

## **Levels and trends of maternal mortality and underlying causes in Kenya**

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### **EXTENDED ABSTRACT**

#### **Introduction**

In nearly the last three decades, an increased interest in maternal mortality has been taken by both researchers and the international community. Strategies and targets to reduce maternal mortality have been set during various International Conferences (The Safe Motherhood Conference in Nairobi in 1987, the International Conference on population in Cairo in 1994, and most importantly, the Millennium Summit in New York in the year 2000). While some developing countries have managed to meet the targets set, persistently high risks of maternal mortality remain one of the greatest health challenges that countries in sub-Saharan Africa continue to face. In virtually all of these countries, vital registration of births and deaths, that could reliably and continuously elicit information on maternal deaths, is usually incomplete. Moreover, hospital records constitute only a small fraction of the recorded maternal deaths. As a result, DHS sibling history data has become the major source of information for estimating levels and trends for adult (Bicego, 1997; Masquelier, 2010; Stanton et al., 2000; Timaeus and Jasseh, 2004) and maternal mortality (Ahmed et al., 2014; Blanc et al., 2013; Hogan et al., 2010; Nove et al., 2014) in these countries.

In Kenya, maternal mortality is a serious public health problem. Between 1990 and 2008, levels of maternal mortality in the country remained considerably high. What could have lead to such high levels?

#### **DATA AND METHOD**

In Kenya, Siblings History data collected in the Maternal Mortality Module in Demographic and Health Surveys is the main sources of estimating maternal mortality at the national level. Survey respondents are asked to give the dates of birth and death for all of their Siblings born of the same mother. If the sister died, the respondent is asked to state whether the death occurred during pregnancy, childbirth or within two months of the end of pregnancy. Studies have shown that this approach of collecting data introduces various biases due to non responses, misclassification of maternal deaths as non-maternal, underreporting and selection bias, which could underestimate maternal mortality (Ahmed et al., 2014; Gakidou and King, 2006; Masquelier, 2010; Obermeyer et al., 2010; Stanton et al., 2000, 1997). To address these issues we use adjustment techniques suggested by previous studies (Masquelier, 2010; Nove et al., 2014; Rutstein and Rojas, 2006; Stanton et al., 1997; Trussell and Rodriguez, 1990; WHO et al., 2014, 2012, 2010).

Our aim is to study the evolution of maternal mortality in Kenya as well as its determinants. Firstly, we estimate levels and trends of by age specific maternal mortality indicator, by survey. Maternal deaths and women-years of exposure in the last 8 year preceding a survey are used. To ascertain plausibility of trends, maternal mortality ratios are compared using the direct (Rutenberg and Sullivan, 1991) and indirect approaches (Graham et al., 1989). To measure trends between 1990 and 2008, the three surveys are combined and maternal mortality ratios are estimated using Poisson regression.

Secondly, we study the evolution of individual determinants. These includes age at death (age at child birth), parity at death and ethnicity (sisters share the same ethnicity). We use Poisson regression to study the relationship between these biological and socio-cultural factors and maternal mortality.

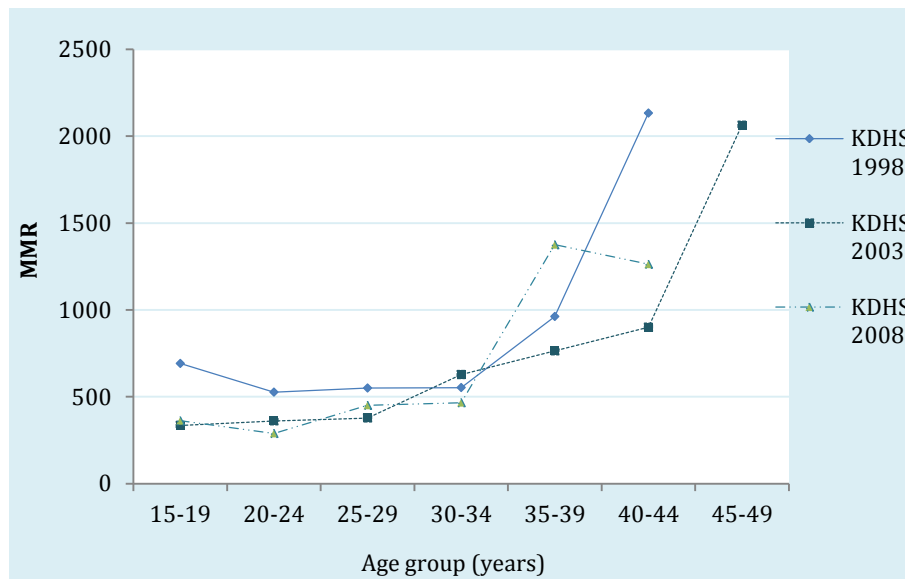
Thirdly, we use the Kenyan health system as contextual determinants of maternal mortality. We study the evolution of geographic distribution of human and physical resources between 1990-2008 and access to maternal health services (family planning, antenatal care and assistance at delivery) within the same period.

## PRELIMINARY RESULTS

Globally, preliminary results show that in the three surveys, maternal mortality ratios (MMR) starts low and rises sharply, forming a J-shaped curve (figure 1). The MMR curve becomes progressively sharper as age advances; MMRs are lowest in 20-24 years age group but increase sharply from 25-29 years age group. The risk in women aged 30 year and older are especially high.

Age-specific maternal mortality ratios vary greatly between surveys. MMR are quite high at all ages in 1998, a reduction of MMRs is observed in 2003 at practically all age groups but rise steeply as from age 35 in 2008.

FIGURE 1 – Age- specific maternal mortality ratios, by survey



## CONCLUSION

An analysis of age specific maternal mortality ratios from three KDHS (1998, 2003, and 2008) shows that, the obstetric risk of maternal mortality, increased sharply after age 30. This suggests that explanatory factors at the individual level which are biological and socio-cultural in nature operate. Essentially, in Kenya women who get pregnant at an older age are most likely to be selected for a number of factors related to both higher mortality and parity such as poverty and low education levels.

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**Key words:** maternal mortality, individual and contextual determinants, sibling history data, Kenya