



2009/ED/EFA/MRT/PI/16

Background paper prepared for the
Education for All Global Monitoring Report 2009

Overcoming Inequality: why governance matters

Linkages between Nutrition, Ill-Health and Education

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2008

This paper was commissioned by the Education for All Global Monitoring Report as background information to assist in drafting the 2009 report. It has not been edited by the team. The views and opinions expressed in this paper are those of the author(s) and should not be attributed to the EFA Global Monitoring Report or to UNESCO. The papers can be cited with the following reference: "Paper commissioned for the EFA Global Monitoring Report 2009, Overcoming Inequality: why governance matters" For further information, please contact efareport@unesco.org

Linkages between Nutrition, Ill-Health and Education

UNESCO 2009 Global Monitoring Report Background Paper

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Introduction

Early childhood development is influenced by a number of factors, most notably health and education. Both of these areas are important not only for their intrinsic importance, specifically the health of the child, but also for their instrumental importance in terms of later life productivity and contribution to the economy. This paper will discuss the linkages between health and education in young children. It has three sections. The first section examines the impact of nutrition and health status on educational outcomes, both in the short and long-term. The second section discusses the impact of educational disadvantage on health, specifically looking at the importance of women's education and agency on ensuring child welfare. The third section focuses on three approaches to early childhood care and development; those that aim to improve women's status (1), to increase purchasing power at the household level (2), and to increase nutritional intake and educational performance of school-age children (3).

The Impact of Health on Cognitive Development and School Participation

Health has effects on cognitive development and school participation in both the short and long-term. In the short-term, poor health can lead to poor participation, irregular attendance and high rates of school drop-out. In the long-term poor health can lead to a decrease in wages earned and productivity.

In the short-term, improved health can have a dramatic effect on education, especially early in life through two pathways. First, better child health improves school attendance, cognitive ability and learning. Miguel and Kremer (2004) found that deworming of children in Kenya increased school attendance. Second, a lesser chance of child mortality and a higher chance of survival into adulthood increase the incentives both for children and for

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parents to invest in education. Bils and Klenow (2000) find an effect of life expectancy on investments in education at the national level.

In terms of the first pathway, ill health leads to problems of three types. First, due to inadequate nutrition and ill health either in utero or early in life, children are unprepared to attend school. Cao et al. (1994) note that cretinism which can be avoided by iodised salt to mother is the most common preventable cause of mental retardation worldwide. Bleakley (2003) notes that parasitic worm diseases, which are most common in children, have effects on school attendance, literacy and physical development. Second, due to illness caused by helminthic infections, micronutrient deficiencies, and chronic protein malnutrition, children fail to learn at school. For example, vitamin A deficiency contributes to measles mortality and diarrhoeal illness and is the leading cause of preventable child blindness in developing countries (Sommer & West 1996). Similarly, iron deficiency results in impaired cognitive development and lowered school achievement (Grantham-McGregor & Ani 2001). Third, in many contexts, there is unequal participation of girls in schools due to the intertwining of biological and cultural forces. For example, menstruation exacerbates iron-deficiency anaemia while early marriage and then pregnancy increases the nutritional demands. In addition, when illness strikes families, girls are more likely to discontinue their studies to assume household chore duties and care for younger siblings.

Improving child health also has a significant impact on long-term welfare through improving educational outcomes. Schultz (2002) argues that each centimetre gain in height due to improved inputs as a child in Ghana and Brazil leads to a wage increase of between 8 and 10% (Strauss & Thomas 1998 provide survey). Bleakley (2007) examines the effect of childhood exposure to malaria on income level as adults in USA, Mexico, Columbia and Brazil and finds very large effects: the removal of malaria increased adult earnings by around 50%. Cutler et al (2007) looks at a DDT eradication program in India in the 1960s and finds a significant effect on the educational outcomes of children who avoided exposure to malaria due to the programme. Horton and Ross (2003) estimate that income foregone due to iron deficiency ranges from 2% of GDP in Honduras to 7.9% in Bangladesh. The World Bank has noted that aggregate production functions suggest that a nine-year increase in the average education of the workforce can raise output 13% and that the increased

educational level can contribute around 25% of the increase in economic output (World Bank 1997). In agriculture, education helps increase output, primarily by increasing the adoption of new technologies and farming practices. Thus, improved child health has significant impact both in terms of short and long-term welfare through increasing educational achievement of school-age children.

The Impact of Educational Disadvantage on Health

Section one has discussed the impact of health and nutritional status on cognitive development and school participation. This section will examine the impact of education on health and nutritional status with a specific focus on the role of women's agency in translating educational opportunity into enhanced public health. It will focus first on the importance of women in ensuring child health, then turn to the role of education in empowerment.

Much attention is paid to development of household purchasing power; however, due to intrahousehold processes, this indicator is not necessarily the best method to assess childhood health. Conventional development theory and practice assume that if men's wages are increasing, all of the household members will be better off. However, studies in South Asia have shown that improvements in welfare depend not only on the levels of income, but also on who earns it, since men and women spend differently. Women spend a high proportion of their income on food and health care for children while men often use their wages for personal expenditure. In India, women relative to men are less likely to spend their earnings on themselves. Women's incomes are indeed more strongly associated with improvements in children's health and nutritional status.

Joan Mencher's (1988) study in India substantiates this claim by comparing earnings versus contributions to household maintenance between women and men. Throughout Tamil Nadu, the amount women contribute (contribution/earning) varies from 95 to 99% compared to men who give 62 to 91%. While the ratio of women to men's earnings varies from 0.45 to 0.71, the ratio of women to men's contribution varies from 0.57 to 1.94. In some instances in Tamil Nadu, women must even contribute to their husbands' personal expenses such as betel leaf chewing or smoking in addition to household maintenance.

During my own research on this topic, one woman said, 'Men play cards all day then demand money from the women and beat them' (Sridhar 2008). Studies in South Asia by Barbara Miller (1992) and Joel Gittelsohn (1991) show that additional female income results in superior nutritional outcomes for women and men, while additional male income only benefits the men. Duncan Thomas (1990) shows that the probability that a child will survive in Brazil is 20 times higher when the income is controlled by the women rather than the men of the household. Women are indeed the key to child health and nutrition

While several economic explanations have been given for the positive effect of women's income, there is evidence to suggest that this might be a direct consequence of assigned gender roles based on cultural and societal norms. In India, among the many cultural definitions of the female, one is her association with the inside, the home and courtyard where she must care for her family while in contrast, men belong outside, in the fields and bazaar where livelihoods are earned and economic and political power are wielded (Bennett 1992). A 'good woman' is constructed as someone who sacrifices her own interests for her family and children. When she is not working, she must spend most of her time caring for her children and maintaining the household. Women are seen as on the inside, not full members of public life.

A man, in contrast, must spend his earnings on role-maintaining activities and appearances in social settings, such as sitting in teashops, drinking alcohol, smoking, and wearing nice clothes. He must be 'in society', earning money and paying tax. Men are not necessarily negatively inclined towards their children. Rather, this behaviour is in line with their perceived 'nature.' As one Tamil man stated, 'It is part of being a man', or as another one justified, 'It's always been this way.'

Thus women must take full responsibility for the health of their children, as well as go to work and earn money in the public sphere often in poorly paid and insecure occupations. In many parts of India, it is predominantly lower caste women who work. While it has been argued that 'work strengthens a woman's position. The woman who works can command respect in her home and can raise her voice in any decision'(Ibrahim 1985), evidence exists that working women have less time for child care. Ghosh et al. (2006) examine the effect of

maternal factors (mother's age, number of live births, birth interval, and mother's work status) and sex of the infant on the duration and bout frequency of breastfeeding in a 27-month longitudinal study of 140 Bangladeshi mothers. The authors discovered that housewives consistently showed greater breastfeeding duration and bout frequency than women in paid employment. Maternal work status was the main factor associated with the duration and frequency of breastfeeding. Similarly, Sivakami (1997) examined the linkage between mothers' work and child health in Tamil Nadu and found that working women spend on average 1.7 hours less than non-working women on child care. The duration of breastfeeding is also shorter. In addition, children of working women were at a significantly greater risk of morbidity even when socio-economic factors were controlled for. Thus while employment might reduce gender inequality, it increases the burden on women for child care through reducing the limited resource of time. The solution to this problem is not to discourage women from outside employment, but rather to promote education so that later in life, women are able to obtain higher quality employment with security (in contrast to daily labour) and access to child-care facilities. For example, the NGO MobileCrèche in India partners with private construction companies in New Delhi to provide a 'crèche' at the construction site. The proximity of the 'crèche' allows women to breastfeed during breaks, and for children over six months, the crèche provides supplementary meals, preschool education, and a safe environment for children to play.

In addition, women's education can lead to an increase in household welfare. Educated women are better able to negotiate their position within the household and improve their status. Sen and Sengupta (1983) demonstrate in their study that children of literate mothers had higher nutritional intakes than children of nonliterate mothers. However, it is not just about providing education, but also when the education is most effective. Timing is important. Similar to the 'window of opportunity' for childhood nutrition (children 6-36 months), education is most important for school-age children relative to later in life.

In addition, the schooling of girls can lead to a reduction in fertility, infant mortality rate, child mortality rate, improve household health by influencing nutritional and health care practices and improve children's school performance (World Bank 1997). A mother's schooling of one to three years is associated with a 20% fall in the risk of childhood death.

Bourne and Walker (1991) show that there is a strong relation between mothers education and various measures of child mortality, and that there is a greater effect on the survival of daughters than on sons. Why? Dasgupta (1990) argues that early life education improves a mother's basic child-care skills, domestic management of ill health, efforts at preventive care and use of modern medical services. For example, the NSS (1986-87) showed that the percentage of rural mothers registered for postnatal care in India increased with schooling level, and this positive association also existed for immunisation rates.

As noted above, education also has an effect on fertility rates. When fertility rates fall, there are fewer children in the family and thus children receive higher investments in the form of schooling and parental attention. There is much cross-country evidence that increased schooling is positively associated with reduced fertility. This is due to intervening factors linked to education such as a delayed age at first marriage, modern methods of birth control, and higher likelihood of child survival. Studies by Caldwell (1980) and Hinchliffe (1986) show that the proportion of the community receiving some education, rather than the average duration of schooling of those who have attended school, is the chief determinant of when a society undergoes a fertility transition thus lending support to the necessity of mass primary education. In fact, within each state in India, there is an inverse relation between level of schooling and desired/actual fertility rate, and in states with higher schooling levels, such as Kerala and Tamil Nadu, fertility rates are lower at each level of schooling than in states with lower schooling levels.

Strategies to Address Early Childhood Care and Development

As the above two sections have discussed, health and education exist in a dynamic relationship resulting in inter-generational poverty traps that are difficult to break. While there is general agreement among experts and policy-makers that ill health and poor educational attainment need to be addressed early in a child's life, often referred to as the 'window of opportunity', there is a lack of consensus on how to go about addressing the problem. This section will examine three approaches to addressing early childhood care and development: those that aim to improve women's status (1), to increase purchasing power at the household level (2), and to increase nutritional intake and educational performance of school-age children (3).

As noted in section two, women are the key to child health and nutrition. However, gender inequality both within and outside the household constrains women's ability to care for their children. To address this limitation, women's groups have been introduced in India. Women's groups usually consists of 10-15 women who meet regularly to discuss common problems, undertake collective action, and conduct saving and lending activities (Kumar 2007). When about 30% of the poor in a village are involved in a group, the groups come together to form a federation. During my own research in India, women's groups struck me as extremely important because they are an affordable entry point for general education that has a beneficial impact on the health and quality of life for women and children (Sridhar 2008). Discussion is usually focused on legal rights, economic activities (e.g. microfinance), and overcoming disadvantage. This must be distinguished from nutrition education which focuses on a more narrow set of topics such as quantity and quality of diet, vitamins, and breastfeeding. A discussion about women's groups with Dr. Anthony Costello, a Professor of Child Health at University of London, revealed that he has found significant positive health effects of women's groups in Nepal (Manandhar et al. 2004). His research project in Nepal has shown that birth outcomes in rural populations improved greatly with the formation of women's groups. For example, the maternal mortality rate was 69 per 100,000 in areas which had women's groups, compared with 341 per 100,000 in areas that did not. Costello has since launched self-help groups in two parts of India, in another area of Nepal and in Malawi.

In addition to the education benefits, an aspect that might account for the positive changes associated with women's groups is that working groups can result in co-operation and collectivity in domestic work and child care between households. If one mother engages in productive work, another may help her with child care. Child care is a major issue not only for women but also for school-age children. Older siblings are often kept home from school to care for younger children when parents are at work. In fact, the presence of children under five in the household was associated with a lower possibility of school enrolment for older children in each of five countries studied by Heymann and Barrera (2008). 42% of low-income single working parent families in Brazil and 37% of low-income single working parent families in Mexico who had an infant to five year old in the household also had at least one

school-age child not enrolled in school. Thus provision of some form of child care arrangements, either through women's groups or through other mechanisms, is extremely important not only to free up women's time to pursue economic opportunities but also to ensure that school-age children can attend school.

The second approach focuses on economic constraints on behaviour. As Amartya Sen (1981) and the UN Task Force on Hunger (2005) have independently noted, purchasing power at the household level must be increased. To support this type of strategy, studies have been conducted, such as by Save the Children UK (2007), which look at the minimum cost of a healthy diet. Save the Children UK undertook this research to examine whether poor communities are able to feed their children adequately with the quantity and quality of dietary intake necessary for healthy growth. In particular, they attempted to determine the minimum cost and affordability of a diet for the household by taking into account seasonal and local variations in availability and price of food. The four study locations were Bangladesh, Myanmar, Ethiopia and Tanzania. The report found that an adequate diet remains unaffordable for large proportions of the populations in all four study communities. Using these findings, the report concludes that poverty is a significant cause of endemic undernutrition and that strategies to address undernutrition might address economic constraints that limit access to food.

Given the findings outlined above, it is apparent that there needs to be increased attention by nutrition and education policy-makers to economic conditions that constrain household behaviour. This can be addressed through several strategies: economic growth (macroscale), improved water and sanitary infrastructure (macro and microscale) and conditional cash transfers (microscale).

The first strategy is that economic growth and improved material standard of living will have a greater impact on child welfare, reflected in nutritional status (Sridhar 2007), than any direct intervention. Economic growth appears to be a necessary but insufficient condition for poverty reduction. However, economic growth has only a marginal effect on undernutrition in conditions of high inequality or where the growth primarily benefits richer households. This is apparent when examining child undernutrition rates since India's 1993

economic liberalization. While the economic growth rate has been on average 8 to 9% per annum since it began, the 2005-2006 National Family Health Survey data reveals the lack of significant reduction in child wasting and stunting. Proposed hypotheses for the lack of impact are that the growth is occurring in certain urban centres (e.g. Bangalore) among the educated middle class, not in villages where the heart of the undernutrition problem is located. Thus economic growth has limited effect unless specifically targeted at the poor.

An additional limitation of economic growth is that poverty reduction at the household level, in certain situations, has only a marginal effect on child undernutrition. This has been captured by the construct 'caloric-income elasticity (CIE)' which is the responsiveness of individual caloric intake to household income, and the associated issue of responsiveness of health, and anthropometrics, to extra calories so obtained. This has been an issue of great debate as CIE estimates have ranged from 0.7-0.8 in the 1970s, to 0.1-0.2 in the 1980s, to 0.35-.0.45 in the 1990s. The lower the CIE, the more risk that household poverty reduction, while having long-term effects, will be too slow to avoid serious undernutrition and permanent damage for many children. Part of the explanation for this is that any increases in purchasing power which raises a household out of poverty occurs through the head of the household (predominantly male) who does not spend his income to improve the welfare of the children, thus illustrating the importance of strategies to address intrahousehold distributive processes.

Other than economic growth, improved water and sanitation infrastructure has an enormous impact on child welfare yet is not traditionally associated with health or education programmes. Improving infrastructure in these two areas affects child health through two pathways: a reduction in disease and a reduction for mothers in water-collection activities leaving more time for child care. Water-borne diseases are a major cause of childhood illness. For example, Minamoto et al. investigated the effect of contaminated water on acute childhood malnutrition through carrying out a survey of 761 children in two discrete rural areas of Bangladesh. The authors discovered that children living in households with contaminated water were significantly more wasted than children living in noncontaminated households (mean difference= -0.361, $p < .001$). The difference

remained highly significant even when taking into account differences in socio-economic status and prevalence of geo-helminths.

As the above study shows, at the individual level, health status is as important as dietary intake in the manifestation of undernutrition (see Sridhar 2008). The small body size found in countries like India is an outcome of both undernutrition and infectious disease which exist in a synergistic relationship. Infection exacerbates undernutrition. In many developing countries, including India, many children experience lower efficiency in nutrition absorption and utilisation by the body due to the endemic frequency of infectious gastrointestinal episodes leading to diarrhoea, as well as upper and lower respiratory infections. Intestinal dysfunction can cause up to 9% reduced absorption of nutrients. Mouth lesions and anorexia also result in reduced food intake. Diarrhoea results in lower intake of food because of the loss of appetite and the withholding of food by caregivers. It is, in fact, the most important non-dietary cause of growth faltering in growth children in developing countries. Children and infants in developing countries spend 15 to 20% of their time suffering from morbidity, and since infections result in increased energy needs for fever and tissue repair, most of the body's resources are devoted to basic maintenance. The energy spent fighting infections comes at a cost to body weight; 1% of body weight is lost daily during episodes of diarrhoea and fevers.

Similarly, undernutrition increases susceptibility to infection by reducing the capacity to fight disease. About half of all child deaths occur because of caloric deprivation, which prevents children's immune systems from effectively resisting even common childhood ailments. These diseases include diarrhoea, measles, malaria, and respiratory infection which, in total, account for one-third of the deaths of children under age five globally. Even mildly underweight children are twice as likely to die prematurely as children who have normal weight. Thus, improving water and sanitation can have a significant impact on child undernutrition rates through a reduction in childhood illness.

While promoting pro-poor economic growth and infrastructure development might well be effective avenues, both of these strategies are slow. Economic growth is estimated to take many years to affect the poorest people in developing countries. For example, an analysis by

the World Bank (2006) shows that at realistic levels of sustained per capita GDP (3% for India), and using an elasticity figure (change in malnutrition rates relative to per capita income growth) of -0.5, it would take until 2035 for India to achieve the nutrition Millennium Development Goal (MDG).

Given the long-term nature of economic growth and improved infrastructure, short-term interventions in the form of conditional and unconditional cash transfers have been implemented to increase the purchasing power of households, thus enhancing food security (Sridhar & Duffield 2006). The most well-known conditional cash transfer programme is Mexico's PROGRESA (Programa de Educación, Salud y Alimentación) which has been renamed Oportunidades. PROGRESA's objectives are to improve the health and nutritional status of all members of poor households, especially mothers and children, as well as to improve school enrolment, attendance and educational performance. PROGRESA supports families living in extreme poverty through both supply (provision of services) and demand (increase capability of households to obtain services) side interventions in education, health and nutrition. Cash transfers are disbursed conditional on the household engaging in a set of behaviours designed to improve health and nutrition. The size of the cash transfer is large, at US\$13 per household per month in 1999 which is on average one-third of the household income of the beneficiary family. The transfer is received every two months through an electronic card given to the mother.

Transfers are conditional on the families fulfilling certain requirements. First, every family member has to receive preventive health services. Carers of children aged less than 60 months are required to take the child to the clinic every two months for growth monitoring, immunisations and health education. Each month, children aged 4-24 months and pregnant and lactating women are given 30 nutritional supplements containing 100% of recommended daily micronutrient requirement and 20% of recommended energy requirement. All adult household members (including men) have to participate in regular meetings at which health, hygiene and nutrition issues and best practices are discussed with nurses and physicians. Targeting is first done geographically then at the household level. Households do not have to apply, but are informed that they are eligible, using door-to-door methods.

The PROGRESA evaluation shows a significant increase in nutrition monitoring and immunisation rates. Infants under three-years old participating in the programme increased their growth monitoring visits between 30 and 60% and beneficiaries aged 0 to 5 had a 12% lower incidence of illness compared to non-PROGRESA children. The data also suggest that PROGRESA has had a significant impact on increasing child growth. Children aged 12 to 36 months grew, on average, 1cm more than the control group children over a 12-month period. The population prevalence of stunting has been reduced by nearly 10%.

Food consumption levels have also increased. Households receiving PROGRESA benefits in treatment localities obtained approximately 7% more calories than did comparable households in control localities. The increase in household consumption was driven by higher expenditures on fruits, vegetables and animal products.

The primary characteristic of PROGRESA is that it provides households with a large and regular source of income. Since such transfers are made to women, they improve their status both within the community and the household. In addition, as noted earlier, women are more likely to spend their income on food and health care for children than are men. PROGRESA's targeting is transparent and fair. Coverage is high: 76% of households in the selected areas were targeted for cash transfers and of these 97% took up the programme. The final aspect is that for PROGRESA, the Government of Mexico funded 100% of the programme and controlled its development from the beginning. There was no donor or foreign influence on the project. The project was really owned by the government.

Another distinguishing feature of PROGRESA is that all members of the household are required to attend health education classes. Men are also targeted and made responsible for the health of their household. This sort of framework has been termed 'responsible paternity' by Irene Tinker which she defines as the awareness of men of their role in the care and education of their children. Health and nutrition projects must take into consideration the fact that men are household decision-makers in much of the world and ensure that they are targeted, as much if not more so than women, to take responsibility for

the members of their household. If projects aim to reshape, rather than reproduce, gender roles, then perhaps gender inequality and the burden of women can be slightly reduced.

The significant effect of PROGRESA on child nutritional status is not unique for a cash transfer scheme. A similar programme in Nicaragua, Red de Protección Social (RPS) resulted in a significant decline in underweight children from 15.3 to 10.4% and prevalence of stunting from 41.9 to 37.1% over two years. In Brazil, the Bolsa Alimentação (BA) increased beneficiary household food expenditure by 9%. In Colombia's Programa Familias en Acción (PFA), food consumption increased in beneficiary households by 19% and 9% in rural and urban households respectively. There was a significant increase in consumption of protein-rich foods, cereals, fats and oils, and fruits and vegetables. In addition, heights increased on average 0.44cm for children aged 0 to 12 months over a one-year period. Finally, in Zambia, the Kalomo District Social Cash Transfer Scheme decreased the prevalence of underweight children aged 0 to 5 years from 41 to 33% over 12 months.

Thus, cash transfer schemes have the potential to improve children's diet and nutritional status through increasing purchasing power at the household level. While I am not claiming that they are the 'silver bullet' and further research is necessary before final conclusions, the reported positive outcomes of these schemes indicate promise and potential. Aside from their nutritional effects, conditional cash transfer schemes have also increased enrolment in schools through the condition of school attendance in order for households to receive the benefit. Thus, the incentives are increased for parents to send their children to school instead of sending them to earn money or to take care of younger siblings.

The third strategy to break the inter-generational poverty trap focuses on feeding programmes in schools, such as the Mid-Day Meal Scheme in India which focus on tackling both child health and education. In particular, feeding programmes increase the incentives for parents to send their children to school and thus can improve school participation both in terms of enrolment and attendance. In addition, these programmes can improve levels of learning by increasing attention levels of children through eliminating feelings of hunger during the school day. Studies have shown that school feeding does improve immediate nutritional intake of children (Jacoby 2002, Afridi 2005) and school participation rates (Drèze

& Goyal 2003, Vermeesch & Kremer 2004). There is little evidence about the effect of feeding schemes on long term nutritional status, thus they have been primarily depicted as educational schemes. In addition, feeding schemes for school-age children miss the 'window of opportunity' for addressing child undernutrition: children 6-36 months old.

The Mid-Day Meal Scheme in India originated in Tamil Nadu and initially offered a school meal originally for children between 5 and 14 years. It was later extended to children from two years onwards, to those over 60 years of age, and to destitute widows and people with disabilities. It provides a hot meal consisting of rice, *sambhar* (tomato and lentil soup with spices), different vegetables and regular supplements. This was a scheme created not just for nutrition but also to increase school enrolment, to create jobs, and to improve social welfare in the state. As an educational tool, it raises the incentives for parents to send their children to school. It also increases the attention span and learning capacity of children who have been shown to perform badly when feeling hungry. As an employment scheme, it attempts to create income-earning opportunities for socially excluded individuals such as those who are low caste, destitute widows, and women. Social welfare may be advanced by breaking down caste and gender boundaries through the sharing of food at school. In terms of this goal, the mid-day meal scheme has been disappointing as *Dalit* participation has been weak (Drèze & Goyal). Factors influencing *Dalit* participation include the locality in which mid-day meals are served in terms of village caste geography as well as the inclusion of *Dalit* cooks.

The mid-day meal scheme was expanded to the national level over 20 years later. On 17 November 2004, the Supreme Court of India ruled that, 'Every child eligible for cooked meal under the mid-day meal scheme, in all States and Union territories, shall be provided with the said meal immediately, and in any case, not later than January, 2005.' Many states, especially Bihar, Uttar Pradesh, Assam, Jharkand, and Jammu and Kashmir have struggled to comply with this deadline. Even among the states that implemented the mid-day meal scheme, as of 2004, Tamil Nadu has been the only state to feed all school children for the entire week. Dr. Venkatasubramanian of the central Planning Commission and former Director of Education recounts, 'When I submitted a proposal to the Chief Minister...that we could provide meals to every school-going child from Monday to Friday, the Chief

Minister had remarked, 'As Director of Education, Mr. Venkatasubramanian has suggested mid-day meals on the working days Monday to Friday for all. But the Director of Education forgets that though schools do not function on Saturdays and Sundays, the stomach functions all the seven days' (Venkatasubramanian 2004).' As a result of the Chief Minister's insistence, the mid-day meal scheme in Tamil Nadu provides food every day of the week, including Saturdays and Sundays.

Conclusion

This paper has reviewed the linkages between child health, particularly nutritional status, and education. Given the close relationship of health and education, strategies to improve either of these issues need to incorporate an integrated approach to early child development. While the Millennium Development Goals should be duly credited for increasing global attention to human development, since the indicators are issue specific, there is a tendency to pursue vertical strategies within each of the targets. All too often in public policy, the human development agenda is splintered into education vs. health vs. nutrition where experts and practitioners in each respective issue area do not link up together. The irony of nutrition experts doing nutrition, and education experts doing education, is that the policies that have the most impact on improving nutrition are often in the realm of education and social protection, while the policies that have significant impact on education are in the realm of health and nutrition. Ultimately child undernutrition cannot be addressed without attention to education and vice-versa.

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