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Adult Education and Child Nutrition

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Abstract

It is well established that mothers' education has a positive effect on child's nutritional status in developing countries. However, the effect of education of other individuals–fathers and household members other than the child's parents–is less explored, especially in the Indian context. The objective of the paper is to examine independent effects of education of mothers, fathers and household members other than the child's parents on child height-for-age and weight-for-age z-score. The determinants of child nutrition were analyzed by estimating a series of econometric models through logit regressions applied on data from India's third National Family Health Survey (NFHS-3) conducted in 2005-06. Particularly interesting, given the lack of previous evidence, is the finding that child nutrition is positively associated with education of fathers and household members other than the child's parents. There are two implications for nutrition policy emerging from this research. First, it underscores the importance of the Government's existing efforts to universalize elementary education and launch adult literacy programmes. Second, policies currently aimed at improving child nutrition must widen their focus beyond mothers to include other household members as well. Therefore, more investment in education sector must be a policy priority for the government.

1. Introduction

It is well established that mothers' education has a positive effect on child's nutritional status in developing countries. However, the effect of education of other individuals–fathers and household members other than the child's parents–is less explored, especially in the Indian context.

The levels of child malnutrition in India are unacceptably high despite strong economic growth in the past few years. According to a UNICEF report, in 2011, 43

percent of children below five years were underweight, 48 percent were stunted and 20 percent were wasted [11]. Education is considered as a key element in the strategy to combat malnutrition in the developing world. This view is based on evidence for a positive effect of adult education on child nutrition in developing countries. We carried out a literature survey that focuses on two kinds of studies: India-specific studies and developing country specific studies. A careful review of the literature reveals that most studies in India have focused on the effect of mother's education on child nutrition. Few have examined the effect of education among family members other than the mother.

It has been argued that fathers, often heading the households in societies of the developing world, make decisions regarding fertility, contraception and use of health care services. Therefore, certain behaviors and practices which may affect children's nutrition depend on the father, and specifically, on his level of education [2]. Education of household members other than the child's parents is important for two reasons [1]. First, an illiterate mother can benefit from the services of a literate household member which is particularly crucial when the mother is the care taker. Second, other household members such as grandmothers and older siblings can play an active role as care-takers when employment draws mothers away from childcare at home.

The objective of this study is to examine the determinants of nutritional status of children under five years of age in India. A special emphasis will be given on exploring the effects of education of mothers, fathers and household members other than the child's parents on child nutrition.

Our study is based on the data from India's third National Family Health Survey (NFHS-3) conducted in 2005-06 (i.e. the latest date for which NFHS data are available). Logit regression is used to identify the determinants of the measures of malnutrition. Particularly interesting, given the lack of previous evidence, is the finding that child nutrition is positively associated with education of fathers and household members other than the child's parents.

In the case of mothers who had more than one child during the 5 year period preceding the NFHS-3 survey, we have restricted the analysis to the last live birth in order to avoid any clustering at the mother level. The sample used for our analysis has 35,570 children (last live births) in the age group of 0-5 years across India. To restore the representativeness of our sample, we have used the national-level weights for all-India analysis.

The rest of the paper is organized as follows. Section 2 describes the model and discusses the model estimation and logit regression results. Section 3 presents the policy implications of our key findings.

2. Model and Regression Results

2.1. Model

2.1.1. Specification. A child's nutritional status is posited to depend on a set of exogenous characteristics of a child $\boldsymbol{x_i}$, characteristics of parents $\boldsymbol{x_p}$, household

characteristics $\boldsymbol{x_h}$ and community characteristics $\boldsymbol{x_c}$. This relation can be expressed as:

Child's nutritional status = $f(x_i, x_p, x_h, x_c)$

The following model is estimated using logit regression:

$p = P(y = 1|x) = e^{x'\beta} / (1 + e^{x'\beta})$

where $x'\beta = \beta_0 + \beta_1 x_i + \beta_2 x_p + \beta_3 x_h + \beta_4 x_c$.

The dependent variable, y, takes value 1 (if child is malnourished) with probability p and value 0 (if child is not malnourished) with probability $(1 - p)$.

2.1.2. Measurement of child nutritional status. In the existing literature, the three most commonly used anthropometric measures of child malnutrition among children under five years are low height-for-age (stunting), low weight-for-height (wasting) and low weight-for-age (underweight). According to a WHO report [12], these three measures capture different aspects of nutritional status of children.

Stunting is a measure of linear growth retardation. It reflects a failure to receive adequate nutrition over a long period of time and is also affected by recurrent and chronic illness. Wasting is a measure of the thinness of children. It reflects a failure to receive adequate nutrition in the period immediately preceding the survey and may be the result of inadequate food intake or a recent episode of illness causing loss of weight and the onset of malnutrition. Underweight captures elements of both stunting and wasting i.e. it reflects both past and/or present malnutrition (although it is unable to distinguish between the two).

However, a less commonly used measure of malnutrition in the literature is the measures of malnutrition based on 'composite index of anthropometric failure' (CIAF) [10]. It measures the percentage of all children who fail by at least one of the three conventional anthropometric measures. In our study, three anthropometric indicators are used to measure a child's nutritional status: measure of malnutrition based on 'stunting', measure of malnutrition based on 'underweight' and measure of malnutrition based on 'CIAF'. The conventional anthropometric measures (underweight / stunting) are expressed as z-scores. z-score for an individual i is calculated as follows:

$$\text{z-score} = (X_i - X_r) / \sigma_r$$

where X_i is an observed value for individual i, X_r and σ_r are median and standard deviation of the reference population, respectively.

According to WHO new child growth standards [13], children with z-scores between -2 and -3 are classified as moderately malnourished (underweight / stunted); and those with z-scores less than -3 are classified as severely malnourished. Since our study attempts to identify the determinants of malnutrition (moderate + severe), therefore a cutoff of -2 for z-score is chosen. This means that a child is considered malnourished if his/her z-score is less than -2. The measure of malnutrition based on 'underweight' ('stunting') takes value '1' if the child is underweight (stunted) and '0' otherwise. The measure of malnutrition based on 'CIAF' takes value '1' if the child is malnourished by at least one of the three conventional anthropometric measures (stunting, underweight, wasting) and '0' otherwise.

2.1.3. Explanatory variables. The explanatory variables used in our analysis can be discussed at four broad levels: child-, parents-, household- and community-specific factors. The child-specific variables include gender [4,7], age [5], birth order [5,7], size at birth and duration of breastfeeding (in months) [4]. The parents-specific variables include mother's age at first marriage [3], education [5,7], current nutritional status as measured by body mass index (BMI) [4,8], status in the household [8], current employment status [7] and father's education [2]. The household-specific variables include educational attainment of household members other than the child's parents [1], household size [7], gender of household head [3], household head's caste/tribe [3,7], household income [4,7] and type of cooking fuel [6]. The community-specific variables include access to safe sanitation, presence of anganwadi centre [7], ante natal visits [7], institutional delivery [9] and access to child immunization services [4,9].

2.2. Logit regression results

Table 1: Results of logit regression (using NFHS-3 national level weights)

Dependent variables ⇨ **Explanatory variables** ⇩	**Measure of malnutrition based on 'CIAF'**	**Measure of malnutrition based on 'Stunting'**	**Measure of malnutrition based on 'Underweight'**
Gender of child (Base group: Male)	-0.023	-0.056	-0.008
	(-0.038)	(-0.042)	(-0.043)
Age of child (Base group: 0-11 months)			
12-23 months	0.4	0.914	0.442
	(0.062)**	(0.071)**	(0.070)**
24-35 months	0.369	0.893	0.45
	(0.072)**	(0.081)**	(0.082)**
36-47 months	0.236	0.708	0.36
	(0.078)**	(0.088)**	(0.090)**
48-59 months	0.166	0.595	0.317
	(0.080)*	(0.091)**	(0.093)**
Birth order	0.021	0.021	0.024
	(0.013)***	(-0.014)	(0.014)***
Size at birth (Base group: Not low)	0.464	0.478	0.564
	(0.049)**	(0.053)**	(0.054)**
Duration of breastfeeding (months)	0.015	0.02	0.019
	(0.002)**	(0.002)**	(0.002)**
Mother's age at marriage	0.124	0.184	0.118
(Base group: >= 20 years)	(0.049)*	(0.054)**	(0.056)*

Mother's highest education level (Base group: No education)			
Primary	-0.117	-0.11	-0.153
	(0.061)***	(0.066)***	(0.068)*
Secondary	-0.165	-0.221	-0.217
	(0.055)**	(0.059)**	(0.062)**
Higher	-0.262	-0.335	-0.434
	(0.104)*	(0.118)**	(0.125)**
Mother's BMI (Base group: >= 18.5)	0.391	0.351	0.522
	(0.041)**	(0.045)**	(0.045)**
Father's highest education level (Base group: No education)			
Higher	-0.247	-0.322	-0.28
	(0.067)**	(0.077)**	(0.079)**
Non-parental household members' education (Base group: No member excluding father and mother has at least completed primary school)	-0.123 (0.049)*	-0.164 (0.053)**	-0.155 (0.055)**

The logit regression results show that the following variables are significant determinants of the measure of malnutrition based on 'CIAF': age, birth order, size at birth and duration of breastfeeding (child-specific factors); mother's age at first marriage, mother's education, mother's nutritional status and father's education (parents-specific factors); education of non-parental household members, standard of living, household size and caste/ tribe of household head (household-specific factors); access to safe sanitation, access to maternal and child health care services (community-specific factors). All the variables found significant by using 'CIAF' as the measure of malnutrition are also found significant by using either 'stunting' or 'underweight' as the measure of malnutrition.

Household's standard of living (Base group: Low)			
Medium	-0.143	-0.116	-0.218
	(0.050)**	(0.054)*	(0.055)**
High	-0.545	-0.553	-0.692
	(0.070)**	(0.077)**	(0.080)**
Household size	0.021	0.026	0.027
	(0.007)**	(0.008)**	(0.008)**
Caste / tribe of household head (Base group: others)			
SC	0.251	0.273	0.341

	(0.057)**	(0.062)**	(0.064)**
ST	0.221	0.169	0.351
	(0.072)**	(0.078)*	(0.079)**
OBC	0.155	0.146	0.202
	(0.047)**	(0.052)**	(0.054)**
Access to safe sanitation	-0.148	-0.169	-0.161
(Base group: No access)	(0.049)**	(0.053)**	(0.055)**
Access to child immunization services	-0.122	-0.129	-0.097
(Base group: Not fully immunized)	(0.044)**	(0.048)**	(0.050)***
Number of ante natal visits (Base group: <4)	-0.221 (0.047)**	-0.224 (0.051)**	-0.256 (0.053)**
Institutional delivery (Base group: No)	-0.139	-0.179	-0.17
	(0.048)**	(0.052)**	(0.054)**
Presence of anganwadi centre in PSU (Base group: No)	-0.073 -(0.047)	-0.106 (0.052)*	-0.086 -(0.053)
Constant	-0.075	-0.81	-0.641
	-0.108	(0.119)**	(0.122)**
Number of observations	21159	18280	17247
Log pseudolikelihood	-13050.698	-11109.916	-10459.44
Likelihood ratio χ^2	1376.66	1529.47	1516.65
Prob > χ^2	0.0000	0.0000	0.0000
Pseudo R^2	0.0871	0.1214	0.1251

Note: Robust standard errors are given in parentheses. ***significant at 10%; *significant at 5%; **significant at 1%.

As noted earlier, few studies in India have examined the effect of education of family members other than the mother on children's nutritional status. In fact the literature in the Indian context has placed almost sole emphasis on mother-specific variables, while pertinent characteristics of the father and other household members have been relatively ignored. Our study tries to address this gap in the literature in the Indian context by showing that the education of father and other household members has significant positive effects on child's nutritional status.

3. Policy Implications

The findings in the previous section demonstrate that child's nutritional status is positively and independently associated with mothers', fathers' and other household members' education. There are two implications for nutrition policy emerging from this research. First, it underscores the importance of the Government's existing efforts to universalize elementary education and launch adult literacy programmes. Second, policies currently aimed at improving child nutrition must widen their focus beyond

mothers to include other household members as well. Now that a growing number of women in India are taking up employment outside the household, other household members such as grandmothers and older siblings are likely to play an increasingly active role as caretakers. Therefore, more investment in education sector must be a policy priority for the government.

References

[1] Burchi, F. (2012): "Whose education affects a child's nutritional status? From parents' to household's education", *Demographic Research*, 27, article 23, 681-704.

[2] Fotso, J.C. (2007): "Urban–rural differentials in child malnutrition: Trends and socioeconomic correlates in sub-Saharan Africa", *Health & Place*, 13: 205–223.

[3] Gaiha, R. and Kulkarani,V. (2005): "Anthropometric Failure and Persistence of Poverty in Rural India", *International Review of Applied Economics*, 19:2, 179-197.

[4] Kandpal, E. and McNamara, P.E. (2009): "Determinants of Nutritional Outcomes of Children in India: A Quantile Regression Approach", *Selected Paper prepared for presentation at the Agricultural & Applied Economics Association 2009 AAEA & ACCI Joint Annual Meeting, Milwaukee, Wisconsin.*

[5] Lokshin, M. and Radyakin,S. (2009): "Month of Birth and Children's Health in India", *The World Bank, Policy Research Working Paper Series: 4813.*

[6] Mishra, V. and Retherford, R.D. (2007): "Does biofuel smoke contribute to anaemia and stunting in early childhood?", *International Journal of Epidemiology*, 36: 117–129.

[7] Radhakrishna, R and Ravi, C. (2004): "Malnutrition in India: Trends and Determinants", *Economic and Political Weekly*, 39: 671-76.

[8] Smith, L.C., Ruel, M.T. and Ndiaye, A. (2005): "Why Is Child Malnutrition Lower in Urban Than in Rural Areas? Evidence from 36 Developing Countries", *World Development*, 33 (8): 1285–1305.

[9] Srinivasan, K. and Mohanty, S.K. (2008): "Household Deprivation and Its Linkages with Reproductive Health Utilisation", *Economic and Political Weekly*, 43*:* 67-76.

[10] Svedberg, P. (2000): "Poverty and Undernutrition: Theory, Measurement, and Policy", Oxford: Oxford University Press.

[11] UNICEF (2013): "The state of the world's children: Children with disabilities", New York.

[12] WHO (1995): "Physical status: The use and interpretation of anthropometry", Report of a World Health Organization Expert committee, *WHO Technical Report Series 854*, Geneva.

[13] WHO (2006): “WHO Child Growth Standards: Length/height-for-age, weight-for- age, weight-for-length, weight-for-height and body mass index-for-age, Methods and development”, Geneva.

[14] Aiga, H., S. Matsuoka, C. Kuroiwa and S. Yamamoto (2009): “Malnutrition among children in rural Malawian fish-farming households”, *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 103: 827—833.

[15] Burchi, F. (2012): "Whose education affects a child’s nutritional status? From parents’ to household’s education”, *Demographic Research*, 27, article 23, 681-704.

[16] Fotso, J.C. (2007): “Urban–rural differentials in child malnutrition: Trends and socioeconomic correlates in sub-Saharan Africa”, *Health & Place*, 13: 205–223

[17] Gaiha, R. and V. Kulkarani (2005): “Anthropometric Failure and Persistence of Poverty in Rural India”, *International Review of Applied Economics*, 19:2, 179-197.

[18] Haddad, L. (1999): “Women’s Status: Levels, Determinants, Consequences for Malnutrition, Interventions, and Policy”, *Asian Development Review*, 17 (1,2): 96-131.

[19] International Institute for Population Sciences (IIPS) and Macro International (2007): *National Family Health Survey (NFHS-3), 2005-06: India:* Volume I, Mumbai: IIPS.

[20] Kandpal, E. and P.E. McNamara (2009): “Determinants of Nutritional Outcomes of Children in India: A Quantile Regression Approach”, *Selected Paper prepared for presentation at the Agricultural & Applied Economics Association 2009 AAEA & ACCI Joint Annual Meeting, Milwaukee, Wisconsin.*

[21] Lokshin, M. and S. Radyakin (2009): "Month of Birth and Children's Health in India", *The World Bank, Policy Research Working Paper Series: 4813.*

[22] Menon, P. (2012): “Childhood Undernutrition in South Asia: Perspectives from the Field of Nutrition”, *CESifo Economic Studies*, 58: 274–295.

[23] Menon, P., P. Bhagowalia, A.R. Quisumbing and V. Soundararajan (2012): “What Dimensions of Women’s Empowerment Matter Most for Child Nutrition?”, *International Food Policy Research Institute, Discussion Paper 01192.*

[24] Mishra, V. and R.D. Retherford (2007): “Does biofuel smoke contribute to anaemia and stunting in early childhood?”, *International Journal of Epidemiology*, 36: 117–129.

[25] Moestue, H. and S. Huttly (2008): “Adult education and child nutrition: the role of family and community”, *Journal of Epidemiology and Community Health*, 62: 153–159.

[26] Radhakrishna, R and C. Ravi (2004): “Malnutrition in India: Trends and Determinants”, *Economic and Political Weekly*, 39: 671-76.

[27] Raj, A., N. Saggurti, M. Winter, A. Labonte, M.R. Decker, D. Balaiah and J.G. Silverman (2010): "The effect of maternal child marriage on morbidity and mortality of children under 5 in India: cross sectional study of a nationally representative sample", *BMJ* 2010;340:b4258.

[28] Smith, L.C., M.T. Ruel and A. Ndiaye (2005): "Why Is Child Malnutrition Lower in Urban Than in Rural Areas? Evidence from 36 Developing Countries", *World Development*, 33 (8): 1285–1305.

[29] Srinivasan, K. and S.K. Mohanty (2008): "Household Deprivation and Its Linkages with Reproductive Health Utilisation", *Economic and Political Weekly*, 43*:* 67-76.

[30] Svedberg, P. (2000): "Poverty and Undernutrition: Theory, Measurement, and Policy", Oxford: Oxford University Press.

[31] UNICEF (1990): "Strategy for improved nutrition of children and women in developing countries", *UNICEF Policy Review Paper*, New York.

[32] UNICEF (1998): "The state of the world's children 1998: Focus on nutrition", New York.

[33] UNICEF (2011): "The state of the world's children: Adolescence an age of opportunity", New York.

[34] UNICEF (2012): "The state of the world's children: Children in an urban world", New York.

[35] UNICEF (2013): "The state of the world's children: Children with disabilities", New York.

[36] WHO (1995): "Physical status: The use and interpretation of anthropometry", Report of a World Health Organization Expert committee, *WHO Technical Report Series 854*, Geneva.

[37] WHO (2006): "WHO Child Growth Standards: Length/height-for-age, weight-for- age, weight-for-length, weight-for-height and body mass index-for-age, Methods and development", Geneva.