Does father's education make a difference on child mortality? Result from Benin DHS data using conditional logit discrete-time model.

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Abstract

Evidence from most studies in developing countries suggests that mother's education is strongly associated with child mortality than father's education (for whom we recognize his socioeconomic role in the household). This paper attempts to examine the association between father's education and child mortality by looking if there is an alteration with community level variation (such as health care offer and a number of socioeconomic and cultural characteristics). We employ data from Benin Demographic and Health Surveys in 2006 using standard logit discrete-time and conditional logit discrete-time model controlling for unobserved community-level factors.

Results show a significant and negative association between father's education and the probability of dying among children of educated mothers. In contrast, no statistically significant effect has not been found among children of uneducated mothers. More research is also necessary to know if this effect occur at all age of the children.

1. Introduction

The importance of parental education, mainly that of mother on child mortality has been examined extensively in a large number of studies (Bbaale & Buyinza, 2012; Boyle, et al., 2006; Buor, 2003; Caldwell, 1979; Fuchs, et al., 2010; Hale, et al., 2009; Hatt & Waters, 2006; Hobcraft, et al., 1984; Huq & Tasnim, 2008; Nakamura, et al., 2011; Smith Greenaway, et al., 2012). Several of these studies have also presented the pathways through which mother's education contributes to the reduction of child mortality, and have shown more generally that mother's education is strongly associated with child health and child mortality than father's education (for whom we recognize his socioeconomic role in the household), given that it's the mother who is mainly involved in the care given to children. Moreover, mother's decisions in hygiene and nutrition, and exposure to environmental risks are all factors that influence health and survival of children (Fuchs, et al., 2010) so that the father's education seems to be less relevant for public policies to improve child survival.

Despite considerable attention to the relationship between mother's education and child mortality, a few studies highlighted a differential impact of father's education on child health outcomes, contrary to the absence of effects that had been shown in the past (Aslam & Kingdon, 2012; Baya, 1998; Breierova & Duflo, 2004; Chen & Li, 2009; Ducan, et al., 1991; Semba, et al., 2008). These studies suggest that the importance of parental education may have been poorly estimated due to certain omitted factors (observed or unobserved) which have been yet stressed in the theoretical models (Levine, et al., 1994; Mosley & Chen, 1984; Schultz, 1984). First, various variables relative to family background[1] that are unobserved can cause bias in the relationship between parental education and child health outcomes because these variables are likely to be correlate with both child health outcomes and education. In such situations, empirical studies have shown that associations between parental education (mainly that of the mother) and child health outcomes have different results (weak or disappears) when family background are controlled.

Research has also indicated that in the context of the functioning of marriage market, educated women are more likely to marry educated men, not only for reasons related to living conditions (Behrman & Rosenzweig, 2002; McIntyre & Lefgren, 2006), but also because of the greater involvement of educated men in the care given to children (Breierova & Duflo, 2004) and their flexibility against traditional practices that can harm

[1] The hypothesis of an intergenerational transmission of values and knowledge inherited by the mother likely to be correlated with the child health outcome has been raised (Behrman & Wolfe, 1987; Grossman, 2005). This transmission can occur through interaction in the family (Christian Baudelot, et al., 2005). In this perspective, Levine et al. (1994) showed that the rich families are more likely to better educated women in their young age and give them more support needed in the use of health care in adulthood (the sponsorship factor). They also indicate that parents can choose to enroll more girls who are most intelligent, and therefore their ability to use health services and family planning are proving more effective (selection factor).

child health (Baya, 1998; GŸrsoy, 1994). Therefore, the comparison of the effect of father and mother education on child health or child survival may be biased, if this unobserved characteristics is not taken into account.

Nonetheless, while researchers devoted considerable attention to the impact of unobserved factors at individual-level, less is known about how community characteristics affect child mortality. A few studies examining this association revealed that community characteristics including availability of health facilities plays an important role on the child health outcomes (Desai & Alva, 1998; Ducan, et al., 1991; Kravdal, 2004). The underlying idea is that the mechanisms through which parental education promotes better child health outcomes cannot be explained in insulating the geographic and cultural context (Caldwell, 1986; Kaufmann G. & Cleland J., 1994). For instance, factors at the community level have been found to be linked with both education and mortality (Desai & Alva, 1998). It's also indicated that education and health services are substitutes given the fact that uneducated women also benefit from public health services (Barrera, 1990; Ducan, et al., 1991).
In these perspectives, the absence of the effect of father's education may be due to the complexity to control community characteristics (when for example there is no information at the community level). Yet, there are several reasons to believe that the father's education can influence the child health and child mortality : by his purchasing power (access to skilled labor) and better living conditions of households which result from it (indirect effect), and also because of the knowledge acquired through education and his participation in decision making on preventive or curative measures against diseases (Baya, 1998). But if his role is less perceived as important factor of child health and child mortality, this may reflect the assumption that in presence of other unobserved factors (such as community level variation) the father's education seems less affect child health outcomes.

This paper is a contribution to this debate using data of Demographic and Health Survey of Benin. The objective is to examine the association between father's education and child mortality in Benin, by comparing the pattern where the community level variation has been controlled with those without adjusting the community level variation. More specifically, assuming that children mortality may be affected by the characteristics of the community (health care offer and a number of socio-economic and cultural characteristics) we expect to find whether there is an alteration in the relationship between father's education and the children's probability of death when community factors (observed or not) are controlled. Our models with and without controlling for these factors allows us to answer this question.

2. Methodology

-Data

This study relies on sample data from Demographic and Health Surveys (DHS) of Benin in 2006. This survey is the third conducted by the Institute of Statistic (INSAE) and Macro International Inc. The data were gathered with individual and community questionnaires, on a stratified cluster-sampling design (750 clusters) covering 17511 households (see INSAE & Macro International Inc, 2007 for details).

Given the objective of this study, our analytical sample is based on data collected through an individual questionnaire administered for women aged 15-49 years. But for the analysis, we restricted the sample to women ever married or in union (Kravdal, 2004). The data provide informations on demographic and socio-economic characteristics of women, household members and women reproductive history (required for the analysis of child survival). Moreover, considering the fact that we have no information to control the community characteristics (except residence area), we take advantage of the cluster-sampling design to control for community characteristics that are not observed by using appropriate statistical methods.

-Variables

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. We retained only the births of last five years preceding the survey for the simple reason that several characteristics on child health are not available outside this period.

The main explanatory variables are father's education and mother's education (Educated = primary and more; Uneducated = no education). In addition to the main explanatory variables, control variables relative to child (sex, birth order and preceding birth interval), mother (age at child's birth, religion) and household (household wealth index, nature of toilet, nature of water, residence area) have been included in the estimation models. These control variables are on the whole consistent with many other studies of the relationship between parental education and child mortality.

-Statistical analysis

This study uses two multivariate regressions to examine the effect of father's education on child survival in Benin : standard logit discrete-time model accounting for within-cluster correlation by using the Huber-White procedure, and the conditional logit discrete-time model called also matched case–control designs, controlling for unobserved community-level factors. Nevertheless, to better understand the effects of

father's education according to those of the mother, we examine the coefficient of father's education in each category of mother's education. This analytical strategy has the advantage of allowing for a comparison, and to support the variability of results without adjusting the community characteristics once the community characteristics have been controlled.

Table 1 provides an overview of descriptive statistics for analysis variables according to the categories of mother's education.

Table 1**:** Distribution (percentage[2]) of child (0-59 months) according to the selected variables for each category of mother's education, DHS 2006.

Explanatory variables selected	Uneducated Mother	Educated Mother	Total
Child's sex			
Male	50,21	50,93	50,39
Female	49,79	49,07	49,61
Birth order and preceding birth interval			
First birth	15,49	28,51	18,66
2-3 & < 24 months	4,99	5,07	5,01
2-3 & >=24 months	28,56	36,65	30,53
4+ & < 24 months	7,58	2,99	6,47
4+ & >=24 months	43,37	26,78	39,34
Father's Education			
Uneducated	62,86	18,42	6,49
Educated	31,07	73,8	41,46
Missing	6,07	7,79	6,49
Mother's age at child's birth			
< 20 years	11,68	10,05	11,28
20-34 years	74,56	80,54	76,02
35-49 years	13,76	9,41	12,7
Religion			
Traditonal	22,63	9,61	19,46
Muslim	27,59	15,2	24,58
Christian	49,77	75,19	55,96
Household wealth index			
Poorest	27,12	7,32	22,3
Poor	24,21	9,48	20,63
Middle	22,78	15,02	20,89
Rich	18,21	25,91	20,08
Richest	7,69	42,27	16,1
Nature of water			
Tap water	17,45	48,97	25,12
Other	15,14	5,73	12,85
Fontaine	12,29	8,61	11,4
Well/Drilling/Rain	55,11	36,68	50,63

[2] Weighted.

Table 1: Cont'd

Explanatory variables selected	Uneducated Mother	Educated Mother	Total
Nature of toilet			
Toilet covered	12,42	32,12	17,22
Uncovered toilet	6,98	25,59	11,51
Nature/other	80,59	42,29	71,28
Residence			
Urban	25,53	58,67	33,59
Rural	74,47	41,33	66,41
Number of children (unweighted)	10826	3343	14169
Number of death (unweighted)	1066	259	1325

3. Preliminary Results

Preliminary results suggest that:

A major finding of this study is that father's education have different effects according to mother's education.

-Conditional logit discrete-time model show that father's education remains insignificant when the mother is uneducated. On the other side, a significant association have been found between father's education and child mortality of educated mothers.

-No significant association does appear when community factors are not controlled.

-This analysis underscores the importance of adjusting community factors in explaining the association between parental education and child health outcomes. The comparison of two models gives the idea that community factors (such as health care services and other) play an important role in the child survival, so that the contribution of the father's cannot properly highlighted outside of his role in producing household income.

Table 2 : Bivariate association between parental education and child mortality (logit discrete-time model accounting for within-cluster correlation by using the Huber-White procedure)

Explicatives variables	**Odds Ratio**	
	Model 1	**Model 2**
Mother's education (Ref=Uneducated)	0.81**	0.88
Father's education (Ref=Uneducated)		
Missing		0.82
Educated		0.83**
Constant	0.034	0.037

Note : *p < .05, **p < .01 and ***p < .001.

Table 3 : Logit discrete-time model accounting for within-cluster correlation by using the Huber-White procedure

Explanatory variables selected	Uneducated mother			Educated mother		
	Odds Ratio	Standard Error	Pvalue	Odds Ratio	Standard Error	Pvalue
Father's Education (Ref=Uneducated)						
Missing	0.83	0.130	0.238	1.09	0.283	0.739
Educated	0.98	0.077	0.809	0.76	0.128	0.105
Mother's age at child's birth (Ref=20-34 years)						
< 20 years	1.08	0.121	0.483	0.94	0.217	0.795
35-49 years	0.98	0.102	0.861	0.82	0.201	0.416
Religion (Ref=Traditional)						
Muslim	1.01	0.094	0.996	1.20	0.333	0.504
Christian	1.01	0.084	0.953	0.98	0.238	0.917
Child's sex (Ref=Male)						
Female	0.96	0.062	0.500	0.80	0.106	0.099
Birth order and preceding birth interval (Ref=first Birth)						
2-3 & < 24 months	1.53	0.216	0.003	0.87	0.266	0.638
2-3 & >=24 months	0.76	0.086	0.016	0.57	0.106	0.003
4+ & < 24 months	1.47	0.198	0.005	1.31	0.429	0.412
4+ & >=24 months	0.88	0.099	0.241	0.78	0.153	0.214
Household wealth index (Ref= Poorest)						
Poor	1.08	0.096	0.381	0.65	0.208	0.175
Middle	1.18	0.110	0.078	1.08	0.294	0.778
Rich	1.06	0.122	0.591	0.92	0.270	0.774
Richest	0.84	0.170	0.396	0.55	0.187	0.078
Nature of water (Ref=Tap water)						
Other	1.10	0.144	0.479	0.95	0.306	0.882
Fontaine	1.10	0.144	0.472	1.14	0.283	0.605
Well/Drilling/Rain	0.97	0.105	0.791	1.01	0.186	0.946
Nature of toilet (Ref= Toilet covered)						
Uncovered toilet	0.86	0.158	0.413	1.28	0.250	0.200
Nature/other	1.11	0.141	0.433	1.03	0.216	0.892
Residence (Ref=Urban)	1.14	0.097	0.121	1.02	0.164	0.916
Constant	0.030	0.006	0.000	0.064	0.025	0.000

Table 4 : Conditional logit discrete-time model controlling for unobserved community-level factors.

Explanatory variables selected	Uneducated mother			Educated mother		
	Odds Ratio	Standard Error	Pvalue	Odds Ratio	Standard Error	Pvalue
Fathers Education (Ref=Uneducated)						
Missing	0.79	0.122	0.125	0.99	0.391	0.981
Educated	1.06	0.099	0.517	0.57	0.140	0.022
Mother's age at child's birth (Ref=20-34 years)						
< 20 years	0.99	0.120	0.867	0.93	0.279	0.816
35-49 years	1.05	0.135	0.692	0.74	0.274	0.413
Religion (Ref=Traditional)						
Muslim	0.99	0.162	0.946	0.64	0.296	0.335
Christian	0.92	0.095	0.404	0.59	0.250	0.213
Child's sex (Ref=Male)						
Female	0.93	0.065	0.317	0.81	0.142	0.222
Birth order and preceding birth interval (Ref=first Birth)						
2-3 & < 24 months	1.33	0.214	0.079	0.497	0.185	0.061
2-3 & >=24 months	0.73	0.095	0.015	0.58	0.146	0.030
4+ & < 24 months	1.21	0.180	0.202	0.62	0.234	0.208
4+ & >=24 months	0.79	0.103	0.073	0.61	0.150	0.043
Household wealth index (Ref= Poorest)						
Poor	1.10	0.120	0.402	0.48	0.235	0.132
Middle	1.09	0.113	0.458	0.71	0.338	0.466
Rich	1.07	0.155	0.655	0.42	0.223	0.102
Richest	0.78	0.209	0.356	0.31	0.179	0.042
Nature of water (Ref=Tap water)						
Other	1.07	0.199	0.703	1.17	0.641	0.773
Fontaine	1.22	0.206	0.250	0.75	0.327	0.508
Well/Drilling/Rain	1.03	0.157	0.832	1.10	0.323	0.750
Nature of toilet (Ref= Toilet covered)						
Uncovered toilet	1.10	0.285	0.702	1.33	0.387	0.327
Nature/other	1.28	0.196	0.112	0.76	0.218	0.344

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