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Maternal Health andMortality in Developing Countries: Challenges of Achieving Millennium Development Goals

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Abstract:*Maternal deaths and disabilities are the leading contributors of women's disease burden with high mortality worldwide. The common risk factors of maternal mortality are postpartum bleeding(15%),complications of unsafe abortion(15%),hypertensive disorders of pregnancy(10%),postpartum infections(8%),obstructive labor(5%),blood clots(3%), and preexisting conditions(28%).UNFPA report that developing nations account for ninety-nine percent of maternal deaths with majority of those deaths occurring in Sub-Saharan Africa and South Asia. Prevention of maternal mortality include: improvements in medical advancement, healthcare services, and maternal health plan. Improvement of maternal health comprises accessibility to healthcare and poverty reduction, detection and prevention of HIV/AIDS virus infection, body weight, oralhealth, and postpartum complications. Rwanda has an excellent record of improving maternal health.Nepal healthcare services has placed emphasis on providing family planning to rural areas and it was shown to be effective. UNFPA recommendations on reduction of maternal mortality are useful. Achievement of MDGs can be summarized by the statement of Vice President for Human Development at World Bank,2010.*

Keywords:*Maternal Mortality, Risk factors, Mortalitymeasurements, Millennium Development Goals.*

I. Introduction

Maternal health is the health of a woman during pregnancy, childbirth and postpartum period [1].Maternal death is defined as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes[2].Ninety-nine percent of the maternal deaths occur in developing countries [3].In 2011,therewere approximately273,500 maternal deaths-uncertainty range,256,300 to 291,700[4].Maternal deaths and disabilities are leading contributors in women's disease burden with an estimated 275,000 women killed each year in childbirth and pregnancy worldwide[5].Forty-five percent of postpartum deaths occur within 24 hours[6].Worldwide, the Maternal Mortality Ratio(MMR) has decreased, with South East Asia seeming the most dramatic decrease of 59% and Africa is seeming a decline of 27 %.There are no regions that are on track to meet Millennium Development Goals(MDGs) of Decreasing maternal mortality by 75% by the year 2015[7].UNFPA(United Nations Population Fund) estimated that 289,000 women died of pregnancy or childbirth related causes, range from severe bleeding to obstructed labor, all of which have highly effective interventions[8].The four measures of maternal death are the maternal mortality ratio(MMR),maternal mortalityrate, lifetime risk of maternal death and proportion of maternal deaths of women of reproductive years[2].Prevention of maternal mortality include better medical care and medical technologies, largely due to improved asepsis, fluid management and blood transfusion and better prenatal care[9].Paper reviews the current literature, maternal mortality in the developing countries and the success of Millennium Development Goals.

II.Risk Factors

The risk factors that increase maternal mortality can be direct or indirect. Generally, there is a distinction between a direct maternal death that is result of a complication of pregnancy, delivery, or management of the two, and an indirect maternal death[10],that is a pregnancy-related death in a patient with a preexisting or newly developed health problem unrelated to pregnancy. Fatalities during but unrelated to a pregnancy are termed*accidentalor incidental* or non-obstetrical maternal deaths. The most common causes are postpartum bleeding(15%),complications from unsafe abortion(15%),hypertensive disorders of pregnancy(10%),postpartum infections(8%),and obstructive labor(6%)[11].Other risk factors include blood clots(3%),pre-existing conditions(28%)[3].Indirect causes are malaria,anemia,HIV/AIDS,and cardiovascular disease, all of which may complicate pregnancy or be aggravated by it[12].

Sociodemographic factors such as age, access to resources and income level are significant indicators of maternal outcomes. Young mothers face risks of complications and death during pregnancy than older mothers [13],especially adolescent aged 15 years or younger[14].Adolescents have higher risks for postpartum hemorrhage, puerperal endometritis, operative vaginal delivery ,episiotomy, low birth weight, preterm delivery, and small for-gestational-age infants, all of which can lead to maternal death[14].Structural support and family

support influences .Furthermore, social disadvantage and social isolation adversely affects health which can lead to increase in maternal death. Additionally, lack of access to skilled medical care during childbirth, the travel distance to the nearest clinic to receive proper care, number of prior births, barriers to accessing prenatal medical care and poor infrastructure all increase maternal deaths[15].

Unsafe abortion is another major cause of maternal death. According to the World Health Organization, every eight minutes a woman dies from complications arising from unsafe abortions. Complications include hemorrhage, infection, sepsis and genital trauma [16]. Globally preventable deaths from improperly performed procedures constitutes 13% of maternal mortality, and 25% or more in some countries where maternal mortality from other causes is relatively low, making unsafe abortion the leading single cause of maternal mortality worldwide[17].

III. Maternal Mortality Measurements

Maternal mortality ratio (MMR):the ratio of the number of maternal deaths during a given time period per 100,000 live births during the same period[2].The MMR is used as a measure of the quality of a health care system. Maternal mortality rate (MMRate): the number of maternal deaths in a population divided by the number of women reproductive age, usually expressed per 1,000 women [2].Life time risk of maternal death refers to the probability that a 15 year-old female will die eventually from maternal cause if she experiences throughout her lifetime the risks of maternal death and the overall levels of fertility that observed for a given population. The adult lifetime risk of maternal mortality can be derived using either the maternal mortality ratio (MMR), or the maternal mortality rate(MMRate),[2].

Proportion of maternal deaths among deaths of women of reproductive age (PM):the number of maternal deaths in a given period divided by the total deaths among women of 15-49 years[18].Approaches to measuring maternal mortality includes civil registration system, household surveys,causes,reproductive age mortality studies(RAMOS) and verbal autopsies[19].

Prevalence Rate

According to the 2010, United States Population Fund report, developing nations account for ninety-nine percent of maternal deaths with majority of those deaths occurring in in Sub-Sharan Africa and Sothern Asia [19].Globally, high and middle income countries experience lower maternal deaths than low income countries. The Human Development Index (HDI) accounts for between 82 and 85 percent of the maternal mortality rates among countries [20].In most cases, high rates of maternal deaths occur in the same countries that have high rates of infant mortality. These trends are a reflection that higher income countries have stronger healthcare infrastructure, medical and healthcare personnel, use more advanced medical technologies and have fewer barriers to accessing care than low income countries. Therefore, in low income countries, the most common cause of maternal death is obstetrical hemorrhage, followed by hypertensive disorders of pregnancy, in contrast to high income countries, for which the most common cause is thromboembolism [21].

At country level India (19% or 56,000)and Nigeria(14% or 40,000) accounted for roughly on third of the maternal deaths in 2010.Democratic Republic of Congo,Pakistan, Sudan,Indonesia,Ethiopia,United Republic of Tanzania, Bangladesh, andAfghanistan comprised between 3 to 5 percent of maternal deaths each[18]These ten countries combined accounted for 60% of all maternal deaths in 2010 according to the United Nations Population Fund report.Countries with lowest maternal deaths wereEstonia, Greece and Singapore [22]. In Malaysia maternal mortality have decreased from 540 per 100,000 live births in 1957 to 28 per 100,000 in 2010[23].In the United States, the maternal deaths rate averaged 9.1 maternal deaths per 100,000 livebirths during the year 1979-1986 but then rose to rapidly to 14 per 100,000 in 2000 and 17.8 in 2009[24].In 2013 the rate was 18.5 deaths per 100,000 live birth, with some 800 maternal deaths reported [25].

Mortality variation

There are significant maternal mortality intra-country variations, especially in nations with large equality gaps in income and education and high healthcare disparities. Women living in rural areas experience higher maternal mortality than women living in urban and suburban centers because those living in wealthier households, having higher education or living in urban areas, have higher use of healthcare services than their poorer, less-educated, or rural counterparts [26,27].There are also racial and ethnic disparities in maternal health outcomes which increases maternal mortality in marginalized groups[28].

Prevention

The death rate for women giving birth plummeted in the twentieth century. The historical level of maternal deaths is probably is around 1 in 100 live births[29].Mortality rates reached very high levels in maternity institutions in the 1800s,sometimes climbing to 40 percent of birth giving women. At the beginning of

the 1900s, maternal death rates were around 1 in 100 for live births. Currently there are an estimated 275,000 maternal deaths each year [5].

UNFPA recommendations include:[8].

1. Prenatal care –all expecting mothers receive at least four antennal visits to check and monitor the health of mother and fetus.
2. Skilled birth attendance with emergency backup such as doctors, nurses and midwives who have the skills to manage normal deliveries and recognize the onset of complications.
3. Emergency obstetric care to address the major causes of maternal death which are hemorrhage, sepsis, unsafe abortion, hypertensive disorders and obstructive labor.
4. Postnatal care which is the six weeks following delivery. During this time bleeding, sepsis, and hypertensive disorders can occur and newborns are extremely vulnerable in the immediate aftermath of birth. Therefore, follow-up visits by a health worker to assess the health of both mother and child in the postnatal period are strongly recommended.

Medical advancements

The decline in maternal deaths has been due largely to improved sepsis, fluid management and blood transfusion, and better personal care. Recent medical technologies have been designed for recourse poor settings that haven effective in reducing maternal deaths as well. The non-pneumatic anti-shock is low-technology device that decreases blood loss, restores vital signs and helps buy time in delay of women receiving adequate emergency care during obstetric hemorrhage [9].It has proven to be a valuable resource. Condoms used as uterine tamponades have also been effective in stopping post-partum hemorrhage [30].

Healthcare Services

Most maternal deaths are avoidable, as the health-care solutions to prevent or manage complications are well known. Improving access to antenatal care in pregnancy, skilled care during childbirth, and care and support in weeks after birth will reduce maternal deaths significantly. It is particularly important that all births are attended by skilled health professionals, as timely management and treatment can make the difference between life and death. To improve maternal health, barriers that, limit access to quality maternal health services must be identified and addressed at all levels of the health system [31].Recommendations for reducing maternal mortality include access to health care, access to family planning services, and emergency obstetric care, funding and intrapartum care and reduction in unnecessary obstetric surgery has also been suggested[32].

Maternal Health Plan

The biggest global plan-policy initiative for maternal came from the United Nations' Millennium Declaration [33],which created the Millennium DevelopmentGoals. The fifth goal of the United Nations' Millennium Development Goals(MDGs) initiative is to reduce the maternal mortality rate by three quarters between 1990 and 2015 and to achieve universal access to reproductive health by 2015[34].Countries and local governments have taken political steps in reducing maternal deaths. Researchers at the 0verseas Development Institute studied maternal health systems in four apparently similar countries Rwanda, Malawi, Niger, and Uganda. In comparison to other three countries Rwanda has an excellent record of improving maternal health rates [35].

In terms of aid policy, proportionally, aid given to improve maternal mortality rates has shrunken as other public health issues, such as/HIVAIDS have become major international concerns.Regardless, there has been progress in reducing maternal mortality rates internationally [36].

IV.Maternal Health

Causes of poor Maternal Health

According to a UNFPA report A woman's chance of dying or becoming disabled during pregnancy and childbirth is closely connected to her social and economic status, the norms and values of her culture, and the geographic remoteness of her home. A woman's lifetime risk of dying as a result of pregnancy or childbirth is 1 in 39 in Sub-Sahara Africa as compared to 1 in 4,700 in industrialized countries [37].

Accessibility to healthcare and poverty

The risk for maternal death(during pregnancy or childbirth) in sub-Sahara Africa is 175 times higher than in developed countries, and risk for pregnancy-related illnesses and negative consequences after birth is even higher[38].A study conducted in Kenya observed that common maternal health problems is poverty-stricken areas include hemorrhage, anemia, hypertension, malaria, placenta. Retention, premature labor, prolonged- complicated labor, and pre-eclampsia [39].Generally, adequate prenatal care encompasses medical care and educational, social and nutritional services during pregnancy[40].Although there are a variety of

reasons women choose not to engage in proper prenatal care,71% pf low-income women in a US national study had difficulties getting access to prenatal care when they sought it out[40].Additionally immigrants and Hispanic women are at higher risk than white or black women for receiving little or no prenatal care, where level of education is also an indicator(since education and race are correlated).Adolescents are least likely to receive any prenatal care at all. Throughout several studies, women and adolescents ranked inadequate finances and lack of transportation as most common barriers to receiving proper prenatal care[41].
Income is strongly correlated with quality of prenatal care [41].Furthermore, researchers found an even stronger relationship between lack of transportation and prenatal care [42].In addition to proximity being a predictor of prenatal care access, Materia and colleagues found similar results for proximity and antenatal care in rural Ethiopia [43].

Human Immunodeficiency virus and AIDS

Human immunodeficiency virus(HIV) maternal infection varies around the world, ranging from 1% to 40 % with Africa and Asians countries having the highest rates[44].If a mother is infected with HIV/AIDS virus, there is 25 % chance that she will pass on the virus to her offspring if she does not receive proper treatment during pregnancy, on the other hand, if mother is treated during pregnancy, there is a 98% chance that her baby will not become infected. According to UNICEF,the last decade has seen a large increase in death among children due to HIV?AIDS contracted from parents[45].Having HIV/AIDS while pregnant can also cause heightened health risk for the mother. A large concern for HIV-positive pregnant women is the risk of contracting tuberculosis (TB) or malaria, in the developing countries [44].

Body weight

Gestational weight gain should typically fall between 11-20 pounds in order to improve outcomes for both mother and child [46].Increased rates of hypertension, diabetes, respiratory complicationsand infections are prevalent in cases of maternal obesity and can have detrimental effects on pregnancy outcomes [47].Obesity is an extremely strong risk factor for gestational diabetes [48].

Oral hygiene

Oral hygiene or oral health has been shown to affect the well-being of both the expectant mother and her unborn fetus. The 2000 Surgeon's General Report stressed the interdependence of oral health on overall health and well=being of an individual[49]Oral health is especially essential during perinatal period and the future development of child[50].The Surgeon General's Report lists various systematic diseases and conditions that have oral manifestations[49].In addition, some studies have demonstrated a relationship between periodontal diseases and diabetes, cardiovascular disease, stroke, and adverse pregnancy outcomes. Poor oral health can affect diet, nutrition, sleep, psychological status, social interaction, school and work [49].

Postpartum complications

Globally, more than eight million of 136 million women giving birth each year suffer from excessive bleeding – postpartum hemorrhage(PPH) after birth,PPH causes one out of every four maternal deaths that occur annually and accounts for more maternal deaths than any other individual cause[51].Deaths due to PPH affect women in the developing countries[51].For every women who dies from causes related to pregnancy, an estimated 20 t0 30 encounter serious complications[52].At least 15 per cent of all births are complicated by potentially fatal condition[52].

During the postpartum period, many mothers breastfeed their infants.Transmission of HIV/AIDS through breastfeeding is a huge issue in developing countries, namely in African countries[53].The World Health Organization recommends that mothers breastfeed their children for the first two years, American Academy of Pediatricians and the American Academy of Family Physicians recommend six months of breastfeeding [54].Infants who are breastfed by healthy mothers(not infected with HIV/AIDS) are less prone to bacterial, viral, and parasitic infections. Breastfed infants also have lower rates of infant mortality, lower rates of sudden infant death(SIDS),and decrease in in obesity and diseases such as childhood metabolic disease, asthma, atopic dermatitis, type 1 diabetes, and child hood cancers are also seen in children who are breastfed[54].

V.Millennium Development Goals

The World Bank estimated that a total of 3.00 US dollars per person a year can provide basic family planning maternal and neonatal health care to woman in developing countries [55].The United Nations Population Fund(UNFPA) recently began its Campaign on Accelerated Reduction of Maternal Mortality in Africa(CARMMA),focusing on providing quality healthcare to mothers. One of the programs within CARMMA is Sierra Leone providing free healthcare to mothers and children. This initiative has widespread support from African leaders and was started in conjunction with African Union Health Ministers [56].

Improving maternal health is the fifth of the United Nation's eight Millennium Development Goals(MDGs),targeting a reduction in the number of women dying during pregnancy and childbirth by three quarters by 2015,notably by increasing the usage of skilled birth attendants, contraception and family planning[57].The current decline of maternal deaths is only half what is necessary to achieve this goal, and in several regions such as Sub-Saharan Africa the maternal mortality is actually increasing. However one country that may meet their MDG 5 is Nepal, which has it appears reduced its maternal mortality by more than 50% since 1990s[58].As the deadline for MDG's approaches, an understanding of the policy developments leading to the inclusion of maternal health within the MDG's is essential for future advocacy efforts[59].Decreasing the rates of maternal mortality and morbidity in developing countries is important because poor maternal health is both an indicator and a cause of extreme poverty. According to Tamar ManuelyanAtinc,Vice President for Human Development at the World Bank[60].

"**Maternal deaths are both caused by poverty and a cause it. The cost of childbirth can quickly exhaust a family's income, bringing with it even more financial hardships."**

Developed countries had rates of maternal mortality similar to those of developing countries until the early 20thcentury; therefore several lesions can be learned from west. During the 19th century Sweden had high levels of maternal mortality, and there was a strong support within the country to reduce mortality rate to fewer than 300 per 100,000 live births. The Swedish government began public health initiatives to train enough midwives to attend all births. This approach was also later used by Norway, Denmark, and the Netherlands who experienced similar success [61].

Increasing contraceptive usage and family planning also improves maternal health through reduction in number of higher risk pregnancies. In Nepal a strong emphasis was placed on providing family planning to rural regions and it was shown to be effective[62].Madagascar saw a dramatic increase in contraceptive use after instituting a nationwide family planning program, the rate of contraceptive use increased from 5.1% in 1992 to 29% in 2008[63].

VI. Conclusion

Millennium Developments Goals (MDGs) are achievable by decreasing the rates of maternal mortality and morbidity in developing countries is important because poor maternal health is both an indicator and cause of extreme poverty**.** At present there are no regions that has achieved MDGs of decreasing maternal mortality by 75 % by the year 2015.

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