An Assessment of the relative contribution of household economics, maternal educational attainment and health service accessibility to rapid child mortality decline in three rural Tanzanian districts

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Background

According to the epidemiological transition theory, progress in medicine and health care not only reduces the level of mortality, it also changes its structure (Omran 1971): the mean age at death increases progressively, and the major infectious and parasitic diseases, which are the main causes of death when mortality is very high, give way to a variety of 'manmade and degenerative diseases' linked both to day-to-day behaviors that present a risk for individuals, and to the biological ageing process. This long-term and ongoing mortality decline is generally qualified as the 'health transition' as the result of progress in health care, but also of social and economic development (Lerner 1973; Preston and Nelson 1974; Caldwell and al. 1990).

This paper proposes to extend this proposition to include the role of service proximity. Specifically, we aim to test the proposition that the impact of service accessibility on mortality declines as the transition progresses. Moreover, we aim to test the hypothesis that the impact of indicators of health equity, such as maternal education and relative household wealth, diminish as the health transition progresses.

Objective

This paper measures the level and analyses trends and determinants of child mortality in rural Tanzania from 1996 to 2010, a period of rapid transition in childhood survival. The analysis aims to clarify the role that access to nearest primary healthcare points has played in explaining the relative pace of under-five mortality decline over 15 years of surveillance and also to elucidate interaction of proximity with social determinants of child survival as the transition progresses.

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<u>Hypothesis</u>

This paper examines hypotheses about the relative contribution of social and economic change versus health service proximity as determinants of the rapid decline of mortality in under-five year olds in rural Tanzania.

Data and method

Ever since 1996, the Ifakara Health Institute has maintained an integrated health and demographic surveillance system (HDSS) in three rural districts of the Coastal and Morogoro regions (Rufiji, Kilombero and Ulanga). 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]. Data on social and economic characteristics that define health equity have been compiled in HDSS areas over time. As well, geographic data on the precise location of households and health facilities have been maintained during this period.

Depending on data availability, our analysis use data from 2000 to 2010. We firstly draw the general trends of child mortality and examine separately the existence of relationships between each characteristic of children, parents, households and the risk of child death (univariate analysis). Then, using multivariate logistic regressions we control effects of significant variables[4] in the univariate variables to determine factors of child mortality decline. One of models allowing multivariate analysis of survival data is the Cox Model. It measures the risk of death differentials by characteristics of children, parents, households in taking into account the time in the regression.
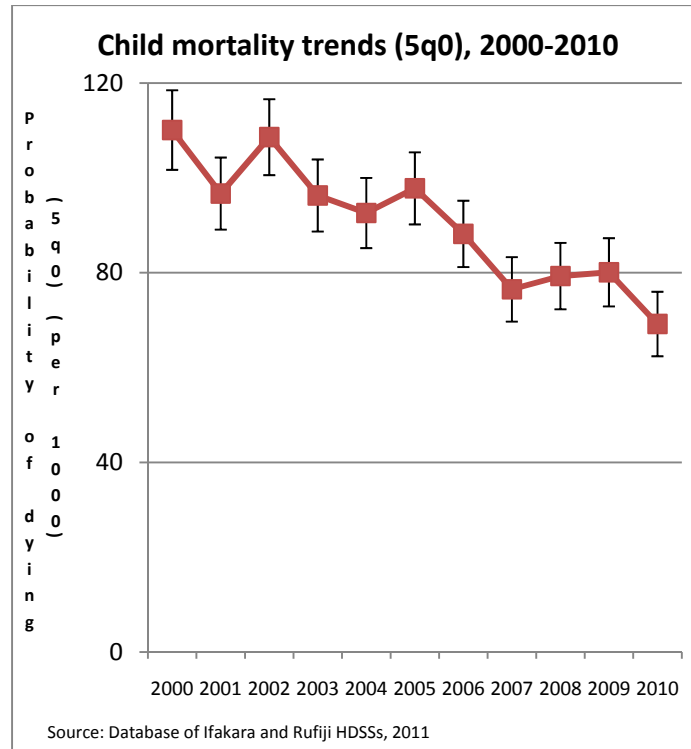
Results and discussion

The mortality has been reduced close to 40% in ten years, from 110 to 70 per 1000 between 2000 and 2010. The health equity has improved as mortality has declined but that educational attainment and household relative wealth remain as significant covariates of childhood survival (multivariate analysis).

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[3] One round = four (4) months long for both Ifakara HDSS and Rufiji HDSS

[4] A statistically significant difference will be defined at $p<0.05$. Chi2 and Wilcoxon's tests will be used to examine possible associations between risk of child death and characteristics of children, parents, households, villages, etc.

Child mortality trends (5q0), 2000-2010

Probability of dying (5q0) per 1000

120	
80	
40	
0	

2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

Source: Database of Ifakara and Rufiji HDSSs, 2011

Findings respond to debates at the core of primary healthcare policy in Tanzania that concern the relative effect of geographic health service inequalities vis-à-vis the effect of social and economic change as determinants of rapid improvement in the survival of Tanzanian children. Although the geographic density of services remains high, residual service proximity effects suggest that plans to launch a large scale community health services initiative could have incremental health equity effects. Under-five year old mortality in Tanzania reduced from 137 to 81 deaths per 1000 live births between 1992-1996 and 2006-2010 , placing the country on target to achieve Millennium Development Goals (MDG 4) (TDHS 2011; Masanja and al. 2008).

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