



FIGO LOGIC INITIATIVE

Every death counts: Electronic tracking systems for maternal death review in India



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ABSTRACT

Maternal death review (MDR) is an important strategy to improve the quality of obstetric care and reduce maternal morbidity and mortality. MDR provides detailed information on various factors at community, facility, and district levels that influence maternal health outcomes. One of the key challenges is to analyze large volumes of data collected via a paper-based system that uses facility and community level forms. This database continues to expand quantitatively (multiple forms and data elements), which makes analysis of data increasingly difficult for timely management and analysis. The present paper describes the development process involved in linking the paper-based system with an electronic system for MDR in India. The lessons learnt from this experience can contribute to understanding how innovative technologies can be used to address large-scale public health issues in low-resource countries and in particular solutions to address maternal health.

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1. Trends in maternal mortality in India

Globally, the maternal mortality ratio (MMR) declined from 400 deaths in 1990 to 210 deaths per 100 000 live births in 2010, which represents an average annual decline of 3.1% [1].

The Government of India (GOI) launched the National Rural Health Mission (NRHM) in 2005. Its objectives included enhanced focus on reproductive and child health, augmented financial resources and local flexibility, focus on health systems strengthening, and emphasis on decentralization [2]. The key strategies that were implemented to achieve improved public health included strengthening capacities for data collection, assessment, and review to enable evidence-based planning, monitoring, and supervision; promotion of public–private partnerships; and implementation of programs.

Implementation of the NRHM had a significant impact and India has made progress in reducing its national MMR from 212 to 178 per 100 000 live births [3,4]. However, the country has a long way to go before it will meet Millennium Development Goal 5, which sets out to reduce MMR to 150 per 100 000 live births by 2015 [5], or the national 12th Five Year Plan of India, which sets out to reduce MMR to 100 per 100 000 live births by 2017 [6].

2. Status of maternal death review in India

Until 2008, the approach to maternal death review (MDR) in India was fragmented, with varying levels of implementation and different approaches to MDR across the states [7]. To ensure uniformity, the GOI finalized an operational framework for implementation of the MDR program in 2009. The program was launched nationally in December 2010 by the Maternal Health Division (MHD) of the Ministry of Health and Family Welfare [8]. After its launch, the capacity building process for all health teams at subnational level was begun in 2011, with its aim to institutionalize the MDR program at all levels. The MDR program collects key information on the factors that lead to and are responsible for a maternal death. This helps elucidate issues surrounding maternal health and subsequently the actions that are needed to improve quality of obstetric care, which will lead to reduction of maternal morbidity and mortality.

3. Overview of the paper-based system

MDR implementation is focused on meeting the following three objectives: (1) to contribute toward improved quality of obstetric care and reduce maternal mortality and morbidity; (2) to provide detailed information on various factors at institution and community level that need to be addressed to reduce maternal deaths; and (3) to disseminate information on data for surveillance, review, and remedial follow-up actions. The current paper-based system uses six forms to report both maternal and non-maternal deaths (Fig. 1). At community level, deaths

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of all women aged 15–49 years (irrespective of the cause of death, maternal or non-maternal) are reported through forms 6, 2, and 3. At facility level, deaths that occur in hospital among pregnant women or within 42 days after termination of pregnancy, irrespective of duration or site of pregnancy and including deaths from abortion and ectopic gestation, are reported through forms 6, 1, and 3. Forms 4 and 5 are used to maintain monthly records at the health facility. Each maternal death must be reported separately, using either the community or facility forms.

The primary informant form (form 6) is used by the community level health worker and facility level nodal officer to report the deaths of all women and maternal deaths, respectively, within 24 hours of a death. This tool captures basic information about the deceased woman, including name, age, date and time of death, place of death, and when the death occurred (e.g. during pregnancy or delivery or abortion, within 42 days after delivery or 6 weeks after abortion).

India is organized into states, districts, and blocks and these comprise medical colleges, district hospitals, women and child hospitals, community health centers, primary health centers, and subcenters. The block and facility registers (forms 4 and 5) are used to keep a monthly record of all deaths of women and maternal deaths, respectively, at these levels. Information about each woman is summarized (e.g. name, age, date of death, address, cause of death, date of field investigation, status of the neonate, action taken).

The facility based form (form 1) captures demographic information and medical details of the deceased, admission, level of delays, prenatal care and delivery outcome, status of the neonate, postnatal outcomes, interventions, cause of death, and socioeconomic factors.

The community based form (form 2) captures demographic information, non-medical information, availability of health facilities and services, transport, and prenatal, intranatal, and postnatal service delivery.

The MDR case summary (form 3) is a report that is prepared for each deceased woman. The same form is used at the facility and community level.

4. Concerns arising from use of the paper-based system

The paper-based system is problematic for the following reasons:

- Use of multiple forms. Maternal deaths are reported using five facility based forms or five community based forms.
- Repetitive information. A wealth of information on each maternal death is captured, which is repeated across the forms. This makes it difficult to manage and collate for analysis.

- Paper-based data collection. This makes it difficult and challenging to carry out analysis for a single maternal death.
- Vast amount of data. For each maternal death, 100–150 data items are captured through the MDR forms. It is impossible to analyze this volume of data in a timeframe that facilitates prompt action.
- Tracking of forms. Given that more than one form is used for recording and reporting data, it is difficult to keep track of which form has been completed and submitted at different levels.
- Linkage with the maternal health database. The GOI runs software called the mother and child tracking system (MCTS). MCTS has a database of all critical health parameters (e.g. height, weight, hemoglobin, number of prenatal check-ups, gravidity, parity) of approximately 20 million pregnant women. At present, linking the MCTS with the MDR program is challenging given the sheer numbers in India.
- Movement of pregnant women. The majority of pregnant women in India stay with their mother during pregnancy and/or delivery and return back to their own home after delivery. As these locations may or may not be in the same city/district/state, determining the quality of services given by a particular health facility and assigning the cause of death to the right facility for improvement poses its own set of challenges.

5. The solution: An electronic system

National MDR software to address the above concerns and strengthen data management systems was developed for the MHD through a public–private partnership. The Avni Health Foundation designed and developed the software with the technical support of the MHD, the National Informatics Centre (NIC), the MCTS team, the National Statistics Division (NSD), and funding support from The Federation of Obstetric and Gynaecological Societies of India (FOGSI). FOGSI was supported by the FIGO Leadership in Obstetrics and Gynecology for Impact and Change (LOGIC) Initiative in Maternal and Newborn Health through a grant from the Bill and Melinda Gates Foundation. The aim of this initiative was to improve maternal and newborn health in low-resource countries by strengthening the roles of obstetric and gynecological national associations.

5.1. Steps in the design, development, and deployment of MDR software

5.1.1. Formation of a technical working group

The technical working group was responsible for ensuring the launch of technically sound software that met the necessary operational, security,

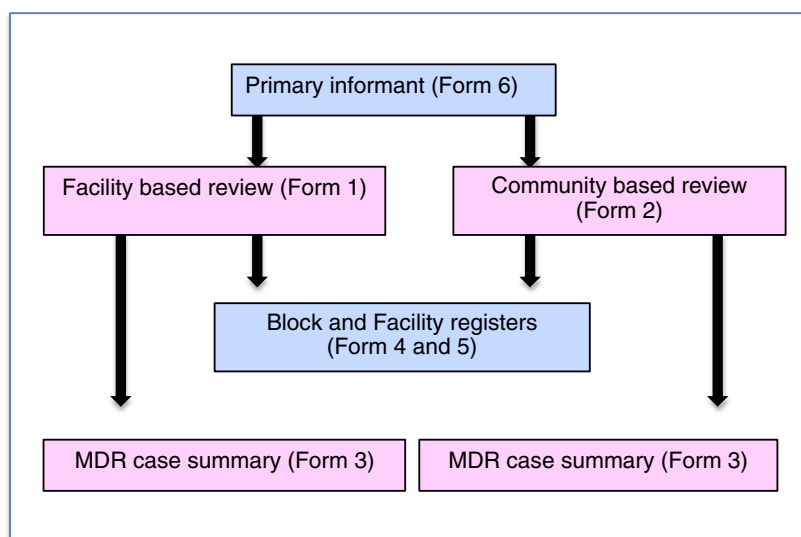


Fig. 1. The six paper-based forms used to collect information on maternal and non-maternal deaths in India at facility and community level.

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