Trends and Causes of Child Mortality in Rural Tanzania: Experience from Rufiji Health and Demographic Surveillance System (HDSS)

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Background

Better understanding the trends and the causes of child mortality is important to guide efforts to scale up child survival (Black am al., 2008; Johnson and al., 2010). Since 2000, child mortality rates are declining again in most of developing countries after the stagnation during the 1990's, due to the mortality attributable to the malaria (Travis and al., 2004). In Tanzania, the under five mortality (5q0) declined by 41 percent from 137 deaths per 1,000 live births in 1992-1996 to 81 deaths in 2006-2010 (TDHS, 2010). To better understand the causes of death contributing to this decrease is particularly important for assisting child mortality policy development and scare resource allocation. The verbal autopsy study conducted in Health and Demographic Surveillance systems (HDSS) as Rufiji provides an opportunity to assess the contribution of specific causes of death changes in child mortality.

Objective

This paper measures the level and analyses trends and causes of death of child mortality in rural Tanzania from 1999 to 2010, a period of rapid transition in childhood survival. The analysis aims to assess the contribution of specific causes of death, in particular the impact of malaria on child mortality decrease in Tanzania.

Methods

Ever since 1999, the Ifakara Health Institute has maintained an integrated health and demographic surveillance system in a rural district of the Coastal region in Rufiji. Since then, household information (birth, union, migration, death and causes of death…) is updated through regular visits, whereby each household is visited thrice (once in every four months) a year in three rounds[3]. Verbal autopsy is done to determine the probable causes of death of the registered deaths. For the purpose of this study only the causes of death for the under five deaths were analyzed to assess the trends in causes of child mortality in Rufiji. The main causes of child mortality were identified and the rates of death due to the specific causes of death in a given year were calculated. We used decomposition techniques to assess the contribution of each cause of death between periods. For that, we calculated the differences in life expectancy observed between 1999-2002 and 2003-2010[4] then we decompose by age and cause of death based on the

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[3] One round = four (4) months long for both Ifakara HDSS and Rufiji HDSS
[4] 1992 – 2002 corresponds to the period of high child mortality in this area and 2003 – 2010, period of reduction of child mortality.

approach of Arriaga (Arriaga, 1984). This method allows us to examine the contribution of each cause of death between two periods by age group (here under five years) to the overall difference in life expectancy

Results:

Between 1999 and 2010, the under five mortality (5q0) has declined by 51.8% with an average percentage of annual decrease of 4.4%. That average for neonatal (0 – 27 days after birth) and post neonatal mortalities (1 – 59 months) is 1% and 5.2% respectively (annex 1). To ensure the comparability of the trend of twelve years, the study was divided into two periods from 1999 to 2002 and 2003 to 2010, the life expectancy at birth passed from 54.0 to 58.8 years.

Between 1999 - 2002 and 2003 – 2007, the child mortality rate is significantly declined from 27.7 to 19.0 per 1000 live births. During this period, the mortality due to the prematurity/low birth weight is remained stable and the leading cause of death for the neonates followed by the emerging of birth injuries/asphyxia. For the post neonates, though the malaria is significantly declined from 12.4 to 7.9 per 1000 live births, it is remaining the leading cause of death followed by Pneumonia which also significantly decreased (from 4.0 to 2.8 per 1000 live births) (annex 2). However, malaria contributed to 52% to the decrease of child mortality and the neonatal causes contributed only to 23% (annex 3).

Conclusion:

The decrease of child mortality in Rufiji during the last years is mainly linked to the reduction of mortality due to malaria. However, the mortality due to neonatal causes has not been reduced. To achievement of MDG 4, the health programs are more interested to improve newborn survival.

Arriaga E.: **Measuring and Explaining the Change in Life Expectancies**. *Demography*, 1984, 21: 83-96

Black RE, Cousens S, Johnson H, Lawn JE, Rudan I, Bassani DG, Jha P, Campbell H, Walker CF, Cibulskis R, et al: **Global, Regional and National Causes of Child Mortality, 2008**. *Lancet 2010*, 375:1969-87.

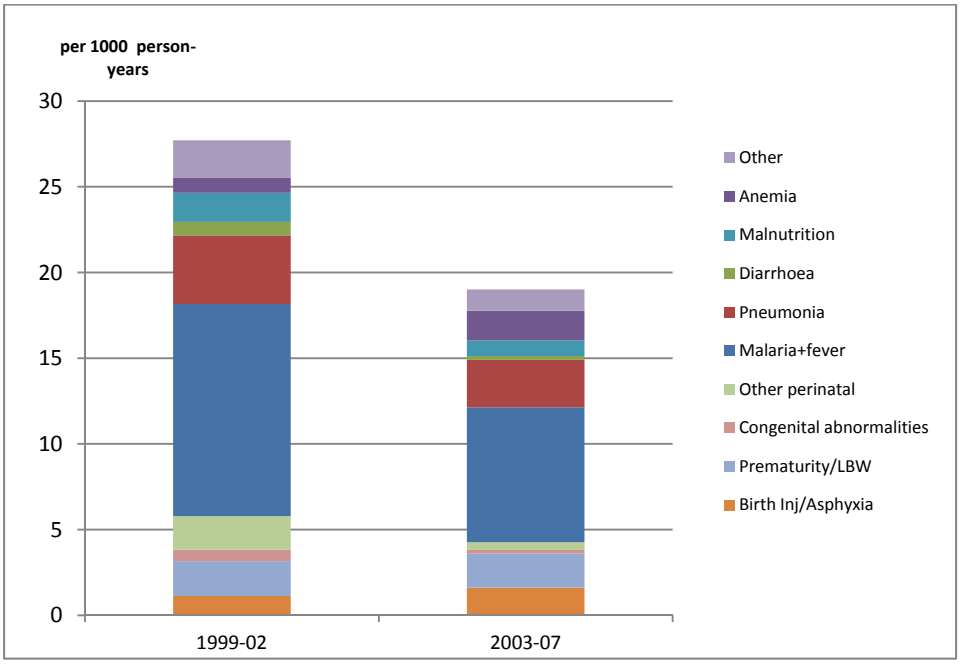
Johnson H, Liu L, Walker CF, Black RE**: Estimating the distribution of causes of child deaths in high mortality countries with incomplete death certification**. *Int J Epidemiol 2010*, 39:1103-1114.

National Bureau of Statistics (NBS) [Tanzania] and ORC Macro. 2005. **Tanzania Demographic and Health Survey 2010**. *Dar es Salaam, Tanzania: NBS and ORC Macro*, 2010. 451p.

Travis P, Bennett S, Haines A. **Overcoming health-systems constraints to achieve the Millennium Development Goals**. *Lancet 2004*; 364: 900-906.

Annex 1: Child mortality trends in Rufiji HDSS, 1999 – 2010
(neonatal = 0 - 27 days and post-neonatal = 1 – 59 months)

Annex 2: Child mortality rates (0 – 5 years) by cause of death and period, 1999 – 2010



Annex 2: Proportionate contribution of specific cause of death to the total change in life expectancy at birth for 1999 – 2002 and 2003 – 2010