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The Three Delays (3 Ds) Contributing to Maternal Mortality in Nigeria

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Abstract:- Maternal mortality in Nigeria is unquestionably high despite concerted efforts geared towards addressing this unending problem. Understanding the reason why women and their newborns die is an important first step in trying to find a lasting solution to this problem that is almost defying all global efforts. This study informed by current literature focuses on the reasons why women and their newborns die in such an alarming rate in Nigeria, which is currently contributing a large chunk to the global maternal mortality burden and how this can be addressed in a lasting manner. The research was conducted to contribute to the body of knowledge related to maternal mortality in Nigeria and this could effectively assist program planners in implementing evidence-based interventions with the capacity to reduce the scourge. The methodology adopted include search on current and recent past peer-reviewed journal articles. The key search words include maternal mortality and the three delays. About twenty (20) of such articles were found. The selected articles were reviewed and organized into the following themes - causes of maternal deaths, the three delays and interventions to address maternal deaths. Findings from the review showed that pregnant women were dying in very high numbers and the three delays - delay in seeking care (delay 1), delay in getting to the health facility (delay 2) and delay in getting needed quality care once the patient is at the health facility (delay3) are largely responsible for these preventable deaths. The paper concluded that Governmental policies addressing training and in-service training can help build the capacity of healthcare workers while provision of emergency transportation can assist pregnant women get to the health facilities to access basic emergency obstetric and newborn care within a short time. Birth planning and complication readiness can be an initial first step that can avert danger at the most critical time of the delivery process.

I. INTRODUCTION

Maternal mortality in Nigeria has remained high despite concerted efforts geared towards addressing this unending problem. Understanding the reason why women and their newborns die is an important first step in trying to find a lasting solution to this problem that is almost defying all global efforts. This study informed by current literature focuses on the reasons why women and their newborns die in such an alarming rate in Nigeria, which is currently contributing a large chunk to the global maternal mortality burden and how this can be addressed in a lasting manner

Lawn et al (2005) stated that a clear understanding of the causes and the context within which these deaths of mothers occur every year is important for health planning and for formulating policies. *He stated further that the causes of these maternal and newborn death is centered on the three delays (3 Ds) causing maternal and newborn deaths".* He noted that *for exploring maternal death, barriers to care-seeking can be characterized by the three delays model developed by Thadeus and Maine (1994)."The model comprises delay in deciding to seek care (delay 1), delay in reaching the health facility (delay 2) and delay in receiving quality care once at the health facility (delay3)".*

Nigeria, a federal republic, is run by a three-tier system of national, state, and local governments, grouped into six geopolitical zones consisting of 774 local governments in 36 states and the Federal Capital Territory, Abuja. The country has an "*estimated population of 173.6 million (World Bank, 2013) with approximately 24 percent being women of reproductive age (UNFPA, 2011), a birth rate of 39 /1,000 population, a Maternal Mortality Ratio (MMR) of 576/100,000 live births, a Neonatal Mortality Rate of 37 per 1000 live births, an under 5 mortality rate of 128/1,000 live births, and an infant mortality rate of 69 /1,000 live births (NDHS, 2013). An analysis of the 2013 National Demographic Health Survey (NDHS) findings provides several instructive observations about the maternal health situation*". The distribution of major Maternal and Newborn Health (MNH) strategies such as Skilled Birth Attendance (SBA) differs widely across the various zones, with the South-east and South-west doing far better than the North-east and North-west. However, high rates of SBA do not necessarily correlate with better maternal and newborn outcomes—as can be deduced from the Maternal Mortality and the Neonatal Mortality parameters.

WHO (2018) estimates shows that "*about 830 women perish daily from avoidable causes related to gravidity and delivery, 99% of these deaths occur in poor countries with higher number of deaths occurring among rural women. In sub-Saharan Africa, a host of nations reduced their rate of maternal deaths by half since 1990. In other regions, including Asia and North Africa, even achieved greater success. Between 1990 and 2015, the global MMR (the number of maternal deaths per 100 000 live births) reduced by a paltry 2.3% per year between 1990 and 2015. Some countries recorded an annual reduction of MMR of about 5.5% between 2000 and 2010 (WHO, 2018).* However, the number of deaths is still unacceptably high and this calls for the need to sustain and improve upon the gains already

achieved to ensure that no woman dies from preventable pregnancy related causes".

Pregnant women die following complications during pregnancy, labor and delivery. Majority of these pregnancy related complications develop following pregnancy and if not addressed properly at this point, may create some serious challenges later in the pregnancy and during labor and delivery. The most regrettable aspect of these complications is that they are actually preventable and treatable. There are some other types of complications that may have been present before conception but are often times increased as a result of pregnancy, particularly those that are not properly managed as part of the pregnant woman's antenatal care. Some of the main pregnancy related complications that accounts for nearly 75% of all maternal deaths are (Say et al, 2014):

- *Severe bleeding, which could be antepartum or postpartum hemorrhage*
- *Sepsis*
- *Elevated blood pressure following pregnancy*
- *Complications from delivery*
- *Abortions, particularly unsafe*.

The rest are mostly caused by diseases as malaria, and AIDS during pregnancy which are often referred to as indirect causes of maternal mortality.

From the WHO (2018) estimates, "maternal mortality ratio in in less developed nations in 2015 is 239 per 100 000 live births as against 12 per 100 000 live births in advanced nations. There is widespread disparities between countries, also also in- countries, and for women with affluent and poor women and depends on whether the woman resides in rural or urban settings. *The risk of death of mothers is particularly higher for adolescent girls below 15 years and complications in pregnancy and childbirth is a leading cause of death among adolescent girls in developing countries* (*Conde-Agudelo et al (2004); Patton et al (2009). Women in developing nations have higher tendency of having more pregnancies, and have higher risks of dying from pregnancy related complications across their lifetime (WHO, 2018)".*

As has been noted above, most maternal deaths are manageable and avoidable, as the healthcare strategies to address these complications are well established and evidenced based. All women are entitled to have the ability to have access to care during pregnancy, managed by skilled personnel during labor and delivery and at postnatal care, and support in the period following delivery. It was estimated that approximately "*2.7 million newborn babies died in 2015 (The Inter-agency Group for Child Mortality Estimation, 2015) and an additional 2.6 million are stillborn Blencowe H, Cousens S, Jassir FB, Say L, Chou D, Mathers C et al. (2016).* It is especially important that all childbirths are conducted by skilled personnel as timely intervention might be all that is needed to save the life of the mother and baby".

Postpartum hemorrhage following delivery could lead to immediate death of a healthy woman within a short time following such bleeding not properly controlled with oxytocin or other interventions such as anti-shock garments. *"Similarly, sepsis after delivery can be prevented if neat practices are observed and should there be fear of infection, it should be promptly recognized and treated promptly. If high blood pressure is detected during pregnancy, it should be carefully managed in a timely manner before the onset of fitting. Drugs such as magnesium sulfate can reduce the risk of progression from pre-eclampsia to eclampsia. One of the easiest ways of preventing maternal deaths is to prevent unwanted pregnancies using modern contraceptive methods. All women, including adolescents, should have access to contraceptive services, safe abortion practices s permitted by law and post abortion care.*

Indigent women in residing in rural communities are less likely to get optimum intervention before, during and after delivery thereby putting their lives and those of their babies at risk. "*It is particularly true for areas with dearth of skilled birth attendants such as sub-Saharan Africa and South Asia (WHO, 2018). In 2015, global births in the richest twenty percent of families were above twice more likely to be attended by skilled birth attendants when compared with those in the poorest 20 percent of families (89 per cent versus 43 per cent) (WHO, 2018). This translate to millions of deliveries are not being managed by skilled personnel such as midwife, doctor or a trained nurse and likely to be managed by Traditional Birth Attendants (TBAs). In rich nations, practically all women attend minimum of four ANC visits, are attended by a skilled personnel during delivery and receive postnatal care. In 2015, only about forty percent of all pregnant women in low-income countries had the recommended antenatal care visits (WHO, 2018). Some additional reasons why pregnant women from getting or soliciting appropriate care during pregnancy and delivery include poverty or high cost of services, distance, lack of information, inadequate services and cultural practices. In other to enhance maternal health outcomes, hurdles that prevent access to high standard maternal health services must be recognized and addressed at all levels of the health care system. Together, these factors aggregated to form the three delays contributing to maternal and newborn mortality".*

II. METHODOLOGY

This systematic review of literature on maternal deaths in Nigeria focused on the causes of maternal deaths and how the three delays contributed to the high number of deaths of women as a result of pregnancy. It involved an in-depth search of current and recent literature with inclusion and exclusion criteria for peer-reviewed journal articles and the results are organized into themes. The search was conducted in published articles in Google Scholar, CINAHL, Health Source and PubMed in September 2019. The keywords "maternal mortality", "Nigeria" and "the three delays" were used as selection criteria. Also, journal

articles published between 2000 and 2019 were included in the search criteria and articles written in other languages other than English were excluded. Twenty (20) articles met the selected criteria, and after review, were organized into the following themes: causes of maternal deaths, the three delays and intervention strategies to address maternal mortality in Nigeria.

III. CAUSES OF MATERNAL MORTALITY

Knight et al (2013) conducted a systematic review to identify and categorize specific facility-level barriers to the provision of evidence-based maternal health care in developing countries. The study highlights "*how a focus on patient-side delays in the decision to seek care can conceal the fact that many health facilities in the developing world are still chronically under-resourced and unable to cope effectively with serious obstetric complications. It stressed the importance of addressing supply-side barriers alongside demand-side factors if further reductions in maternal mortality are to be achieved"*. Also, WHO (2014) conducted a systematic analysis of global causes of maternal death between 2003 – 2009. The analysis *shows that "hemorrhage, hypertensive disorders and sepsis were responsible for more than half of maternal deaths worldwide"*. It revealed further that about one quarter of deaths were as a result of indirect causes. The analysis further showed that such reviews should inform the formulation of health policies, interventions, and resource allocation to reduce maternal deaths at national and international levels. It also hinted that additional efforts are needed to improve the availability and quality of data related to maternal mortality. These causes of maternal deaths are preventable especially when the pregnant women present on time and are attended to by well trained and well-motivated skill birth attendants.

Agan et al (2010) assessed trends in maternal mortality in a tertiary health facility, the maternal mortality ratio, the impact of sociodemographic factors in the deaths, and common medical and social causes of these deaths at the hospital from 1999 to 2009. He found "that there was a reduction in maternal mortality during the study period. However, *the study "observed that the extent of the reduction is deemed inadequate. The medical and social causes of maternal deaths identified in the study are preventable, especially the third delay*". The study suggested that the government, hospital authorities and all and sundry should make efforts to reduce these parameters and also cautioned on the need for health care providers to have a change of their attitude towards attitudinal change towards obstetric emergencies.

Thorsen et al (2012) conducted a study to identify the socio-cultural and facility-based factors that contributed to maternal deaths in the district of Lilongwe, Malawi. The study found that *"lack of recognizing signs, symptoms, and severity of the situation; using traditional Birth Attendant services; low female literacy level; delayed access to transport; hardship of long distance and physical terrain; delayed prompt quality emergency obstetric care; and delayed care while at the hospital due to patient refusal or concealment were observed"*. According to the 3Ds, *"the most common delay observed was in receiving treatment upon reaching the facility due to referral delays, missed diagnoses, lack of blood, lack of drugs, or inadequate care, and severe mismanagement (Thorsen et al, 2012)"*.

Omo-Aghoja et al, (2010) "estimated the maternal mortality ratio, identify the contribution of Type III delays and assess the status of emergency obstetric services in a Nigerian Teaching Hospital by reviewing hospital records over a period of two (2) year. They found that *"the leading causes of death were HIV/AIDS (20.2%), eclampsia (12.4%), puerperal sepsis (11.9%), unsafe abortion (9.5%), and postpartum hemorrhage (4.8%). The associated causes of death were Type III delay (61.9%), Type I delay (28.6%), Type II delay (0%) and 9.5% of the women had no delay. Type III delay was due largely to delayed referral*".

Lawn et al (2009) conducted a study to determine the two million intrapartum-related stillbirths and neonatal deaths: where, why and what can be done. They found out that *"maternal risk factors and delays in accessing care are critical contributors. It stated further that the rural poor are at particular risk, and also have the lowest coverage of skilled care at birth. It concluded that each year, the deaths of 2 million babies are linked to complications during birth and the burden is inequitably carried by the poor"*. The study provided some useful recommendations that strategies aimed at addressing these delays must be evidence-based and are needed urgently in other to reduce the burden of intrapartum-related deaths especially in low- and middle-income countries where over 60 million women deliver at home or are being attended to by TBAs.

Hanson et al, (2015) assessed pregnancy-related mortality by distance to health facilities and by cause of death in a disadvantaged rural area of southern Tanzania. *The study found that pregnancy-related mortality was high at 712 deaths per 100 000 livebirths, with hemorrhage being the leading cause of death. Deaths due to direct causes of maternal mortality were strongly related to distance, with mortality increasing from 111 per 100 000 livebirths among women who lived within 5 km to 422 deaths per 100 000 livebirths among those who lived more than 35 km from a hospital (adjusted odds ratio 3·68; 95% CI 1·37–9·88). Neither pregnancy-related nor indirect maternal mortality was associated with distance to hospital. Among women who lived within 5 km of a hospital, pregnancy related mortality was 664 deaths per 100 000 livebirths even though 72% gave birth in hospital and 8% had delivery by caesarian section. The study concluded that long distances to hospital contribute to high levels of direct obstetric mortality. High pregnancy related mortality in those living near to a hospital suggests deficiencies in quality of care"*.

A study to determine the incidence, characteristics, determinants and perinatal outcomes of near misses in a tertiary hospital in South-west Nigeria (Ikeola, 2013) *"found that the incidence of near miss was 12%. Severe*

hemorrhage (41.3%), hypertensive disorders in pregnancy (37.3%), prolonged obstructed labour (23%), septicemia (18.6%) and severe anemia (14.6%) were the direct causes of near miss. The study identified some significant risk factors and found that these risk factors are responsive to suitable medical and public health interventions. Undesirable newborn outcomes can easily be linked to near miss events.

➢ *The three delays (3 Ds)*

The model comprises delay in deciding to seek care (delay 1), delay in reaching the health facility (delay 2) and delay in receiving quality care once at the health facility (delay3). There is generally low uptake of antenatal, labor and delivery services in health facilities in Nigeria (23 percent for public facilities and 13 percent for private facilities (NDHS, 2014). To effectively reduce maternal deaths special efforts should be made to target the most critical periods associated with maternal and newborn death, particularly the times around labor, delivery and the first 48 hours post-delivery. Sound epidemiological data and profiles should guide implementation to ensure that the socio-cultural context that shapes health seeking behaviors and attitudes of the target populations is appropriately addressed. Special efforts should also be made to ensure that service delivery standards are met and activities such as demand generation, health system strengthening, capacity building and motivation of providers, service delivery, commodities logistics management, referral systems are properly coordinated and harmonized in partnership with our government counterparts and other stakeholders to ensure synergy. The low uptake of labor and delivery services in health facilities generally in Nigeria makes the enhancement of facility structures and quality and availability of services a necessary starting point. Also, it is important that efforts geared towards reducing maternal mortality should endeavor to work with the host communities to: sensitize on availability and changed quality of services; address beliefs and practices that hinder health seeking behaviors; address stigma related to HIV that hinders access, improve awareness about danger signs and emergency response, birth preparedness planning (using domesticated tools), and the benefits of using available MNH/RH/TB/HIV services, and strengthen emergency transportation service. Demand generation activities to increase service uptake will involve community-level activities including social and behavior change, including behavior change communication (BCC) as well as awareness-raising for target audiences through working with existing community structures (CBOs) efforts and mass media.

➢ *Increase timely utilization of institutional delivery services (Addressing Delay One)*

Nigeria has significant under-utilization of facility-based delivery services. The reason adduced for this low utilization of facilities services include: long distances, cost, cultural norms (preference for home deliveries; low status of women) and poor quality of care at facilities (NDHS, 2014).

➢ *Intervention strategies to address the first delay*

- Identify, select, train and support community health workers (CHWs) in collaboration with community leaders drawing from the existing CHWs such as Traditional Birth Attendants (TBAs), Private Patent Medicine Vendors (PPMVs), Community-Based Distributors (CBDs), Community Home-Based Care Providers (CHBCPs), faith-based groups and other informal providers to mobilize communities for behavior change, positive health seeking behavior, and benefiting from some clinical interventions extending into the community from the health system. These community based cadre will promote, through one-on-one and one-on-group activities, birth preparedness/complications readiness and early booking/registration and attending at least four Ante Natal Care (ANC) visits during the pregnancy, preferably having the first visit during the first trimester. Other interventions include: early identification of danger signs; encouraging skilled facility delivery and Post-natal care (PNC), Lactational Amenorrhea Method (LAM), HTSP/PPFP, referral for long term methods, malaria in pregnancy prevention and management; HIV Counseling and Testing (HCT) and Prevention of Mother-To-Child Transmission (PMTCT) of HIV.
- Regular exchanges between community volunteers and their facility counterparts will be scheduled for collaboration on linking communities to facilities with increasing benefit for all.
- Support relevant community leaders to establish safe motherhood sub-committee within existing community development committees that will work with CBOs and other civil society groups to strengthen the capacity of communities and service providers (including CHWs, facility management teams and officials from LGAs) to plan and implement rights based, demand generation and community based service provision while also improving referral systems/linkages and enhancing women's participation and empowerment.
- Implement gender-equitable approaches, targeting male engagement and women's empowerment, for promoting better MNH outcomes.

➢ *Ensure women and their newborns are provided key health services (Addressing Delay Two)*

The challenges and barriers to accessing services are key contributors to the poor Maternal and Newborn Health (MNH) outcomes in Nigeria. Further, some of the access challenges are geographic due to the physical terrain as some communities are hard to reach due to bad road networks. In addition, there are also financial barriers (a significant cost of care is out-of-pocket with majority of the population living below the poverty line) as well as the absence of effective communication and transportation systems that exacerbates the situation. The most common reported means of available and functional transportation in the public sector to transport women in emergencies is a two-wheeled motorcycle.

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➢ *Intervention strategies to address second delay*

- Strengthen the capacity of health facilities with sufficient number of skilled birth attendants within appropriate geographical positioning to provide all pregnant women across Nigeria—24 hours per day/seven days a week—access to quality MNH services within a 2 hour window through training and provision of essential MNH equipment and supplies.
- Strengthen/establish and support emergency transport scheme to convey pregnant women from their homes to health facilities for emergency obstetric care.
- Expand access to services by supporting Community Health Worker (CHW) training in targeted communities to deliver defined MNH/HIV information and services (birth preparedness, post-natal care (PNC) and establish a functional referral system).
- Strengthen the referral network to ensure that women with complications are promptly transferred from the community or health center to an appropriate level of facility and for follow-up, particularly of mother/baby pairs through supporting referral services.
- Support the establishment by communities and government counterparts of birth centers/mother's waiting homes for those mothers who are high risk, live far away and/or have other difficulty accessing a health center for delivery on time.

➢ *Improve the quality of maternity care and institutional delivery services (Addressing Delay Three)*

Poor quality of care is a significant barrier and one of the reasons for poor maternal and newborn outcomes in Nigeria. Some of the key quality challenges include inadequate skilled providers to provide 24 hour services. It is possible that the facilities have one skilled provider; the number is inadequate to provide all day services which are critical for maternal and newborn care. Lack of basic infrastructure such as electricity; water; lack of functional equipment to provide quality MNH services; inadequate training and supervision; lack of and under-utilization of clinical MNH and RH protocols, use of the partograph; and lack of basic necessities such as toilets. Additionally, commodity insecurity of essential MNH/RH supplies is also common with stock-out of at least one antibiotic.

➢ *Intervention strategies to address the third delay*

- Support in-service training for facility based providers such as medical officers, nurses and midwives and ensure availability of Standard Operating Procedures (SOPs), equipment and supplies for the provision of emergency obstetric and newborn care (EmONC).
- Strengthen availability of quality post-natal clinics through trainings, provision of SOPs, equipment and supplies with special emphasis on provision of comprehensive FP services, support for infant feeding, as well as identification, management and/or referrals for newborn and maternal complications.
- Strengthen mentorship and supportive supervision from the Federal, State and LGAs and the University Teaching Hospitals for provision of quality clinical obstetric, newborn and HIV care through supportive supervision trainings, mentorship and facilitating conduct of integrated supervision visits.
- Work with the Federal Ministry of Health (MOH), SMOH and LGAs and relevant community structures to extend and scale-up the Federal Governments' Midwifery Service Scheme where feasible to fill the gaps of accessible, acceptable skilled birth attendants.
- Explore mechanisms for improving HRH availability through contracting retired or private health professionals and re-distribution of public sector providers to improve availability of skilled birth attendants.
- Support/build capacity of the pre-service teaching institutions and their faculty through a deliberate policy of using these institutions for all project related in-service trainings.

IV. CONCLUSION

From the above review of current and recent literatures, it is clear that the causes of maternal mortality are centered on the three delays. The model helped in delineating the various factors contributing to maternal deaths and how intervention efforts can be channeled towards reducing deaths of mothers. From the model, it was clear that the contributory factors leading to maternal mortality are avoidable, or at least manageable. Governmental policies addressing training and in-service training can help build the capacity of healthcare workers while provision of emergency transportation can assist pregnant women get to the point where they can to access basic emergency obstetric and newborn care within a short time. Birth planning and complication readiness can be an initial first step that can avert danger at the most critical time of the delivery process. If family and community members are involved in local health committees, this can go a long way in providing necessary local support for pregnant women in need. It also important to strengthen community structures so that they can provide some level of support as they are closer to these women and their families.

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