number of community death review systems trialled in countries with high maternal deaths^{17,18}. In Bangladesh, a comprehensive death review system for maternal death was not functional in the health system until 2010. In addition, adequate registration and notification of deaths was lacking until 2010. The Bangladesh maternal mortality survey in 2001 showed that the maternal mortality ratio is 320 per 100,000 live births¹⁹, and the millennium developmental goal (MDG) was set to reduce this to 143 per 100,000 live births by 2015²⁰. Likewise, neonatal deaths were also aimed to be reduced by two-thirds in the same time frame. Considering these challenges and needs, the country initiated and established a maternal and neonatal death review system in 2010 to address the MDGs²¹. The initial death review system ran for a year in a district of Bangladesh and showed some positive results²¹. In the meantime, the results of the Bangladesh maternal mortality survey 2010 were published in 2011, and clearly showed a progressive reduction in maternal mortality - 194 per 100,000 livebirths²². Although the annual death reduction rate did not achieve the target, the country started to use death review system data at a local level for the improvement of the overall situation. Subsequently, the country gradually expanded the death review into 10 districts by 2013, which covered approximately 20 million of the general population. Although the countdown2015 report mentioned that Bangladesh is one of nine countries with good progress in achieving the maternal death target by 2015²⁰, the United Nations (UNs) report estimated that the maternal mortality ratio of Bangladesh in 2015 was 176 per 100,000 livebirths²³. Moreover, Bangladesh demographic and health survey report of 2014 stated that the neonatal mortality rate is 28 per 1000 live births²⁴.

The new sustainable development goal (SDG) 3 has set a universal target, which means Bangladesh has to reduce maternal mortality to less than 70 per 100,000 live births, as well as neonatal deaths to <12 per 1000 live births by 2030¹. Considering the present targets, the Ministry of Health and Family Welfare (MoH&FW) of Bangladesh has put forward the maternal and perinatal death review system for national scale up in 2016. The country has revised the maternal and perinatal death review system to be more action oriented and named this as Maternal and Perinatal Death Surveillance and Response (MPDSR).

This reviewed discusses the shifting paradigm of the Bangladesh maternal and neonatal death review system in the last seven years and the effects of the death review system in the country, and its facilitation for reaching the SDG3 target. This review focusses on the most recent articles, news and reports published on the maternal and perinatal death review system in Bangladesh, as well as related articles in low income countries in a similar context. Google scholar and MEDLINE/PubMed were used to find suitable articles, and full text of articles were preferred to review. A total number of nine articles relating to the maternal and perinatal death review in Bangladesh were found in full text. Moreover, the study also reviewed available reports, case studies, government letters, meeting minutes, web articles and thesis papers relating to the topic.

Inception of the system in Bangladesh

A maternal and perinatal death review explores medical and social causes related to maternal and neonatal deaths through a systematic process. Bangladesh initiated this type of intervention initially in one district named Thakurgaon with a population of around 1.4 million in 2010²¹. The system was run by the government through the Directorate General of Health Services (DGHS) in collaboration with Directorate General of Family Planning (DGFP) of the MoH&FW. The initiative was under a partnership of the government and UN maternal and neonatal health initiatives. The death review was funded by UNICEF and Bangladesh, initially through DFID, UK Aid and then Global Affairs Canada; technical implementation support was given by a national non-government organization, Centre for Injury Prevention and Research Bangladesh (CIPRB) under a partnership with UNICEF²¹.

Previously, there were no structured death review tools used widely in the country that provided evidence-based data for preparing action plans at different levels to reduce maternal and neonatal deaths in Bangladesh. Therefore, the country adopted its death review tool considering existing tools from various sources, such as Bangladesh maternal mortality survey, hospital base facility death review tool used by DGFP, World Health Organization (WHO) verbal autopsy tool, and tools developed by the Obstetric and Gynaecological Society of Bangladesh. A national technical group was formed to review all existing tools to prepare a simpler version for the country to use. Technical persons from DGHS and DGFP, professional experts, UNs, researchers and public health experts worked together to finalize these tools and guidelines under a participatory process. Next, these were endorsed by the government to use in the targeted district²⁵.

The guiding principal of the WHO 'beyond the numbers' for the maternal death audit was followed, where the entire system maintained confidentiality, non-blaming, anonymity and a non-punitive approach²⁶.

The system highlighted both community and facility death notifications of maternal deaths, and neonatal deaths and stillbirths through the government health system. Subsequently, for community deaths, each of the maternal deaths, neonatal death and stillbirths were reviewed. In addition, social intervention through social interaction with the community to discuss preventable future deaths was also performed, called 'social autopsy'. Maternal and perinatal death review findings were used for local level planning, and implementation of those action plans was performed by health managers to reduce such preventable deaths²⁵. Death review findings were discussed and analysed at death review committees at the upazila and district level. A number of local action plans were taken and implemented using the findings from the death review committee meetings^{21,25}.

Scale up of the system

In following years, the death review system gradually expanded from four districts in 2011 to ten districts by 2013²⁷. Moreover, at the beginning of 2015, Save the Children supported the government in introducing Maternal and Perinatal Death Review (MPDR) in four districts where **MaMoni Health System Strengthening Projects** were running²⁸. Overall, by 2015, 14 districts were under

the coverage of MPDR, and the surveillance system covered approximately 28 million of the general population.

In 2015, the government took the initiative countrywide for its national scale-up, considering its need and importance to address the quality of care on maternal and neonatal health, as well as to reach the SDG3 in time. As part of this initiative, the Health Economics Unit of the Quality Improvement Secretariat of the MoH&FW took the initiative to update the national guideline and training manual for health care providers²⁹⁻³³. Three technical working groups were formed at a national level³⁰ and followed the maternal death surveillance and response (MDSR) framework developed by the WHO in 2013, in order to fit the revised version of death review system³⁴. The previous version of the death review system did not focus on 'response'; therefore, this component was embedded within the existing MPDR. The updated version of the death review system highlighted death 'surveillance and response' in the conceptual framework, and was renamed Maternal and Perinatal Death Surveillance and Response (MPDSR). New revised version of National guideline, ToT manual and tools were approved by the ministry of health and family welfare for country use. The revised, simplified maternal and neonatal death review tools allow field level government health workers to complete the review more easily. MPDSR also highlights the integration of the quality improvement committee at sub-district, district, divisional and national levels to review the progress and respond to findings. In addition, facility-based MPDSR sub-committee at various levels was included to review facility deaths, in order to improve quality of care in facilities. Furthermore, the new system has introduced a focal person for MPDSR from the health department at sub-district, district, division and national levels to closely monitor and supervise MPDSR activities, including reporting to the quality improvement committees³⁴.

Using District Health Information Software 2

The system has been further enriched by integrating the death review data in the District Health Information Software 2 (DHIS-2) of the Health Management Information System (HMIS) of DGHS. This has strengthened the overall health system by effective reporting of data online. Therefore, all death notification data entered in the DHIS-2 by a community health care provider, who works in a community clinic (small unit of outpatient service for maternal and neonatal health at the village level run by the government), can be seen at any time using the DHIS-2 platform by the health managers of different levels for immediate planning and interventions based on the data³⁵. Similarly, cause analysis of community maternal and neonatal deaths, including ICD-10 codes, are assigned at a divisional level by professional experts of medical college hospitals (obstetricians & gynaecologists and neonatologists). The Quality Improvement Secretariat of the MoH&FW organizes capacity development training for professional experts performing manual analysis on possible medical causes, including factors associated with death using a community verbal autopsy form³⁶. Final causes of death are inserted into the DHIS-2 at the divisional level in a periodic basis. This creates a unique opportunity for the upazilas and district level health managers, as well as for national level policy makers, planners, researchers, developmental partners and related stakeholders to understand and track the maternal and neonatal death situation in Bangladesh.

Impact of the system

The development of the death review system for maternal and neonatal death has had a positive effect on the improvement of overall maternal and neonatal health, including playing a pivotal role in the reduction of a significant number of deaths. Various components of the system have been evaluated to moderate its effects³⁷. Notifications of maternal and neonatal deaths at the community level allows the deaths from the whole community to be captured, including under-privileged areas and hard to reach areas. Therefore, the maternal and neonatal mortality ratios that are calculated yearly in districts provide an accurate idea on the maternal and neonatal health situations in the particular areas. The notification system also highlights areas with a high amount of deaths. Specific interventions taken by local managers in death-dense areas can lead to a reduction in deaths in subsequent years³⁸. Another utilization of the death notification system is its incorporation with DHIS-2, which helps to visualise the live data online. In addition, local planning, such as using death spot maps at the sub-districts level, helps health managers to concentrate where interventions are needed³⁹.

Verbal autopsy in the death review system at the community level is used to explore medical causes, causes of delays and social factors associated with deaths reported by the MPDSR in Bangladesh^{40,41}. Findings of verbal autopsies are used by local health managers for effective planning and reduction of such deaths in the future, causing improvements in 1st delay (decision making) and 2nd delays (transferring to referral centre) and improvement in referrals to specific facilities⁴².

Facility death review of maternal and neonatal deaths can also be used to explore the causes of deaths in the facilities, as well as factors associated with the deaths, including gaps and challenges in the facility, which can then be overcome. The district uses these findings for effective planning and can intervene accordingly. For example, in one district, the provision of blood donors for an emergency supply of blood for mothers with postpartum haemorrhage (PPH) reduced the amount of deaths due to PPH⁴³.

Social autopsy in the death review system has allowed communities to engage in dialog on the causes of the deaths, explore social stigmas and barriers, and try to explore possible solutions for the prevention of preventable future deaths under an effective and harmonized dialog between the community and health care providers who facilitate the social autopsy interviews^{25,44}. It has been observed over the years that social autopsy is able to explore social causes behind deaths⁴⁵. Community interaction enhances the ownership of the community, allows understanding of their own problems, and empowers the community to think and take appropriate action. Representative publicly-elected community leaders at the village level can change social barriers to prevent unwanted deaths, minimize delays and influence pregnant mothers to uptake care at government health facilities^{46,47}.

A unique approach

The MPDSR in Bangladesh is unique, as it not only includes death surveillance and response, but also covers community and facility maternal and newborn deaths together. In addition, the MPDSR

captures stillbirth data through death notification system. The system is a national programme of the government and is led by various sections of the government for its implementation within the MoH&FW, including DGHS, DGFP, Management Information System (MIS) and Health Economic Unit (HEU), along with support of developmental partners, professional bodies and non-government organizations. The government health providers working in the health system are the key actors in the MPDSR roll out, which is sustainable and replicable in other countries with similar settings. Similarly, quality improvement committees at different level is the main platform for planning and implementation of various interventions. The data platform DHIS-2 is a live surveillance system and effective monitoring tool to see the progress of the country to reach the maternal and neonatal death reduction by 2030 as set out in SDG3³⁴. Initial costing of the development phase of the death review system was found to be high; however, cost estimation has shown that field implementation of the system is much lower in order to sustain and run the system in the ongoing government health system⁴⁸.

South-East Asian countries, such as India, Pakistan, Sri Lanka, Nepal and the Maldives, have already implemented death reviews for maternal deaths. India has conducted maternal and perinatal death inquiry and response in a few districts with an aim to work on community deaths. However, this system does not explore facility deaths, or how best to use the outcome data^{17,49}. A study conducted in India has calculated both community and facility deaths, but was restricted to maternal deaths only¹¹. By contrast, Pakistan has determined maternal death cause identification using verbal autopsy¹⁷. A recent report by the WHO on MDSR highlighted the role of death surveillance and response in the reduction of maternal mortality in order to address the SDGs¹. It also focused on both community and facility maternal death review.

Challenges ahead

The new approach of MPDSR in Bangladesh could be an evidence-based example for other low and middle income countries in achieving the best effects at a local level using a government health system, which has achieved functional planning and implementation of decisions based on death review findings. However, many countries around the world have reported that maternal death review results showed disparity between policy and practice; especially, effective coordination and planning requirement for a timely response remain a challenge^{4,50,51}.

Experiences of the early implementation of the Bangladesh maternal and perinatal death review from 2010 to 2015 has shown some strategic challenges. Previous studies mentioned that challenges still persist in capturing all deaths from the community, especially from pocket areas in hard to reach districts^{38,39}. Ensuring the quality of data through conduction of verbal autopsy in the community and the best utilization of the findings at various level is also a challenge^{40–42}. Moreover, social autopsy findings showed that social barriers are still a key issue in averting maternal and neonatal deaths^{45,46}. It is recommended that social autopsy intervention in the community could play pivotal role in changing the beliefs and practices of the community to seek appropriate care during pregnancy, delivery and postpartum period. Social mobilization also influences social empowerment through engagement and social commitment; therefore, social autopsies in MPDSR have an enormous opportunity for use in other countries⁴⁴. At a facility level, limitation of proper documentation and record keeping has been identified as a key barrier to reviewing facility deaths⁴³.

Conclusions

The shifting of Bangladesh from the MPDR to the MPDSR is a timely initiative to achieve the SDG3 in Bangladesh. A death notification system is able to capture all maternal deaths, neonatal deaths and stillbirths in the community and facility, while the death review for maternal and neonatal deaths explores the causes, gaps, and challenges that needed to be overcome. The quality improvement committees at different levels closely monitor the progress and intervene accordingly. At a local level, action plans use live data in the HMIS guide, which supports health managers and planners to make decisions and implement effective and focused interventions for achieving the SDG3 in Bangladesh by 2030.

Competing interests

No competing interests were disclosed.

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Olakunle Alonge

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This is a well-written review article and highlights an intervention for a very important public health problem - maternal deaths in low and middle income countries. The article is a very fine contribution to the literature.

It could be further strengthened by providing specific recommendations on the way forward regarding maternal death notification, review and response in Bangladesh based on findings from other countries - perhaps, these recommendations could be presented in a table highlighting identified challenges and potential solutions. Similarly, a box or panel highlighting the essential components of the perinatal and maternal death review system in Bangladesh will also be useful for readers.

The abstract could be rewritten as a summary of the literature review (highlighting the reason for the literature review, and briefly summarizing each segment of the paper). The abstract and paper could use further editing for typos.

Is the topic of the review discussed comprehensively in the context of the current literature?

Yes

Are all factual statements correct and adequately supported by citations?

Yes

Is the review written in accessible language?

Yes

Are the conclusions drawn appropriate in the context of the current research literature?

Yes

Competing Interests: No competing interests were disclosed.

I have read this submission. I believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Referee Report 22 August 2017

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**Mithila Faruque** 

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I have gone through the review article. To me, the author has taken a timely initiative to review on maternal and perinatal death review system and also he is experienced enough to write review on this topic. He has described the total MPDR system in Bangladesh from its initiation to scale up, benefits and challenges. But he didn't mention in the whole paper what was the purpose of this review paper. Also some more comparison with the maternal and perinatal death review system of other countries should be added. The author could include a table showing the findings of different articles (used in reference) in short regarding MPDR, so that the readers can get a clear view of the review articles at a glance. Also the conclusion should be modified by adding the advantage of this review paper, not only of the death review system, I mean how this review paper will bring benefits to other researchers or how can it be used further in future.

Also I have some corrections mentioned below (the correction lines are numbered as in the pdf file)

Introduction

- Last paragraph, line 1 - "This reviewed" needs to be corrected to "This review"
- Last paragraph, line 4 - " This review" needs to be corrected to "The review"
- Last paragraph line 9 - "full text of articles" needs to be corrected to "full text articles"

Inception of the system in Bangladesh

- First paragraph line 2 - "though" needs to be corrected to "through"
- Last paragraph line 3 - "though" needs to be corrected to "through"
- Last paragraph line 4 - "neonatal death" needs to be corrected to "neonatal deaths"

Scale up of the system

- Second paragraph line 18 - "ministry of health and family welfare" needs to be corrected to "Ministry of Health and Family Welfare"

A unique approach

- First paragraph line 4 - "though" needs to be corrected to "through"

Is the topic of the review discussed comprehensively in the context of the current literature?

Yes

Are all factual statements correct and adequately supported by citations?

Yes

Is the review written in accessible language?

Yes

Are the conclusions drawn appropriate in the context of the current research literature?

Partly

Competing Interests: No competing interests were disclosed.

I have read this submission. I believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.
