

The Incidence of Maternal Near-Miss in Kenya

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Short Abstract

Maternal mortality in Kenya is estimated at 510 deaths per 100,000 live births, and there is limited national information on the burden of maternal morbidity, as well as its causes and determinants. Maternal near-miss (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. MNM cases occur more frequently than maternal deaths in contexts where maternal mortality is high, and may be a preferred indicator of quality of obstetric care. The aim of this study is to describe the incidence and causes of MNM in Kenya. We conducted a prospective, cross-sectional study among women who experience MNM in a nationally representative sample of referral facilities in Kenya. This study will strengthen the evidence base of causes and determinants of maternal morbidity and mortality as well as the quality of maternal health care in Kenya.

Extended Abstract:

Background

Reducing maternal mortality and morbidity is widely recognized internationally as a priority for policy and program action. While considerable progress was made to reduce maternal mortality in attempts to fulfill Millennium Development Goal 5, no geographic region succeeded in reaching the goal of reducing the maternal mortality ratio by 75% (United Nations, 2015). Globally, sub-Saharan Africa is the region with the highest maternal mortality ratio (MMR) estimated at 546 per 100,000 live births, which is more than double the global MMR of 216 per 100,000 live births (Alkema et al., 2016). However, maternal mortality presents just a tip of the iceberg: for each maternal death, there are many women who survive various types of severe complications from pregnancy (Kaye, Kakaire, & Osinde, 2011; Lotufo, Parpinelli, Haddad, Surita, & Cecatti, 2012). Despite the high levels of maternal deaths within Sub-Saharan Africa, a maternal death is a rare event and the absolute numbers of maternal deaths are low within health facilities in individual countries, making it difficult and costly to adequately study the causes and determinants of maternal deaths.

Maternal near-miss (MNM) events are severe maternal morbidities defined “as women who nearly died but survived a complication that occurred during pregnancy, childbirth or within 6 weeks of termination of pregnancy” (Tunçalp, Hindin, Souza, Chou, & Say, 2012). MNM events occur more frequently than maternal deaths in contexts where MMR is high, and implicit in their definition is the fact that almost all cases must be managed in health facilities or else the patient would die (Rulisa, Umuziranenge, Small, & van Roosmalen, 2015). Thus, it is easier to collect accurate facility-based data on MNMs than data on maternal deaths, which frequently occur outside of health facilities in low and middle-income countries and therefore may not be captured in national health information systems. For this reason, MNMs have been utilized as a proxy for maternal death to study the causes and determinants of severe maternal outcomes, and may be a preferred indicator of the quality of obstetric care. Collecting nationally

representative data on the incidence of MNM provides critical information and context for program and policy actors to understand maternal health care delivery systems and identify ways of improving the quality of maternal care provided to women and girls.

Kenya has made significant investments in providing women access to maternal health care, including introducing a reproductive voucher program subsidizing care in the public and private sector in 2006 and introducing a policy for free maternity services in public facilities in June 2013 (Amendah, Mutua, Kyobutungi, Buliva, & Bellows, 2013; Gitobu, Gichangi, & Mwanda, 2018). Recent estimates from the United Nations Maternal Mortality Estimation Inter-Agency Group show that overall MMR decreased from 759 maternal deaths per 100,000 live births in 2000 to 510 deaths in 2015, whilst another study evaluating the impact of the policy for free maternity services showed an increase in health service utilization but only found a statistically significant decline in MMR in public rural facilities and no significant decline nationally (Alkema et al., 2016; Gitobu et al., 2018). Furthermore, although an estimated 17-36% of maternal deaths in Kenya have been attributed to unsafe abortion in subnational studies, there are no national level studies exploring the proportion of maternal deaths or morbidity that are due to abortion complications (Desai et al., 2013; Oyieke, Obore, & Kigundu, 2006; Ziraba et al., 2015; Ziraba, Madise, Mills, Kyobutungi, & Ezeh, 2009). Overall, there is limited national level information on the greater burden of maternal morbidity, the major causes of maternal morbidity and mortality, individual level and health system determinants of MNM, and the social and economic consequences of severe pregnancy-related complications on women and their families. The objective of this study is to describe the incidence and causes of MNM in Kenya.

Research Questions

This paper addresses three primary research questions:

- 1) What is the incidence of maternal near-miss in Kenya?
- 2) What is the proportion of maternal near-miss due to unsafe abortion, and how does that differ by sub-groups of women (such as age, education, household wealth status, residence and parity)?
- 3) What is the distribution of the primary causes of maternal near-misses according to common diagnostic categories?

Methodology

Study design

We conducted a prospective, cross-sectional study among women who experience MNM due to pregnancy related complications based on organ-system dysfunction criteria, recommended 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. The study period was for three months from February to May 2018. During this period, women admitted with severe complications from pregnancy, childbirth or within 42 days of delivery or termination of pregnancy were eligible for the study. Each facility had one interviewer, a medical doctor or nurse, who collected data on each potential MNM case admitted to their facility. Larger facilities had two to three interviewers. To ensure

all potential MNM cases were captured, the facility interviewer visited the obstetrical wards, delivery rooms, emergency rooms and intensive care units daily to check whether there had been admissions of new MNM cases or cases with potential for MNM events since the last visit. This involved reviewing the pregnancy-related admissions daily with key personnel in each of these units.

Each woman admitted with a near-miss condition or with a potential for becoming a near-miss case during the study period was first approached by her health care provider who informed her about the study and asked if the study team could speak with her. If she agreed to speak to the study team and was in a stable condition, the facility interviewer further explained the study and obtained her written consent to participate, which included the permission to interview her health care provider and to review her medical records. Upon giving her informed consent to participate in the study, the interviewer interviewed the woman's health care provider and reviewed her health records to collect necessary information regarding the near-miss situation, including the cause(s) of the event, using an adapted version of the WHO MNM identification tool, which has been validated in resource-constrained health systems. The second component of the study was an interview with the woman to obtain information on her health care seeking decision-making behaviors, her experiences with delays to seeking and receiving care, and the social and economic costs of this MNM event.

Sampling

There are six levels of health facilities in Kenya per the 2014 Kenya Health Sector Strategic and Investment Plan (KHSSP): 1) community units; 2) dispensary; 3) health centre; 4) primary referral facilities; 5) secondary referral facilities; and 6) tertiary referral facilities (Ministry of Health, 2013a). Since MNMs are severe complications that often require surgery, we included all Level 5 and 6 facilities since they are designated to perform Caesarean sections and MNMs are more likely to present here. 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 will estimate the incidence of MNM and the proportion of MNM cases that are due to unsafe abortion, and produce these rates at the national and regional level (five main regions), with limited sample power to estimate this rate at the county level.

Preliminary Results

A total of 709 women with severe pregnancy-related complications presented to study facilities during the three months of data collection. The response rate was 96%, resulting in a final sample size of 683 women. The results for this paper are forthcoming. The following results will be presented in answering the three primary research questions outlined above:

- Number of MNM cases treated in the selected health facilities during the study period
- Proportion of MNM cases that were due to unsafe abortions compared to all MNM cases
- Distribution of MNM patients by sociodemographic characteristics, such as age, marital status, number of previous live births, education, socioeconomic status, and residence
- Distribution of the primary causes of MNM (i.e., postpartum hemorrhage, sepsis, prolonged obstructed labor etc.)

References

- Alkema, L., Chou, D., Hogan, D., Zhang, S., Moller, A.-B., Gemmill, A., ... Say, L. (2016). Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group. *The Lancet*, *387*(10017), 462–474. [https://doi.org/10.1016/S0140-6736\(15\)00838-7](https://doi.org/10.1016/S0140-6736(15)00838-7)
- Amendah, D. D., Mutua, M. K., Kyobutungi, C., Buliva, E., & Bellows, B. (2013). Reproductive Health Voucher Program and Facility Based Delivery in Informal Settlements in Nairobi: A Longitudinal Analysis. *PLOS ONE*, *8*(11), e80582. <https://doi.org/10.1371/journal.pone.0080582>
- Desai, M., Phillips-Howard, P. A., Odhiambo, F. O., Katana, A., Ouma, P., Hamel, M. J., ... Laserson, K. F. (2013). An Analysis of Pregnancy-Related Mortality in the KEMRI/CDC Health and Demographic Surveillance System in Western Kenya. *PLoS ONE*, *8*(7), e68733. <https://doi.org/10.1371/journal.pone.0068733>
- Gitobu, C. M., Gichangi, P. B., & Mwanda, W. O. (2018). The effect of Kenya's free maternal health care policy on the utilization of health facility delivery services and maternal and neonatal mortality in public health facilities. *BMC Pregnancy and Childbirth*, *18*(1), 77. <https://doi.org/10.1186/s12884-018-1708-2>
- Kaye, D. K., Kakaire, O., & Osinde, M. O. (2011). Systematic review of the magnitude and case fatality ratio for severe maternal morbidity in sub-Saharan Africa between 1995 and 2010. *BMC Pregnancy and Childbirth*, *11*(1). <https://doi.org/10.1186/1471-2393-11-65>
- Lotufo, F. A., Parpinelli, M. A., Haddad, S. M., Surita, F. G., & Cecatti, J. G. (2012). Applying the new concept of maternal near-miss in an intensive care unit. *Clinics*, *67*(3), 225–230. [https://doi.org/10.6061/clinics/2012\(03\)04](https://doi.org/10.6061/clinics/2012(03)04)
- Ministry of Health. (2013a). *Transforming Health: Accelerating Attainment of Universal Health Coverage: The Kenya Health Sector Strategic and Investment Plan (KHSSP) July 2014–June 2018*. Nairobi, Kenya: Ministry of Health. Retrieved from <http://www.health.go.ke/wp-content/uploads/2016/03/KHSSP-BOOK.pdf>
- Oyieke, J., Obore, S., & Kigundu, C. (2006). Millennium development goal 5: a review of maternal mortality at the Kenyatta National Hospital, Nairobi. *East African Medical Journal*, *83*(1). <https://doi.org/10.4314/eamj.v83i1.9345>
- Rulisa, S., Umuziranenge, I., Small, M., & van Roosmalen, J. (2015). Maternal near miss and mortality in a tertiary care hospital in Rwanda. *BMC Pregnancy and Childbirth*, *15*(1). <https://doi.org/10.1186/s12884-015-0619-8>
- Tunçalp, Ö., 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 & Gynaecology*, *119*(6), 653–661. <https://doi.org/10.1111/j.1471-0528.2012.03294.x>
- United Nations. (2015). *The Millennium Development Goals Report 2015*. New York, New York: United Nations. Retrieved from http://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20rev%20%28July%201%29.pdf
- World Health Organization. (2011). *Evaluating the quality of care for severe pregnancy complications: The WHO near-miss approach for maternal health*. Geneva, Switzerland: World Health Organization. Retrieved from http://apps.who.int/iris/bitstream/handle/10665/44692/9789241502221_eng.pdf;jsessionid=D00ABCDE695CE76C7558246EE10E4ECC?sequence=1

- Ziraba, A. K., Izugbara, C., Levandowski, B. A., Gebreselassie, H., Mutua, M., Mohamed, S. F., ... Kimani-Murage, E. W. (2015). Unsafe abortion in Kenya: a cross-sectional study of abortion complication severity and associated factors. *BMC Pregnancy and Childbirth*, 15(1).
<https://doi.org/10.1186/s12884-015-0459-6>
- Ziraba, A. K., Madise, N., Mills, S., Kyobutungi, C., & Ezeh, A. (2009). Maternal mortality in the informal settlements of Nairobi city: what do we know? *Reproductive Health*, 6(1).
<https://doi.org/10.1186/1742-4755-6-6>