

## Maternal and Perinatal Death Surveillance and Response System: An Intervention to Reduce Maternal and Perinatal Deaths in Africa; Using Nigeria as a Case Study

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### Abstract

Zero maternal and early neonatal deaths from preventable causes have been a global target for many years. There has been observed improvement as the trends have reduced for the past 20 years globally. While this can be seen as a considerable global reduction, it is, however, not uniform to continents, regions, and Nations. Of note, Sub-Saharan African countries remain the worst affected. Healthcare solutions to manage or prevent complications in pregnancy and childbirth are well known. While access to quality skilled care has been accepted globally as a major solution to the reduction of maternal and perinatal deaths and it is the greatest need of every woman, the majority of countries in Sub-Saharan Africa lack an accountability framework to ensure every woman in childbirth receive the right care, every time.

For this reason, the sustainable development goals called for a renewed focus, and the healthcare system is held accountable for quality service provision. This article appreciates the efforts and approaches African Countries have put to close the gap. However, after several years of implementation, the goal remains far from being achieved. This article, therefore, provides the significance of adopting maternal and perinatal death surveillance and response (MPDSR) as a quality improvement methodology, using Nigeria as a case study. This will definitely contribute to the realization of global targets among countries in sub-Saharan Africa with a high burden of maternal deaths.

It further explains why and how the MPDSR system works and outlines the structural and operational requirements for the implementation of the methodology.

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## Introduction

Ending preventable maternal and perinatal deaths has been a global agenda for many years. For instance, global millennium development goals (MDGs) had a target of reducing maternal mortality by 75% between 1990 and 2015. However, Nigeria and many other countries in Sub-Saharan Africa (SSA) did not only fail to achieve this but are still recording exceptionally high maternal and perinatal (still births plus early neonatal deaths or deaths in 1st week life) deaths [1]. Globally, in 2017 approximately 810 women died every day during pregnancy, in labor & delivery, and after childbirth translating to maternal mortality ratio (number of maternal deaths per 100,000 live births) of 211/100,000 live births [2]. Approximately 2.7 million children die in the first 28 days of life, while 2.6 million are stillbirths translating to neonatal mortality rate (deaths within 1st 28 days of life per 1000 live births) of 17/1000 live births [3,4]. While the burden of maternal and perinatal deaths is still very high globally, there is a large disparity between developed and low-income countries. For example, while maternal mortality ratio in low-income countries was 462 per 100,000 live births, developed countries recorded 11 per 100,000 live births in 2017.

Even so within SSA the burden varies between countries. For instance, a joint estimate by WHO-World Bank-UNICEF-UNFPA and United nation population division, showed that MMR for Nigeria was reported to be 917

per 100,000 live births while in Namibia was at 195 per 100,000 live births. This reflects substantial inequalities in accessing quality health care among pregnant and lactating women in these countries [5]. In sub-Saharan Africa the major causes of maternal deaths include hemorrhage (37%), Hypertensive disorders (pre-eclampsia, eclampsia) (16%), and sepsis (10%). Other direct causes include complications of unsafe abortion and uterine rupture.

On the other hand, the African continental estimates show that preterm birth complications (30%) complications during labor and delivery (30%) and neonatal infection such as neonatal sepsis, tetanus or meningitis contribute immensely to majority of newborn deaths. Often there are other factors involved such as socio-demographic factors such as teenage pregnancies, level of education, economic status and health system related factors such as lack of skilled birth attendants are fundamental determinants of maternal health outcomes [6]. The majority of maternal and perinatal deaths are preventable since health care solutions to manage or prevent complications are well known [2]. Timely access to high quality of care in pregnancy, labor and delivery, and after childbirth, is the greatest need of every woman. Importantly, all births should be attended by skilled birth attendant, as early detection, management, and treatment of complications can make a difference between life and death of a mother as well as her baby [2].

The global commitment to Sustainable Development Goals (SDGs) that includes targets to end preventable maternal and newborn deaths, calls for a renewed focus and accountability as stipulated in “2015 Global Strategy for Women’s and Children’s and Adolescent’s Health 2016-2030, the 2014 World Health Organization (WHO) Every Newborn Action Plan and the WHO 2015 Ending Preventable Maternal Mortality strategy”. In all these, quality of care is the single most priority area. The WHO defines quality as “the extent to which health care services provided to individuals and patient populations improve desired health outcomes” or more simply, as “doing the right thing for every person every time.” Quality health care is generally safe, timely effective, efficient, equitable and client responsive. On the other hand, manifestations of poor quality of care includes provision of non-evidence-based care; disrespectful and abusive care; delayed care; lack of skilled health workers; lack of essential drugs, equipment, and supplies; poor health infrastructure; non-effective referral systems and finally lack of vital health information to define clinical care and inform management in making key decisions [7]. The quality-of-care framework published by WHO in 2016 underscored the need for evidence-based, systematic approach to service provision while being sensitive to client’s experience around childbirth and postnatal period [3].

### **Situation in Nigeria**

Nigeria is the most populated country in Africa, with a population of 187 million in 2016 and fertility rate of 5.6 [7]. It is among the

countries in Sub-Saharan Africa with the highest maternal and perinatal deaths. It ranks second globally in the number of maternal deaths [1]. Her maternal mortality ratio stands at 814 deaths per 100, 000 live births and neonatal mortality rate of 32 deaths per 1000 live births [8].

Though the country has made significant progress in maternal child health, it did not achieve MDG 4 for child survival due to high numbers of neonatal deaths and did not achieve MDG 5 for maternal survival [7]. In 2015, the Federal Government of Nigeria renewed her focus on maternal child health by devoting to implement Sustainable development goals (SDG) including targets to end preventable maternal and newborn deaths [7]. In the following year 2016, the Federal Ministry of Health (FMOH) developed a National Health Policy 2017-2021 that placed reproductive, maternal, and newborn, child and adolescent health (RMNCAH) a priority public health problem with policy goals to address issues surrounding quality of care [9]. Equally, the ministry, during the same year launched the Nigeria Every Newborn Action Plan (NiENAP) which was conceptualized from the one developed by the WHO. This strategy framework was aligned to 10 key areas of the National Health Policy to achieve significant reduction of mortality and coverage targets by 2030 [9].

Other intervention the Federal Government of Nigeria has invested on include Midwives Service Scheme; systematic primary health care infrastructure upgrades via Ward Health System; and subsidy Reinvestment and

empowerment program, maternal and child health (SURE-P-MCH) amongst others [7]. Despite the renewed and narrowed focus on maternal and newborn health of care is still far from the best.

### Health care governance in Nigeria

Nigeria is governed by the dictate's of 1999 constitution. Unfortunately, the roles and responsibility are not well stipulated across the three tiers of governance in health system management and delivery. The tiers include the Federal government, State government and Local Government Areas (LGA). However, the National Health Act 2014, though it does not extensively address the gap in the constitution, it does provide the first legislative framework for the country's health system.

The country has in place several sub-sectoral policies and plans, including the Reproductive Health policy, Health Financing policy, Health promotion policy and the National Human resources for Health and plan amongst others. There is also an existing framework for the oversight of programme implementation, where the National Council for Health is at the helm. There are various coordination platforms chaired by the Ministry of Health, including the Health Partners Coordinating Committee and the Development Group for Health as well as various thematic technical groups and Task forces. Yet, as a result of poor coordination among these groups there is duplication of efforts and wastage of scarce resources [9]. The delivery of health services is through primary health care, secondary and tertiary

care. The Federal Government is responsible for providing Tertiary health care including management of teaching hospitals and policy formulation, the State Government ensures provision of secondary care by operating general hospitals and Local Government is responsible for primary health care provision and were supported by Federal Government through National Primary Health Care Development Agency [7].

The FMOH in the National Health policy 2016 documents remarks that availability of health facilities does not necessarily translate to quality health care. As it is in Nigeria several services are not available to the public. The available services are characterized by inconsistency due to time-to-time industrial action by all cadres of health care provision and poor integration of private sector to Nigerian Health care system.

The facilities, especially in rural areas are far away from people making access difficult due to cost implication. There is disproportionate competence in clinical diagnosis and management of illnesses, with low adherence to clinical guidelines by clinical staff. Though the ministry of health provides licenses to ensure facilities comply with set standards, monitoring quality of care services especially in private sector is limited. As well there is no institutional framework regulating quality and standards [9]. As such service coverage is extremely low with slow progress over time. This is as illustrated in Table 1. Generally, due to poor governance of health care and subsequent poor-quality provision makes the services less desirable and with low public confidence.

| Indicator                                                                                  | 2003 | 2008 | 2013 |
|--------------------------------------------------------------------------------------------|------|------|------|
| Percentage of married women aged 15-49 who are currently using contraceptives (any method) | 13%  | 15%  | 15%  |
| Antenatal care attendance by skilled provider during pregnancy for most recent births      | 58%  | 58%  | 61%  |
| Delivery in a health facility                                                              | 33%  | 35%  | 36%  |
| Delivery assisted by skilled provider                                                      | 35%  | 39%  | 38%  |

**Table 1:** performance of key MNCH services in Nigeria. Source: National Health policy 2016 [7].

## Quality improvement methodology

Several interventions have been suggested to reverse the trends of maternal and perinatal deaths. This includes introducing community midwifery to primary health care system. This intervention involves making available skilled antenatal, labor and delivery care at the community level. However, a study conducted in Nigeria to review perception of stakeholders to implementing this strategy, revealed that there was a need to carefully assess modalities and benefits of introducing the intervention in the Nigerian Health care system [10]. Secondly, a systematic review study by Lassi and Bhutta on “Community-based intervention packages for reducing maternal and neonatal morbidity and mortality and improving neonatal outcomes,” revealed that there is limited literature on implemented interventions specifically addressing reduction of maternal mortality and reporting outcomes [11]. However, there was observed evidence of reduction of neonatal deaths by 25% in community-intervention packages that disseminated education and promoted creating awareness on birth and newborn care preparedness as well as packages comprised of community mobilization, education, and home visitation by community health worker. There was observed significant reduction of stillbirths

by 46% with visitation made by midwives, contrary there was no impact of home visits made by traditional birth attendants [11]. Thirdly, Wilkinson in study on impact of implementing perinatal death audit system in a rural African health district hospital between 1991 and 1995 revealed a significant impact in reduction of perinatal mortality [12]. The study findings showed that between 1991 and 1995 there were 31% average monthly increase in number of skilled deliveries, 40% reduction of perinatal mortality rate, proportion of deliveries at the peripheral clinics was consistently at 35% of the overall deliveries however, proportion of perinatal deaths fell from 17% in 1991 to 6.3% in 1995.

The perinatal mortality audit methodology was used to identify health system weakness in delivery of maternity care, design interventions exclusive to the identified problem and finally to evaluate the impact. The author recognizes that despite significant increase in workload, as evidenced by the large number of skilled deliveries, quality of care significantly improved (by elimination of avoidable deaths) that saw perinatal death mortality reduce by 40%. The methodology gave rise to the following changes: recruitment of more doctors, midwives were trained to advanced diploma level and the regional wide maternity services were

restructured to have this methodology, district health system owned, and clinical staff were sensitized on the same and were empowered to participate in proper training and support. The village clinics were also discouraged to referring women in labor or with obstetric complications to neighboring hospitals. Fundamentally, there is a global consensus that accurate information is a prerequisite to effective decision making. As such empirical evidence is necessary where context specific interventions are used to reduce maternal and perinatal deaths. However, the actual burden of maternal and perinatal deaths is unknown and estimating them requires national wide surveys that are unaffordable to many low-income countries [6]. Without knowing the true numbers of deaths or causes, countries are unable to adequately improve quality of care, prevent future deaths, improve vital statistics, allocate resources, and ultimately reach global targets [5].

To eliminate the gap, the WHO, in 2004, launched “Beyond numbers” a guide to help countries understand circumstances surrounding maternal death and possibly address the challenges. However, the approach didn’t meet the target for several years of implementation [5]. In 2012, the United Nations Commission on the Status of Women made a resolution to eliminate preventable maternal mortality. In 2016, a guide by WHO was published on conducting mortality audits for perinatal and neonatal deaths together with tools on how this was to be adopted across nations down to facility level. Importantly, a critical component was introduced to the elimination strategy

maternal and perinatal death surveillance. The system was to keep track of the number of deaths and provide essential information regarding the cause of death, underlying contributory factors and necessary actions to address contributing factors to avert preventable deaths. As such, top priority recommendation highlighted in the WHO global action plan was to institutionalize maternal and perinatal death surveillance and response systems (MPDSR) as an intervention to enable make use of audit data to track and prevent maternal and perinatal deaths [13]. This approach like the intervention that was evaluated in Wilkinson study [12]. The Federal Government of Nigeria, like many other African countries have adopted this system however implementation has been very slow. For instance, the FMOH started by operationalization of maternal death audits with support from Society of Gynecology and obstetrics of Nigeria and the International Federation of Gynecology and Obstetrics (FIGO). The Saving Newborn Lives project of Save the Children in collaboration with the ministry of Health lead to the development of MPDSR guideline that was launched in 2016. In spite of existence of global guidelines and policies, there is still lack of commitment operationalization of MPDSR system across states as evidenced by Lack of routine tracking system for the rollout of MPDSR nor Maternal death reviews [13].

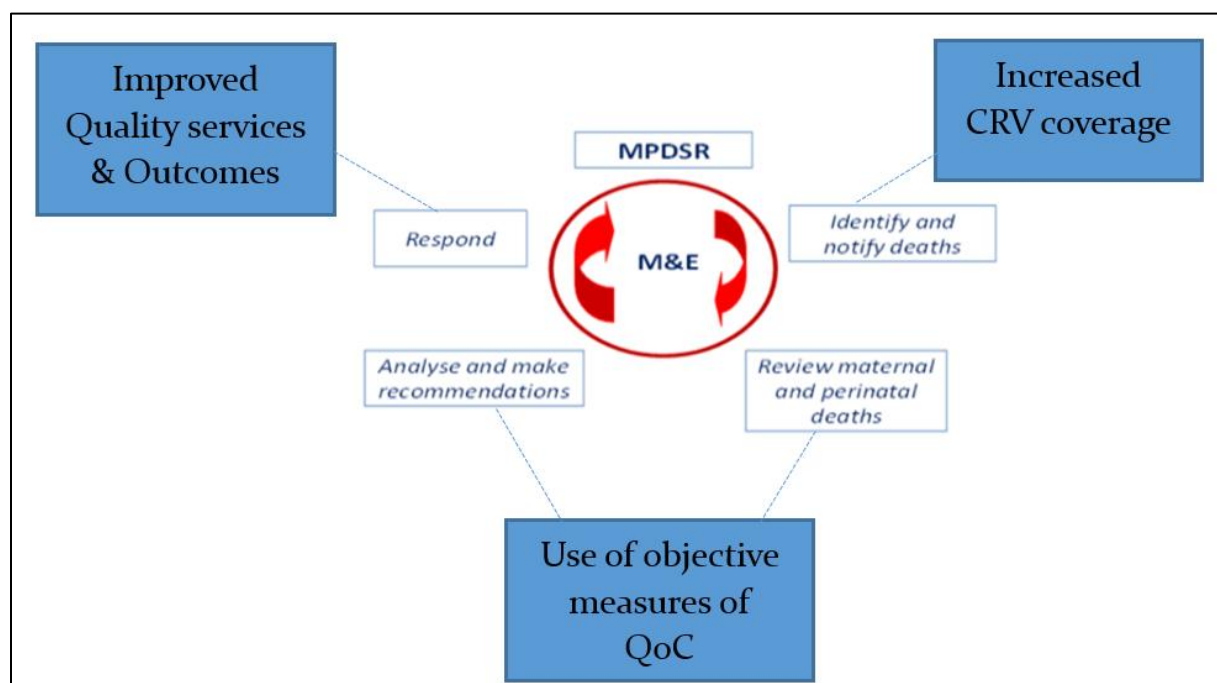
### How does MPDSR work?

The system comprises of processes of capturing information on number and causes of deaths whether for maternal, stillbirths and neonatal deaths. The system builds on

existing health programs for mortality audit especially maternal death review. It is characterized by continuous action and surveillance cycle of identification, notification and review of maternal and perinatal deaths followed by analyzing circumstances surrounding each death by looking at continuum of care breakdowns, from the household to health facility level that may have been preventable. After doing

the analysis, then follows recommendations for action, referred to as response. The continuous action cycle process is so significant for quality improvement that links data from the grass-root to the national level.

The community involvement and capturing audits at that level is also unique to this system. Below is a model describing MPDSR system (Figure 1).



**Figure 1:** Maternal and Perinatal death surveillance and response model. Source: Kenya Ministry of Health, 2017 [14].

Through mortality audit process specific cases are identified, then are notified within the timelines stipulated in the national guidelines while using the relevant forms from the local to the national level. The process is followed by systematically reviewing and analyzing the cause and contributing factors to the maternal and perinatal death. The analysis will consider the

three distinct delays contributing to maternal mortality namely:

1. delay in deciding to seek care. This would be as a result of socio-cultural norms like lack of decision-making power of women, failure to recognize danger signs, failure to perceive the severity of sickness.

2. delay in accessing care either due to long distances, lack of transport from home to health facility or between facilities.
3. delay in receiving quality care at the health facility. This would be due to shortage of staff, poor staff attitude, lack of supplies, equipment or infrastructure, and lack of competence [15]. The process is finalized by implementing the action points identified and agreed upon during audit review meetings.

### **Structure and operation of MPDSR system.**

The system operates by establishing MPDSR committees at various levels of health care provision. The committees include community, facility, regional and national MPDSR committees. The committees are governed by the following principles:

1. No blame policy.
2. focus on health systems not individuals.
3. MPDSR meeting is primarily an educational experience for all participants.
4. Zero-reporting principle; and
5. Documentation of patient case notes is the main source of information for the MPDSR process [14].

Role of facility MPDSR committees include holding monthly meeting over and above maternal and perinatal review meetings; ensure notification of all maternal deaths occurring at the health facility; hold death review meetings to determine the cause of all

maternal deaths occurring at the facility; implement institutionalized activities to prevent future occurrence such activities identified and agreed upon during audit review meetings; provide feedback to community MPDSR committee as provided. While the roles and responsibility of community MPDSR committee includes hold death review (verbal autopsy) of all maternal deaths occurring in the community; ensure all community maternal deaths are notified; provide monthly reports of all maternal and perinatal deaths occurring in the community; implementing community-based activities to prevent similar deaths in the future- such activities are identified and agreed upon during the mortality review meeting. The committee is also charged with the responsibility of holding advocacy meetings to promote maternal and new-born health [14]. Composition of facility MPDSR committee include the medical superintendent, head of quality improvement team, maternity in-charge who is the secretary to the committee, Maternal child health clinics representative, obstetrician, pediatrician, health records information officer, Reproductive health coordinator, Facility administrator, Anesthetist, representative of training institution if students are attached to the facility [14]. The MPDSR committee makes the following 5 key decisions: Cause of maternal or perinatal death, classification of death i.e., direct, indirect or incidental, identifies relevant delays, Avoidability and Actions to prevent occurrence of similar death. The five C's of MPDSR actions include commitment to quality, coverage, Caesarian Section safety, contraception, and community involvement

[14]. The MPDSR monitoring and evaluation framework provides for yearly system review regarding completeness of surveillance and audit of responses including actions to improve quality of care. QoC assessments are conducted through sampling maternity facilities nationally quarterly then biannual, and finally annually depending on system strengthening growth. The impact of the intervention is measured using the national maternal and perinatal mortality ratios as well as individual facility ratio performance. Studies have shown successful implementation of MPDSR requires clear allocation of roles and responsibilities for action and implementation these actions should be routinely monitored to assess progress. Findings from MPDSR system evaluation study conducted in Kenya showed that the system is effective and is sustainable through focusing on learning, solution-

oriented response, political commitment and action, being accountable for the results and finally keeping track on quality-of-care improvements [16].

## Conclusion

The findings show that MPDSR provides an important platform for determining where the problem is as well as providing evidence-based solutions. Second, the continuous action cycle serves as a yardstick for improved quality of care, resulting in the desired outcomes.

## Publishing consent

We, Kenneth Mwenda and Issac Kiroso, authors of a student paper submitted to Intercollege, give our consent to publish the work in the Journal of Biomedical and Allied Research.

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