Stunting in children- the need for a paradigm shift

Malnutrition is a national curse which pushes the country further into poverty and retards national progress in India. Amongst the five WHO targets for malnutrition, stunting is the most challenging for public health. Stunting is defined as height/length for age less than 2 standard deviation below WHO growth standards. The global target for stunting is 100 million by the year 2025 from an estimated 170 million stunted children in 2010. At the current rates of reduction, this target will not be achieved. The global burden of stunting far exceeds undernutrition (195 million stunted children and 130 million undernourished children). Highest rates of stunting are in Africa and South Central Asia (including India). Of the 10 countries with highest rates of stunting 6 are in Asia and India is the third largest contributor to the problem of stunting. India accounts for almost 30% of the stunted children in the world (estimated numbers). It is one of the 10 top countries with maximum rates of stunting. The prevalence of stunting has declined from 48% to 38.7% an average of about 1% decline per year. During the same reference period the prevalence of undernutrition declined from 42.5% to 29.4% and the prevalence of wasting declined from 19.8% to 15.1%.

Recognition of stunting

During the last 2 decades, the awareness about birth weight and monitoring of weight of the child has increased amongst the countries, programs, providers and the care givers. WHO has recommended reference growth standards for assessment of undernutrition in children. These have been endorsed globally and India has accepted the WHO growth reference standards and included them in mother child protection card. In India, the application of WHO growth standards has been in place for more than 5 years. At present, the most widely used measurement for monitoring nutritional status in children is recording of body weight. Even this assessment is not done by a large proportion of providers and families due to several constraints including community behavior and family mind set in many societies. However, the assessment of weight does not provide any indication for stunting. Assessment of body length/ height in program setting is difficult, it is uncommon and is at present limited to a few research studies or periodic surveys. Accurate assessment of height/length in program setting and

in the community is difficult. Assessment of mid upper arm circumference (MUAC) although recommended is also not done widely. Furthermore, it cannot be applied for children below 6 months age. A limitation of mid arm circumference is that it reflects wasting and not stunting.

It is not surprising that stunting even though a serious public health problem remains unrecognized. Even the high risk groups of children are not assessed for stunting. Unless a simple system of assessment and monitoring for stunting is put into place in the program, progress towards achievement of the target of stunting will be compromised.

Effects of stunting

Sadly more than one third of deaths in childhood and 10% of disease burden is associated with malnutrition as an underlying cause. Studies show that there is a critical window of opportunity between pre-conception and age two, during which nutrition can have a measurable and lasting impact on growth, brain development, incidence of disabilities, and susceptibility to disease or infection. Height-for-age at two years was the best predictor of human capital, and early undernutrition is associated with lower human capital. Research also shows that poor growth during childhood also has important long-term consequences in adult life in terms of body size, work, reproductive performance, and risk of adult onset chronic diseases- hypertension, heart disease stroke obesity etc. Compared to children who are not stunted, stunted children often enroll in school later, complete fewer grades, and perform less well in school. As a consequence, this under performance leads to reduced productivity and income-earning capacity in adult life. Short women are at a greater risk for obstetric complications because of their smaller pelvic size and possibly anemia. Stunting in childhood for women can impact on

their risk of maternal mortality. Likewise, chronic undernutrition in early life, either before birth or during early childhood, can later lead to the next generation of babies being born with a low birth weight due to foetal growth restriction, which in turn leads to undernutrition and stunting as these babies grow older. Thus a vicious cycle of undernutrition repeats itself generation after generation. In addition, the occurrence of early pregnancy also contributes to both low birth weight of the infant and of premature cessation of growth in the mother.

Studies show that height at two years of age is clearly associated with enhanced productivity and human capital in adulthood. Consequently, reduction of childhood stunting should be considered a highly cost effective intervention that should be included in the national policy in India.

Timing of occurrence of stunting

The information on birth weight has been widely used but low birth weight indicates that the baby was born too soon or was born too small (meaning small for gestational age). In many countries including India, even measurement of birth weight is not done in many cases and the information on length at the time of birth is even more sparing. It has been estimated that about 20% of stunting is in utero in origin.

During the life course, there are different periods that should be considered as relevant to the occurrence of stunting (a) fetal age (b) infancy (c) childhood and (d) pre pubertal that are influenced by different regulatory mechanisms. There are period of stasis (salutation) and rapid growth (spurts).There is no doubt that genes do influence physical growth but it has been estimated that only about 10% influence on physical growth is genetic. The growth patterns are remarkably similar during foetal life and in early childhood. Environmental factors such as maternal nutritional status, feeding practices, hygiene and sanitation, frequency of infections and access to healthcare are the major determinants of physical growth in the first 2 years of life.

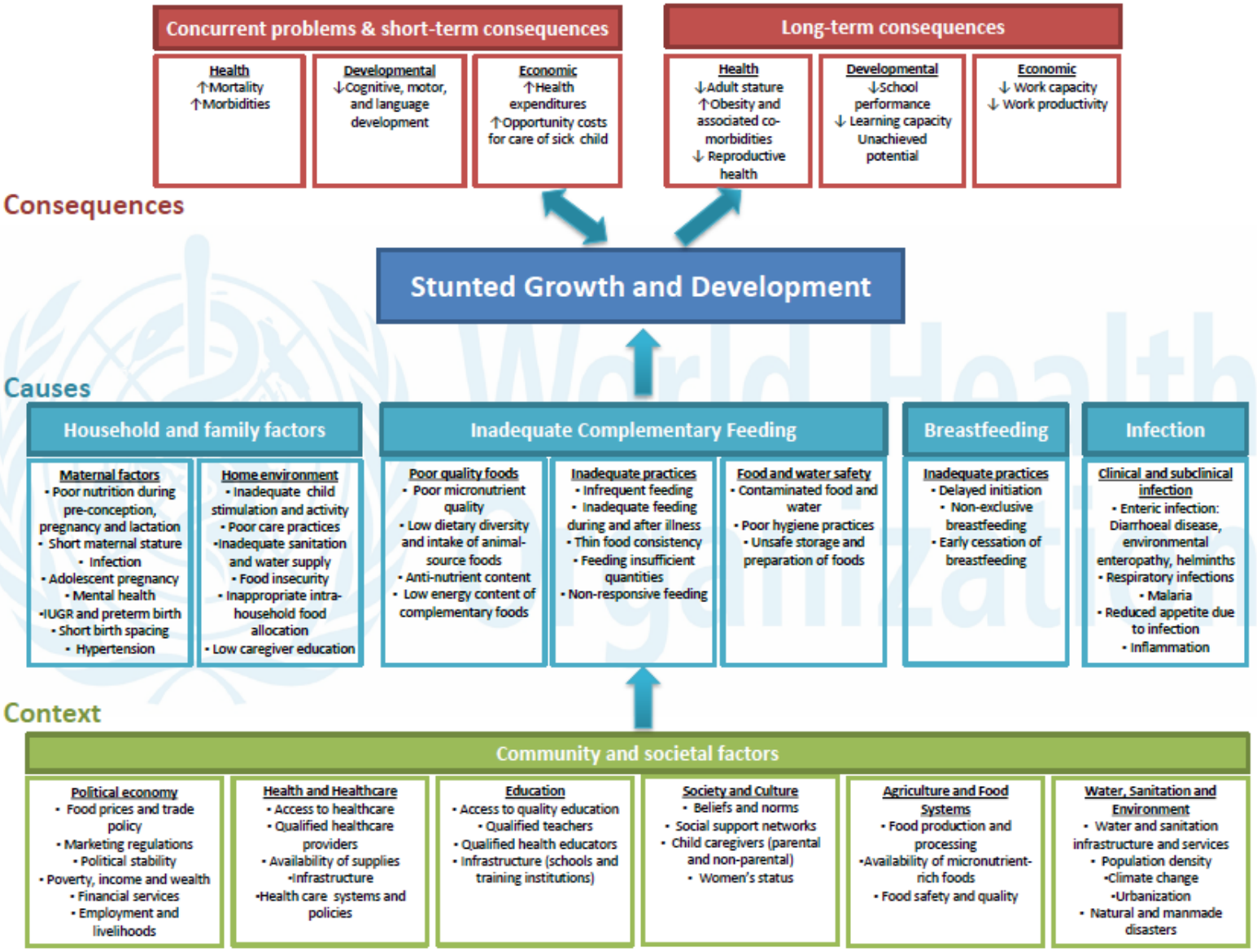
In children below 3 years of age stunting reflects a continuous process of failing to grow while in older individuals it indicates having failed to grow. For length/height for age, the global mean is surprisingly close to National Center for Health Statistics (NCHS) and Cambridge references at birth, The two most vulnerable periods for the occurrence of stunting are the intrauterine period which leads to fetal growth restriction (FGR), and during the period of weaning when the child is started on complimentary foods (between 6 months and 2 years age). Consequently most cases of stunting have already occurred by the age of 2 years. Therefore the critical window of opportunity to address the problem of stunting is between pre conception (and peri conception period) and 2 years of age. Mean weights start to falter at

about 3 months of age and decline rapidly until about 12 months, with a markedly slower decline until about 18 months and a catch-up pattern after that. Growth faltering in weight for length/height is restricted to the first 15 months of life, followed by rapid improvement. These findings highlight the need for prenatal and early life interventions to prevent growth failure.

Causes of stunting

1. Fetal growth restriction is the starting point for stunting. Overall, this can contribute to about 20% of the stunting. Maternal nutritional status before pregnancy, her age at pregnancy, her nutritional status during pregnancy and the duration of pregnancy can all have influence on fetal growth and development. Similarly exposure to toxins including adverse effect of tobacco smoke, smoke exposure in the household, alcohol, high risk pregnancy and inadequate antenatal care can all contribute to low birth weight and fetal growth restriction. In addition to the poor nutritional status (including micro nutrient deficiencies), short birth spacing of less than 18 months, adolescent pregnancy and short maternal height can contribute to fetal growth restriction. This highlights the importance of intergenerational aspects of the problem of stunting.
2. Nonexclusive breast feeding or sub optimal breast feeding practices (late initiation of breast feeding after child birth, supplemental feeding or early discontinuation of breast feeding) starts the process of unsatisfactory feeding which enhances the risk of poor growth, infection and disease that predispose to stunting and threaten survival.
3. Maternal stress, neglect and trauma with insufficient care giver and family support and interaction with the rapidly growing and developing child in early infancy can lead to poor physical growth and adversely affect brain development that occurs rapidly during the first two years of life. A study on adverse childhood events in USA has highlighted the immediate and long term adverse consequences that justify a paradigm shift in the approach to prevention and management of stunting in childhood.
4. After the age of 6 months, breast feeding if not complemented with adequate quantity of high quality mixed diet can lead to faltering of physical growth. The age period between 6 months and 2 years is critical period of vulnerability for stunting.
5. Micro nutrient insufficiency should be corrected but the evidence for single or a combination of two or more micro nutrient deficiencies leading to stunting is not strong.
6. In the presence of food scarcity or because of unsatisfactory family behavioral practices related to local traditions that include imposition of food restrictions during and after illnesses, growth faltering begins that leads to wasting. This can be the start for stunting in a large number of children.
7. Infections are common after the age of 6 months and these are sometimes serious. The infections can be recurrent. Feeding and child stimulation are often unsatisfactory during the course of infection and even beyond. Poor hygiene and contaminated environment can contribute to the occurrence of sub clinical infections. The adverse effect of mycotoxins is not widely recognized although these may be important. These sub clinical infections can have a

prominent negative effect on child growth and development. It can compromise efficient absorption of nutrients and affect child growth adversely. It is notable that every additional episode of diarrhea after the first attack increases the risk of occurrence of malnutrition.



Stunting a part of the malnutrition syndrome

Stunting underweight and wasting often co-exist in the communities. Stunting represents chronic undernutrition, and wasting is a combination of acute and chronic undernutrition while low weight for age is often due to acute nutritional deprivation and or recurrent infection. Often times stunting and wasting are associated with one or more micronutrient deficiencies. Children who are stunted and

underweight have about 4 times higher risk of death than non-undernourished children. In contrast, if the child has undernutrition in the form of stunting and wasting the risk increases to 12 times.

Wasting (Low weight for height) is often of recent origin and is responsive to correction by nutritional measures and application of medical measures. Since the mechanisms for decline in linear growth are less well understood and stunting is more resistant to corrective treatment, the interventions that would correct stunting are less well understood and deserve more attention.

Interventions likely to be effective

Stunting should be considered to be a part of an intergenerational cycle which is difficult to break even though there are windows of opportunity for interventions which need to be considered seriously. Although efforts are needed to tackle the problem of stunting throughout the life course, there are critical sensitive periods when actions against stunting are likely to be most effective These are prenatal period, until 2 years age and during adolescent periods.

During these sensitive periods, integrated interventions including nutrition, care and support, sensitivity and responsiveness, learning through play and communication through improved care giving, prevention of infections illnesses and injuries, early and appropriate response to illnesses correction of micronutrient deficiencies can have long lasting impact on reduction of stunting, improving child survival, reduction in infections and optimum brain development.

Stunting in children is a powerful indicator of child health inequalities (prominently socio economic and gender). Stunting syndrome relates with SE situation. 79 countries show more than 2 fold difference in stunting rates between the highest and the lowest quartile. As far as the gender inequities are concerned, interventions for prevention and management of stunting are likely to have double benefit directly for the child and indirectly through ensuring better nutritional status of girls and women who will reap the benefits of interventions early in life during their reproductive period.

Prenatal multiple micro nutrients are associated with 9% decline in SGA and balanced energy and proteins intake leads to 31% reduction. Daily iron supplementation reduces low birth weight by 20% but zinc does not show a significant effect. Calcium supplementation leads to an average increase of birth weight by 85 grams.

The problem of chronic malnutrition with exacerbations of acute deprivation continue to be a problem of serious magnitude. The moot question to address is whether stunting is a medical emergency which requires policies that are articulated for the prevention and management of severe acute malnutrition (SAM). Stunting is a serious hidden public health problem and deserves much greater and holistic attention for its resolution. It is estimated that 90% nutrition specific interventions would lead to 20% reduction in stunting.

At present in the global discourse there is little emphasis on the role of stimulation and play in addressing the problem of stunting. Evidence suggests that play and communication and care for early childhood development as an integrated part of continuum of care should be a major thrust in addressing the problem of stunting.

Policy and strategy to tackle stunting

1. Support policies and strategies to improve maternal nutrition and health, beginning with adolescent girls (weekly iron and folic acid supplementation, prevention and treatment of infections and nutrient supplementation during pregnancy and maternity protection policies for pre- and postnatal care). After birth, protect and promote early initiation of breast feeding for exclusive breastfeeding for the first six months of an infant's life, followed by continued breastfeeding for 2 years or more, to provide “secure” nutrition and protect infants from gastrointestinal infections (clinical and sub clinical). Ensure investments that help meet the nutrient requirements and promote consumption of healthy, diversified diets including high-quality, nutrient-rich foods especially during 6 to 23 months age, including support for nutrition-sensitive agriculture and social protection programs. Improve micronutrient intake through food fortification, including complementary foods, supplements when needed, and encouraging diversification of food production and distribution including food security. Foster safe food storage and handling practices to avoid infections from microbial contamination and mycotoxins. Strengthen community-based interventions to protect children from infections (diarrhoea and malaria), intestinal worms and environmental causes of sub-clinical infection through improved water, sanitation and hygiene (WASH). Support incorporation of linear growth assessment in child health routines to provide critical, real-time information for target setting and progress monitoring.

8. Better integrate nutrition in health promotion strategies and strengthen service delivery capacity in primary health care systems and community-based care to prevent stunting and acute malnutrition, supported by social protection programmes.

In summary

A multi sectoral effort is needed to address the serious public health problem of stunting but a matter of equal concern is the lack of sturdy simple to administer and monitor measure of assessing stunting in the community.

Programmatic implications are primarily twofold: (i) blend and combine multiple approaches for management of malnourished children in community and institutional settings; and (ii) set into place a breadth of interventions to address multi-dimensional problem of poverty and prevent chronic malnutrition through long-term and multi-sectoral efforts at building community capacity and support structures.

In conclusion, the 1000 days window (270 days in utero and 730 days after birth) is short and critical. It is the most critical period to prevent and manage stunting which has immediate as well as long term adverse impact. This would help reduce mortality, improve nutritional status, and foster better education and adult productivity. Control of stunting would also contribute to greater resilience of communities to withstand crises and illnesses. It would also provide greater equity (socio economic and gender). Besides the WHO global targets for 2025, it is important for India to make steady progress towards achieving zero stunting (<2.3%) on a longer term basis.

At present there are a large number of gaps in our understanding of biological and environmental factors Also a major gap is the problem of assessing the situation monitoring and surveillance.

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