Tracking women and children in a Continuum of Reproductive, Maternal, Newborn, and Child Healthcare (RMNCH) in India

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Abstract   The Continuum of Reproductive, Maternal, Newborn, and Child Healthcare (RMNCH) model is suggested to be an effective tool to improve maternal and child health. This short dispatch proposes that if India pursues the continuum of care model, a well-designed follow-up strategy to track prospective mothers and their children is imperative.
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1. The context

Despite the fact that India has secured a far greater position on the global economic stage, this progress has failed to translate into an acceptable level of improvement in maternal and child health indicators. India managed to reduce its maternal mortality ratio (MMR) between 1990 (600 deaths/100,000 live births) and 2010 (200 deaths/100,000 live births) at an average annual rate of reduction (AARR) of 5.2%. The under-five mortality rate was reduced from 114 deaths/1000 live births in 1990 to 61 deaths /1000 live births in 2011 at an AARR of 3% [1,2]. Yet India still accounts for the highest number of maternal (2010) and child deaths (2011) globally [1,2].

India has endorsed a number of international agreements and summits, including the Safe Motherhood Initiative in 1987, the International Conference on Population and Development in 1994, and the Millennium Development Goals (MDGs) in 2000 and India took an oath to extend every possible effort to improve Reproductive, Maternal, Newborn, and Child Healthcare (RMNCH). As a result, India launched its National Population Policy (NPP) in 2000 and the National Health Policy (NHP) in 2002 to improve maternal and child health. Within the framework of the NPP, ambitious goals were set to be achieved by 2010. These included reducing the MMR to 100 per 100,000 live births, achieving 80% institutional deliveries and 100% deliveries by

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medical professionals, addressing the unmet needs for family planning, as well as delaying the age of marriage until 20 years of age, but it failed to keep up the pace to improve the RMNCH in India [3].

Realizing the major setbacks of both the NPP and the NHP, the national government launched its National Rural Health Mission (NRHM) in 2005. The reports have been mixed regarding the success of the NRHM and its conditional cash transfer program — *Janani Suraksha Yojana* (JSY) [4], which is meant to decelerate maternal and child mortality. In 2008, the Government of India launched the National Urban Health Mission (NUHM) to improve healthcare indicators in urban areas, especially slums [5]. India's child nutrition indicators are worse than anywhere in the world. Immunization rates are uniformly lower (even the BCG vaccine) than the corresponding estimates for every other sub-Saharan African and even conflict-ravaged countries like Afghanistan and Iraq, whereas grave maternal (e.g. morbidity) and perinatal conditions, as well as childhood diseases are a significant part of India's growing disease burden [6]. The maternal and perinatal conditions together constitute nearly 12% of the total disease burden, diarrheal diseases 8% and childhood diseases contribute more than 5% [7]. The non-communicable diseases share almost 8% of the disease burden where increasing (during the period 1998—2006) levels of anemia among women of reproductive age, and the rising incidence of obesity are quite a challenge to program and policy makers in India [7].

2. The Continuum of Reproductive, Maternal, Newborn, and Child Healthcare (RMNCH)

With the alarmingly high maternal and child mortality in India and other developing countries, national and international public health leaders and professionals have proposed a comprehensive strategy to improve RMNCH called the Continuum of RMNCH [8,9], which has two dimensions — time and place [10]. The time dimension refers to linking care from adolescence and pre-pregnancy, through childbirth, the immediate postnatal period and childhood and the place dimension refers to linking care that is provided across different levels, such as the home and community, clinical care at primary and tertiary health centers, and outpatient and outreach services [10]. Recent studies have attempted to quantify the continuum of RMNCH in India [11], and globally [12]. It is worth mentioning that the Continuum of Care received criticism in the recently convened ''Global Maternal Health

Conference on Quality of Care,'' and further modification has been proposed [13]. This short report intends to outline that if India follows the Continuum of Care to reduce maternal and child mortality, a comprehensive tracking strategy of prospective mothers is integral to advancing this model of care. A way forward on the role of key stakeholders is also discussed.

The coverage gap indicators in the RMNCH services offer a comprehensive picture concerning the demand and supply of healthcare services, and the uptake of the facilities available. In India, the problem in the coverage gap in maternal and child healthcare indicators is tremendous, and the socioeconomic factors associated with the uptake of healthcare services have been captured in various studies. According to 2007—2008 statistics, only 55% of women aged 15—49 reported the use of any contraceptive method, whereas nearly 50% reported having three or more antenatal care visits; 52% of women received safe delivery care and only 48% of women received postnatal care within 48 h after delivery [14]. Also, only 45% of women received check-ups within 24 h of giving birth, and only 54% of children received full immunization (BCG, three injections of DPT, three doses of Polio [excluding Polio 0] and measles) [14]. With a mean coverage in maternal, newborn, and child healthcare of 45%, almost 210 districts (out of 601 districts) in India have a coverage gap equal to or above 50%, which demands urgent action [11]. To address poor reproductive health in India, factors such as the unacceptably high rate of Reproductive Tract Infections (RTIs) and Sexually Transmitted Diseases (STDs), high adolescent birth rate, low contraceptive use, the mismanagement of pre-pregnancy needs, and pregnancies that do not result in birth (such as incomplete or abortion) should not be avoided [15]. Having said that, it is very possible that women who receive antenatal care might not come to a health facility for delivery care or women who receive delivery care might not receive postnatal care. Similarly, there is a potential that their children will not receive any of the required care either.

3. Possible solution: a tracking strategy

The question this poses is: how can policy makers ensure that a prospective mother and her child receive the required care in the continuum model? A possible solution would be a comprehensive tracking strategy that could be designed to follow a prospective mother's pregnancy so that she can get the required prenatal, delivery, and postnatal

care, as well as ensure recommended care for her child. In order to make this happen, it would be viable to work through both the NRHM and the NUHM for rural and urban areas, respectively through community level health workers.

The importance of community health workers (CHWs) in tackling health problems at the household level is well-documented in developed countries like the United States of America, and developing countries such as Brazil, Iran, Pakistan, and sub-Saharan Africa. Iranian CHWs, called *behvarzes*, are part of the systematic primary healthcare strategy with specialized training in the health needs of the rural population [16]. A study [17] on *behvarzes* demonstrated that proper training of CHWs coupled with strategic program implementation, and consistent effort to build good rapport with the respective community could yield better health outcomes for the community. Another example includes the National Programme for Family Planning and Primary Health Care of Pakistan, popularly known as the Lady Health Worker Programme [18]. This program for CHWs managed to deliver the required maternal, newborn, and child care services for 60% of the population in rural areas.

India also has a network of CHWs who are trained to perform a specific set of primary care functions [19]. One of the key components of the NRHM is to provide every village in the country with a trained female community health activist. The Accredited Social Health Activist (ASHA) is a health activist association in the community that creates awareness about health and its social determinants, and that can mobilize the community toward local health planning, increased utilization and accountability of the existing health services [20]. ASHA also counsels women on birth preparedness, the importance of safe delivery, breast-feeding and complementary feeding, immunization, contraception and prevention of common infections, including Reproductive Tract Infection/Sexually Transmitted Infections (RTIs/STIs) and care of the young child. ASHA members mobilize the community and facilitate access to health and health-related services available at the Anganwadi/sub-center/primary health centers, such as immunizations, ante-natal check-up (ANC), postnatal check-up, supplementary nutrition, sanitation and other services provided by the government. The Auxiliary Nurse Midwife (ANM) and Anganwadi Worker (AWW) each act as a resource person, and help to execute the village-level activities [20].

In brief, the ASHA, ANM, and AWW have access to prospective mothers at the household level in each village. They are positioned to keep closer track of whether the mother or child has received the required care. On the other hand, under the National Urban Health Mission (NUHM), the role of community health workers will be played by the *Mahila Arogya Samiti* (consisting of 5-20 members with an elected chairperson/secretary), a community-based federated group of around 20—100 households are responsible for health and hygiene, behavior change promotion, and facilitating the community to utilize the healthcare services in their coverage area. The Urban Social Health Activist (USHA) in urban areas would provide a similar mode of assistance as the ASHA member in rural areas, as well as provide leadership for, and promote, the *Mahila Arogya Samiti*.

In order to make the tracking strategy a reality, a comprehensive protocol for the registration of each pregnancy should be followed. A very poor registration system of pregnancy, birth, or death is persistent in India; however, a very efficient electronic tracking strategy should be developed to maintain the routine care of mothers and children. The computerized system could be linked with mobile phones within the particular household of the prospective mother. In designing an efficient tracking system, assistance can be acquired from the National Informatics Centre (NIC), which provides e-Governance support to the Central Government, State Governments, Union Territory Administrations, Districts and other Government bodies [21]. It offers a wide range of services, including a Nationwide Communication Network for decentralized planning, improvement in Government services, and wider transparency of national and local governments. A profile database of household members that would identify a woman in the reproductive age group, a prospective mother, and children, should be created with a unique identity, and the database should be linked with the sub-centers (SCs), Primary Healthcare Centers (PHCs), Community Healthcare Centers (CHCs), and District Hospitals (DHs), the healthcare provider in India. The database should be accessible to the concerned authority in health centers so they can communicate any information regarding the health of women, mothers, and their children in a given household.

As proposed, an application for mobile phones should be designed to convey messages relaying information on healthcare required for a woman, mother, or children. If the household does not have a mobile phone, the information will be communicated through community level health workers, such as ASHA, AWW, ANM, or USHA. Thus, with

the help of creating a database for a woman and her child/children, an effective follow-up strategy could be executed. Accordingly, the community level health worker would be trained in operating the computer system to track the progress of care given to prospective mothers or her children. Of course, this needs physical facilities (e.g. electricity) and human resources to enhance the currently overburdened public health infrastructure in India. To measure the effectiveness of the tracking strategy, a periodic surveillance system should be designed, which will gauge healthcare utilization (e.g. contraceptive prevalence rate, antenatal care visit, child immunization), health outcomes (e.g. maternal, newborn, or child mortality), health status (e.g. nutritional status of woman, mother, and child, disease burden), as well as individual/household satisfaction with the tracking system. An effective tracking strategy is imperative for the success of the continuum of RMNCH.

The recent development of mHealth (mobile health) to address and overcome disparities in access to health services, inadequacies of the health infrastructure within countries, shortage of human resources for health, high cost of accessing health, and limitations in the availability of financial resources, has proven effective in India as well as African countries [22]. For example, CycleTel is a mobile phone application that offers a family planning method directly on a user's mobile phone via SMS. Based on the Standard Days Method (SDM), CycleTel succeeded in Lucknow and New Delhi, India, to expand access to family planning by offering an effective family planning method directly via mobile phones [22]. Another example is MOTECH Suite [22], which includes inter-operable workflows within and across five key functional areas: improving demand for health services, managing patient data, improving frontline worker performance, managing the last-mile supply chain, and tracking patient compliance with treatment. The MOTECH Suite system has been tested in over 20 countries, including Afghanistan, Ethiopia, Ghana, India, Tanzania, and Zambia. The MOTECH Suite system was deployed in the Indian State of Bihar to track pregnant women, mothers, and children under the age of one along the continuum of care with specific protocols on birth preparedness, delivery, postnatal care, and exclusive breastfeeding. However, for both CycleTel and MOTECH Suite, neither have an adequate list of the range of services needed for each prospective mother and child as per the continuum, nor do they provide a facility to develop a strong database through a registration system.

In India, the effort to strengthen the electronic registration of Reproductive, Maternal, Newborn, and Child Healthcare at the community level is at a nascent stage. In Haryana, India, outreach workers used handheld computers to collect data on immunization records, prenatal care schedules, and routine demographic information that feed into centralized electronic health records for easy access by rural paramedics [23]. The UNICEF-funded *Sisu Samrakshak* (SSK) program in Andhra Pradesh, India, also exemplifies the incorporation of data management into primary health care services using mobile technology [24]. This initiative equips frontline AWW with handheld devices that monitor the health development in their catchment area and communicate the data to the nearest rural health centers [24]. Subsequently, the same mobile device disseminates necessary information related to topics such as pregnancy, nutrition, and immunizations [24].

In brief, to see effective results in the implementation of continuum of care, it is crucial to track every prospective mother and their children to avert avoidable maternal and child deaths in India. To use available information to take corrective actions that can overcome systematic and programmatic gaps in service provision to avert maternal deaths, the Maternal Death Review (MDR) has been institutionalized by the federal Indian government [25]. Under this process, reporting and analysis on the causes of the maternal deaths have to be collected through a Community Based Maternal Death Review (CBMDR) or a Facility Based Maternal Death Review (FBMDR). The guidelines for MDR suggest that the CBMDR must be taken up for all deaths that occur in the specified geographical area, irrespective of the place of death, be it at home, a facility or in transit, whereas the FBMDR will be taken up for all government teaching hospitals, referral hospitals and other hospitals (District, Sub district, CHCs) where more than 500 deliveries are conducted in a year [26]. The loophole in MDR provisioning is that it investigates causes of maternal death retrospectively, whereas this tracking strategy proposes a preventative framework to improve Reproductive, Maternal, Newborn, and Child Healthcare at the individual level.

The High-Level Expert Group (HLEG) on universal health coverage instituted by the Planning Commission of India suggested the 'National Health Package' for essential health at the primary, secondary, and tertiary levels of care for all citizens of India by 2022 [27]. According to the budgetary provision in the Twelfth Five Year Plan, the Government of India

allocated over 1.5% of its GDP to healthcare. Some of this could be directed to design an effective tracking strategy in line with the Global Investment Framework of Continuum of RMNCH [28] in India.

Conflict of interest

We have no conflict of interest to declare.

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