

Child nutrition in Ethiopia: A Review Article

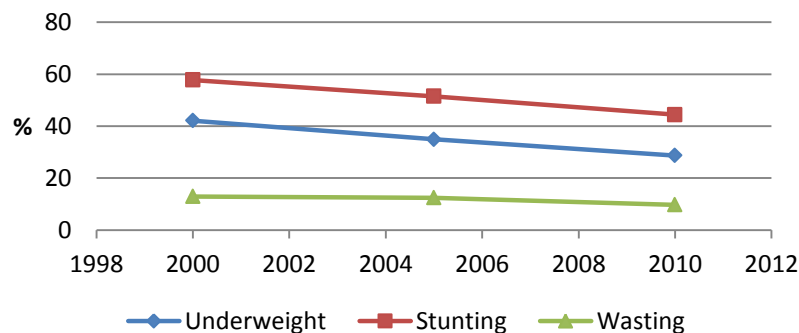
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Introduction

Ethiopia has recorded remarkable development gains over the past two decades. Child deaths were cut by 67 per cent from 204 per 1000 live births in 1990 to 68 per 1000(1) live births in 2012 achieving MDG 4 on child survival, three years ahead of time; the number of children in school trebled from as low as 32 per cent in 1990s to 96.4 per cent (2); people with access to clean water more than doubled, with improved access to safe water for 54 per cent (3) of the population. In addition, the country has seen the proportion of people living below the poverty line decline from 44 per cent in 1995 to 30 per cent in 2011(4).

With respect to nutrition indicators, between 2000 and 2011, the national stunting prevalence rates declined by 24% (from 58% to 44%), whilst underweight declined from 42 per cent to 29 per cent (by 31%) and wasting from 13 per cent to 10 per cent. (See Figure 1 below) Anaemia prevalence amongst child under-five remains high at 44 per cent (even though it declined by 19% in the last 6 years), and whilst there are recent improvements in the production of iodised salt still only 15 per cent of household are consuming iodised salt. Regarding infant feeding practices just over half (52 per cent) of children under 6 months were exclusively breastfed, and of even greater concern, only 4.3 per cent of children aged older than 6 months consumed the recommended 4 food groups and only 13 per cent of children under 2 consumed iron rich foods.

Figure 1. Ethiopia DHS Anthropometric Trends (WHO standards)



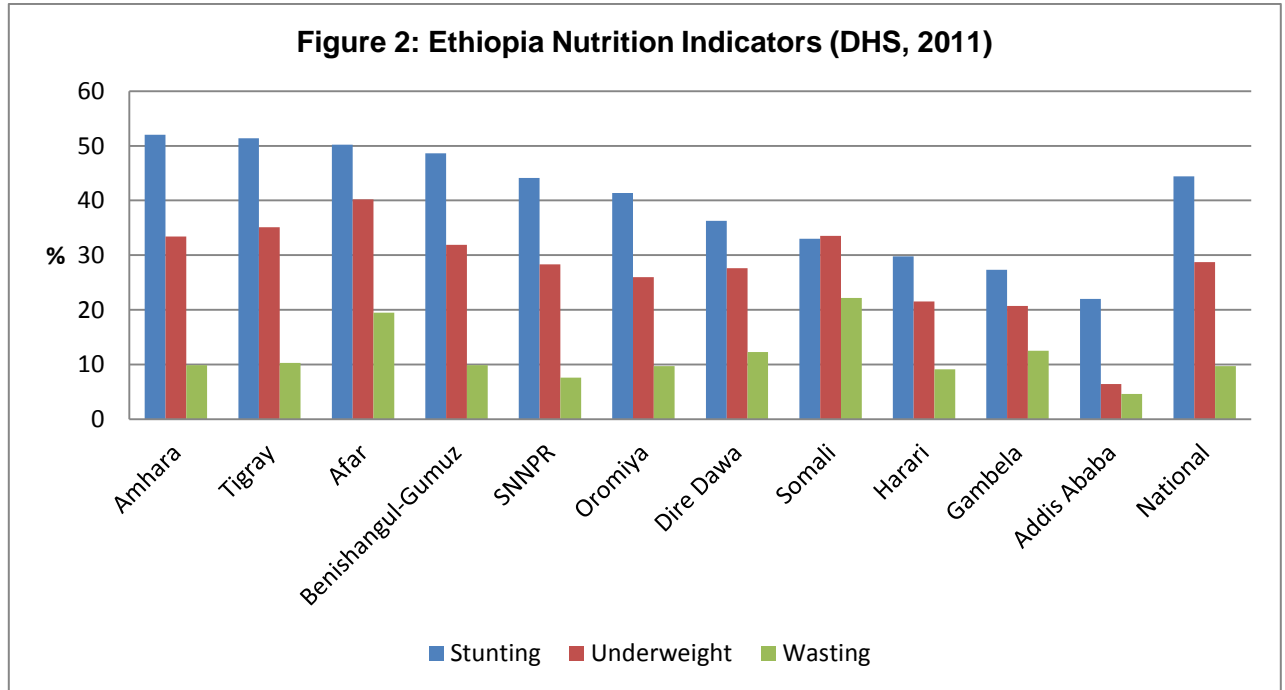
¹ UNIGME report 2013, APR report 2013

² Education Statistics Annual Abstract 2010/11 (MoE)

³ EDHS 2011

⁴ Ethiopia's Progress Towards Eradicating Poverty: An Interim Report on Poverty Analysis Study (2010/11), MoFED (2012)

There are significant regional disparities that emerge in Ethiopia, with regions such as Tigray and Amhara, despite having good agriculture yields, also having the highest levels of stunting at 51% and 52%, respectively. The figure (2) below highlights these stark regional disparities in nutritional status.



It is in full recognition of these remaining challenges regarding nutritional status of infants and young children that the Federal Ministry of Health in close partnership with 9 other social sector ministries decided to review and update the 2008 National Nutrition Program.

Revised NNP Builds on Sound Scientific Evidence and Programme Experiences

In June 2013, Ethiopia launched an ambitious and revised National Nutrition Plan for Ethiopia, that seeks to transform the economic and development trajectory of millions of children and their mothers, by addressing food and nutrition insecurity in the country. The revision process of the NNP was based on a solid foundation of the current evidence base to support large scale nutrition programming efforts. Indeed as part of the launch activities, the new Lancet Maternal and Child Nutrition Series (LNS 2013) was also launched in Ethiopia.

The LNS 2013 acknowledges that nutrition is crucial to both individual and national development. The LNS 2013 highlighted that

globally there are 165 million children under five who are stunted and the current annual rate of reduction (2.1%) is not fast enough to reach the World Health Assembly target of a 40 per cent reduction in the number of children under five who are stunted by 2025. The LNS 2013 also demonstrated that under-nutrition is responsible for 45 per cent of all under five child deaths representing more than 3 million deaths per year. Foetal growth restriction and sub-optimal breastfeeding together account for more than 1.3 million deaths and micronutrient deficiencies in particular vitamin A deficiency and zinc deficiency are responsible for nearly 300,000 child deaths. Overall, the LNS 2013 strengthened the case for the continued focus on the window of opportunity namely the 1,000

days during pregnancy and the first two years of life. The revised NNP for Ethiopia includes most of the 10 priority evidence based

interventions, in the LNS 2013, to prevent and treat under-nutrition across the whole life course.

The revised NNP aims to strategically address nutrition problems in the country by:

- Taking into account the multi-sectoral and multi-dimensional nature of under-nutrition and to identify the roles and responsibility of other sectors to contribute to nutrition through a concrete plan of action for linkages among the sectors
 - Focussing on the lifecycle approach to map key actions needed to improve the nutritional status of women and children starting with the first thousand days, and in particular articulates nutrition actions for in and out of school adolescents, through to pregnant women and the first 2 years of life, building on the accelerated stunting
 - partner can contribute to better nutrition outcomes.
- reduction strategy that was developed by the FMOH with development partners in Feb 2011
 - Strengthening initiatives that were not adequately addressed in the previous national nutrition programme such as food fortification and nutrition sensitive actions
 - Aligning the reporting period to the GTP and the MDGs , namely 2015
 - Articulating ambitious targets and includes accountability/ results matrix depicting how each of the results can be realized and how each NNP implementing

Box A: The centrality of stunting reduction in Ethiopia

At the core of the revised NNP 2013 to 2015 is the target to reduce stunting prevalence from 44% to 30% by 2015. The renewed focus on stunting in Ethiopia is based on a thorough review of the evidence base showing the consequences of stunting across the lifecycle starting with the first 1000 days of life as well as its social and economic impact

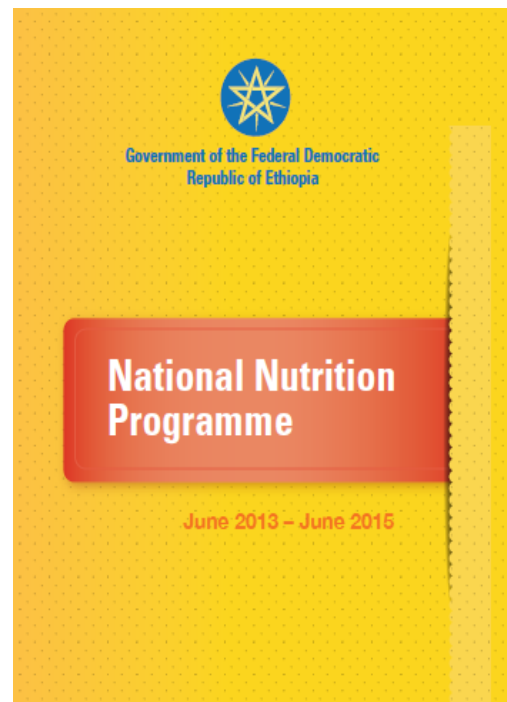


Table 1: NNP Impact indicators

Results Indicators	2010/11 (Baseline)	2012/ 13	2014/ 15
Proportion of under 5 children with height-for- age Z-score below -2 SD (Prevalence of stunting)	44.4	38	30
Proportion of under 5 children with weight-for- age Z-score below -2 SD (Prevalence of under-weight)	28.70	25	21
Proportion of under 5 children with weight-for- height Z-score below -2 SD (Prevalence of wasting)	9.70	7	5
Proportion of women of reproductive age (15-49 years) with BMI <18.5	27	24	19
Proportion of newborns who weighed less than 2.5 kg at birth	10.8	11	9

The First 1000 Days of Life

With the growing impetus to end malnutrition, an emphasis on the first 1,000 days of life — a window of opportunity for health and development — has also become central for Ethiopia. The process often starts in the womb and continues through at least the first two years of life. The periods of pregnancy through to lactation and the first two years of life pose special nutritional challenges because these are when nutrition requirements are greatest and when these population subgroups, in Ethiopia in particular, are most vulnerable to inadequate caring behaviors, inadequate access to health services, and unsuitable feeding practices (World Bank 2006).

Young children need adequate dietary intake (through exclusive breastfeeding followed by quality complementary feeding) to support the rapid rate of growth that occurs in the first two years of life. Inadequate feeding and care practices often lead to a rapid decline in nutritional status after birth, and more prominently after 3 to 4 months of age (when typically other foods beyond just breast milk

are introduced). Growth in children drops dramatically during this early time period in all regions of the world, with Africa being the second most severe after Asia (Shrimpton, 2001).

Poor infant and young child feeding practices are also likely to be causing stunting in Ethiopia. The LNS 2013 package of interventions includes the promotion of exclusive breastfeeding until 6 months and the promotion of adequate complementary feeding from 6 to 24 months as proven high impact interventions. In addition, zinc supplementation and zinc in the management of diarrhea, as well as hand washing and hygiene interventions are also recommended. Although exclusive breastfeeding rates are reasonable and need to be protected and further improved in Ethiopia. The complementary feeding pattern is extremely poor both in terms of timing of introduction as well as the quality of the foods used, and zinc deficiency is probably a dominant feature (Shrimpton et al, 2012).

Data also show that the damage done by under-nutrition very early in life, to both physical growth and brain development is largely irreversible after 24 months of age (Martorell et al 1994; LNS 2013). Growth during this time is episodic rather than continuous and may alter the path of later growth and disease risk. Height has been shown to be related to adult productivity (Behrman et al 2001) and final height is determined in large part by nutrition from conception to two years of age. A one percent loss in adult height as a result of childhood stunting is associated with a 1.4% loss in productivity (Hunt, 2005). Growth failure before the age of two, anemia during the first two years of life, and iodine deficiency in

the womb can also have profound and irreversible effects on a child's ability to learn (Behrman et al 2004). Vitamin and mineral deficiencies in the womb and in early childhood can cause blindness, dwarfism, mental retardation, and neural tube defects—all severe handicaps for human and country development, with limiting growth for Ethiopia (World Bank, 2006). For example, anemia has a significant impact on productivity in adults. Eliminating anemia leads to a 5 to 17% increase in adult productivity, which adds up to 2% of GDP in the worst affected countries (Horton 2009; Horton et al 2003; Strauss et al 1998).

Interpretation of the lifecycle approach in the Ethiopian context

Malnutrition can continue from generation to generation in a cycle driven by poverty as shown in Figure 3. A child born to a mother that is undernourished will likely be born with low birth weight and has increased risks of high morbidity and mortality. If the infant survives, and the mother is not able to care for the child or adequate, quality food is not available or accessed, its growth will be impaired resulting in stunting, poor cognitive abilities and increased susceptibility to infectious diseases, and later in life, to non-communicable diseases. As the child grows, their chances of escaping this nutrition-poverty trap diminish. Stunting can be irreversible, and the options for better education attainment and delaying marriage decrease. If a girl, she will in turn, give birth to a baby of low birth weight, and the cycle begins again. This cycle must be broken and it all begins with the mother or more importantly, adolescent girls to get them on the right track

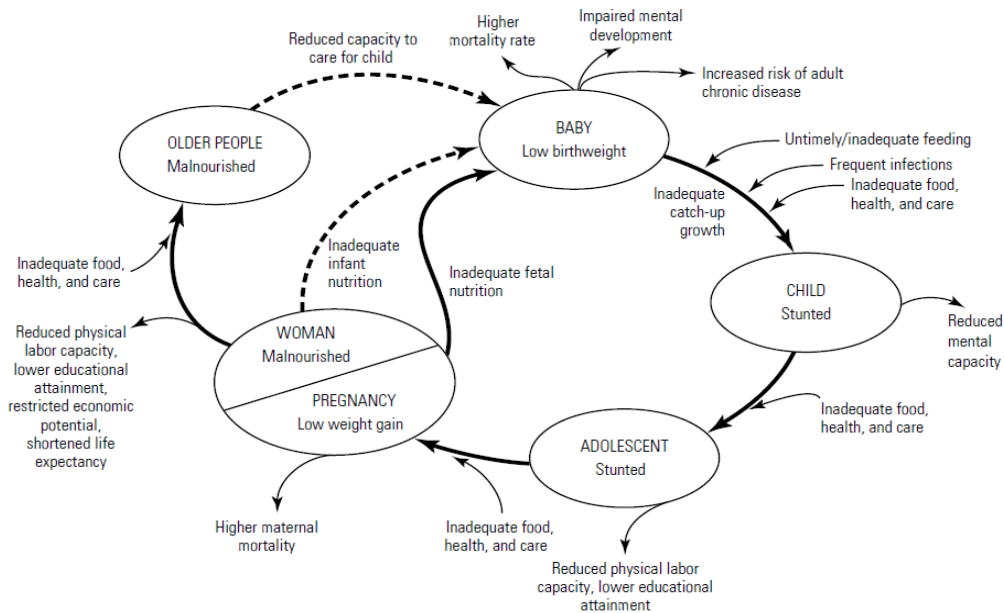
for when they themselves become mothers (Benson 2006).

The Lancet 2013 Maternal and Child Nutrition Series also examined the emerging public health challenges around overweight and obesity for women and children and the consequences of the double burden of malnutrition in low-income and middle-income countries.¹ The global population has been experiencing a dynamic nutrition transition ² as people move away from traditional plant-based high-fiber diets to those high in sugars and fat. The nutrition transition is preceded by a demographic transition - falling fertility rates and rising aging population - and an epidemiological transition where non-communicable diseases instead of infectious diseases has become the main cause of mortality. A “double burden of malnutrition” (DBM) is thus appearing in both developed and developing countries with the coexistence of under-nutrition and over-nutrition in the same

population. The issue of the Double Burden of Malnutrition was recently a topic in the agenda of the 63rd World Health Assembly (2010) in which member states adopted Resolution WHA63.23 on Maternal, Infant and Young Child Nutrition whereby Member States were

urged “to develop or review current policy frameworks addressing the double burden of malnutrition...”

Figure 3: Cycle of impact from mother to fetus (Benson 2004).



Source: Adapted from SCN 2000.

Young women, maternal and child under-nutrition remains one of Ethiopia's most fundamental challenges for improved human development and sustained economic growth. Because under-nutrition is intricately linked to

morbidity and mortality, the punishing under-nutrition, that begins with mothers, is unrealized human potential (Benson and Shekar 2006).

Causes and Consequences of High Rates of Under-nutrition in Ethiopia Fetal Growth

Inadequate fetal growth most probably plays an important part in the process of the young child stunting in Ethiopia. Although no good birth weight data is available, the EDHS 2011 revealed that, among children born in the five years before the survey with a reported birth weight, 11% weighed less than 2.5 kilograms. Low birth weight is more common among

children of the youngest mothers, age less than 20 (13%) and older mothers, age 35-49 (17%). Seventeen percent of births in rural areas, compared with 9 percent in urban areas, have a reported birth weight less than 2.5 kg. On the other hand, based on mother's subjective assessment of the size of the baby at birth, in the absence of birth weight, mothers reported

that 21% of all live births in the five years preceding the survey to be very small and 9%

as smaller than average (EDHS 2011).

Infant and Young Child Growth

Infant and young child growth is very poor, and certainly contributes to the process of stunting in Ethiopia. The 2011 EDHS indicated that 44% of children under age five are stunted, and 21% of children are severely stunted. In general, the prevalence of stunting increases as the age of a child increases, with the highest prevalence of chronic malnutrition found in children age 24-35 months (57%) and lowest in children under age six months (10%). Children in rural areas are one and a half times more

likely to be stunted (46%) than those in urban areas (32%). There is considerable variation in child stunting rates across the regions (Figure 4) with stunting levels are somewhat above the national average in the Amhara (52%), Tigray (51%), Afar (50%), and Benishangul-Gumuz (49%) regions and are lowest in Addis Ababa and Gambella region (22 and 27 percent, respectively). However, there are no differences in stunting rates across the five wealth quintiles (Figure 5).

Figure 3: Stunting rates across Regional States, EDHS 2011

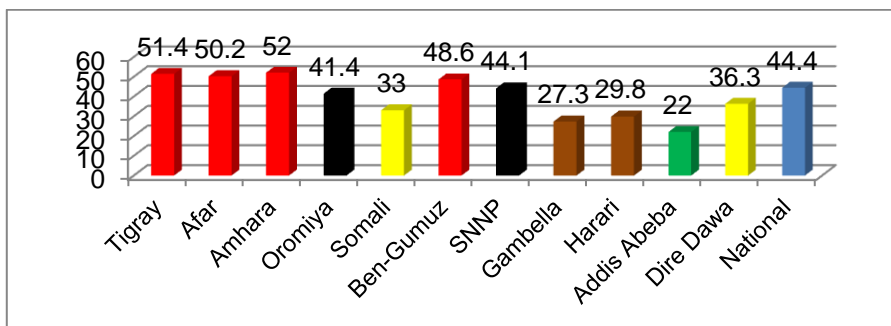
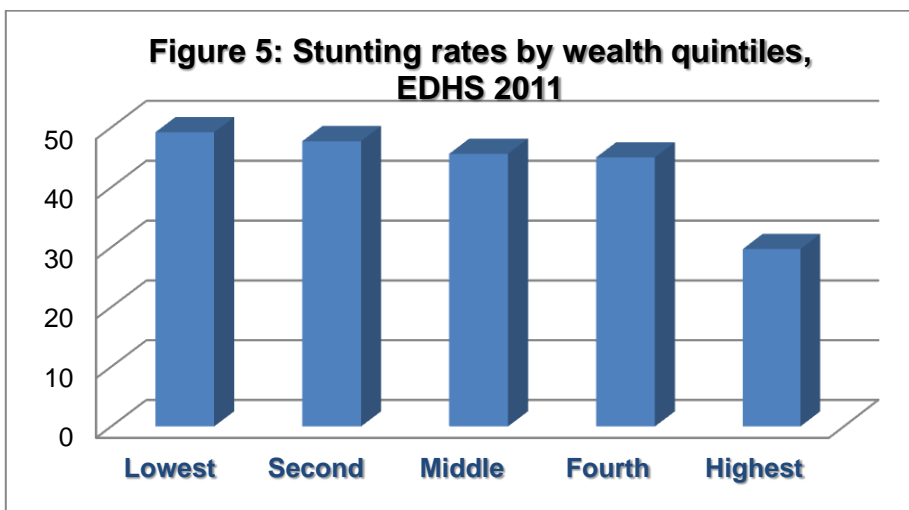


Figure 5: Stunting rates by wealth quintiles, EDHS 2011



Maternal Nutritional Status

Maternal nutritional status (that is, among women aged between 15 and 49 years) is poor in many respects in Ethiopia. Physical size is one measure of the adequacy of maternal nutrient status, determining the size of nutrient reserves that can be called upon in times of need, such as during pregnancy and lactation. Although about a quarter of women of reproductive age are thin (BMI<18.5), only a few (3%) were very short (<145cm). Women of short stature are most likely to reside in the Amhara region, and to have no education or primary education. Overweight or obesity (BMI 25 kg/m² or above) is not common among women in Ethiopia. Five percent are overweight (BMI 25-29 kg/m²), and just 1% are obese (BMI 30 kg/m² or above).

The age of the mother has a strong influence on the adequacy of their physical nutritional status. In the 2011 EDHS the median age of first marriage was around 16.5 years and the median age first pregnancy was 19.2 years. Despite this three year delay from marriage to first birth, 34% of mothers have had at least one child during their adolescence, while amongst those who were adolescent (15-19 years) during the survey period, 12% were already mothers or pregnant with their first child. These adolescent mothers were still growing, as mean height of the 15-19 year old group of mothers in the 2011 EDHS survey was 2.8 cms shorter than the 20-29, as well as the 30-39 and 40-49 year age groups. Similarly, adolescents (age 15-19) are more likely to be thin (36%) than older women (average 24.6%).

The prevalence of iron deficiency (ID) and iron deficiency anemia (IDA) in Ethiopia among women of reproductive age has been relatively well documented. A national survey conducted in 2005 (Umata M. et al., 2008) showed that ID

and IDA were observed in 49.7% and 17.0% of women, respectively, and subsequent analyses (Haidar JA, Pobocik RS, 2009) of the data from this national survey confirmed that iron deficiency and history of illness are strongly associated with anemia.

The more recent EDHS (2011) revealed that 17% of Ethiopian women age 15-49 are anemic; with 13% having mild anemia, 3% having moderate anemia, and 1% having severe anemia (Figure 6). A higher proportion of pregnant women are anemic (22%) than women who are breastfeeding (19%) and women who are neither pregnant nor breastfeeding (15%). In comparison with the data from the 2005 EDHS, the prevalence of any anemia has declined from 27% to 17% in 2011, a decrease of 37%.

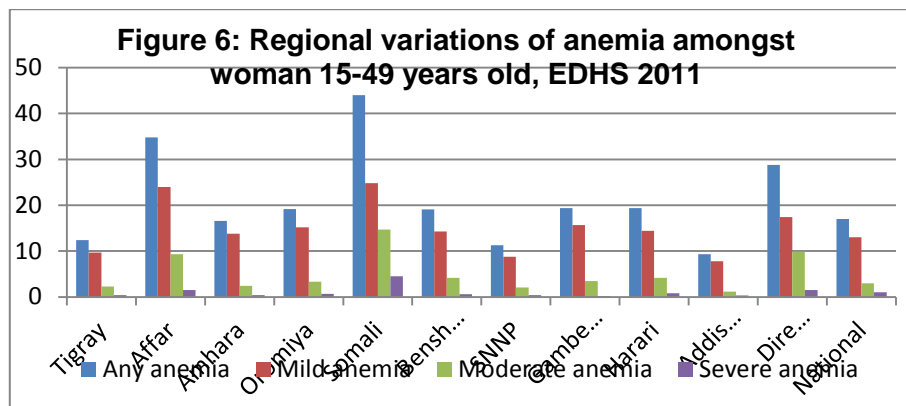
The association between maternal anemia and child stunting is not well documented, with the studies of maternal anemia focusing more frequently on birth outcomes, such as birth weight, preterm birth, anemia at birth, and perinatal mortality (Black RE. et al., 2013; Koura GK et al., 2012; De Pee S., et al, 2002). Anemia among pregnant women (Getachew et al., 2012) and non-pregnant women of reproductive age (15-49 years) (CSA, 2001; 2006; 2011; Umata M. et al., 2008) in Ethiopia denotes a moderate to severe public health problem (WHO, 2006) warrants further investigation and consideration of its impacts on stunting.

With at least a third of mothers showing signs of goiter, iodine deficiency constitutes a severe problem nationally (FNB 1998). Although some variability is seen across the regions, the majority of them and especially the most of the populous ones, have either a severe, or

moderate to severe level of deficiency, while just three (Afar, Harari, Dire Dawa) have a mild deficiency problem.

Of the other micronutrient deficiencies, vitamin A is similarly poor, with some 2% of mothers reported night blindness nationally, constituting a moderate to severe problem (FNB 1998). The situation varies across the regions, with two provinces having a severe deficiency problem

Tigray (14%) and Beneshenghul (6%) and five most populous ones having just a mild deficiency problem. While representative data on maternal zinc deficiency doesn't exist, one study suggests the situation is of great concern, with 74% of pregnant women in Southern Ethiopia having low plasma zinc levels, while just 29% were anemic, 33% had depleted iron stores, and 27% had low plasma retinol levels (Gibson et al 2008).



In conclusion, for the majority of regions and the majority of the population, mothers are affected by moderate to severe, and/or severe deficiencies of iodine, vitamin a and iron, with at least a half of mothers deficient in at least one micronutrient, and many likely to have

multiple micronutrient deficiencies. Of these iron is not the worst deficiency, and Iodine and Zinc deficiency are likely to be of greater concern. Although excessive shortness is uncommon in mothers, about quarter are excessively thin, largely due to their young age.

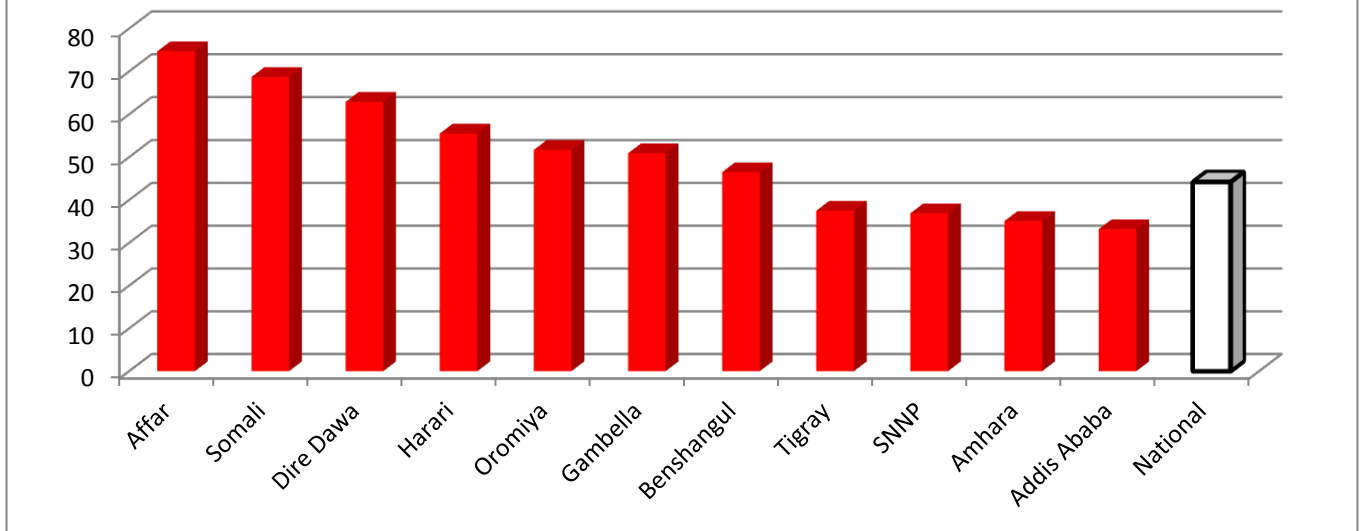
Nutritional Status of Infant and Young Children

More than four in ten Ethiopian children (44 percent) are anemic. One child of every five (21 percent) had mild anemia, another 20 percent moderate anemia, and 3 percent had severe anemia. Anemia prevalence is highest among children age 9-11 months (73 percent) and decreases steadily with age from 12 to 59 months. Forty-five percent of children in rural areas have anemia, compared with 35 percent of children in urban areas. The same severity of

risk is seen in young children of all regions except Addis Ababa which even so, still had a moderate to severe population risk (Figure 7).

The national anemia prevalence estimate has dropped by 19 percent in the past six years, from 54 percent in 2005 to 44 percent in 2011. This is much *better than the 60% reported for the rest of Africa (UNSCN 2010), still classifies it as having a severe iron deficiency problem amongst its children (FNB 1998).*

Figure 7: Percentage of children aged 6-59 months classified as having anemia by Region, EDHS 2011



A severe deficiency problem also exists for vitamin A in children, with low serum retinol levels affecting 38% of young children nationally in 2005. While this is an improvement over rates found in 1980 (60%) they are similar to that seen in 1996 (40%) and similar to rates seen elsewhere in Africa (UNSCN 2010). Furthermore 1.7% had clinical eye signs of vitamin A deficiency in 2005 as compared with 2.0% in 1980 and 1.5% in 1996. Although there is variation across regions, most have a severe deficiency problem (>20% low serum retinol) with just SNNPR having a moderate to severe deficiency situation.

The situation of iodine deficiency in children is poor, but there some inconsistency of classification seen across indicators. While nationally 40% having detectable goiter, which is a severe deficiency situation, only 46% have inadequate urinary iodine excretion rates, which constitutes a mild deficiency situation (FNB 1998). The least affected regions were Afar, Harari and Dire Dawa (mild deficiency), and

the worst affected (severe deficiency) were Oromiya, SNNPR and Beneshanghul.

Zinc deficiency has also been reported in Ethiopia, with supplementation giving a growth effect in young children (Umeta et al 2000). This suggests that zinc is first limiting nutrient for growth in these infant in the second six months of life. Although there are no data on how widespread the problem is, it is unlikely to be confined to the central area of the country near Addis Ababa where the study was carried out, as complementary feeding patterns are similarly poor across the whole country.

A small proportion of children in Ethiopia are classified as overweight or obese. Overall, 2 percent of children below age five years are overweight or obese (+2 SD). Overweight or obesity among children increases with increasing BMI of the mother, from 1 percent among children of mothers who are thin to 4 percent among children of mothers who are overweight/obese (BMI >25). There are no substantial differences between male and female children. Variation by region is minimal except for Addis Ababa, where 6 percent of

children under five, the highest percentage in all regions, are overweight or obese.

In conclusion severe deficiencies of vitamin A and iron are affecting young children in nearly all regions, with iodine deficiency more of a moderate risk. The majority of the young child population is affected by at least one micronutrient deficiency, and many are likely to have multiple micronutrient deficiencies, and of these while iron and vitamin A deficiency are the most prevalent, and iodine deficiency

are also of greater concern. Although there is no representative data on zinc deficiency it is also likely to be a severe problem affecting young children in most regions. With the current obesity level increasing globally, levels of overweight or obesity in children needs to be monitored closely in Ethiopia too.

The Social and Economic Impact of Child under-nutrition in Ethiopia (Table 2)

The Cost of Hunger Africa (COHA) model is used to estimate the additional cases of morbidity, mortality, school repetitions, school dropouts, and reduced physical capacity that can be directly associated to a childhood under-nutrition (person's under-nutrition before the age of five), and the associated costs to an economy . The COHA – Ethiopia study revealed the following main results pertaining to children:

- For 2009, there were an estimated 4.4 million additional clinical episodes associated with under-nutrition in children under five, which incurred a cost of an estimated ETB 1.8 billion (US\$ 154 million). According to the estimated data, only 3 out of every 10 of all episodes received proper health attention.
- Under-nutrition was associated with 24% of all child mortalities; 379,000 deaths in the period 2004 - 2009.
- In primary education, stunted children have a higher grade repetition rate, at 15.1% than non-stunted children, at 11.2%, based on statistics for 2009. This incremental rate generated 152,000 additional cases of grade repetition in 2009, and a cost of ETB 93 million (US\$ 7.8 million).
- Stunted children in Ethiopia are also more likely to drop out of school. The model

estimated that for 2009 the average schooling achievement for a person who was stunted as a child is 1.07 years lower than for a person who was never

- undernourished. The related disadvantage in the labor market generated estimated costs of ETB 625 million (US\$ 52 million) in potential productivity loss for that year.
- Overall results in Ethiopia show that an estimated ETB 55.5 billion (US\$ 4.7 billion) was lost in the year 2009 as a result of child under-nutrition. This is equivalent to 16.5% of GDP. On the other hand, the study estimates that Ethiopia could reduce losses by ETB 148 billion (US\$ 12.5 billion) by 2025 if it reduces underweight rates to 5% and stunting to 10% in children under five years; alternatively, a reduction of the child under-nutrition rates to half of the current levels by the year 2025 could reduce losses by ETB 70.9 billion (US\$ 6 billion)

All in all, the social and economic impact of child under-nutrition in Ethiopia is alarming – and demands a ‘Call to Action’. To this end, all stakeholders (including the members of the Ethiopian Pediatric Society) are expected to contribute and lead actions towards alleviating the problem of child under-nutrition.

Table 2: Summary of costs of child under-nutrition in Ethiopia

	Episodes	Cost in ETB	Percentage of GDP
Health Costs			
LBW and Underweight	3,139,682	1,256	
Increased Morbidity	1,270,996	566	
Total for Health	4,410,678	1,822	0.54%
Education Cost			
Increased Repetition - Primary	152,488	93	
Increased Repetition - Secondary	-----	-----	
Total for Education	152,488	93	0.03%
Productivity Costs			
Lower Productivity - Non-Manual Activities	1,938,632	625	
Lower Productivity - Manual Activities	24,273,274	12,857	
Lower Productivity - Mortality	3,230,218	40,070	
Total for Productivity	29,442,124	53,552	15.97%
TOTAL COSTS FOR ETHIOPIA in 2009		55,468	16.54%

What can or must the members of EPS and other similar associations do for nutrition

- For Clients – promote preventative nutrition actions through counseling and education targeted to address both childhood under-nutrition and obesity.
- During Service provision – adopt mechanisms that would enable appropriate services for children, such as Baby-friendly Hospital Initiative; addressing micronutrient problems, etc.
- To Colleagues/ staff – build the capacity of nurses, junior doctors etc about the life cycle approach towards addressing nutritional problems while not forgetting nutrition sensitive actions.
- For Students – teach students to look at nutrition in a holistic manner: the life cycle approach; household issues; gender

sensitive matters; communicable & non-communicable diseases; promotion and prevention.

- ***Where they live in (Community)***

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