

Titre : Maternal Education and Child Mortality in Benin : Exploring the local context effects.

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Abstract

Although the majority of previous studies have shown a strong relation between mother's education and child mortality in developing countries, these have not been highlighted (tend to be rather weak) in other studies that took into account factors omitted in previous studies, drawing also attention to the multilevel nature of the relationship. In particular, community education has an impact on child mortality, in addition to the individual education of the mother. However, taking into account the explanatory approaches of community effects –socialization mechanisms and instrumental mechanisms–, very little research has focused on the possibility that some community institutions, such as marketplace could have an impact on child mortality. To advance our knowledge on these issues, this study is designed in an attempt to examine, through a multi-level model, if other people's education of the community and the presence of market are of importance significant in the relationship between mother's education and child survival before age five living in Africa and particularly in Benin. Additionally, we test whether the results differed according to area of residence (urban/rural) given that they are not homogeneous. The possibility of a rural/urban difference has not been checked earlier.

Introduction

The relationship between mother's education and child survival has been the subject of numerous studies since the 1980s in various developing countries. Several of them have shown a negative relation between mother's education and child survival before age five, a relation that persists after controlling for demographic and socioeconomic characteristics. At the same time, this effect have not shown up (or tend to be rather weak) in other studies that took into account factors omitted in the previous studies. For example, Desai & Alva (1998), have explicitly showed that besides certain individual factors omitted, contextual factors play also an important role in the relation.

In recognition of these findings, many multilevel studies (DeRose & Kulkarni, 2005; Fotso & Kuate-Defo, 2005; Kravdal, 2004; Pamuk, et al., 2011) report that community education positively influences child survival regardless of individual education of mothers, supporting the hypothesis that contextual factors are particularly important in the relationship between mother's education and child survival (Desai & Alva, 1998; Sastry, 1996). But it seems reasonable to assume that the importance of these community factors also involve effects of social interactions (Kravdal, 2009). For example, the fact of living in a community with other people who have a relatively higher level of education or literacy can promote a better health knowledge (Andrzejewski, et al., 2009), and can have consequences on child survival because of imitation or neighborhood effects (DeRose & Kulkarni, 2005; Kravdal, 2004; Pamuk, et al., 2011; Parashar, 2005). Other studies (Kawachi, et al., 1999; Sampson, 2003) have also shown that community contribute to a certain extent the circulation of health knowledge (which could have been expensive) because of the importance of social interactions taking place through social networks and social organizations. However, results of previous studies are limited to the

national level (country), without taking into account that the effects are likely to vary according to area of residence within the same country (Sampson, 2003), given the differences in survival, but also because of the demographic and socioeconomic characteristics of the households (Van de Poel, et al., 2007), socio-economic resources, and access to health care (Legrand & Lalou, 1996; Poel, et al., 2009; Sastry, 1997) that vary by area of residence.

Moreover, the debate surrounding the explanation of community effects attaches importance to socialization mechanisms (social interaction), but also to instrumental mechanisms (community institutions) that promote the exchange of information (Bloom, et al., 2008; Bongaarts & Watkins, 1996; Montgomery, et al., 2001; Small & Newman, 2001), and to some extent influences the behavior of individuals in the community. But very little research has focused on the possibility that some institutions in the community may also have an influence on the child survival. In our study, in addition to community education, we explore the hypothesis that the presence of the market (one of the social institutions across the community) has also an impact on child survival. For this purpose, if there is agreement on the economic role of the market (exchange of goods and services), it also plays a social function since it serves as place of meeting and exchange between people of the same region or surrounding, at regular intervals, thus promoting a relation network between families, ethnic groups and allies (Andrzejewski, et al., 2009; Bignante & Tecco, 2013). In the same way, work of Bignante & Tecco (2013) insist on the fact that exchanges that take place offer numerous opportunities for the circulation of information on various health issues, and the transmission of health knowledge. Sometimes, the markets are also a place where awareness messages can be transmitted more easily (Dixon, et al., 2011).

To advance our knowledge on these issues, this study is designed in an attempt to examine, through a multi-level model, if other people's education of the community and the presence of market are of importance significant in the relationship between maternal education and child survival before age five living in Africa and particularly in Benin. Additionally, we test whether the results differed according to area of residence (urban/rural) given that they are not homogeneous (Ducan, et al., 1991). Specifically, we test the following hypotheses:

- (1) Irrespective of individual-level effect of mother's education, children living in community where the average education of women is relatively high have a probability of dying before age five lower than those living in community where the average education is low.

Insofar as the educated women have an easier access to knowledge hygiene and health care of their children, we suppose that in the community with strong proportion of educated women, this knowledge will benefit the less educated women and can lead them to change health behaviors. This process of social interaction can be carried out various ways: imitation, learning from the experience of other educated women, neighbors, sharing information. If this is the case, we should observe a low probability of death

among children in community with a high proportion of educated women, especially in urban areas.

- (2) Children who live in community where there is a marketplace have a probability of dying before age five lower than those living in community without a marketplace.

This hypothesis suppose among others that the market is a meeting place between individuals of the same locality or surrounding areas (spatial interaction). According to the relation networks between women, they can discuss and exchange mutually information on various health questions and the best way to overcome them. This sharing of information or knowledge may be related to the difficulty of obtaining health care because of the limited availability and accessibility of health services in the locality of residence. Therefore, this knowledge is likely to modify mother's health behaviors and improve the child survival, especially in rural areas.

In the following sections, we present the analytical framework, data and method of analysis, the results, before ending with a discussion and conclusion.

Analytical framework

The conceptual approach that we adopt in this study is inspired on that of Mosley & Chen (1984), not only because it is the most used in many recent studies using multilevel methods to study the determinants of morbidity and mortality in African countries (see, e.g., Boco 2010; Poel et al., 2009; Soura, 2009; Fosto & Kuate-Defo, 2005; Sastry, 2011), but because it is closely related to the theoretical foundations regarding the role of mother's education (within the meaning of Caldwell¹ (1979)), and intermediate variables that can be influenced by the mother's education (Masuy-Stroobant, 2002a, 2002b). According to this approach, socioeconomic factors (e.g., education) operate at different levels (individual/household, community) to influence child survival through proximate determinants.

According to our research objectives, we postulate that mother's education affects child survival through a set of factors that we classify into three groups of variables: characteristics of the mother (age at child's birth, place of delivery, religion), child (age, sex, birth order and preceding birth interval) and household (husband's education, standard of living, size, gender of household head, place of residence). In the analysis of education effects on health and child mortality, the importance of these variables have been confirmed since the work of Caldwell (1979), and have been reaffirmed in recent

¹ Caldwell (1979) distinguishes three main mechanisms of action by which mother's education influences health and child survival. The first element of explanation that highlights suppose that (1) more educated mothers operate more easily a rupture with traditional practices, becomes less fatalistic, and can adopt behavior therapy to combat disease by using ways that offer modern society (modern health care). Then, (2) an educated mother is more receptive to modern methods of health care, and more careful in their contacts with health personnel. Finally, (3) education can change the relations and the status of women within the family structure (relation wife-husband, relation wife-family in-law, etc.).

empirical work (Bbaale & Buyinza, 2012; Boyle, et al., 2006; Buor, 2003; Fuchs, et al., 2010; Hale, et al., 2009; Hatt & Waters, 2006; Hobcraft, et al., 1984; Huq & Tasnim, 2008; Pamuk, et al., 2011; Smith-Greenaway, 2013).

At the community level, several characteristics (political, economic, cultural, religious and social systems, including investment in education and the status of women) likely to give an account of the degree of modernization and urbanization of the community are also stakeholder determinants of education (Kravdal, 2004; Mosley & Chen, 1984) so that the mechanisms that link community education can be numerous and complex to operationalize. However studies have shown that in addition to individual education, community education also influences the child survival because of social interactions that promote the diffusion of health knowledge (see, e.g, work of Kravdal (2004) for more details). Addition to community education, the existence of social institutions (such as the presence of market) are also among the factors promoting the diffusion of health knowledge. Empirically, there is evidence that the presence of a market in the locality positively influence women's health knowledge (Andrzejewski, et al., 2009). We therefore expect to find that the presence of market and community education will both influence the child survival.

Data and Methods

Data

The data used come from the coupling of the Demographic and Health Survey (DHS) and the Integrated Modular Survey on Living Conditions of Households (EMICoV) carried out in 2006 in Benin (see, e.g., INSAE & Macro International Inc., 2007 for more details on the survey organization). These data are collected on the basis of individual and community questionnaires, and focus on a sample of 750 clusters covering 17511 households. The mortality analysis is mainly based on data reported in the reproductive history of women aged 15-49 using the individual questionnaire administered to women. Given the issue of the study, we selected children born in the last five years preceding the survey, and whose mothers are married or in union. The restriction of the sample to mothers married or in union is motivated by our intention to take into account the husband's education (Kravdal, 2004) which is a very relevant variable to study the effects of mother's education on child mortality (Baya, 1998; Breierova & Duflo, 2004; Desai & Alva, 1998).

In total, 15369 children under five and mothers from married or in union are concerned. Mothers have on average more than one child per household (1,7 children). Among them, 1299 children died before age five.

The dependent variable is the risk of dying before age five, measured by the duration since the birth of the child until the age of his death (in months). Surviving children at the time of survey were censored at their age at the time of survey. The independent variable that characterizes mother's education includes three modalities : uneducated , primary, secondary and more.

Concerning the community variables, we focus on community education and presence of market as follows:

- The Community level of education : Average women aged 15-49 with at least the primary level;
- The presence of market: Market in the locality(yes/no)

Table 1 gives an overview of the descriptive statistics for explanatory variables disaggregated by urban and rural² areas in order to explore the differences of proportion or mean (and standard deviation).

[Table 1 about here]

Statistical methods

For statistical analysis, we estimated in first (exploratory stage) gross effects to test the associations between each of the explanatory variables and the dependent variable (table 1). Gross effects are obtained from the logit discrete-time model, using the Hubert White procedure to account for correlation between children of the same mother and the same community.

At multivariate level, we estimated a multilevel discrete-time logit models with random intercepts. This model is well suited for the analysis of hierarchical data, such as DHS, where we consider two levels: the individual/family and the community (cluster).

Expected results

We expect to find a significant association between community education and child survival, in addition to the effect of mother's education, even when other socio-economic factors are taken into account. We also expect that the community education and the presence of the market positively influences child survival with differences by area of residence.

² The use of urban or rural is same as that defined in the sampling design of the investigation

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Table 1. Descriptive Statistics (percent or mean and standard deviations) and gross effects for variables used in statistical analysis of child mortality.

Variable	Urban %	Rural %	All areas	
			%	Gross effects (odd ratio)
Mother's characteristics				
Education				
None	57,52	84,86	75,68	1
Primary	27,18	12,54	17,46	0,92
Secondary and +	13,3	2,6	6,87	0,56***
Age group at child's birth				
20-34 years	78,55	74,74	76,02	1
Less than 20 years	8,29	12,79	11,28	1,2**
35 years and +	13,16	12,47	12,7	0,97
Religion				
Traditional	11,02	23,74	19,46	1
Moslem	25,64	24,04	24,58	1,01
Christian	63,35	52,22	55,96	0,92
Place of delivery				
Other place	13,98	25,81	21,83	1
Health facility	86,02	74,19	78,17	0,74***
Child's characteristics				
Sex				
Male	52,34	49,4	50,39	1
Female	47,66	50,6	49,61	0,93
Birth order and preceding birth interval				
First birth	22,47	16,73	18,66	1
2-3 and < 2 years	5,3	4,86	5,01	1,37**
2-3 and >2 years	33,96	28,79	30,53	0,71***
4+ and < 2 years	5,17	7,12	6,47	1,47***
4+ and > 2 years	33,1	42,5	39,34	0,88*
Household characteristics				
Husband's education				
None	40,7	67,02	58,18	1
Primary	26,59	22,41	23,82	0,89*
Secondary and +	32,71	10,56	18	0,74***
Living Standard index				
Poor	20,64	54,2	42,93	1
Middle	40,65	41,14	40,97	1,01
Rich	38,72	4,66	16,1	0,59***

cont'd

Variable	Urban %	Rural %	All areas	
			%	Gross effects (odd ratio)
Mother head of household				
No	90,83	92,78	92,13	1
Yes	9,17	7,22	7,87	0,69**
Household size	6,4 (3,38)	7,37 (4,10)	7,04 (3,90)	0,96***
Residence				
Urban			33,59	1
Rural			66,41	1,32***
Community characteristics				
Education (mean of primary and +)	0,49 (0,27)	0,2 (0,17)	0,3 (0,25)	0,53***
Presence of market (by the distance)				
>3km	37,86	62,4	54,16	1
missing	5,39	6,71	6,27	0,99
<=3km	56,75	30,88	39,57	0,84**
Total	5163	10206	15369	
Death	363	936	1299	