

Tackling Child Malnutrition in Ethiopia:

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Preface

This paper is one of a series of Young Lives Project working papers, an innovative longitudinal study of childhood poverty in Ethiopia, India (Andhra Pradesh State), Peru and Vietnam. Between 2002 and 2015, some 2000 children in each country are being tracked and surveyed at 3-4 year intervals from when they are 1 until 14 years of age. In addition, 1000 older children in each country are being followed from when they are aged 8 years.

Young Lives is a joint research and policy initiative co-ordinated by an academic consortium and Save the Children UK, incorporating both inter-disciplinary and North-South collaboration. In Ethiopia the research component of the project is housed under the Ethiopian Development Research Institute, while the policy monitoring, engagement and advocacy components are led by Save the Children UK, Ethiopia.

Young Lives seeks to:

- produce long-term data on children and poverty in the four research countries
- draw on this data to develop a nuanced and comparative understanding of childhood poverty dynamics to inform national policy agendas
- trace associations between key macro policy trends and child outcomes and use these findings as a basis to advocate for policy choices at macro and meso levels that facilitate the reduction of childhood poverty
- actively engage with ongoing work on poverty alleviation and reduction, involving stakeholders who may use or be impacted by the research throughout the research design, data collection and analyses, and dissemination stages
- foster public concern about, and encourage political motivation to act on, childhood poverty issues through its advocacy and media work at both national and international levels.

In Ethiopia, the project has received financial support from the UK Department for International Development and Canada's International Development Research Centre. This support is gratefully acknowledged.

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Abstract

This paper emphasises that malnutrition cannot be tackled without understanding its causes. Child malnutrition remains a major public health problem in Ethiopia, yet the government has no specific nutrition policy. Levels of wasting (acute malnutrition) and stunting (chronic malnutrition) in children aged six to fifty-nine months are among the world's highest. As long as so many children remain malnourished, Ethiopia will not achieve the first Millennium Development Goal – eradication of extreme poverty and hunger.

Drawing on a sample of 1,999 one-year-olds from twenty sentinel sites, the Young Lives Project has sought to better understand the child, household, community and policy level determinants of malnutrition and the ways in which they differ across different regions of Ethiopia. The paper quantifies the impact of poverty, healthcare and caring practices and challenges the World Bank belief that investment in growth monitoring to promote change in caregivers' behaviour will, by itself, significantly improve nutritional status.

Coverage of health services may have expanded, but limited and costly services discourage users. Healthcare choices primarily depend not on proximity to health facilities but lack of quality services. Respondents complained about inadequate equipment, poorly trained and/or insensitive medical staff and expensive medication.

The following measures would contribute significantly to tackling child malnutrition:

- training more nutritionists to work alongside other health professionals
- training to make health workers more sensitive and monitoring levels of user satisfaction
- introducing therapeutic feeding in clinics
- concerted efforts to ensure that essential quality drugs are available and health personnel know how to administer them
- a streamlined system to allow certified poor households to receive free medical care
- action to eradicate harmful practices – such as removal of milk teeth and the uvula - carried out by traditional healers
- inclusion of specific nutritional indicators in Ethiopia's new Poverty Reduction Strategy Paper so that a designated agency can be held accountable for progress to improve child nutrition.

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I. Introduction

I.1 Child malnutrition as a major public health problem

Most causes of child mortality in developing countries are preventable. Malnutrition alone is responsible for over half the under-five-year-old deaths in developing countries, making it one of the most important public health problems in the developing world (Pelletier, 1994; Shangvi and Murray, 1997).¹ Child malnutrition in Ethiopia constitutes a particularly daunting challenge as the country had a 17 percent under-five mortality rate in 2001, of which an estimated 57 percent was linked to severe and mild to moderate malnutrition.² National data from 1999–2000 show that wasting (acute malnutrition) and stunting (chronic malnutrition) in children aged six to fifty-nine months were 9.6 and 56.7 percent respectively (Ministry of Finance and Economic Development – MoFED, 2002a, 2002b).³

These figures are among the highest in the world and are severe even by sub-Saharan African standards (World Bank, 2004).⁴ Survivors of child malnutrition can suffer from impaired physical development and limited intellectual abilities, which in turn may diminish their working capacity during adulthood and have negative effects on national economic growth (Alderman *et al*, 2004; Alderman *et al*, 2003). Child malnutrition may also lead to higher levels of chronic illness and disability in adult life which may have intergenerational effects as malnourished females are more likely to give birth to low-weight babies (Silva, 2005). Inability to reduce the prevalence of malnutrition in children under five will lead to non-achievement of one of the key targets of the first Millennium Development Goal, eradication of extreme poverty and hunger.

In recent years Ethiopia has only had limited success in reducing the prevalence of child malnutrition. In the case of wasting, the rate increased slightly from 9.2 percent to 9.6 percent between 1995 and 2000. However, the proportion of severely wasted children declined by 47.1 percent (from 3.4 percent to 1.8 percent) over the same period. Much of this change can be accounted for by change in rural areas where severe wasting was halved. Disaggregating by gender, the data indicates that girls were better off in 1999–2000 while males fared better in 1995–96 in terms of both wasting and severe wasting.⁵

1 A recent estimate in Black *et al.* (2003) shows that an estimated 53 percent of child deaths per year are attributable to being underweight.

2 This challenge is further exacerbated by the fact that Ethiopia is one of the least developed countries in the world as measured by the (Purchasing Power Parity) per capita GNP or the Human Development Index (World Bank, 2004; UNDP, 2002). Some 44 percent of the Ethiopian people live below the poverty line (MoFED, 2002a). The food poverty line used in the SDPRP is based on a basket providing 2,200 kcal per adult equivalent per day. After adjusting for the non-food component the total poverty line (both food and non-food) was estimated at 1,075 Birr in 1995/96 (MoFED, 2002b).

3 The findings of the Ethiopia demographic and health survey 2000 (CSA and ORC Macro, 2001) also show that 51.5 percent of children under five were stunted (low height compared to standard heights for their age), 10.5 percent were wasted (low weight for their height) and 47.2 percent were underweight (low weight for their age).

4 In sub-Saharan Africa the average incidence of underweight children in the 1990s was 33 percent and the average prevalence of stunted children in the mid-1990s was 39 percent (see Christiaensen and Alderman, 2004).

5 A negative (but weak) correlation was found between child wasting and expenditure quintile for Ethiopia (MoFED, 2002a). The weak correlation may be because of a non-linear relationship. When regional profiles are considered, the highest proportion of wasted children was observed in Gambella (13 percent), followed by Dire Dawa (12.3 percent), Afar (11.8 percent) and Tigray (11.7 percent). Dire Dawa was found to have the largest proportion of severely wasted children (3.1 percent) followed by Tigray (2.3 percent), and Amhara, Benshangul Gumuz and Somali with 2.2 percent each (MoFED, 2002a). MoFED (2002a) suggested that the deterioration of short-term malnutrition (as captured by wasting) in 1999–2000 could be attributed to both the decline in international aid, due to the war with Eritrea, and the drought which occurred at the same time.

Turning to stunting, CSA data shows that stunting for children under five declined from 66.6 percent in 1995-1996 to 56.8 percent in 1999-2000. While there was a decline in stunting both in rural and urban areas from 1995 to 2000, the rate of change was greater in urban than rural areas: 20.4 percent decline compared to 15.3 percent decline (Tables 1.1 and 1.2).⁶

While the problem of malnutrition in Ethiopia is relatively well documented, its specific determinants are not well understood. To reduce malnutrition one must understand its causes. Not only are existing studies based predominantly on small-scale surveys that focus on particular regions of the country, but also there is a lack of agreement about the relative importance of factors affecting nutritional status. This question is not only of academic interest but of considerable policy relevance, both among national and international policy-makers.⁷ Thus it is important to better understand the child-, household-, community- and policy-level determinants of malnutrition and the way in which they differ across different regions. Without such knowledge it will not be possible to develop effective policy strategies to tackle this problem.

1.2 Policy context

Although the Ethiopian government has adopted a cross-cutting approach to nutrition over the last decade, there is no specific nutrition policy. As the National Plan of Action for Ethiopian Children (NPAEC) 2003-2010 points out:

In spite of the recognition of the problems and impacts of malnutrition on child survival and development, no concerted intervention schemes and guidelines have been designed and implemented at national level...to date the country has no nutrition policy and strategies (Ethiopian Ministry of Labour and Social Affairs, 2004: 12).

The Sustainable Development and Poverty Reduction Programme (SDRPP – Ethiopia’s Poverty Reduction Strategy Paper – PRSP) incorporates elements of the public health, food and gender approaches to addressing malnutrition. It includes an emphasis on health promotion and prevention, especially among the poor. It aims to address food insecurity through the Agricultural Development Led Industrialization (ADLI) strategy and related food security initiatives, and to support women’s empowerment in order to improve women’s control over resources. However, cross-linkages and synergies are not well developed. Nor is there a systematic approach to co-ordinate or sequence these policy components. While the NPAEC includes nutritional intervention and supplementation programmes, nutritional education, school feeding schemes and community involvement, it pays little attention to the differential impact of family livelihood patterns and caregivers’ productive work responsibilities on child well-being. Neither does it acknowledge the importance of family planning and spacing and the differences between children in rural and urban areas and in food surplus and food insecure regions.

6 The data also show that stunting and severe stunting are strongly and negatively correlated with expenditure quintiles, suggesting that households with larger expenditures have lower proportions of stunted and severely stunted children (MoFED, 2002a).

7 Child malnutrition has been a concern in Ethiopia since the late 1950s when the first nutrition survey showed that Protein Energy Malnutrition was widespread. Prior to the late 1960s nutrition-related activities involved the impact on child nutritional status of introduction of a low-cost indigenous supplementary diet. The subsequent creation of a nutrition institute within the Ministry of Health led to broader emphasis on promotion of better weaning practices and guidance to state and non-governmental agencies on nutrition programmes. The 1980s witnessed efforts to study the biochemical nature of Ethiopia’s major staple foods and to forge grassroots working relationships between staff of Ministries of Agriculture, Health and Education. The linkage thus created aimed at production of nutritious food by integrating agricultural research with research on nutrition, while enhancing nutrition education and promotion activities through the MOH and MOE. Since the early 1990s the institute has focused on research and nutrition has been considered as a cross-cutting issue.

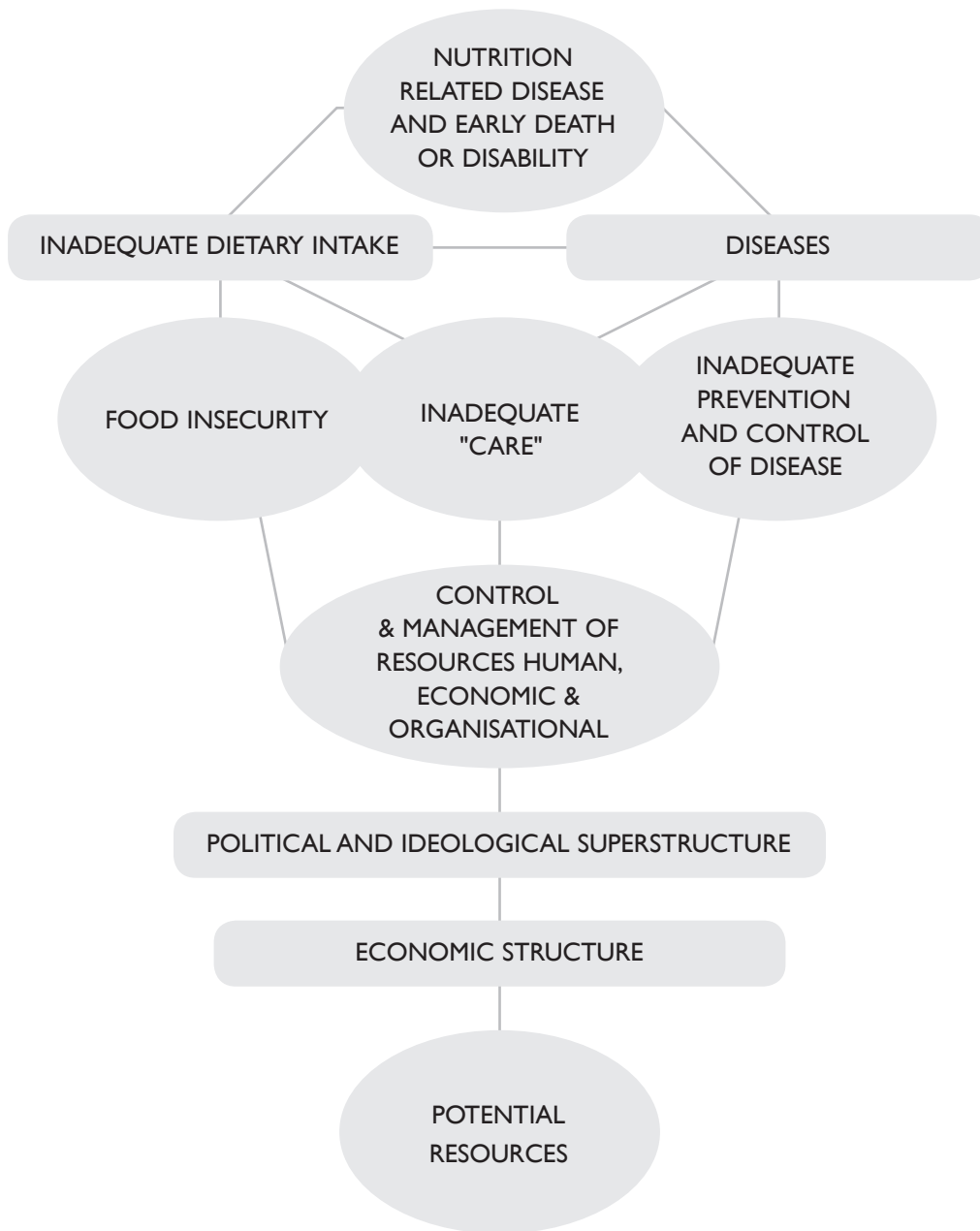
1.3 Objectives of the paper

Malnutrition cannot be tackled without understanding its causes. The problem of the nutritional status of children in Ethiopia may be fairly well documented but its specific determinants remain poorly understood (Yamano *et al*, 2003; SC UK Ethiopia, 2002; SC UK, 2003; Smith and Haddad, 2000). A review of the literature on the nutritional status of children shows that the limited number of studies carried out in Ethiopia are based on small-scale surveys focusing on particular regions. There is little agreement in the literature on the (relative) importance of factors affecting nutritional status. For example, based on empirical results, some studies stress the importance of parental education and/or nutritional knowledge, while others recommend the need to focus on improving the poverty/wealth status of households in poor countries like Ethiopia (Christiaensen and Alderman, 2004; SC UK Ethiopia, 2002; SC UK, 2003). SC UK (2003), for example, questions the nutrition component of World Bank-funded projects in Bangladesh, Ethiopia and Uganda which incorporate growth monitoring as a key strategy to educate mothers as a means of reducing malnutrition in young children. SC UK (2003: 5) notes that World Bank-funded projects are based on the questionable assumption that lack of knowledge, confidence and capacity to solve problems are major causes of malnutrition and that provision of counselling and encouraging women to care for their children will significantly improve nutrition, even when families remain trapped in poverty and health and sanitation services are very weak. While acknowledging that caring practices can contribute to improving child malnutrition, SC UK (2003) challenges the naïve view that major investment in growth monitoring to promote change in caregivers' behaviour will necessarily have a significant impact on nutritional status.

The international literature on child malnutrition also suggests that differences in levels of malnutrition depend on the sex of the child and the location of residence (Sahn and Stifel, 2002; Pal, 1999; Smith *et al*, 2004). However, this has not been explored in detail in Ethiopia. Other variables such as sex and age composition within the household, parental education levels, social capital, marital status, community characteristics, economic shocks and levels of food aid are also presented in the literature as determinants of children's nutritional status. Lack of knowledge of the magnitude and direction of the impact of most of these variables in Ethiopia hinders development of effective policies and deployment of resources. It is vital to improve understanding of the socio-economic determinants of malnutrition in order to develop a more comprehensive policy approach.

Drawing on the Young Lives sample of 1,999 one-year-olds from twenty sentinel sites, this paper will contribute a more comprehensive analysis of the determinants of malnutrition in one-year-old children in Ethiopia and provide insights into their interactive impact and relative importance. Using internationally accepted criteria of wasting, stunting and underweight, it explores the determinants of child malnutrition in order to contribute to debates on how to develop more effective policy interventions. The paper focuses on the importance of poverty, healthcare and caring practices – the three broad determinants of child malnutrition identified by UNICEF (1990, 1998). We use both quantitative and qualitative data and use UNICEF's conceptual framework as a guide (UNICEF, 1990, 1998). UNICEF's framework considers inadequate nutrient intake and disease as immediate factors causing malnutrition, and explains how they are exacerbated by inadequate household food security, maternal healthcare, infant care, health services and an unhealthy environment. A diagram showing UNICEF's conceptual framework is presented in Figure 1.

FIGURE I. THE CAUSES OF MALNUTRITION



Source: UNICEF (1990)

2. Review of the literature

2.1 Theoretical framework

For the quantitative analysis of this paper, we use an economic perspective based on a household utility maximisation framework. This follows the tradition established by Becker (1981) which views a household as maximising a utility function which depends on leisure, market-purchased goods and home-produced goods such as child nutrition. The maximisation is done subject to a budget constraint, a time constraint and a (biological) nutrition production function. The production of nutrition depends on a set of inputs – such as food (or nutrients), caring practices and the utilisation of health services; a series of exogenous individual characteristics including those of children and a vector of household characteristics such as the education of the parents and community characteristics.

A reduced form demand equation for status of child health (H) is derived from the solution of the constrained household utility maximisation problem:

$$H_i = H(X_{ch}, X_h, X_{co}, u)$$

where X_{ch} are characteristics of the child such as age and sex, X_h are household characteristics such as household parental education levels, household resources and household demographics, and X_{co} are community characteristics such as food prices and accessibility and quality of health services. u is a random error term representing the unobservable individual, household and community characteristics affecting the child's nutritional status which is assumed to be uncorrelated with the X variables.

2.2 Empirical literature

This section briefly reviews the empirical literature on the determinants of children's nutritional status.

2.2.1 Measurement of child nutritional status

Due to lack of data on consumption of calories and micronutrients by children, empirical studies typically use anthropometric measures derived from measurements of the child's height, weight and age. Three commonly used measures are height-for-age, weight-for-height and height-for-weight. Low height-for-age (stunting) is an indicator of long-term poor nutritional status of the child while low weight-for-height (wasting) indicates short-term poor nutritional status. Low weight-for-age (underweight) reflects poor social conditions in both the long and short term.

For these measures to be useful they have to be compared with corresponding measures for a well-nourished and healthy reference population of children.⁸ Based on recommendations by WHO (1985), most studies use US children of the same age and gender as a reference population. In order to standardise the three measures of child malnutrition mentioned above, they are typically transformed into z-scores referred to as height-for-age z-scores (HAZ), weight-for-height z-scores (WHZ) and weight-for-age z-scores (WAZ). A child is considered stunted, wasted or underweight if the corresponding HAZ, WHZ and WAZ z-scores are less than -2 . When the measures of HAZ, WHZ and WAZ are less than -3 , the child is considered severely stunted, severely wasted and severely underweight respectively.

2.2.2 Determinants of children's nutritional status

2.2.2.1 Household economic welfare

Wealth/income (expenditure) of the household

Multiple studies acknowledge that an increase in household income/wealth is expected to reduce child malnutrition (Glewwe *et al*, 2002; Christiaensen and Alderman, 2004; Moen, 1993; Haider *et al* no date). Haider *et al*, drawing on a study undertaken in Holetta woreda, Ethiopia) reported that child malnutrition (as measured by stunting) is significantly lower in households with superior quality crossbred cows than in those without. It was also shown that households with crossbred cows had a higher level of consumption of calories, protein and other nutrients. The higher consumption, they noted, was due to higher income brought about by the ownership of crossbred cows. According to Christiaensen and Alderman (2004), sustained per capita income growth of 2.5 percent over a 15-year period could lead to a 3–6 percent decline in chronic malnutrition in Ethiopia. However, they argue, income growth alone might not be sufficient to alleviate child malnutrition as nutrition is also influenced by a number of other factors. Similarly, Glewwe *et al* (2002) observed that a dramatic decline in poverty and child stunting was achieved in Vietnam due to rapid economic growth since 1986. They concluded that growth in household income, though not very large, had a positive impact on child nutrition in Vietnam during the 1990s. They also noted that, over time, child stunting declined within each quintile even after adjustment for change in income, suggesting that factors other than income growth led to improvement in child nutrition. Studies in Ethiopia similarly finding a negative correlation between level of economic status and child malnutrition (stunting) include Getaneh *et al* (1998), Genebo *et al* (1999) and Yimer (2000).

Shocks

Shocks of different types, such as drought, are also important in influencing the nutritional status of children, particularly wasting (Hoddinott and Kinsey, 2001; Dercon and Hoddinott, 2003; Yamano *et al*, 2003; Alderman *et al*, 2002; Carter and Mallucio, 2003). Dercon and Hoddinott (2003) looked into the impact of shocks on health status using data from Ethiopia and Zimbabwe. They found that the impact of shocks within the household is not uniform, and that younger pre-schoolers were more adversely affected by shocks such as drought than older pre-schoolers.

Employment status of mothers/caregivers

Employment of the mother or caregiver may be expected to enhance accessibility of the household to income, which may in turn have a positive effect on the nutritional status of the child. This may be expected because such income is more likely to be controlled by the mother/caregiver and used to improve children's nutritional status. However, it may also be argued that employment of the mother/caregiver may have a negative effect on children's nutritional status by reducing both infants' access to breastfeeding and time spent on childcare. Some empirical studies show that the mothers of the most malnourished children work outside their home, while others do not find any association between maternal employment and the nutritional status of the child (Abbi *et al*, 1991; Leslie, 1988). Ukwuani and Suchindran (2003) found that mothers' work in Nigeria reduced stunting in their children, but the expected positive effect of earning cash from work on childhood nutrition was less visible from the

results. Using the 2000 Demographic and Health Survey (DHS) data for Ethiopia, Girma and Genebo (2002) found no significant association between stunting and employment status of the mother.

2.2.2.2 Household/individual characteristics and education

A growing number of studies recognise the important role that household/individual characteristics and parental levels of education play in shaping child nutritional outcomes.

Household characteristics/structure

Christiaensen and Alderman (2004) found that larger family size results in better standardised height of children in Ethiopia. Their argument is that large families can benefit from economies of scale, both in time available for childcare and in expenditure, and children are better raised due to accumulated parental experience. However, it is unlikely that this relationship holds indefinitely. They failed to indicate the optimum household size. Christiaensen and Alderman noted that child nutrition status is not affected by the sex of the household head. Bronte-Tinkewa and DeJong (2004) found that in Jamaica living in a single-parent household and a cohabiting household increases the odds of stunting for children. Their analysis also indicates that children in single-parent, low-income families with siblings and low-income extended families with siblings are more likely to have low height-for-age,⁹ suggesting the importance of household structure in understanding children's nutritional outcomes.

Sex of child

A number of studies in Africa suggest that malnutrition among boys is consistently higher than malnutrition among girls (Christiaensen and Alderman, 2004; MoFED, 2002a; Glewwe *et al*, 2002; Svedberg, 1990; Sahn and Stifel, 2002). Sahn and Stifel (2002: 32) present three possible explanations. The first is that there is a problem with the gender-specific standard for the African population, in a similar way to the inconsistencies noted regarding the weight-for-height curves for young children (<2 years) in some African countries (Macfarlane, 1996). Secondly, girls are genetically more robust than boys. Finally, there is greater nutritional investment in young girls than boys – apparently counter-intuitive, since girls are frequently regarded as a 'poorer investment' as they eventually marry and leave to join their husband's family. However, this difference may also be linked to girls' greater access to food through their gender-ascribed role in contributing to food preparation. We may also note that the energy requirement is different for boys and girls (WHO, 1985), especially as boys are often expected to help with more energy-consuming tasks while girls are frequently involved with chores within the household. Other studies, for example by Pal (1999) in India, have found that the nutritional status of female children is better than that of male children.¹⁰

Age of child

Weaning/feeding practices, care and exposure to infection may also affect children's nutritional status at specific ages. Studies in Ethiopia have shown that older children are associated with increased malnutrition (Yimer, 2000; Genebo *et al*, 1999).

9 These results were obtained by interacting household structure, income and siblings.

10 This result was based on the coefficient of a sex variable included in a regression. Pal (1999) then discusses the determinants of male and female nutritional status separately.

Birth interval of the child

When pregnancies are closely spaced, it is often the case that the mother will have little time to regain lost fat and nutrient stores (ACC/SCN cited in Girma and Genebo, 2002). Child nutritional status is also expected to improve with higher birth spacing as the mother would get enough time for care and feeding. Studies showed that in most countries where DHS surveys have been conducted, children born less than 24 months after the previous child was born (a short birth interval) have a higher level of stunting (cited in Girma and Genebo, 2002)

Birth order

Parents are expected to give less attention to older children when there is a new child who needs much attention and care. Studies have shown that stunting is rare in lower birth orders (2-3) and that higher birth order (5+) is positively associated with child malnutrition (cited in Girma and Genebo, 2002). Using DHS 2000 data for Ethiopia, Girma and Genebo (2002) found that first-born children are at a significantly higher risk of stunting than children of higher birth order. They argue that this may be because of mothers' low level of experience in the area of childcare and feeding.

Household education

Various studies have concluded that parental education, especially that of mothers, is a key element in improving children's nutritional status (Christiaensen and Alderman, 2004; Moen, 1993; Yimer, 2000; Genebo *et al*, 1999). Glewwe (1999) investigated the mechanisms through which schooling results in better child nutrition. Glewwe identified three possible pathways: (1) direct teaching of nutrition and health knowledge in schools to future mothers; (2) additional nutritional knowledge flowing from literacy and numeracy skills; and (3) exposure and familiarity with modern society through school, thus encouraging the use of modern medicines.

The impact of mothers' schooling on child nutrition is not only through its effect on nutritional knowledge. A more educated mother is likely to have a higher income (which can directly affect her children's health and nutrition) and higher status and power in the household as well as the community, putting her in a better position to make decisions about her children's needs (Moen, 1993). The literature also indicates that where the general level of education of a community is low – which is the case in our study – higher levels of education of female and male members of the household can indirectly influence child nutritional status (Basu and Foster, 1998; Gibson, 2001).

Christiaensen and Alderman (2004) found that the effect of maternal education is about twice as important as that of paternal education. They showed that completion of primary school by at least one adult female in a household results in a 6–11 percent decline in stunting, while education of a male adult reduces child stunting by only 2–8 percent.¹¹

2.2.2.3 Access to services

Water and sanitation

Households living in wealthier communities generally have a relatively healthier environment, better sanitation facilities and access to clean water and healthcare facilities (Glewwe *et al*, 2002). Due to

11 Primary school completion by all Ethiopian women would result in a seven percent decrease in the (stunting) gap of 2.48 points (according to Christiaensen and Alderman's estimate) between the HAZ score of the Ethiopian population and the standardised norm of a healthy population. Post-secondary schooling also has an additional impact to that of primary or secondary schooling. These results could possibly be due to a positive correlation between education level and income and the fact that higher income results in better-nourished (healthy) children.

their impact on diarrhoeal diseases, water and sanitation play a particularly important role in child nutrition.

Christiaensen and Alderman (2004) noted that in Ethiopia, 14 percent of households in urban communities get water from their own tap and three percent own flush toilets. However, no rural household in their sample had tap water in their home and only one percent had flush toilet facilities. Their findings indicate a significant and positive impact of these facilities on child nutrition. Getaneh *et al* (1998) also found that an unprotected water source and non-availability of toilet facilities were associated with low child stature in Jimma. Glewwe *et al* (2002) considered the impact of clean water, a sanitary toilet and electricity on child health in Vietnam. They found that, when these three variables are considered separately, the lack of a sanitary toilet and electricity had significant negative effects on child health while clean water had no significant effect. When the three variables were added simultaneously, electricity lost its statistical significance while a sanitary toilet remained significant. They concluded that policies directed at improving sanitary toilets in a community will have better health outcomes than either water or electricity alone.

Esrey (1996) and Esrey *et al* (1992) found in a multi-country study that improved sanitation has a substantial effect on nutritional status and improvement in water supply enhances these effects. They also note that when considered separately, water supply has a smaller effect on nutritional status than sanitation.

Using DHS 2000 data from Ethiopia, Silva (2005) looks into the impact of externalities associated with access to water and sanitation. After controlling for household access to these services, this study looks at how the proportion of households with access to these services in the community affects the nutritional status of children. She finds that the presence or absence of adequate water and sanitation significantly determine the probability of a child being underweight.

Access to health services

People cannot access health services if they are not accessible. Quality and cost also determine uptake (MoFED, 2002a, 2002b). Access to health services impacts nutritional status as children without access to such services are more likely to be malnourished or exhibit weight loss due to untreated diarrhoea and other infectious diseases.

In Ethiopia it is estimated that only 38–47 percent of the total population have access to health services (Degefe and Nega, 2000). Services are unevenly distributed, as more than 50 percent of health facilities are concentrated in a few urban areas – and disproportionately in Addis Ababa – although only some 15 percent of Ethiopians are urbanites. The ratio of national population to hospital beds is about 6,000:1 (the highest figure in the world and around four times the average for sub-Saharan Africa). The total population per primary healthcare facility is about 21,992, three times the sub-Saharan average. Seventy-two percent of medical doctors, 89 percent of health officers and 58 percent of nurses are located in urban areas. About 35 percent of all hospital beds are in Addis Ababa (Degefe and Nega, 2000).

One of the important measures of access to health facilities used in the literature is the distance between the location of the household and the nearest healthcare facility (MoFED, 2002a; Roberts, 2003; Christiaensen and Alderman, 2004). This indicator, a proxy for availability of healthcare,

which affects healthcare choices (decisions to utilise them), is widely used in malnutrition studies (Christiaensen and Alderman, 2004). It is particularly useful for a country like Ethiopia where transportation networks are very poor (MoFED, 2002a). The average distance from a household to the nearest health centre, as reported by MoFED (2002a) based on the welfare monitoring survey of 1999–2000, is given in Table 2.1.

However, Christiaensen and Alderman (2004) found that after controlling for a number of other determinants of child malnutrition, distance to the nearest health centre is not significant. They note that the lack of explanatory power of the distance variable could be potentially explained by the fact that the proxy for access to health centre does not capture the quality of healthcare – a consideration which is as important as distance. Another possibility is that households may be unable to pay, so the availability of health services may not increase usage.

2.2.2.4 Food aid

Given the importance of disaster relief in many developing countries, food aid programmes are significant. Food aid is expected to affect the general nutritional status of households receiving it. However, the distribution of food within the household could also be an important issue, particularly for children whose welfare depends on the decisions and actions of adult members of the household. Using panel data, Quisumbing (2003) looked into the effects of food aid on child nutritional status (stunting and wasting) in rural Ethiopia. In addition to a consideration of the effects of total food aid, she looked into possible differential effects of free distribution (FD) and food-for-work (FFW) on the nutritional status of boys and girls. She concludes that the effects of food aid on child malnutrition are different depending on the modality of food aid and gender. She finds that both FD and FFW have a positive impact on wasting – a measure of malnutrition expected to respond more to such interventions in the short run. However, households seem to invest FD in girls' nutrition while proceeds from FFW are invested in boys' nutrition. Two possible explanations that Quisumbing gives for the differential impacts of food aid on boys and girls are: 1) that households are attempting to redress imbalances existing in the nutritional status of children (which are worse for boys than for girls); and 2) supplies gained via FFW, which is increasingly targeted towards women, may go more to boys as they are considered important for old-age security. However, FD, which leads to a general increase in household income/wealth, may be used to improve the nutritional status of girls. Yamano *et al* (2003) used data for 1995–96 in Ethiopia and found that food aid has a substantial positive effect on the growth of children between six and twenty-four months.

2.2.2.5 Healthcare and caring practices

Dietary intake and food assimilation could be affected by diarrhoea and other infectious diseases, which in turn impacts negatively on children's nutritional status (CSA and ORC Macro 2001). In a bivariate analysis using DHS 2000 survey data for Ethiopia, Girma and Genebo (2002) found no significant association between stunting on the one hand and diarrhoea and fever on the other. A study of child nutrition in Nigeria by Ukwuani and Suchindran (2003) revealed that, during infancy, recent episodes of diarrhoea and/or shorter breastfeeding duration increased wasting. For infants, immunisation reduced stunting, but longer duration of breastfeeding, and being a higher parity child

increased stunting. During childhood, higher birth weight and immunisation reduced stunting and wasting. Also during childhood recent episodes of fever increased wasting.

Ruel *et al* (1999) found in a study of child nutrition in Accra, Ghana that good caregiving practices related to child feeding and use of preventive health services were a strong determinant of children's height-for-age z-scores. This was especially the case among children from the two lower income terciles and children whose mothers had less than secondary schooling. This led them to the suggestion that in this population, good care practices could compensate for the negative effects of poverty and low maternal schooling on children's height-for-age z-scores. They conclude that effective targeting of specific education messages to improve child feeding practices and use of preventive healthcare could have a major impact on reducing childhood malnutrition in Accra.

In sum, the literature review helps us to identify important factors that are associated with child malnutrition in developing countries, including factors related to individual characteristics such as gender and birth order, household economic welfare, household composition and education levels, food aid provision, and access to services (health, water and sanitation).

3. Data, methods and empirical results

3.1 Data and methods

3.1.1 Data

We used quantitative data collected in the second half of 2002 from 1,999 households with 6–18-month-old children from five regions of Ethiopia as a result of the Young Lives Ethiopia project. The data was collected from 20 sentinel sites with 100 children from each site. Eight sites are in urban areas and 12 are rural. They are mainly in food insecure areas in Addis Ababa and the Amhara, Oromia, Southern Nations, Nationalities and Peoples (SNNP) and Tigray regions. By purposive selection of sites, the poor are deliberately over-represented as the objective of the project is to analyse panel data focusing on child poverty. The selection of households within a site was done by using the equivalent of a random sampling process, going door-to-door looking for households with children between 6 and 18 months of age at the time of the survey.¹²

The quantitative survey included weighing all the children and measuring their height. Child weight was measured using calibrated child scales and recorded to the nearest 0.1kg. Child height was measured to the nearest 0.1cm using height boards made for the purpose. We compared the weight-for-height (wasting), height-for-age (stunting) and weight-for-age (underweight) of the sampled children with an international standard population using the Centre for Disease Control/World Health Organisation reference points with the help of the Epi-Info statistical package (Dibley *et al*, 1987).

We were able to obtain complete and useable child age, weight and height measurements for 1,765 of the one-year-old children. Though we had to discard some observations because of probable measurement errors and missing values, the largest part of the observations excluded were accounted for by the inability of the enumerators to measure all the children in one sentinel site because of a malaria epidemic. Following recommendations of a WHO Expert Committee (WHO, 1995), we excluded extreme values of height-for-age and weight-for-height z-scores since they may be due to measurement errors.

The quantitative data collected also includes variables that are expected to influence household economic welfare (and hence child nutritional status), such as wealth, land and cattle ownership, food availability, food aid and economic shocks. Household and individual characteristics that are expected to influence the nutritional status of the child are also available. These include age of child and mother, sex of child, education of members of the household, marital status and employment status of the caregiver and breakdown of household composition by age and gender. Availability of, and access, to services such as safe water supply, sanitation and health facilities is another set of variables included in the analysis. The data also includes indicators of the health status of the child in terms of the various diseases that could affect nutritional status. Variables included in the analysis that reflect caring practices which may influence child nutritional status include number of antenatal visits, whether the child was born at a health facility, whether the child was cared for by children under five, the length of breastfeeding, and whether the child was vaccinated. Indicators of social capital included in the study are membership in funerary, religious and women's groups.

12 For a detailed discussion of the sampling method used and characteristics of the sites selected see Alemu *et al* (2003). While the first round of the survey was conducted in 2002, there is a plan to follow the selected children every three years or so over a period of 15 years.

The qualitative research was carried out in five of the twenty Young Lives sites in February and March 2005. One site from each of the five regions represented in the Young Lives sample was selected, four of which are rural and one urban. Data collection instruments were informed by questions arising from the quantitative analysis as well as the inputs of public health and nutritional experts. In each site, the following qualitative methods were adopted over a four-week period: three focus group discussions with 8–10 participants (with mothers of well-nourished children and representatives of various sectors of the community); approximately 15 subsequent semi-structured in-depth interviews (with mothers of malnourished children); and interviews with key informants (health professionals, elders and community development workers).

3.1.2 Methods

Both quantitative and qualitative methods are used in the analysis. The methods used for the quantitative analysis are descriptive statistics such as mean values and percentages, bivariate and multivariate analysis. The bivariate analysis relies on results from linear correlation between the three indicators of child nutritional status considered in this study, on the one hand, and their associates on the other. The multivariate analysis is based on the theoretical framework presented above and uses both ordinary least squares (OLS) and probit models. OLS is used when the dependent variables considered are z-scores (height-for-age, weight-for-age and weight-for-height z-scores) while the probit model is used when the dependent variable is dichotomous (taking the value 0 or 1) as is the case when we look at stunted children versus those not stunted, underweight versus not underweight and wasted versus not wasted.

The analysis of the qualitative data was based on: (1) a debriefing workshop where the five research assistants and senior researchers presented their findings and discussed similarities and differences across the sites; (2) the transcripts of taped interviews (in both English and Amharic); and (3) extensive field notes and field reports prepared by the research assistants. The analysis sought to identify both common patterns across all the sites as well as differences, and the underlying reasons according to the following themes: understanding of the concept of malnutrition and its causes; the roles of food security/wealth; caring practices and health-seeking behaviour in explaining child malnutrition; and the influence of various policies/programmes on child malnutrition. Particular attention was also paid to the gender dynamics at play at the household and community levels.

3.2 Empirical results

3.2.1 Descriptive statistics

The descriptive statistics are presented in Table 3.1. The sample size used in the analysis is 1,762 after removing observations with missing values and outliers. A total of 1,017 rural households and 745 households from urban areas are used in the analysis.

3.2.1.1 Anthropometric measures

Using each of the three indicators (weight-for-height, height-for-age, and weight-for-age), in addition to z-scores we also classify the sample depending on whether a child is wasted, underweight or stunted.

The results show that, as expected, the mean value of the z-scores is negative for each of the three indicators with mean weight-for-age being the lowest of the three (-1.636) followed by mean height-for-age (-1.516). A cut-off value of -2 standard deviations was used to define stunting (low height-for-age), underweight (low weight-for-age) and wasting (low weight-for-height). The proportion of underweight children is 40 percent, while those who are stunted are 38 percent of the sample and 14 percent are wasted. When we compare this with national data for 1999/2000 for wasting and stunting presented in Tables 1.1 and 1.2,¹³ as a percentage of the total sample, the children in our sample are more wasted (14 percent compared with 9.6 percent) but are less stunted (38 percent compared with 56.8 percent). The data also show that rural children are more malnourished than those in urban areas. The proportion of children in urban areas that are underweight, stunted and wasted are 29, 29 and 11 percent respectively, while the corresponding figures for rural areas are 50, 44 and 17 percent. The national data referred to above also show that the percentage of children wasted and stunted is higher in rural than in urban areas. As can be seen from Tables 1.1 and 1.2, a comparison of the results for our sample with the national data also shows that a larger percentage of the children in our sample are wasted but the opposite is true for stunting.

3.2.1.2 Child characteristics

The average birth order of a child is 3.1 with the figure for rural areas being higher (3.45) than for urban areas (2.64), indicating, as expected, the larger average number of children in rural families.

3.2.1.3 Family/household characteristics

Household composition

We also consider household composition in our study, reflected through the number of individuals in different age groups. We may note here that the average number of children below five years of age is about 1.5 with the average being higher in rural areas (1.54) than in urban areas (1.37). There are households which have as many as five children below five years of age.

Caregiver's/mother's characteristics and marital status

The data also confirm the general expectation that Ethiopian caregivers are almost exclusively females (99.5 percent). About 86 percent of the household heads are males, with the proportion being higher in rural (90.7 percent) than in urban areas (79 percent). Since almost all the caregivers are mothers, the mean age of the caregivers and that of the mothers is almost the same, about 28 years. For about 85 percent of the households there is a permanent partner and this figure is very close to the percentage of male-headed households, since typically the male is considered the head of the household whenever there is a permanent partner. The employment status of the caregiver is also expected to influence the nutritional status of the child. Our data show that about 12 percent of the caregivers were employed in paid work. Only about 8 percent of caregivers in rural areas were employed compared with about 18 percent in urban areas.

13 Note that our sample and national data are not directly comparable for at least two reasons. First, our sample includes children between six and 18 months old while the national data includes children between six and 59 months old. Second, our data was collected in 2002 while the national data was collected in 1999/2000.

Household wealth/assets

Wealth status is one of the variables that may influence child nutritional status. A wealth index was used to assess the economic status of the household, partly because of the absence of information on income and expenditure from the dataset used for this study. The wealth index was constructed from variables that are broader than production assets, such as home ownership. All variables were scaled for scale equivalence, i.e., 0.0 to 1.0, but weights are arbitrary because the weighting makes little difference when the contributing variables of the index are highly correlated, (housing, consumer durables, services) as they are here.¹⁴ The mean of the wealth index for a household was 0.17, with a big variation between urban (0.32) and rural areas (0.07). This is because the items included in the index are more common in the former. To capture some important resources/assets in rural areas we included number of cattle owned and land owned or rented. The data show that the average number of cattle owned by a household is 1.22 and, as expected, the average for rural areas is 1.89 compared with 0.32 for urban areas. Similarly, while the average land owned or rented is about 0.6 hectare per household, this is much lower in urban areas (0.07) than in rural communities (0.96).

Education levels and access to information

The level of education of the individuals in our sample is generally low with the mean years of schooling for mothers and fathers both being 2.6. The corresponding figures for urban areas are higher than those for rural areas, which is also to be expected. Due to knock-on effects of education within the household, the maximum level of education of male and female members of the household is considered to be important in influencing child nutritional status (Basu and Foster 1998; Gibson 2001). On average, the maximum years of schooling of male and female members is about 5.1 and 4 years respectively, and again is found to be higher in urban areas (Table 3.1). Ownership of radio and television were included in the analysis separately since, in addition to being indicators of wealth, they also indicate access to information that may influence childcare behaviour. We see from the data that televisions are almost exclusively owned by urban households, and 61 percent of urban households own radio but only 24 percent of rural areas households.

Shocks

We may also note that while crop failure and receiving food aid are predominantly phenomena observed in rural areas, unexpected decrease in food availability is a type of shock also faced by a considerable percentage of urban households (34 percent).

Access to water and sanitation

About 46 percent of the households use water from unsafe sources. In line with results from other studies, the percentage of rural households that do not have access to safe sources of water is higher (about 66 percent) than that for urban households (about 17 percent). Availability of safe sanitation facilities is even more limited. While about 39 percent of the households use pit latrines or flush toilets, the percentage is much smaller in rural (about 15 percent) than urban areas (72 percent).

14 The wealth index includes indicators of housing quality, consumer durables and services. Note, however, that radio ownership, TV ownership, use of pit latrine/flush toilet and use of safe water sources are not included in the wealth index as each of these were included as separate variables in the analysis.

Healthcare/health-seeking behaviour and caring practices

The two most frequently reported ailments that the children in the sample suffered from during the 24-hour period before the survey were diarrhoea and fever, both known to be associated with child malnutrition. About 23 percent of the children had had diarrhoea while about 26 percent had fever. The percentage of children suffering from these diseases was higher in rural areas. We may also note that close to 78 percent of the households whose children were seriously ill took their children to a health facility. More did so in urban areas.

The average number of antenatal visits made by the mother is 2.16. The average for rural areas (1.36) is less than half of that for urban areas (3.25). About 19 percent of the children in sampled households were born at a health facility; 40.1 percent in urban areas but as a result of more limited access to health facilities only 3.1 percent in rural areas. Some 12 percent of the children in the sample were cared for by children under five for some time. The percentage was higher in rural (15 percent) than in urban areas (7.2 percent). The duration of exclusive breastfeeding is, on average, higher than the recommended six-month period. About 73 percent of the children received BCG vaccination while 57.6 percent of them were vaccinated against measles. Again these percentages were lower in rural areas.

Social capital

Membership in funerary, religious and women's groups were used as indicators of social capital for this study. A larger percentage of households are members of funerary groups (54.4 percent) compared with membership in religious groups (38 percent) and in women's groups (19.5 percent).

3.2.1.4 Community characteristics

Average distance to public health facilities

The average distance of communities to public health centres is less than 10 km for about 53 percent of the households. The corresponding figure for urban areas is about 62 percent compared with about 46 percent for rural areas.

3.2.2 Bivariate analysis

We calculated the correlation coefficient to examine whether there is a linear association between the different (continuous and discrete) indicators of child nutritional status on the one hand, and the variables they are expected to be associated with on the other. Table 3.2 presents the correlation coefficients together with the p-values underneath. In the discussion of the correlation coefficients below we consider the correlation to be significant if the p-value is 0.1 (10 percent) or lower. We should also note that we are considering only linear correlation.

3.2.2.1 Weight-for-height z-scores (wasting)

The following variables are positively and significantly correlated with either the weight-for-height z-scores or the discrete indicator of wasting or both: years of schooling of mother and father, maximum years of schooling of a male and a female member of the household, number of female adults, wealth

index, radio ownership, television ownership, use of pit latrine and/or flush toilet, number of antenatal visits, birth at a health facility and BCG vaccination.

Variables which are negatively and significantly correlated with either the weight-for-height z-scores or the discrete indicator of wasting or both are: being a male child, child age, birth order, number of boys and number of children, being a Muslim caregiver, number of cattle owned, land owned and rented, crop failure, decrease in food availability, being a recipient of food aid, unsafe water, average distance of community to public health centres, diarrhoea, fever, child being cared for by child(ren) under five, and vaccination against measles.

3.2.2.2 Weight-for-age (underweight)

Variables which are positively and significantly correlated with either the weight-for-age z-scores and/or the discrete indicator of underweight are: years of schooling of the mother, years of schooling of the father, maximum years of schooling of a male household member, maximum years of schooling of a female household member, number of male adults, number of female adults, wealth index, ownership of radio, ownership of television, use of pit latrine and/or flush toilet, number of antenatal visits, birth in a health facility, BCG vaccination and vaccination against measles.

On the other hand, the following variables are negatively and significantly correlated with either the weight-for-age z-scores or the discrete indicator of underweight or both: sex of child, age of the child, birth order, age of the mother, number of children below five years of age, being a Muslim caregiver, number of cattle owned, land owned and rented, crop failure, decrease in food availability, being a recipient of food aid, unsafe water, average distance of community to public health centres, diarrhoea, fever, child being cared for by child(ren) under five, and membership in funerary groups.

3.2.2.3 Height-for-age (stunting)

The following variables are positively and significantly correlated with either height-for-age z-scores or the discrete indicator of stunting or both: having a permanent partner, years of schooling of mother, years of schooling of father, maximum years of schooling of a female member of the household, maximum years of schooling of a male member of the household, number of male adults, number of female adults, caregiver being Muslim, wealth index, ownership of radio, ownership of television, use of pit latrine and/or flush toilet, average distance of community to public health centres, diarrhoea, fever, number of antenatal visits, birth in a health facility, and membership in a women's group.

Variables negatively and significantly correlated with height-for-age z-scores or the discrete indicator of stunting or both are: sex of child, age of child, number of children below five years, land owned or rented, crop failure, decrease in food availability, being a recipient of food aid, unsafe water, and membership in a religious group.

While most of the signs of the variables that are significantly associated with indicators of children's nutritional status, reported above, are to be expected, we cannot arrive at robust conclusions since we have not controlled for other variables. This is because the results are based on a bivariate analysis with linear correlation measures. We therefore proceed to the multivariate analysis.

3.2.3 Multivariate analysis

Tables 3.3–3.5 present results of the multivariate analysis. Each table presents both OLS and probit results. OLS is used when height-for-age, weight-for-age and weight-for-height z-scores are the dependent variable. Probit is used when the dependent variable is 0 or 1, where 1 indicates that the child is stunted, underweight or wasted and 0 indicates that the child is not. Most of the variables reported in the descriptive statistics are included in the multivariate analysis except sex of head of household, sex of caregiver, age of caregiver, years of schooling of mother, father, caregiver and head of household, receipt of BCG vaccination and indicators of the health status of the child at the time of the survey. Sex of the head of the household is excluded as it is almost the same as the variable indicating marital status, since caregivers/mothers with permanent partners are generally living in male-headed households. The sex of caregiver variable is almost a constant since male caregivers are only 0.5 percent of the total sample. We also followed the recent literature and used maximum years of schooling of a male and a female member of the household for the education variable. Following the literature we included vaccination against measles and did not include the variable indicating BCG vaccination partly because of a high correlation between these two variables. Indicators of the health status of the child during the survey, such as experiencing diarrhoea and fever, were not included as explanatory variables in the multivariate analysis due to endogeneity – that is, there could be a two-way causation as diarrhoea may lead to wasting of the child but the child may experience diarrhoea because he/she is wasted.

Following the literature, we tried to take interaction effects into account by including linkages between wealth, education and food aid on the one hand and indicators of shocks (decrease in food availability and crop failure) on the other. However, we report results that do not include these interaction effects as they were found to be insignificant in almost all cases. All the results reported are corrected for heteroskedasticity of a general form. We have two groups of results: results for the full sample (Table 3.3) and results stratified by location (Tables 3.4 and 3.5).¹⁵ While Table 3.3 presents the results for all the three indicators of child malnutrition, i.e., wasting, stunting and underweight, Tables 3.4–3.5 present the results by location for wasting and underweight. We may note that the variables that we consider as statistically significantly different from zero are those with a significance level of 10 percent or less. We have included site dummies to control for site-specific effects such as altitude and prices in all cases, but the results are not reported. We have also performed cluster estimation.

3.2.4 Key findings

Our findings are grouped into three categories: child, family/household and community.

3.2.4.1 Child characteristics

Sex

The results for the multivariate analysis for the full sample (Table 3.3) and those by location (Tables 3.4 and 3.5) show that boys are more likely to be wasted, stunted and underweight, a result which also holds when we stratify the data by rural or urban location. This is consistent with results from studies

15 To see whether separate analysis for rural and urban areas is statistically justified, we conducted a Chow test. The tabulated F-value with 0.05 area in the upper tail is about 1.39 (with 35 and 992 as the numerator and denominator degrees of freedom respectively). The calculated F-values for wasting and underweight suggest that a separate analysis may be justified (though the F-value for wasting is just about 1.39). The Chow test for stunting ($F=1.05$), however, suggests that a separate analysis is not justified. The results for stunting by location are, therefore, not presented.

elsewhere in Ethiopia and in other African countries, and is largely attributable to possible genetic differences between male and female children. Although this difference did not come out as strongly in the qualitative findings – most mothers insisted that there were no differences in feeding practices between girls and boys – exceptions were found among several respondents in Oromia and SNNP. Here caregivers were more concerned about providing their male children with regular sustenance for fear they would become “malnourished and lose their strength” overnight if they fell asleep without being fed. They were not similarly concerned about girls. These mothers wanted their boys to grow up strong so they could cope with the rigours of traditional agricultural labour. One other plausible gender difference relates to the link between unsafe water, diarrhoea and child malnutrition. In Bilbala in the Amhara Region, parents provide male babies with water at 40 days and girls at 80 – the result of gender-linked differences in scheduling christening ceremonies – thereby possibly exposing them to contaminated water and disease. Although only evident in one region, this example suggests that boys’ malnutrition may be a result of more than just genetic differences and also attributable to other more complex environmental and cultural factors.

Age

Within the group of 6–18-month-old children included in the sample, older Young Lives children were found to be more malnourished (wasted, stunted and underweight), in both urban and rural areas.¹⁶ These results suggest that there may be problems associated with excessively protracted and/or irregular breastfeeding and inappropriate weaning/feeding practices. Our qualitative research supported this hypothesis. Caregivers involved in occupations outside the house, especially market traders, are often unable to feed their infants regularly. As one woman trader from Uduga admitted: *“I used to leave him alone and go to market to sell goods. The neighbours say I made the baby sick by leaving him alone. No one was there to feed him on time. I of course used to feed him when I came back”* (2005). In other cases the problem was related to poverty-induced non-availability of food. Mothers’ coping strategies included both excessively delaying giving their children supplementary food and feeding children foodstuffs that they knew had low nutritional content.¹⁷ One mother in Bilbala explained that: *“A child can start supplementary food even after six months or a year. But due to the fact that I am poor, I couldn’t start feeding him supplementary food until he was two years old”* (2005). Another, however, adopted a different strategy: *“As we are impoverished, there are times when we feed our children salted water and sesame juice. We also give them roasted and boiled cereals when we have no other things. When we have [such food] we feed them nutritious foods like milk, honey and tea”* (2005).

Birth order

The results show that for the full sample birth order is not significantly associated with any of the three indicators of child malnutrition considered in this study. However, the results by location show that higher birth order is associated with wasting and underweight for urban children, while the likelihood of a child being wasted in rural areas decreases with higher birth order. Neither pattern emerged strongly in the qualitative research. However, as discussed further below, birth spacing was emphasised as a key issue. That is, young children born in close succession have to share scarce resources and are thus more likely to suffer from malnutrition than children in smaller families.

16 Note, however, that the results suggest that this trend does not continue indefinitely and would be reversed after a certain age as reflected by the positive sign of the square of the age of the child variable.

17 Note that respondents in each site differed as to what foods they viewed were suitable for supplementary or weaning food. Because in most cases the foods they identified were those most commonly found in their area the challenge will be for health and development extension workers to build on this knowledge when advising households about balanced diet and food production.

3.2.4.2 Family/household characteristics

Household composition

Household composition variables were considered with the expectation that the age and sex of household members may be associated with the nutritional status of the child. The results for the full sample suggest that the number of children below five years of age is associated with increased likelihood that the child is stunted and underweight. A similar result is observed for underweight in both rural and urban areas and wasting in rural areas. As having more children below five years of age would imply shorter birth intervals and more difficulty in caring for children, this points towards the importance of birth spacing and family planning. A women's association member in Tigray explained the problem: *“Besides drought, there is a lack of family planning. This affects babies who are denied breast-milk – their major dietary source. Moreover, owing to existing problems, they cannot give the baby what is available in the house as children are born one after the other and parents are under lots of pressure”* (2005).

Our qualitative research confirmed that many caregivers were well aware of this connection and were eager to have access to contraception. *“I want to control birth. I got information about using it from people who come to our village to teach us about it”* (Ibeseta mother, 2005). However, women's ability to control family size was often limited, not only because of lack of access to contraceptives but also due to resistance from spouses. Male opposition was typically twofold. Some husbands were against family planning as they view children as an essential source of household labour and insurance in old age. Others were opposed because of the potential sexual freedom the pill could afford women. The following example vividly illustrates this intra-household power struggle: *“Once a woman came to the clinic where I was working and asked for Depo-Provera. Because her blood pressure was very high, she was not able to take it and was instead advised to take oral contraceptive pills. She started to cry and said that if she took the pills her husband would kick her out of the house. She then insisted that she wanted the injection. She cried and waited half a day at the clinic”* (Ibesta health worker, 2005). It should be noted, however, that it is not only men who resist family planning. A number of women from rural sites also responded that they wanted to have many offspring as children are “gifts from God” and/or to please their husbands.

Caregiver's marital and employment status

In households where the caregiver has a permanent partner, the multivariate analysis found that children are less likely to be stunted or underweight. Given that almost all caregivers in our sample are female, the results imply that children of female-headed households are more wasted or underweight than those of male-headed ones. This may be a reflection of factors such as limited availability of resources, income and household labour supply – which are not fully captured by the wealth index – as well as the more limited time available for childcare. Our analysis by location shows that this result holds for wasting and underweight in urban but not rural areas, perhaps because urban mothers work more regularly away from the home and/or due to the lack of support from an extended family which is more commonly found in rural areas. We also find that whether or not the caregiver is employed for paid work was not significant. There are two opposing effects of employment of caregiver on child malnutrition. While increased income and better control over such income may be expected to lead to use of such income to improve the welfare of the household (including that of the child), the fact that

the caregiver works may imply less time available for childcare. Our results suggest that the net effect of these two opposing effects makes employment status of the caregiver an insignificant variable.

Although these differences were also found in the qualitative research, a wider range of problems associated with family composition were also identified, suggesting that the problems are more complex and relate to issues of intra-household distribution of power and resources (see discussion below). In some regions, children with step-parents were not afforded equal care and access to food. As one focus group participant in Bilbala explained: *“Separation of family stunts (mekechch) children because they will miss their parents. After divorce there will be no one to feed them. Even when they cry, there is no one to take care of them. Due to this reason children become skinny. Being in another marriage, children often become malnourished even though the father orders the new wife to feed the children but a stepmother cannot breastfeed the baby”*. Children’s nutritional status within two-parent households could similarly be compromised due to the relatively common practice of husbands taking several wives (either formally or informally). As one elderly man from Wurib pointed out: *“In my opinion, women do not have the right to share the family economic resources equally. The husband is considered to be the boss and manages and controls the family alone. Besides he can have two or more wives which reduces the availability of economic resources and intensifies family poverty. This is one reason that children do not have proper health and sanitation care”*.

Household wealth/assets

Lower household wealth increases the likelihood that the child is wasted or underweight. This result was positive in both rural and urban areas, but only significant in urban areas, at least in part because the wealth index we employed is biased towards items more commonly found in urban environments.

Our qualitative research emphasised that rural poverty was a major contributing factor to child malnutrition. In some cases poverty was linked to the inability to seek adequate medical help for infants: *“At first he looked like a son of a rich person. Afterwards, he grew thin because of hunger. I was afraid of losing him. Therefore I borrowed from relatives and neighbours and did a lot of work to make him live longer. I suspected some parasite and gave him a medicine for stomach illness. After that he got well. I thought he was going to die”* (Wurib mother, 2005). In other cases, poverty was at the root of caregiver stress about taking care of a large family and led to inadequate breastmilk supply: *“When I am tense thinking about what to feed my children, my breast will not produce milk and the child cries and refuses to feed on my breast”* (Bilbala mother, 2005).

When we employed indicators of more typical rural assets in the quantitative analysis – land and livestock ownership – we similarly found that rural households with more livestock are less likely to have children who are wasted or underweight. As one Uduga mother emphasised, landlessness precludes families from even subsistence living. This in turn means that providing adequate food and medical care can lead to a major drain of household income: *“We do not have land and thus we do not produce food...we purchase food to eat. We couldn’t therefore treat her medically, and we also couldn’t feed her the necessary food that children should have because we did not have anything”*. In urban areas, however, the reverse is the case. This could be because urban dwellers with livestock belong to the urban periphery and are generally poorer than households engaged in non-farm occupations.

In addition to aggregate household wealth and asset ownership, the intra-household distribution of resources also emerged as an important constraining factor. Although our quantitative data did not find a significant relationship between female employment outside the house, our qualitative findings were in line with Kabeer's (2003) argument that when women have control over family income they are more likely to invest it in their children, while men have a greater tendency to use household income for alcohol and cigarette consumption. We found that when women lack control over family income they are often hampered from providing sufficient and quality food for their children. As one Wurib mother explained: *“The husband is the manager of all economic resources of the family. He won't give her a penny but she has the obligation to look after the children and make food in the houses”* (Wurib mother, 2005). By contrast, in some cases, male partners squander income from the annual harvest on alcohol at the expense of their offspring's longer-term food security: *“Some peasants finish their annual harvest within a week by selling what they produced and spend the money on drink while children wait for them at home”* (Uduga focus group participant, 2005). This concern about misappropriation of resources also extended in some instances to relatives. As a Bilbala mother noted: *“Due to our misery, we go out looking for jobs, leaving them alone. They have no one to take care of them. If we make relatives stay with children, we know that they will instead take the food and eat it themselves”*.

However, while women's access to income-generating opportunities is important in terms of reducing power differentials within the household and promoting women's empowerment, children's well-being may be negatively impacted, at least in the short term. In the absence of adequate community childcare mechanisms children may be disadvantaged, either from being left alone or left in the care of older (but often still young) siblings – in the case of women traders as discussed above – or from exposure to harsh climatic conditions in the case of women farmers. As the chairwoman of the Bilbala Women's Association noted: *“One reason for malnourished babies is that mothers are expected to go out in the field to support their husband in the farm, carrying their child on their back throughout the day. The babies therefore will not get time for breastfeeding and become exhausted by hot sunlight, contributing to their weakness and vulnerability to disease”*.

Our qualitative research suggested that finding ways to promote women's economic empowerment while simultaneously cushioning children from the effects of a deficit of caregiving time must be prioritised. This is the case with both credit programmes – which are increasingly targeting women lenders in rural Ethiopia – and food-for-work programmes. In the latter case, the problem is complex as the following case illustrates. While local authorities are trying to protect pregnant mothers from the gruelling work that such programmes often entail, the absence of other safety nets may expose pregnant and lactating women to even greater deprivation. As one Bilbala woman poignantly explained: *“The chairman and other administrative bodies prohibited pregnant women from participating in food-for-work activities, telling us that we may get sick if we work. Because of that I quit work and became hungry. It was when I got hungry that the baby became stunted inside me”*.

Shocks

Households that experienced crop failure had children that were more likely to be wasted, a result which holds true both for the full sample and for urban and rural areas. Such results are to be expected as sudden adverse events in the household can affect the availability of food or milk for the child either directly or through their indirect effects on the mother. This may be both in terms of quantity of food

intake and the quality of food stuffs. As one Bilbala mother noted, she coped with a sudden hike in food prices by decreasing both the number of meals and the amount of protein in her children's diet: *"I cut the meal from three to two and use cheaper grain and cereal foods instead of meat and eggs...when the price gets cheaper, we don't increase our meal frequency to four and five times but the quality will be improved"* (2005).

Our multivariate analysis also found the unexpected result that crop failure decreases the likelihood that the child will be stunted and that decreased food availability makes underweight and wasting of the child less likely in urban areas. One possible explanation could be that households are cushioned against such shocks by different kinds of support, especially food aid and food-for-work programmes, that were not captured in the quantitative data but were frequently discussed in the qualitative interviews.

Parental education levels and access to information

Our quantitative results suggest that households with better educated male members had a lower incidence of stunting, but contrary to expectations suggest that there was a correlation with higher female education and child wasting. The analysis by location shows that the positive association between female education and child wasting holds only for rural areas. This pattern however was not supported by the qualitative data. Indeed, higher levels of maternal education were linked in some sites to the ability to better access and act upon knowledge about nutrition and healthcare. For example, one Uduga focus group participant noted that: *"The educated mothers take their children to health centres immediately or take them to get preventative vaccinations. Even pregnant women go to health centres for advice. They take and make use of the advice they get. But the non-educated are not as concerned about healthcare. They run to the clinic only after they fall sick"* (2005). By contrast, less educated mothers tended to explain the problem in terms of religious fatalism or superstition. One Bilbala mother, for example, viewed malnutrition as a divine intervention: *"God makes children malnourished when he wants to punish us and well-nourished when he doesn't"*, while another attributed her son's illness to affliction from the "evil eye": *"The cause of weight loss in children is the evil eye. The evil eye can be expelled by rotating egg, lemon and dried leaves over the child's head three times. He should then be excluded from other people. Only when he is taken to the marketplace or to the church with a lot of people around will he be cured. That is the time the evil spirit goes out of the child and lands on another person"*.

It should be stressed that the relationship between formal education, nutritional knowledge and caring practices did not emerge in our research as a simple or linear one. A number of respondents of varying educational levels continued to combine both indigenous health knowledge and practices with modern scientific health-seeking behaviour. *"When we take them to the health centre, the medicine they give the children does not help them. They soon get sick after two or three days. Therefore we take them for traditional treatment and after two or three days they are cured. So many people do not go to the health clinic to treat diarrhoea or vomiting"* (Uduga mother, 2005). Similarly, a focus group discussion in Wurib emphasised that education alone is insufficient. Instead, the potential influence of formal education is also mediated through a household's financial situation, which may constrain childcare options, as well as maternal health which has a powerful knock-on impact on infant health.

To tap the possible role of information dissemination in affecting child nutrition we assessed ownership of radio and television. We find that households that own radios have children who are less likely to be

stunted and underweight, suggesting that radio programmes on nutritional promotion are having some impact. For example, one mother from Ibesta noted that *“I still feed my four-year old breast milk because I know that it is good. I heard from the radio and also people that breastfeeding is good. I did not give him additional food until he was six months old”*. However, both urban and rural women complained about limited access to information, particularly related to family planning. One Kirkos mother emphasised the need for greater knowledge of different contraceptive methods and understanding of potential complications: *“There have to be some arrangements and planning on how to use family planning. The coil causes many problems and there are no lessons on how to protect ourselves from the side effects. Same with foam and pills – there need to be lessons on how to handle the side effects. Also with the vaccine, there are precautions to be taken but nobody gives us lessons on that”*. Similarly, a mother from Tigray complained that the methods to teach women about family planning employed by government-affiliated women’s associations were not sufficiently sensitive to women’s desire for privacy: *“They do not teach us about family planning and childcare... The women’s association just tell us during public meetings. But we want someone to teach us in our own homes”*.

Access to water and sanitation

Water and sanitation also emerged as important factors in explaining child malnutrition. Households that use water from unsafe sources such as a river are more likely to have children who are underweight, especially in rural areas, while children of households that use a pit latrine or flush toilet are less likely to be stunted or underweight. The opposite, however, was found in the case of wasting, particularly in urban areas, probably because of the unhealthy conditions of communal latrines in slum areas. The qualitative research also highlighted the importance of sanitation practices in diminishing the likelihood of malnutrition. As one health worker from Arato emphasised, ensuring adequate sanitation and hygiene standards often constitutes a major challenge for parents, especially with large numbers of children. *“The reason children do not get proper care is lack of family planning. If there are nine or ten children in a house who could manage to care for their food, clothes and hygiene? This is a common problem of our society. From our experience, when two or three children are found in a household they are raised properly and they are clean and well-fed”*.

Healthcare/health-seeking behaviour

In households where the mother made more antenatal visits the multivariate analysis concluded that children are less likely to be wasted and underweight, and children vaccinated against measles are less likely to be underweight. If we take antenatal visits and child vaccinations as proxies for health-seeking behaviour, these results suggest the importance of use of health facilities/services in reducing the incidence of underweight and wasting. However, the qualitative results suggested that there is still both inadequate understanding of and/or trust in modern scientific healthcare in tackling malnutrition, which is in turn reflected in an unwillingness to replace reliance on spiritual healers with faith in modern medicine. As the behaviour of one Arato mother underscores, even when caregivers do seek modern medical advice, they do not necessarily act on it for fear of possible side-effects: *“My son was very sick...I did not know what was wrong with him (I thought maybe malnutrition) so I took him to the health worker. He prescribed syrup, tablets and injections, but I did not give them to him as I thought it would be very strong for him to take....God made him well”* (Tigray mother, 2005). Indeed, our qualitative research found that in all our sites, many community members continue to adhere to

traditional belief systems about health and illness, and commonly employ practices related to warding off evil spirits and attracting divine intervention: *“My daughter has been sick because of her milk teeth. She became very thin. I took her to the clinic but she did not get better. People told me it was the evil eye. She always used to cry. They told me that her birth had been untimely. They then advised me to take her to the spiritual healer. But I did not because I do not believe in that”* (Ibesta mother, 2005). Rather than provide traditional health services which could potentially complement Western medical treatment – as herbalists (*medhanit awaki*) or bone-setters (*wogesha*) do – spiritual or witch doctors (*tenaquai*) commonly encourage practices that are based on superstitions. These have no physical impact on the child, except to potentially delay seeking alternative treatments. For example, one elderly woman in Wurib explained that: *“Traditionally we will slaughter a chicken and put it in the backyard. When the bird takes away the chicken, the child will get well”*. However, in other cases spiritual healers frequently press parents to remove an infant’s milk teeth or uvula as a ‘cure’ for diarrhoea. This can lead to infections, general weakness and blood loss and reduced ability to eat solid food, thereby often aggravating the child’s malnutrition. However, as this explanation from a mother in Ibesta underscores, many caregivers are convinced that such practices are in the best interests of the child: *“It is good to pull out milk teeth because when we take them to the health centre, the medicine they give does not help them. So we go for traditional treatment of diarrhoea and vomiting – they pull out the milk teeth. Although the health personnel advised us against removing milk teeth, I have pulled out the milk teeth of all my children”*.

The qualitative research also found that in addition to child health, maternal health, both pre- and post-partum, is considered to be very important in decreasing the likelihood of malnutrition. As an elder in Wurib pointed out: *“First and foremost, when the mother of the child suffers from lack of sufficient food, especially when she is pregnant, the child will be thin and weak”*. Similarly, as a Bilbala mother explained: *“When we mothers lose weight our breasts become exhausted. This results in children being stunted (yikechichal)”*.

Social capital

The quantitative results indicate that absolute social capital, specifically membership in religious groups, was found to increase the likelihood of stunting and underweight. However, we found that membership in funeral groups and women’s groups decreases the likelihood of a child being underweight and wasted in urban areas. While the qualitative research did not explore the role of religious organisations in depth, one possible reason for the negative influence on a child’s nutritional status could be that strongly religious parents put their faith in divine intervention (as discussed above) rather than actively seeking to improve their caring practices and to access appropriate preventative and curative healthcare.

3.2.4.3 Community characteristics

Urban/rural divide

The quantitative results indicate that Young Lives children in rural areas are more likely to be stunted than those in urban areas. However, Young Lives children in urban areas are more likely to be wasted and underweight compared with those in rural areas, controlling for all other factors. This result is surprising given that international literature suggests that the nutritional status of urban children is

usually better. One possible explanation is that because Young Lives purposefully selected poor sites, the urban poor in the sample may be relatively worse off particularly in terms of short-term nutritional problems. Longitudinal data also suggests that urban poverty is increasing more rapidly than rural poverty in Ethiopia and thus our data may be capturing part of the influence of this trend (Dercon, 2002). Moreover, it is worth noting that overall rural children in our sample were still significantly more likely to be malnourished than urban children: 16.8 percent of rural children were wasted, compared to 10.5 percent of urban children; 48.6 percent compared to 29 percent were underweight and 44.4 percent compared to 29.4 percent were stunted. In the qualitative research the main differences between urban and rural sites were the greater food availability in urban areas and the lower levels of reliance on spiritual healers in the case of infant illness. However, poverty and complaints about poor quality and expensive health services were shared across both populations.

Average distance to public health facilities

In the quantitative analysis, communities with better access to public health facilities were found to have a higher incidence of child wasting, stunting and underweight. This counter-intuitive result was also found by Christiansen and Alderman (2004), who argue that distance as a proxy for health-seeking behaviour may lack explanatory power as it fails to take into consideration the importance of quality of services. Our qualitative research suggests that service quality, availability of drugs and affordability of health services have a greater impact on a child's nutritional status than distance to health services.

A major concern is the treatment that poor women receive from health professionals. As one mother from Billbala complained, the growth monitoring programmes do not provide women with necessary information or increase their understanding about their child's well-being. Moreover, there tends to be an assumption by health professionals that mothers are ignorant: *"After they took the child's weight, they asked me if the child was sick and I answered yes. Then they gave him some drops but did not check him... They don't check. They don't ask. They don't tell."* (2005). Inequities in service delivery are another major issue facing impoverished households and their ability to take care of their children. A mother in the Addis Ababa *kebele* of Kirkos pointed out that patients with personal links to health personnel are often favoured: *"There is a big queue and it takes a long time to be seen to. Even if you get the service there are no medical supplies or there are problems with them. If you know someone there it is easier. I experienced that. The person who was next to me got the proper medicine because the health personnel knew him"*.

Cost is also a major concern. Although antenatal care is free of charge and the poor are eligible for exemptions from health fees, most clinics lack sufficient medical supplies giving patients and their families no choice but to buy expensive medicines from private pharmacies. *"The health personnel prescribe treatments but it is difficult to get medicine and they tell us to get it from other pharmacies which are not affordable. You need to have money for that and if there is not money, the other option is to take the child to a traditional healer"* (mother, Kirkos 2005).

4. Discussion and policy implications

The policy implications of our findings can best be discussed by referring to UNICEF's three-part conceptual framework on child malnutrition. We would emphasise, however, that a broad understanding of the factors that underpin the three core variables – “caring practices”, “food security” and “health services” – as well as their inter-linkages is necessary to develop a holistic, child-sensitive nutrition policy.

I. Factors related to caring practices

Many countries, including Ethiopia, are trying to adopt and implement systems for the integrated management of childhood illnesses developed by WHO and UNICEF. Their strategy has two components: institution- and home-based. At the health institution level the objective is to enable health workers to accurately identify childhood illnesses, treat major illnesses, give counselling to caregivers and establish functional referral systems for severely ill children. At the home level the strategy is to promote health-seeking behaviour, and improve nutrition, the provision of preventative care and the correct implementation of prescribed care (WHO, 2005). However, the strategy faces implementation problems due to failure to integrate child health and development into health policies, lack of adequate trained health personnel, shortage of drugs, and inefficient referral systems often hampered by lack of roads and appropriate transport systems.

There is much debate about whether to concentrate greater resources on providing more education to caregivers and communities so as to enhance their nutritional knowledge and related caring practices.¹⁸ Our findings suggest this debate needs to be more nuanced. Our qualitative findings underscore the importance of focusing on what caregivers and local communities do and do not understand about child nutrition, and how and why such knowledge does and does not translate into behavioural change.

Focus group discussions and in-depth interviews with women with both malnourished and well-nourished children indicated that caregivers can identify the symptoms of malnutrition, and are knowledgeable about key reasons for malnutrition such as: lack of a balanced diet, premature cessation of breastfeeding, inadequate birth spacing, poor sanitation, unvaccinated children and diarrhoea. However, our research suggested that there is often a disconnection between this awareness and follow-up behaviour and/or the capacity to act on this knowledge.

Respondents pointed out that financial and/or cultural constraints hampered household's preferred caring practices. For example:

- *Sanitation practices:* Mothers were aware of the importance of washing their hands before food preparation and feeding their children but frequently could not afford to buy soap.
- *Weaning food options:* Poorer households were frequently unable to provide ideal weaning foods for their babies, such as eggs, cows' milk, pasta and *kocho* (root of *enset*, false banana) and had to make do with less than ideal foods, such as *injera* (pancake-like bread made of cereals) eaten without other additions and *kolo* (roasted cereals), which are not digestible by babies and are believed to be low quality food for the poor.

- *Family spacing*: Access to contraception to ensure family spacing, longer breastfeeding and the provision of sufficient food was viewed as important by many female respondents. Although some families avoided birth control for religious reasons, many mothers emphasised that they were prevented from using birth control pills by their husbands and also by community stigmatisation of users.

However, in other cases, the solutions to deal with symptoms of child nutrition were based on misinformation and were often likely to exacerbate the child's illness. Examples included the following:

- In the case of infant diarrhoea caregivers often first seek out traditional healers. They recommend practices to ward off the “evil eye”, extraction of milk teeth and the uvula. These may at best have no impact, or in other cases aggravate the child's health problems, either through direct intervention or delay of medical treatment. While the problem is partially wealth-related – as the poor tend to go to modern health clinic services only as a last resort – such practices are also clearly related to the incompatibility of traditional and modern medical knowledge.
- Many women are aware of the general importance of clean water sources, but not about what characterises clean water. For example, one mother believed that decanting water would ensure that it was safe for her children to drink.
- Genetic differences may not be the only underlying reason behind the higher prevalence of malnutrition in boys than girls. Our research suggested that boys' earlier exposure to unsafe water in some regions may contribute to this difference, suggesting that there is a need to further investigate the impact of environmental factors on boys' and girls' nutritional status.
- Community awareness about the importance of increasing pregnant and lactating mothers' food intake seemed to be low, although insufficient breast-milk (due to a mother's ill-health, household food shortages and stress) was cited as a major problem.

Clearly, the Ministry of Health's health extension package needs to take as its starting point local understandings about child malnutrition *and* resulting local practices. Educational programmes about nutritional care then need to be developed that seek to bridge the gap between problem identification and solutions. For example, households need to know how to address diarrhoea and inflammations associated with teething (infant milk-teeth) and to be aware of how the remedies provided by traditional healers can be injurious to their children. Community education about the particular nutritional and food intake needs of pregnant and lactating mothers, as well as the problems faced by teenage mothers is also needed. Other complementary interventions that should be incorporated into the health and development extension packages include: a) the distribution of subsidised or free soap; b) efforts to expand availability of sources of safe water; c) construction and maintenance of clean community latrines, especially in urban areas; and d) provision of low-cost radio receivers in order to facilitate rural communities' access to information on nutrition, sanitation, health and development programmes.

Lastly, although our quantitative findings inexplicably found a negative relationship between adult female education and child malnutrition, our qualitative research results were in line with the broader

international literature and suggested that maternal education was important in terms of shaping caregiving practices. Policies to expand nutritional knowledge as well as general adult education should thus be developed in tandem.

II. Factors related to food security and income

Understood broadly as factors related to household livelihoods, food security and income issues were identified as being at least as important as maternal nutritional knowledge and caring practices in both the qualitative and quantitative findings. Our research suggests that the food security dimension of tackling child malnutrition needs to be concerned with improving aggregate household wealth (which enables families to purchase appropriate food both in seasons of plenty and of scarcity), the intra-household distribution of power and resources, and the introduction of mechanisms to allow women to better balance their caring and productive work responsibilities.

Seasonality

Food security is most obviously linked to seasonality and crop success or failure. Particularly in drought-prone rural areas, but also in urban areas such as Addis where the cost of food rises in winter and variety decreases, seasonal differences emerged as a major contributing factor to acute forms of malnutrition, including wasting. Such differences were further exacerbated by crop failure, suggesting that food security and safety-net programmes need to be designed to take into account the particular deprivations suffered during seasons of scarcity.

Wealth and assets

Household wealth and assets also emerged as being significantly related to lower incidences of wasting and underweight in one-year-old children. Wealth and assets mattered for three main reasons: the ability to provide appropriate weaning food, the ability to ensure that both expectant mothers and mothers are well-nourished (thereby reducing the likelihood of underweight babies and facilitating longer breastfeeding) and the ability to seek timely help from modern health services in the case of child illness (see discussion below). In this regard, the Rural Development Sector's policy emphasis on providing vocational training for farmers, introducing low-cost technologies (which will in turn decrease the demand for household labour) and initiatives to diversify household income sources constitute welcome developments. Similarly positive are the micro-credit programmes run by NGOs and micro-finance institutions that are targeting women in order to improve urban and rural household incomes. However, because these programmes are generally small-scale, we suggest that governmental efforts should be made to strengthen and expand micro-finance developments. It is of course important that measures are simultaneously taken to mitigate the potential nutritional risks to women and infants from long working hours outside the house. Ensuring the use of labour-saving technology within the household (possibly through subsidies) would be one option.

In addition to improving aggregate household wealth, its intra-household distribution also emerged as important. Women with at least some control over household income and/or access to credit in their own name are better able to address their children's dietary and healthcare needs. We would also add here that the Ministry of Agriculture's proposal to introduce gender-sensitive agricultural initiatives

- i.e. facilitating the production of consumption-oriented, low-labour intensive, nutrition-rich crops
- is a welcome step.

Caregiver's employment

The type of caregiver employment was found to have a more mixed impact. While access to independent income was generally positive, in some communities – especially in Guraghe/Wurib – focus group participants identified problems linked to the arduous hours worked by women market traders. Typically infants in such households are weaned as early as three months and left in the care of older siblings while the mother spends all day or even several days travelling and selling goods at market. Not only is child health potentially compromised by premature weaning and introduction of age-inappropriate foods, but in the absence of community childcare mechanisms this employment pattern reduces the amount of time available for childcare. In addition, it may create demands on older children that conflict with their education. Caregiver involvement in agricultural or construction work may also lead to similar outcomes, suggesting that safety nets to allow lactating mothers to practise exclusive breastfeeding for six months and the slow introduction of complementary foods over the child's first two years could be a crucial long-term investment at a key juncture in a child's life.

It is thus important to emphasise that the 2004 Food Security Package's inclusion of community childcare mechanisms and safety net programmes for pregnant and lactating mothers represents a very positive development. In the case of community childcare, however, no such initiatives had been started in the five sites where our research was carried out by March 2005, suggesting that more resources are needed to ensure that these programmes are reaching rural communities. Secondly, while it is important that the government recognises that it is difficult for women to work at full capacity during the later months of pregnancy and at least the first six months of lactation, cash transfers are needed to cushion the impact of women's (partial) withdrawal from productive and reproductive tasks during this period.

III. Factors related to health services and health-seeking behaviour

Rather than proximity to health services, our findings underscored the importance of the *quality* of health services. Respondents complained about inadequate equipment, poorly trained and/or insufficiently sensitive health professional and excessively expensive medication. Coverage of health services may have expanded significantly but the disappointingly limited and costly services available discourage users. Moreover, even though a health-fee waiver system has been introduced for poor households, it is excessively time-consuming and bureaucratic and thus discourages health-seeking behaviour among targeted households. As a result, many respondents still access traditional healers first and only turn to modern clinics as a last resort when the child's illness is already severe. This not only reduces the chances of a remedy but also contributes to further mistrust of clinic services.

In order to address these problems, our research suggests that the following measures would contribute significantly to tackling child malnutrition:

- Training by the Ministry of Health of nutritionists who would work alongside other health professionals to implement health and development extension packages. Nutritionists are

in short supply and expanding the country's nutritional expertise is necessary to better coordinate policy strategies and tackle the multi-dimensionality of malnutrition.

- Health professionals need sensitivity training so as to improve caregivers' confidence in their services. Such training should also include methods about how to provide caregivers with useful information so that they understand how and why their children are being treated and feel empowered to take better care of their children at home. Given that the kebele-level women's associations are involved in providing education about birth spacing and contraceptives, they may also benefit from similar capacity building. Monitoring whether users are satisfied with services would be a useful indicator of improvement.
- Concerted efforts also need to be made to ensure that essential quality drugs are available and health personnel know how to administer them appropriately. Our research into vaccinations found that one negative experience resulting in deformity can have a powerful deterrent effect for the wider community.
- Therapeutic feeding should be introduced to clinics to deal with acute cases of malnutrition.
- Although the health-fee waiver system for poor households is positive in principle, accessing this exemption is time-consuming and bureaucratic in practice. Caregivers are dissuaded from seeking medical treatment. Particularly in the case of acute illness, we recommend that a new system of certifying poor households as eligible for free care should be introduced to replace the current system where households have to seek a waiver on a case-by-case basis.
- While it is good that the SDPRP and the Health Sector Development Program (HSDP) recognise nutrition as an issue that cuts across multiple sectors we, nevertheless, believe that it is important to include specific nutritional indicators into the new PRSP so that a designated governmental agency can be held accountable for progress in tackling nutrition. As the Ministry of Labour and Social Affairs noted in a recent report to the UN on Ethiopia's progress in implementing the UN Convention on the Rights of the Child (UNCRC): "*The nutritional status of children is an indicator of the living standard level of households, the community and the Nation*" (MoLSA, 2004: 45).
- Lastly, more effort needs to be taken to eradicate the harmful practices carried out by traditional healers, which often exacerbate child ill-health. Although the SDPRP mentions the importance of promoting linkages between traditional and modern medical practitioners, our research suggests that more urgent measures are required. While traditional health providers may offer useful complementary services in some areas of health behaviour, the practices they advocate in the case of malnutrition are clearly unhelpful. This suggests that given the high levels of trust and reliance among rural (and to a lesser degree urban) Ethiopian communities in traditional medicine, the government would be well-advised to provide training for traditional healers in some aspects of modern medicine and solicit their support as front-line health workers. In addition, legislation should be introduced to ban the practice of harmful practices such as the removal of milk teeth and the uvula and to also prosecute those who provide such services.

Tables

Table 1.1 Child wasting in Ethiopia in percent (children aged 6–59 months)

Location		1995/96			1999/2000			% Change for all
		Male	Female	All	Male	Female	All	
Ethiopia	Wasted	8.9	9.4	9.2	10.2	9.0	9.6	4.3
	Severely wasted	3.3	3.6	3.4	1.9	1.6	1.8	-47.1
Rural	Wasted	9.3	9.8	9.5	10.5	9.3	9.9	4.2
	Severely wasted	3.4	3.8	3.6	1.9	1.7	1.8	-50.0
Urban	Wasted	6.5	7.2	6.8	6.5	5.6	6.1	-10.3
	Severely wasted	2.3	2.4	2.3	2.0	1.0	1.5	-34.8

Source: MoFED 2002a: 52.

Table 1.2 Child stunting in Ethiopia in percent (for children aged 6–59 months)

Location		1995/96			1999/2000			% Change for all
		Male	Female	All	Male	Female	All	
Ethiopia	Stunted	68.1	65.1	66.6	58.1	55.5	56.8	-14.7
	Severely stunted	45.2	42.2	43.7	32.0	30.6	31.3	-28.3
Rural	Stunted	70.0	66.7	68.4	59.4	56.4	57.9	-15.3
	Severely stunted	47.4	43.8	45.6	32.9	31.6	32.3	-29.2
Urban	Stunted	56.6	55.2	55.9	44.0	45.0	44.5	-20.4
	Severely stunted	32.1	31.9	32.0	21.5	20.4	21.0	-34.4

Source: MoFED 2002a: 54.

Table 2.1 Distance to reach the nearest health centre (in km) (1999/2000)

	Percentiles of individuals					
	5	25	50	75	95	Mean
National	0	2.5	6	10	18	7.01
Rural	1	3	6	11	20	7.98
Urban	0	0	1	2	3.5	1.17

Source: MoFED 2002a: 76.

Table 3.1 Descriptive statistics (full sample, urban and rural)

Variable name	Mean (Full Sample) N=1762	Mean (Urban) N=745	Mean (Rural) N=1017
Weight-for-height z-scores	-0.763	-0.534	-0.931
Weight-for-age z-scores	-1.636	-1.311	-1.875
Height-for-age z-scores	-1.516	-1.296	-1.678
Dummy for weight-for-height (1 if not wasted)	0.859	0.895	0.832
Dummy for weight-for-age (1 if not underweight)	0.597	0.710	0.514
Dummy for height-for-age (1 if not stunted)	0.620	0.706	0.556
Sex of child (1 if male)	0.525	0.511	0.536
Age of child in years	1.014	1.013	1.015
Birth order	3.107	2.639	3.448
Sex of caregiver (1 if male)	0.005	0.009	0.001
Sex of head (1 if male)	0.857	0.790	0.907
Age of mother in years	27.458	27.023	27.776
Age of caregiver in years	28.015	28.179	27.896
Age of head in years	37.444	38.075	36.983
Marital status (1 for permanent partner)	0.852	0.779	0.906
Years of schooling of mother	2.613	4.635	1.299
Years of schooling of father	3.769	5.826	2.548
Years of schooling of caregiver	2.522	4.573	1.218
Years of schooling of the head	3.508	5.662	2.478
Maximum years of schooling of a male member	5.109	7.201	3.577
Maximum years of schooling of a female member	3.985	6.035	2.485
Caregiver employed (1 if yes)	0.118	0.176	0.076
Number of male adults	1.247	1.326	1.189
Number of female adults	1.427	1.647	1.266
Number of boys (5–15 years)	0.762	0.646	0.847
Number of girls (5–15 years)	0.806	0.752	0.845
Number of children below 5 years	1.469	1.369	1.542
Religion of mother (1 if Muslim)	0.169	0.091	0.226
Number of cattle owned	1.224	0.319	1.887
Land 'owned' or rented in hectares	0.585	0.070	0.962
Wealth index	0.174	0.315	0.070
Household owns a radio (1 if yes)	0.395	0.609	0.238
Household owns a television (1 if yes)	0.059	0.139	0.001
Crop failure (1 if yes)	0.388	0.064	0.625

Continued overleaf

Table 3.1 Continued

Variable name	Mean (Full Sample) N=1762	Mean (Urban) N=745	Mean (Rural) N=1017
Decrease in food availability (1 if yes)	0.468	0.340	0.561
Received food aid (1 if yes)	0.208	0.043	0.329
Unsafe water source (1 if yes)	0.457	0.173	0.664
Uses pit latrine or flush toilet (1 if yes)	0.392	0.720	0.152
Distance of community to public health centre (1 if < 10km)	0.531	0.623	0.463
Diarrhoea in last 24 hours (1 if yes)	0.229	0.185	0.261
Fever in last 24 hours (1 if yes)	0.256	0.187	0.306
Child taken to health facility during serious illness1 (N=)	0.779	0.844	0.745
Child taken to health facility during serious illness2 (N=)	0.675	0.789	0.624
Number of antenatal visits	2.159	3.251	1.360
Gave birth at a health facility (1 if yes)	0.188	0.401	0.031
Cared for by under-five child(ren) (1 if yes)	0.117	0.072	0.150
Breastfeeding period in months	11.727	11.224	12.039
Received BCG vaccination (1 if yes)	0.732	0.811	0.674
Received vaccination against measles (1 if yes)	0.576	0.626	0.540
Member of funeral group (1 if yes)	0.544	0.489	0.584
Member of religious group (1 if yes)	0.380	0.278	0.454
Member of women's group (1 if yes)	0.195	0.164	0.217

Table 3.2 Linear correlation between indicators of child nutritional status and their associates*

	zwfh	zwfa	zhfa	lowwfh	lowwfa	lowhfa
Weight-for-height z-scores (zwfh)	1.00					
Weight-for-age z-scores (zwfa)	0.64	1.00				
	0.00					
Height-for-age z-scores (zhfa)	-0.07	0.71	1.00			
	0.00	0.00				
Wasting (lowwfh)(1 if wasted)	-0.62	-0.40	0.05	1.00		
	0.00	0.00	0.05			
Underweight (lowwfa)(1 if underweight)	-0.51	-0.78	-0.56	0.36	1.00	
	0.00	0.00	0.00	0.00		
Stunting (lowhfa) (1 if stunted)	0.03	-0.57	-0.77	-0.03	0.52	1.00
	0.16	0.00	0.00	0.17	0.00	
Sex of child (1 if male)	-0.03	-0.08	-0.11	0.06	0.05	0.09
	0.19	0.00	0.00	0.02	0.06	0.00

Continued overleaf

Table 3.2 Continued

	zwfh	zwfa	zhfa	lowwfh	lowwfa	lowhfa
Age of child in years	-0.23	-0.25	-0.22	0.11	0.20	0.15
	0.00	0.00	0.00	0.00	0.00	0.00
Birth order	-0.07	-0.06	-0.01	0.05	0.06	0.03
	0.01	0.01	0.60	0.02	0.01	0.21
Age of mother	-0.02	-0.03	-0.01	0.02	0.04	0.04
	0.30	0.25	0.75	0.41	0.08	0.11
Marital status (1 if permanent partner)	-0.02	0.02	0.05	0.01	-0.03	-0.03
	0.40	0.31	0.03	0.73	0.23	0.18
Years of schooling of mother	0.11	0.13	0.08	-0.07	-0.12	-0.06
	0.00	0.00	0.00	0.00	0.00	0.01
Years of schooling of father	0.07	0.13	0.10	-0.05	-0.11	-0.09
	0.00	0.00	0.00	0.06	0.00	0.00
Years of schooling of a female household member	0.09	0.13	0.08	-0.06	-0.12	-0.07
	0.00	0.00	0.00	0.01	0.00	0.00
Caregiver employed (1 if yes)	0.00	0.04	0.04	-0.01	-0.02	-0.02
	0.94	0.14	0.11	0.62	0.38	0.36
Years of schooling of a male household member	0.07	0.14	0.12	-0.03	-0.12	-0.11
	0.00	0.00	0.00	0.19	0.00	0.00
Number of male adults	0.02	0.07	0.06	-0.01	-0.04	-0.05
	0.51	0.01	0.01	0.71	0.07	0.03
Number of female adults	0.04	0.08	0.06	-0.04	-0.07	-0.09
	0.07	0.00	0.01	0.11	0.00	0.00
Number of boys (5-15 years)	-0.06	-0.02	0.03	0.07	0.03	-0.03
	0.01	0.38	0.18	0.00	0.20	0.17
Number of girls (5-15 years)	0.01	0.01	0.01	-0.00	0.01	0.02
	0.78	0.56	0.54	0.96	0.75	0.49
Number of children below 5 years	-0.07	-0.09	-0.05	0.05	0.08	0.03
	0.00	0.00	0.04	0.03	0.00	0.27
Religion of caregiver (1 if Muslim)	-0.21	-0.11	0.05	0.17	0.09	-0.04
	0.00	0.00	0.04	0.00	0.00	0.06
Number of cattle owned	-0.07	-0.08	-0.03	0.04	0.08	0.04
	0.01	0.00	0.14	0.10	0.00	0.11
Land owned or rented	-0.14	-0.19	-0.12	0.07	0.16	0.10
	0.00	0.00	0.00	0.01	0.00	0.00
Wealth index	0.23	0.30	0.16	-0.15	-0.27	-0.18
	0.00	0.00	0.00	0.00	0.00	0.00
Ownership of radio	0.11	0.19	0.13	-0.06	-0.16	-0.16
	0.00	0.00	0.00	0.02	0.00	0.00

Continued overleaf

Table 3.2 Continued

	zwfh	zwfa	zhfa	lowwfh	lowwfa	lowhfa
Ownership of television	0.11	0.15	0.08	-0.07	-0.12	-0.10
	0.00	0.00	0.00	0.00	0.00	0.00
Crop failure (1 if yes)	-0.13	-0.12	-0.03	0.08	0.11	0.05
	0.00	0.00	0.28	0.00	0.00	0.03
Decrease in food availability (1 if yes)	-0.09	-0.09	-0.03	0.02	0.10	0.07
	0.00	0.00	0.16	0.31	0.00	0.00
Food aid received (1 if yes)	-0.06	-0.07	-0.06	-0.00	0.09	0.08
	0.02	0.00	0.02	0.90	0.00	0.00
Unsafe water (1 if yes)	-0.11	-0.16	-0.10	0.07	0.15	0.10
	0.00	0.00	0.00	0.00	0.00	0.00
Uses pit latrine or flush toilet (1 if yes)	0.18	0.29	0.19	-0.09	-0.25	-0.19
	0.00	0.00	0.00	0.00	0.00	0.00
Average distance of community to public health facility (1 if less than 10km)	0.19	0.06	-0.10	-0.10	-0.05	0.07
	0.00	0.01	0.00	0.00	0.04	0.01
Diarrhoea (1 if yes)	-0.05	-0.11	-0.09	0.03	0.12	0.08
	0.04	0.00	0.00	0.20	0.00	0.00
Fever (1 if yes)	-0.11	-0.09	-0.01	0.08	0.08	0.03
	0.00	0.00	0.80	0.00	0.00	0.19
Number of antenatal visits	0.11	0.16	0.10	-0.08	-0.15	-0.09
	0.00	0.00	0.00	0.00	0.00	0.00
Gave birth at a health facility (1 if yes)	0.14	0.18	0.09	-0.09	-0.15	-0.10
	0.00	0.00	0.00	0.00	0.00	0.00
Child cared for by under-five child(ren) (1 if yes)	-0.13	-0.09	0.00	0.07	0.07	-0.00
	0.00	0.00	0.95	0.00	0.00	0.96
Length of breastfeeding period	-0.21	-0.26	-0.23	0.19	0.23	0.20
	0.00	0.00	0.00	0.00	0.00	0.00
BCG vaccination (1 if yes)	0.08	0.09	0.03	-0.04	-0.07	-0.03
	0.00	0.00	0.23	0.08	0.01	0.29
Vaccination against measles (1 if yes)	-0.06	-0.01	0.00	0.02	-0.00	-0.00
	0.02	0.67	0.94	0.44	0.90	0.95
Membership in funeral group (1 if yes)	-0.03	-0.04	-0.02	0.03	0.02	0.03
	0.26	0.08	0.33	0.15	0.35	0.26
Membership in religious group (1 if yes)	0.01	-0.01	-0.02	-0.01	0.02	0.04
	0.74	0.59	0.51	0.83	0.30	0.06
Membership in women's group (1 if yes)	-0.02	0.03	0.06	-0.03	-0.00	-0.03
	0.35	0.17	0.02	0.26	0.92	0.24

*Numbers just below the correlation coefficients are p-values.

Table 3.3 Estimation results for full sample

	Wasting		Stunting		Underweight	
	OLS	Probit	OLS	Probit	OLS	Probit
Sex of child (1 if male)	-0.126	0.314	-0.305	0.262	-0.233	0.165
	(5.05)***	(2.99)***	(6.03)***	(5.19)***	(6.26)***	(3.20)***
Age of child in years	-2.863	1.180	-5.154	4.647	-6.721	7.915
	(3.68)***	(1.05)	(4.67)***	(4.91)***	(9.00)***	(8.67)***
Age of child squared	0.961	-0.190	1.942	-1.878	2.767	-3.357
	(2.60)**	(0.35)	(3.94)***	(4.66)***	(7.59)***	(7.72)***
Birth order	-0.003	-0.002	-0.042	0.039	-0.035	0.008
	(0.12)	(0.03)	(1.25)	(1.09)	(1.12)	(0.16)
Age of mother in years	-0.019	-0.059	0.025	0.007	-0.008	0.039
	(0.70)	(1.21)	(0.69)	(0.19)	(0.27)	(0.93)
Age of mother squared	0.000	0.001	-0.000	-0.000	0.000	-0.001
	(0.60)	(1.27)	(0.68)	(0.01)	(0.26)	(0.81)
Marital status (1 for permanent partner)	0.069	-0.250	0.269	-0.182	0.236	-0.273
	(0.80)	(1.63)	(2.10)**	(1.52)	(2.58)**	(2.63)***
Max. yrs schooling of a female member	-0.012	0.033	-0.003	-0.028	-0.009	0.011
	(1.27)	(1.78)*	(0.25)	(1.22)	(0.97)	(0.96)
Max. yrs schooling of a male member	-0.002	-0.001	0.026	0.013	0.016	-0.006
	(0.15)	(0.07)	(2.45)**	(2.68)***	(1.35)	(0.45)
Caregiver employed (1 if yes)	0.048	-0.085	0.019	0.059	0.050	-0.026
	(0.81)	(0.52)	(0.17)	(0.48)	(0.69)	(0.25)
Number of male adults	-0.017	0.018	0.007	0.020	0.003	0.027
	(0.43)	(0.26)	(0.16)	(0.46)	(0.05)	(0.49)
Number of female adults	0.003	-0.074	0.022	-0.089	0.013	-0.052
	(0.13)	(1.25)	(0.48)	(1.77)*	(0.31)	(0.91)
Number of boys (5-15 years)	-0.016	0.105	0.110	-0.135	0.066	-0.028
	(0.33)	(1.23)	(1.89)*	(2.27)**	(1.59)	(0.49)
Number of girls (5-15 years)	0.002	0.013	0.054	-0.022	0.043	-0.001
	(0.05)	(0.21)	(0.78)	(0.32)	(0.93)	(0.02)
Number of children below 5 years	-0.000	0.021	-0.206	0.074	-0.123	0.122
	(0.01)	(0.27)	(2.79)**	(1.05)	(2.27)**	(1.69)*
Religion of mother (1 if Muslim)	0.080	-0.099	-0.127	0.066	-0.018	-0.034
	(1.10)	(0.98)	(0.93)	(0.47)	(0.23)	(0.17)
Number of cattle owned	0.020	-0.036	0.007	-0.003	0.017	-0.005
	(1.62)	(1.60)	(0.29)	(0.10)	(1.04)	(0.34)
Land 'owned' or rented in hectares	-0.008	-0.003	0.013	-0.059	0.001	-0.049
	(0.19)	(0.05)	(0.21)	(0.99)	(0.03)	(1.00)
Wealth index	0.814	-1.250	0.666	-0.568	1.056	-1.370
	(2.53)**	(2.47)**	(1.39)	(0.96)	(2.37)**	(2.28)**
Household owns a radio (1 if yes)	0.039	-0.014	0.146	-0.228	0.134	-0.129
	(0.46)	(0.12)	(1.58)	(2.40)**	(1.85)*	(1.25)
Household owns a television (1 if yes)	-0.018	-0.083	0.080	-0.258	0.032	0.019
	(0.16)	(0.39)	(1.26)	(1.58)	(0.56)	(0.25)
Crop failure (1 if yes)	-0.102	0.354	0.129	-0.192	-0.002	-0.014

Continued overleaf

Table 3.3 Continued

	Wasting		Stunting		Underweight	
	OLS	Probit	OLS	Probit	OLS	Probit
	(2.12)**	(3.22)***	(1.19)	(1.89)*	(0.03)	(0.12)
Decrease in food availability (1 if yes)	0.053	-0.151	-0.053	0.166	0.003	0.083
	(0.93)	(1.57)	(0.54)	(1.39)	(0.04)	(0.77)
Received food aid (1 if yes)	-0.021	0.019	-0.003	0.021	-0.016	0.085
	(0.40)	(0.15)	(0.03)	(0.15)	(0.20)	(0.72)
Unsafe water source (1 if yes)	-0.060	-0.073	-0.092	0.024	-0.105	0.218
	(1.01)	(0.81)	(0.76)	(0.19)	(1.36)	(2.78)***
Uses pit latrine or flush toilet (1 if yes)	-0.114	0.284	0.369	-0.260	0.162	-0.093
	(1.32)	(2.29)**	(4.35)***	(2.92)***	(2.21)**	(1.83)*
Distance of community to public health center (1 if less than 10km)	-0.114	0.537	-0.698	0.559	-0.654	0.678
	(0.99)	(2.06)**	(6.12)***	(3.12)***	(6.21)***	(3.87)***
Number of antenatal visits	0.005	-0.036	-0.002	0.004	0.005	-0.022
	(0.38)	(2.19)**	(0.16)	(0.34)	(0.73)	(1.76)*
Gave birth at a health facility (1 if yes)	-0.031	-0.076	-0.050	0.056	-0.066	0.109
	(0.27)	(0.45)	(0.34)	(0.46)	(0.79)	(0.95)
Cared for by under-five child(ren) (1 if yes)	-0.111	-0.153	0.233	-0.179	0.037	-0.089
	(1.73)	(1.59)	(2.88)***	(1.99)**	(0.61)	(1.00)
Received vaccination against measles (1 if yes)	0.030	-0.075	0.128	-0.068	0.112	-0.134
	(0.45)	(0.63)	(1.59)	(0.74)	(2.00)*	(1.53)
Member of funeral group (1 if yes)	0.057	-0.155	-0.092	0.099	-0.016	-0.081
	(0.91)	(1.48)	(1.63)	(1.13)	(0.43)	(0.97)
Member of religious group (1 if yes)	-0.007	0.007	-0.114	0.148	-0.085	0.161
	(0.14)	(0.08)	(1.57)	(1.80)*	(2.64)**	(2.90)***
Member of women's group (1 if yes)	-0.015	-0.044	0.007	0.027	-0.000	0.139
	(0.26)	(0.45)	(0.07)	(0.23)	(0.00)	(1.50)
Urban	-0.700	0.171	-0.280	-0.677	-0.795	-0.242
	(6.21)***	(0.81)	(1.66)	(2.04)**	(7.05)***	(1.07)
Constant	1.696	-1.731	1.387	-3.123	2.603	-5.574
	(3.25)***	(1.86)*	(1.75)*	(5.68)***	(5.44)***	(6.34)***
Observations	1762	1762	1762	1762	1762	1762
R-squared	0.29		0.24		0.29	

Robust t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

+ The value of the dependent variable is 1 if the child is wasted, stunted or underweight and is 0 if not.

Table 3.4 Estimation results for wasting by location

	OLS Urban	OLS Rural	Probit Urban+	Probit Rural+
Sex of child (1 if male)	-0.080	-0.149	0.216	0.388
	(1.31)	(6.08)***	(1.24)	(2.83)***
Age of child in years	-1.744	-3.518	2.555	0.830
	(1.24)	(3.76)***	(2.32)**	(0.52)
Age of child squared	0.535	1.243	-1.009	0.039
	(0.79)	(2.80)**	(1.72)*	(0.05)
Birth order	-0.043	0.054	0.121	-0.143
	(1.34)	(1.77)	(1.80)*	(1.98)**
Age of mother in years	-0.071	0.015	-0.054	-0.066
	(2.06)*	(0.56)	(0.54)	(1.33)
Age of mother squared	0.001	-0.000	0.001	0.001
	(2.03)*	(0.64)	(0.44)	(1.35)
Marital status (1 for permanent partner)	0.104	0.040	-0.541	0.053
	(0.92)	(0.36)	(2.26)**	(0.25)
Max. yrs schooling of a female member	-0.006	-0.018	0.018	0.034
	(0.52)	(1.09)	(0.67)	(1.73)*
Max. yrs schooling of a male member	-0.019	0.009	0.037	-0.019
	(0.88)	(0.73)	(1.12)	(0.76)
Caregiver employed (1 if yes)	0.010	0.065	-0.007	-0.071
	(0.12)	(0.70)	(0.02)	(0.30)
Number of male adults	0.044	-0.132	-0.089	0.144
	(0.83)	(2.87)**	(1.09)	(1.36)
Number of female adults	-0.017	0.016	-0.040	-0.048
	(0.61)	(0.29)	(0.54)	(0.47)
Number of boys (5-15 years)	0.075	-0.118	-0.134	0.338
	(1.07)	(2.16)*	(1.40)	(3.19)***
Number of girls (5-15 years)	-0.000	-0.060	-0.149	0.214
	(0.00)	(1.13)	(1.28)	(2.86)***
Number of children below 5 years	0.071	-0.076	-0.132	0.161
	(1.33)	(1.06)	(0.86)	(2.14)**
Religion of mother (1 if Muslim)	0.174	-0.004	-0.170	-0.017
	(2.61)**	(0.05)	(1.14)	(0.15)
Number of cattle owned	-0.060	0.046	0.071	-0.064
	(1.68)	(3.43)***	(0.97)	(2.32)**
Land 'owned' or rented in hectares	-0.378	0.014	0.234	-0.039
	(1.34)	(0.40)	(0.50)	(0.75)
Wealth index	0.982	0.177	-2.036	-0.399
	(2.26)*	(0.42)	(3.64)***	(0.47)
Household owns a radio (1 if yes)	0.171	-0.063	0.060	-0.069
	(1.96)*	(0.53)	(0.46)	(0.41)

Continued overleaf

Table 3.4 Continued

	OLS Urban	OLS Rural	Probit Urban +	Probit Rural +
Household owns a television (1 if yes)	-0.054		-0.007	
	(0.47)		(0.03)	
Crop failure (1 if yes)	-0.008	-0.108	0.314	0.292
	(0.10)	(1.86)*	(2.17)**	(2.39)**
Decrease in food availability (1 if yes)	0.026	0.061	-0.301	-0.001
	(0.31)	(0.84)	(2.04)**	(0.01)
Received food aid (1 if yes)	-0.063	-0.028	0.228	0.009
	(0.59)	(0.45)	(1.06)	(0.06)
Unsafe water source (1 if yes)	-0.056	-0.031	-0.184	-0.020
	(0.69)	(0.37)	(0.83)	(0.17)
Uses pit latrine or flush toilet (1 if yes)	-0.257	-0.019	0.510	0.122
	(2.15)*	(0.15)	(3.11)***	(0.66)
Distance of community to public health center (1 if less than 10km)	0.291	-0.178	1.522	0.608
	(4.52)***	(1.28)	(9.97)***	(1.55)
Number of antenatal visits	0.021	-0.016	-0.042	-0.029
	(1.12)	(1.61)	(1.85)*	(1.05)
Gave birth at a health facility (1 if yes)	0.005	-0.157	-0.017	-0.285
	(0.04)	(0.60)	(0.14)	(0.51)
Cared for by under-five child(ren) (1 if yes)	-0.203	-0.081	-0.063	-0.195
	(1.99)*	(1.02)	(0.31)	(1.77)*
Received vaccination against measles (1 if yes)	-0.013	0.050	-0.184	-0.015
	(0.09)	(0.68)	(0.87)	(0.10)
Member of funeral group (1 if yes)	0.039	0.102	-0.230	-0.040
	(0.32)	(1.51)	(1.47)	(0.27)
Member of religious group (1 if yes)	-0.005	-0.010	0.050	-0.011
	(0.04)	(0.14)	(0.33)	(0.12)
Member of women's group (1 if yes)	0.029	-0.016	-0.334	0.050
	(0.33)	(0.18)	(2.12)**	(0.33)
Constant	1.861	1.805	-2.121	-2.205
	(2.67)**	(2.43)**	(1.20)	(1.99)**
Observations	744	1018	744	1018
R-squared	0.21	0.34		

Robust t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

+ The value of the dependent variable is 1 if the child is wasted and is 0 if not.

Table 3.5 Estimation results for underweight by location

	OLS Urban	OLS Rural	Probit Urban+	Probit Rural+
Sex of child (1 if male)	-0.302 (5.02)***	-0.187 (3.76)***	0.195 (2.38)**	0.141 (1.88)*
Age of child in years	-5.650 (4.27)***	-7.298 (8.96)***	5.764 (3.57)***	9.319 (9.05)***
Age of child squared	2.283 (3.50)***	3.055 (8.05)***	-2.405 (3.13)***	-4.000 (8.03)***
Birth order	-0.082 (3.02)**	0.051 (0.97)	0.073 (1.05)	-0.077 (1.07)
Age of mother in years	0.006 (0.12)	-0.035 (1.10)	-0.000 (0.00)	0.078 (1.52)
Age of mother squared	0.000 (0.12)	0.000 (0.81)	-0.000 (0.00)	-0.001 (1.38)
Marital status (1 for permanent partner)	0.233 (3.07)**	0.223 (1.57)	-0.359 (4.39)***	-0.144 (0.83)
Max. yrs schooling of a female member	-0.004 (0.42)	-0.016 (0.87)	0.006 (0.44)	0.021 (1.02)
Max. yrs schooling of a male member	0.012 (0.57)	0.017 (1.19)	-0.005 (0.20)	-0.001 (0.08)
Caregiver employed (1 if yes)	0.013 (0.11)	0.080 (0.69)	-0.006 (0.05)	-0.002 (0.01)
Number of male adults	0.083 (1.47)	-0.177 (2.99)**	-0.054 (0.80)	0.171 (2.30)**
Number of female adults	-0.013 (0.29)	0.022 (0.28)	-0.051 (0.62)	-0.010 (0.11)
Number of boys (5-15 years)	0.080 (1.61)	0.006 (0.07)	-0.075 (0.82)	0.060 (0.76)
Number of girls (5-15 years)	0.081 (2.03)*	-0.042 (0.46)	-0.022 (0.28)	0.073 (0.64)
Number of children below 5 years	-0.050 (0.64)	-0.217 (2.66)**	0.170 (2.58)***	0.135 (1.16)
Religion of mother (1 if Muslim)	0.069 (0.57)	-0.138 (1.70)	-0.009 (0.05)	0.006 (0.02)
Number of cattle owned	-0.087 (2.69)**	0.043 (2.38)**	0.107 (2.99)***	-0.027 (1.54)
Land 'owned' or rented in hectares	-0.189 (0.89)	0.024 (0.66)	0.189 (1.07)	-0.070 (1.37)
Wealth index	1.232 (2.11)*	0.398 (0.69)	-1.755 (2.22)**	-0.827 (0.93)
Household owns a radio (1 if yes)	0.207 (2.53)**	0.070 (0.62)	-0.197 (1.74)*	-0.105 (0.60)
Household owns a television (1 if yes)	-0.039 (0.58)		0.141 (3.47)***	
Crop failure (1 if yes)	0.122	-0.019	-0.203	-0.031

Continued overleaf

Table 3.5 Continued

	OLS Urban	OLS Rural	Probit Urban+	Probit Rural+
	(1.02)	(0.16)	(2.27)**	(0.18)
Decrease in food availability (1 if yes)	-0.028	0.019	0.006	0.171
	(0.34)	(0.15)	(0.05)	(1.02)
Received food aid (1 if yes)	0.112	-0.049	-0.383	0.185
	(0.58)	(0.56)	(1.20)	(1.57)
Unsafe water source (1 if yes)	-0.106	-0.079	0.072	0.277
	(0.71)	(0.79)	(0.67)	(2.42)**
Uses pit latrine or flush toilet (1 if yes)	0.108	0.174	-0.094	-0.037
	(1.12)	(1.33)	(1.10)	(0.53)
Distance of community to public health center (1 if less than 10km)	-0.159	-0.650	0.275	0.739
	(4.38)***	(4.29)***	(1.23)	(3.85)***
Number of antenatal visits	0.011	-0.001	-0.027	-0.017
	(1.22)	(0.09)	(1.51)	(0.91)
Gave birth at a health facility (1 if yes)	-0.007	-0.256	0.057	0.251
	(0.09)	(0.99)	(0.41)	(0.95)
Cared for by under-five child(ren) (1 if yes)	0.032	0.006	-0.056	-0.060
	(0.20)	(0.12)	(0.32)	(0.61)
Received vaccination against measles (1 if yes)	0.059	0.154	-0.072	-0.168
	(0.45)	(2.64)**	(0.33)	(1.80)*
Member of funeral group (1 if yes)	0.040	-0.024	-0.344	0.083
	(0.59)	(0.41)	(3.60)***	(0.88)
Member of religious group (1 if yes)	-0.057	-0.089	0.204	0.154
	(1.17)	(1.84)*	(3.08)***	(1.89)*
Member of women's group (1 if yes)	-0.001	0.046	0.062	0.157
	(0.02)	(0.54)	(0.32)	(1.53)
Constant	1.267	3.559	-3.156	-7.332
	(1.58)	(9.68)***	(2.57)**	(7.56)***
Observations	744	1018	744	1018
R-squared	0.23	0.30		

Robust t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

+ The value of the dependent variable is 1 if the child is underweight and is 0 if not.

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The Young Lives Partners

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Young Lives is an international longitudinal study of childhood poverty, taking place in Ethiopia, India, Peru and Vietnam, and funded by DFID. The project aims to improve our understanding of the causes and consequences of childhood poverty in the developing world by following the lives of a group of 8,000 children and their families over a 15-year period. Through the involvement of academic, government and NGO partners in the aforementioned countries, South Africa and the UK, the Young Lives project will highlight ways in which policy can be improved to more effectively tackle child poverty.

This paper emphasises that malnutrition cannot be tackled without understanding its causes. Child malnutrition remains a major public health problem in Ethiopia, yet the government has no specific nutrition policy. Levels of wasting (acute malnutrition) and stunting (chronic malnutrition) in children aged six to fifty-nine months are among the world's highest. As long as so many children remain malnourished, Ethiopia will not achieve the first Millennium Development Goal – eradication of extreme poverty and hunger.

Drawing on a sample of 1,999 one-year-olds from twenty sentinel sites, the Young Lives Project has sought to better understand the child-, household-, community- and policy-level determinants of malnutrition and the ways in which they differ across different regions of Ethiopia. The paper quantifies the impact of poverty, healthcare and caring practices and challenges the World Bank belief that investment in growth monitoring to promote change in caregivers' behaviour will, by itself, significantly improve nutritional status.

Coverage of health services may have expanded, but limited and costly services discourage users. Health care choices primarily depend not on proximity to health facilities but lack of quality services. Respondents complained about inadequate equipment, poorly trained and/or insensitive medical staff and expensive medication.

The following measures would contribute significantly to tackling child malnutrition:

- training more nutritionists to work alongside other health professionals
- training to make health workers more sensitive and monitoring levels of user satisfaction
- introducing therapeutic feeding in clinics
- concerted efforts to ensure that essential quality drugs are available and health personnel know how to administer them
- a streamlined system to allow certified poor households to receive free medical care
- action to eradicate harmful practices – such as removal of milk teeth and the uvula - carried out by traditional healers
- inclusion of specific nutritional indicators in Ethiopia's new Poverty Reduction Strategy Paper so that a designated agency can be held accountable for progress to improve child nutrition.

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