

## The Financial Cost of Maternal Near Miss in Kenya

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### **Session 416: Causes and Consequences of Adverse Birth Outcomes**

#### **Short Abstract:**

Improved access to quality healthcare throughout pregnancy and during childbirth has led to significant reductions in maternal mortality across sub-Saharan Africa (SSA), including Kenya. However, maternal morbidity, represented by severe obstetric complications, remain a major public health challenge. A maternal near-miss (MNM) is defined as a woman who nearly died but survived a complication during pregnancy, childbirth or within 42 days of termination of pregnancy. MNMs are associated with severe social and economic implications for women, households and health systems. While evidence is limited on costs of MNM treatment, few studies have suggested high costs with catastrophic impact on household budgets. This prospective, cross-sectional study investigated the national burden of MNM and the financial costs of treating MNMs in Kenya. Analysis will mainly present total direct and indirect cost of MNM treatment, costs of MNMs due to unsafe abortions, source of funds, and proportion of MNM expenses to household income.

#### **Extended Abstract:**

##### **Background**

Maternal mortality remains a major public health challenge in sub-Saharan Africa (SSA), including Kenya, where as much as 362 per 100,000 women died in 2015 due to pregnancy and childbirth related complications (Kenya National Bureau of Statistics, 2015). Although several countries in SSA halved the number of maternal deaths since 1990 (Merdad and Ali, 2018), maternal morbidity resulting from severe obstetric emergencies represent the main cause of illnesses and disability among women in SSA (Hoque, 2011; Semasaka Sengoma et al., 2017; Tuncalp et al., 2012). As a consequence, other complementary morbidity measures such as maternal near miss (MNM) have been proposed within these contexts of declining and rare maternal deaths (Nelissen et al., 2013). MNM events are defined as women who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy (Tuncalp et al., 2012). MNM cases occur more frequently than maternal deaths and within health facilities, and are a preferred indicator of quality of obstetric care since facility data is more accessible for MNM cases that can provide additional information about protective risk factors on the pathway to survival. Notably, maternal complications that cause MNM events are the same causes that lead to maternal mortality, including severe hemorrhage, infection, pregnancy-related hypertension, obstructed labor and complications related to unsafe abortion, and are often associated with emergency procedures such as hysterectomy and admission to critical care (Say et al., 2014).

Studies have reported the incidence of near miss complications in SSA as extremely high, but there are no national level studies of MNM in Kenya. One study in Benin estimated that near-miss events are ten times more frequent than maternal deaths (Hounkpatin and Aaa, 2016), while in South Africa another study estimates that MNMs are five times more common (Iwuh et al., 2018). In low-resource health systems, the lack of access to good quality emergency services means that women who suffer pregnancy-related complications may not receive the care they need promptly and could become critically ill, leading to long-term adverse consequences for women's health and socio-economic conditions (Kyei-Nimakoh et al., 2017).

While epidemiological estimates may indicate the magnitude of the problem, to date little is known about the associated economic consequences of MNM events for women, their families and the health system. Studies of women's accounts of their near-miss experience show that such events result in household crises and lead to the mobilization of savings and resources that were earmarked for other uses. Borghi et al, determined that the direct costs in Benin and Ghana due to near-miss complications during delivery were immense for the women and their households. Women presenting with MNMs during childbirth spent a significantly higher amount of financial resources than women who experienced normal and non-threatening deliveries (Borghi et al., 2003). Similarly, another study in Burkina Faso also concluded that the cost of MNM was significantly higher than the cost of care for uncomplicated normal delivery (Storeng et al., 2008). Additionally, they reported that compared to women who had uncomplicated deliveries, women who survived near-miss events experienced substantial difficulties meeting the costs of care, an indication of the higher costs of MNM. Women commonly recounted the selling of household assets, borrowing money and subsequent long repayment periods for debts incurred as a result of MNM events. A disproportionate share of the costs was spent on direct health care. However, there is sparse literature examining the differential costs of treating MNM cases due to unsafe abortion complications compared to other pregnancy-related complications.

The aim of this study is to describe the burden of MNM at the national level in Kenya, as well as the socioeconomic costs for women who experience a MNM event and their families. This study generates new evidence on the financial costs of MNMs in Kenya as well as additional details on the differential costs comparing the treatment costs of abortion-related MNM to other types of MNMs. Evidence from this study could potentially guide interventions to reduce risks of near-misses, and diminish financial losses to individual women and the health system.

### **Study research questions**

This study addresses two primary research questions:

- 1) What is the financial cost (both direct and indirect), to women and their families of treating MNM cases?
- 2) What is the proportion of financial cost attributable to MNM events related to unsafe abortion?

### **Methods**

### *Study design*

We conducted a nationwide, prospective, cross-sectional study among women who experienced maternal near-miss events based on criteria as defined by the World Health Organization (WHO) (World Health Organization, 2011), and were admitted to a health facility within a nationally representative sample of health facilities over a three months period (February to May, 2018). The study included 59 level 4, 5 and 6 public and private health facilities across 27 counties in Kenya, drawn from among 3,485 healthcare facilities listed by the Ministry of Health by March 2016. All women admitted with severe complications from pregnancy, childbirth or within 42 days of delivery or termination of pregnancy, were eligible for the study.

### *Sampling*

There are six levels of health facilities in Kenya per the 2014 Kenya Health Sector Strategic and Investment Plan (KHSSP): level 1) community units; level 2) dispensary; level 3) health center; level 4) primary referral facilities; level 5) secondary referral facilities; and level 6) tertiary referral facilities (Ministry of Health Kenya, 2013). Since MNMs are severe complications that often require surgery, we included all Level 5 and 6 facilities which are designated to perform Caesarean sections and are more likely to handle MNM cases. We then generated a random sample of all Level 4 facilities, which are likely to receive and treat MNM cases as primary referral facilities, especially when there is no higher-level facility in the immediate region. With this nationally representative sample of referral facilities, this study estimates the incidence of MNM and the proportion of MNM cases that are due to unsafe abortion, and produces these rates at the national and regional level (five main regions), with limited sample power to estimate these rates at the county level.

### *Data collection*

The study employed a consecutive census of MNM patients. Across all the sampled facilities, 63 trained clinicians assessed patients admitted for obstetric emergencies for eligibility. In case a patient was eligible, and in a stable condition, the clinician administered an informed consent and captured all requisite clinical data on the patient. The clinician also sought consent from the patient on whether or not she was willing to be interviewed on care seeking, including the cost of treatment for her condition that got her admitted to the facility. All patients who consented for the cost study component were linked to trained fieldworkers who interviewed these MNM patients or the persons who accompanied them to the hospital (caretakers) for information on direct financial costs – both medical costs (e.g. medicines, hospital bills for consultation or any surgical interventions, diagnostic procedures such as laboratory tests and x-ray) and non-medical costs (e.g. transport, food, telephone expenses and accommodation) incurred during the immediate illness period. Indirect costs, e.g. lost earnings and waiting time; and intangible costs such as pain, inconvenience and anxiety, were not be measured. Interviews were administered using a tablet-based questionnaire on a surveyCTO platform. These interviews were conducted within the health facilities with the exact locations determined in consultation with facility management. All interviews were then uploaded to a central server based at the African Population and Health Research Center (APHRC) where the data was retrieved, cleaned and analyzed.

## **Preliminary results**

A total of 742 women admitted with MNM cases during the study duration were eligible for inclusion in the study. At discharge, though, 683 women responded to the cost questionnaire, giving a response rate of 92 percent. Other women not interviewed (n=59), included those that died, declined to consent for the interview, were referred to other facilities for treatment, or were discharged without clinicians knowledge.

Key results for the paper are still being summarized. Nevertheless, preliminary analysis shows that there were high total direct and indirect financial cost of treatment for MNM cases in Kenya. Importantly, the total direct and indirect expenses in treatment varied widely across regions, with highest figures seen in Nairobi (60.2%), (the capital city) and Rift valley region (48%). Least total expense figures were reported in Nyanza and western regions (14.2%), Eastern region (25%) and Coast and North Eastern (31.6%). Majority of women spent significant proportions of households' income on MNM treatment and care, suggesting catastrophic health expenses. In addition, over 75% of patients paid out of pocket for these services (mostly from family and the individual savings) to cover MNM treatment costs. Notably, up to a third of all MNM treatment costs were waived by the health facility, principally because the patient could not afford to pay, further highlighting the proportion of MNM associated costs covered by the health systems. Of all the severe maternal health outcomes, unsafe abortions contributed more than 67% of the cases, and more than 60% those with abortion related MNM complications, spent more than \$50 for treatment compared to non-abortion related MNM complications in the study. Finally, medical costs due to unsafe abortion-related MNM accounted for the largest share of total costs, mainly spent on drugs and medical supplies.

## References

- Borghesi, J., Hanson, K., Acquah, C. A., Ekanmian, G., Filippi, V., Ronsmans, C., . . . Alihonou, E. (2003). Costs of near-miss obstetric complications for women and their families in Benin and Ghana. *Health Policy and Planning, 18*(4), 383-390.
- Hoque, M. (2011). Incidence of Obstetric and Foetal Complications during Labor and Delivery at a Community Health Centre, Midwives Obstetric Unit of Durban, South Africa. *ISRN Obstetrics and Gynecology, 2011*, 259308. doi:10.5402/2011/259308
- Hounkpatin, B., & Aaa, O. (2016). *The Impact of Audits of Maternal Deaths and Near Miss at University Hospital of Mother and Child Lagoon (Benin)* (Vol. 13).
- Iwuh, I. A., Fawcus, S., & Schoeman, L. (2018). Maternal near-miss audit in the Metro West maternity service, Cape Town, South Africa: A retrospective observational study. *South African Medical Journal, 108*(3), 171-175. doi:10.7196/SAMJ.2018.v108i3.12876
- Kenya National Bureau of Statistics. (2015). *Kenya Demographic and Health Survey 2014* Retrieved from Nairobi:
- Kyei-Nimakoh, M., Carolan-Olah, M., & McCann, T. V. (2017). Access barriers to obstetric care at health facilities in sub-Saharan Africa—a systematic review. *Systematic Reviews, 6*, 110. doi:10.1186/s13643-017-0503-x
- Merdad, L., & Ali, M. M. (2018). Timing of maternal death: Levels, trends, and ecological correlates using sibling data from 34 sub-Saharan African countries. *PLoS One, 13*(1), e0189416. doi:10.1371/journal.pone.0189416
- Ministry of Health Kenya. (2013). *Kenya Health Sector Strategic and Investment Plan 2013-2017*. Retrieved from Nairobi:
- Nelissen, E., Mduma, E., Broerse, J., Ersdal, H., Evjen-Olsen, B., van Roosmalen, J., & Stekelenburg, J. (2013). Applicability of the WHO maternal near miss criteria in a low-resource setting. *PLoS One, 8*(4), e61248. doi:10.1371/journal.pone.0061248
- Say, L., Chou, D., Gemmill, A., Tunçalp, O., Moller, A. B., Daniels, J., . . . Alkema, L. (2014). Global causes of maternal death: a WHO systematic analysis. *Lancet Glob Health, 2*(6), e323-333. doi:10.1016/s2214-109x(14)70227-x
- Semasaka Sengoma, J. P., Krantz, G., Nzayirambaho, M., Munyanshongore, C., Edvardsson, K., & Mogren, I. (2017). Prevalence of pregnancy-related complications and course of labour of surviving women who gave birth in selected health facilities in Rwanda: a health facility-based, cross-sectional study. *BMJ Open, 7*(7). doi:10.1136/bmjopen-2016-015015
- Storeng, K. T., Baggaley, R. F., Ganaba, R., Ouattara, F., Akoum, M. S., & Filippi, V. (2008). Paying the price: the cost and consequences of emergency obstetric care in Burkina Faso. *Social Science and Medicine, 66*(3), 545-557. doi:10.1016/j.socscimed.2007.10.001
- Tunçalp, O., Hindin, M. J., Souza, J. P., Chou, D., & Say, L. (2012). The prevalence of maternal near miss: a systematic review. *BJOG: An International Journal of Obstetrics and Gynaecology, 119*(6), 653-661. doi:10.1111/j.1471-0528.2012.03294.x