



## Conference on ‘Food and nutrition security in Africa: new challenges and opportunities for sustainability’

# What would it take to prevent stunted growth in children in sub-Saharan Africa?

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There is increasing agreement among the nutrition community about the use of length/height-for-age as the indicator to monitor the long-term impact of chronic nutritional deficiencies. Stunting, an indicator of linear growth failure, has both long- and short-term consequences affecting growth and development and adult work potential. The number of stunted children in sub-Saharan Africa is expected to increase by 2025 if the current trends remain. Stunting among African children peaks during the complementary feeding period, which coincides with the period when children are no longer on exclusive breastfeeding and infections are frequent. Addressing stunting has become the focus of global efforts. The World Health Assembly in 2012 set a 40% reduction in the number of stunted children by 2025. To effectively address the issues of stunting in sub-Saharan Africa it is appropriate to examine the issue of what it takes. The WHO Multicentre Growth Reference Study (MGRS) conducted in several regions of the world, including Africa has lessons on what it would take to prevent in African children. The children in the MGRS had good socioeconomic background characteristics reflected by years of maternal education and availability of basic amenities, such as potable water and sanitary conditions. The prescription of exclusive breastfeeding, high-quality diversified diets and attention to care were critical factors contributing to healthy growth for the African children. Preventing stunting in sub-Saharan Africa is possible. It requires governments to put in place policies that would create the conducive environment needed. The complex and multiple causes of stunting offer the opportunity to address stunting in a multisectoral and within a food systems approach. The global resolve to make food systems deliver on healthy diet requires all stakeholders to work together to achieve the global goal of reducing stunting. This review highlights the key elements contributing to adequate growth in the Africa cohort of the WHO-MGRS and how these provide lessons for addressing stunting in children in sub-Saharan Africa.

### Stunting: Sub-Saharan Africa: Growth pattern: Children

There is convergence among the nutrition community on the use of length-for-age as the indicator of choice in monitoring the long-term impact of chronic nutritional deficiency. The *Lancet* series on maternal and child undernutrition<sup>(1)</sup> reported critical associations between stunting (length/height-for-age  $z$ -score  $< -2$  standard deviation) at age 2 years and the long-term consequences.

They concluded that ‘poor fetal growth or stunting in the first 2 years leads to irreversible damage, including shorter adult height, lower attained schooling, reduced adult income and decreased offspring birth weight’. They showed the link between stunting at age 2 years and lower human capital. This negative effect of stunting does not end with the victim but can be passed on to the

**Abbreviations:** MGRS, Multicentre Growth Reference Study; RIING, research to improve infant Nutrition and Growth project.  
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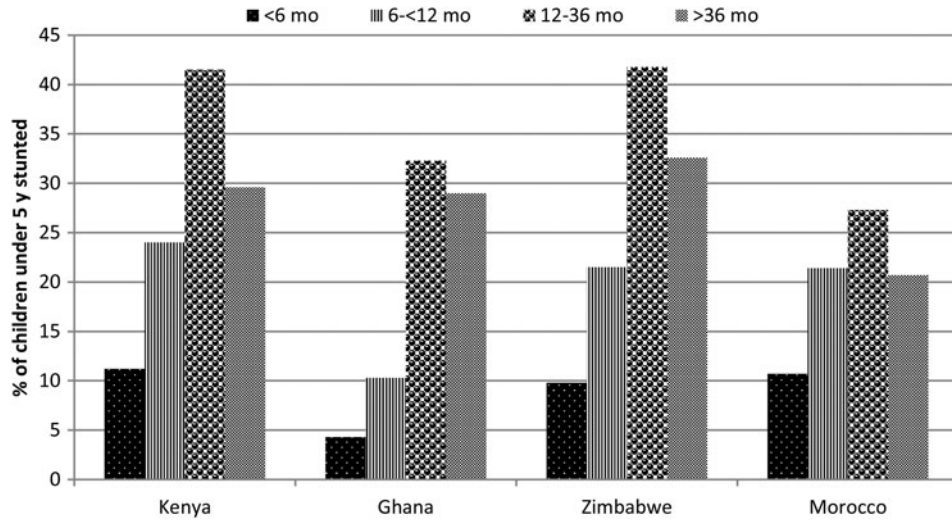


Fig 1. Stunting prevalence by age categories (mo, months; y, years): Kenya<sup>(24)</sup>; Ghana<sup>(25)</sup>; Zimbabwe<sup>(26)</sup>; Morocco<sup>(27)</sup>.

offspring if the environmental conditions within which the growth faltering occurred persists.

### Prevalence of stunting

Based on WHO dataset, globally 25.7% (164.8 million) of children under 5 years are stunted<sup>(2)</sup>. For Africa, the prevalence was 40.1% (56.9 million) in 2008<sup>(3)</sup>. The 2013 *Lancet* series reported a prevalence of 36.5% (56.3 million) stunting rates for African children under 5 years<sup>(2)</sup>. Although there was a decrease in the prevalence within the 5-year period, it was not accompanied by a commensurate decrease in the number of stunted children due to the increasing population. Over a 10-year period (1990–2010), Africa was the only region where the number of stunted children under 5 years increased. Projections to 2025 show the increasing trend is likely to remain<sup>(2)</sup>.

The long- and short-term effects of stunting have been well documented and include negative effects on physical growth, cognitive development, child development and school performance. Additionally stunted children are more likely to be obese adults and to suffer the risk of nutrition-related non-communicable diseases<sup>(1,2)</sup>.

### Causes of stunting

Several factors contribute to stunting; key among them are nutritional deprivation or adverse fetal environment during pregnancy, poor quality diets during the complementary feeding period and frequent infections. Stunting has origins during the fetal stages<sup>(4,5)</sup>. Data from country demographic and health surveys show stunting peaks during the complementary feeding period (Fig. 1). This period also coincides with frequent infections as children are no longer on exclusive breastfeeding.

### Global efforts to address stunting

Addressing stunting has become the focus of many global efforts in recent times. The World Health Assembly Resolution 65.6 (2012) has 40% reduction in the number of stunted children as the first of its six global nutrition targets to be achieved by 2025. The Sustainable Development goal 2, target 2.1, on ending all forms of malnutrition, specifically mentions achieving by 2025 the agreed target on stunting for children under 5 years.

The United Kingdom–Brazilian Nutrition for Growth event in 2013 had global leaders committing to support an unprecedented effort to reduce undernutrition and specifically sought to reduce the number of stunted children under 5 years by 20 million by 2020. To this end, the donors committed \$4.15 billion to tackle undernutrition.

The European Commission, one of the major factors supporting food and nutrition security efforts globally, has made a political commitment to support partner countries to reduce the number of children under 5 years who are stunted by about 7 million by 2025.

The Scaling-Up-Nutrition Movement and the 1000 d initiative are supporting countries that have committed to address undernutrition, especially to reduce the prevalence of stunting in children under 5 years. The United Nations Secretary General's Zero Hunger Challenge has 'zero stunted children' as the first of five challenges proposed.

The International Conference on Nutrition jointly organised by the Food and Agriculture Organization of the United Nations and WHO (November 2014) in the Rome Declaration on Nutrition<sup>(6)</sup>, has countries committing to prevent all forms of malnutrition, including stunting. The accompanying Framework for Action<sup>(7)</sup> document has two recommended actions to address stunting. The global resolve to address stunting and its devastating effect on human development is high and unprecedented. Countries must capture this momentum around nutrition and move from commitments into action. To effectively address the issue of stunting

in high burdened African countries, it is appropriate to critically look at what it would take to prevent stunting.

### Growth patterns of African children

Studies that have examined the growth patterns among African children in the first 24 months and beyond show that length/height-for-age *z*-scores are often below the median reference values from birth and continue to deviate rapidly throughout the first 2 years of life<sup>(4,8)</sup> without any indication of catch up. The reasons for these deviations in growth pattern are attributed to pre-natal programming<sup>(4)</sup> and postnatally it is to poor infant feeding practices and frequent infections. The period from pregnancy to the first 24 months of infant life has been identified as the window of opportunity within which interventions are expected to have maximum impact<sup>(9)</sup>.

In 2006, WHO launched a new Child Growth Standard developed based on breastfed infants. The study called WHO Multicentre Growth Reference Study (MGRS) was conducted in six sites around the world from where study infants were recruited: Brazil, Ghana, India, Oman, Norway and USA. All the study infants followed a prescriptive approach with respect to feeding, environmental living conditions and health care practices. Carefully selected inclusion criteria were applied to all sites<sup>(10)</sup>. By following this prescriptive approach, the MGRS was able to achieve uniform optimal growth in weight and length in the children during the 24 month follow-up irrespective of their geographic location. The growth of the Ghanaian children in the MGRS was comparable to their counterparts from developed countries. The optimal growth of the Ghanaian children in the MGRS provides an opportunity to examine what would it take to prevent stunting among African children.

It helps to compare the background characteristics of the healthy growing MGRS Ghanaian children to that of the background characteristics of another cohort of Ghanaian children who participated in the Research to improve infant Nutrition and Growth (RIING) project<sup>(11)</sup>. The RIING project, an observational study, sought to examine the factors that influenced the ability of households to provide optimal feeding and care giving practices for their infants. Infants were recruited into the RIING project within 24 h after birth (just like the MGRS infants). Unlike the MGRS infants, the RIING study infants did not follow any prescriptive intervention. Monthly anthropometric measurements were taken on the infants by trained anthropometrists. The growth outcomes of the infants of the RIING project is published elsewhere<sup>(11)</sup>. The background characteristics of the infants in the two studies (MGRS and RIING) both involving Ghanaian children provide some understanding on what it would take to prevent stunting among children in sub-Saharan Africa (Table 1)<sup>(10,11)</sup>. From Table 1, what stands out is that years of maternal education for infants of the MGRS was about double that for the RIING infants. The Ghanaian children of the MGRS

**Table 1.** Background characteristics of two cohorts of Ghanaian children

	MGRS Ghana children ( <i>n</i> 329)*	RIING Ghana children ( <i>n</i> 167)†
Maternal education (years)‡	15.1 (SD 2.7)	8.3 (SD 3.4)
Maternal age (years)‡	30.8 (SD 4.0)	28.9 (SD 6.0)
Maternal height (cm)‡	161.9 (SD 5.2)	158.9 (SD 5.4)
Family income (\$/month)	793	–
Pipe water (% yes)	100	27.3
Flush toilet (% yes)	98.8	14.8
Vehicle (% yes)	81.4	8.7
% low birth weight	1.5	7.3
Birth weight (kg)‡	3.3 (SD 0.4)	3.1 (SD 0.5)
Birth length (cm)‡	49.4 (SD 1.9)	49.3 (SD 2.8)
Birth head circumference (cm)‡	34.3 (SD 1.2)	34.5 (SD 1.7)

MGRS, Multicentre Growth Reference Study; RIING, Research to improve infant Nutrition and Growth.

\* WHO MGRS<sup>(10)</sup>.

† Lartey *et al.*<sup>(11)</sup>.

‡ Mean value and standard deviation.

cohort had favourable socio-economic conditions reflected in maternal education and access to better living conditions. They all lived in households with good access to potable water, and adequate toilet facilities (access to flush toilets). In addition, the Ghanaian infants in the MGRS cohort followed a prescriptive set of guidelines involving exclusive breastfeeding for 6 months (in line with Ghana Health Service guidelines), introduction of appropriate complementary foods by 6 months and continued breastfeeding for at least 12 months. Parents of the Ghanaian MGRS cohort were to ensure that infants followed the needed paediatric routines of attending child welfare clinics and adhering to their scheduled immunisations. At the end of the 24 months follow up the compliance to the MGRS infant feeding criteria was quite high<sup>(12)</sup>. By age 12 months, the median dietary diversity of the Ghanaian MGRS children was six food groups<sup>(13)</sup>.

The end result was that with a prescriptive approach of exclusive breastfeeding, adequate diet and care and a conducive environment, the Ghanaian children in the MGRS cohort sustained linear growth similar to their counterparts in affluent societies.

### Lessons from the WHO Multicentre Growth Reference Study

There are lessons from the MGRS to be applied in the efforts to prevent stunting. The environment in which the child is born is critical in shaping their growth and development. Stewart *et al.*<sup>(14)</sup> identified proximal factors that contribute to stunted growth which include household and family factors, breastfeeding practices, complementary feeding practices and infections. With regard to household factors maternal education is very important. Analysis of large datasets from Indonesia and Bangladesh found an association between stunting and

lower levels of maternal education. Also there was an association between years of maternal education and the likelihood of stunting<sup>(15)</sup>. Although the mechanism by which maternal education impacts stunting is not clear, it is likely to influence stunting through child care-giving behaviours such as attention to child's immunisation, and feeding and hygienic practices<sup>(15)</sup>.

The MGRS aimed to address all these factors in the prescriptive approach employed. Specifically, households were of good socio-economic background, were supported and encouraged to do exclusive breastfeeding and to continue breastfeeding thereafter until at least 12 months, guidance was given on complementary feeding and they were encouraged to adhere to regular child welfare visits, immunisations and infant feeding and childcare practices that would reduce infections. About 89% of the Ghanaian children in the MGRS cohort complied with the breastfeeding recommendations<sup>(12)</sup>. The socio-economic levels of the households ensure economic access to high-quality diversified diets. The entire living environment which involved household socio-economic factor, breastfeeding, adequate complementary feeding, attention to health care, household amenities such as portable water, and adequate toilet facilities was favourable.

### Role of governments

To create this conducive environment to ensure healthy length growth and prevent stunting, there is a lot governments must put in place. The following is not an exhaustive list, but are key to addressing the causative factors around stunting.

Government policies on education should aim to encourage girls to stay in school longer. Sub-Saharan Africa has the highest number of children of primary school age out of school (32 million)<sup>(16)</sup>. In terms of enrolment, wastage and achievement, more women than men in sub-Saharan Africa have the lowest education status<sup>(17)</sup>. There is no doubt that sub-Saharan Africa is the region that would benefit the most with improvement in women's education.

As of November 2014, many African countries, thirty-two out of fifty-four Scaling-Up-Nutrition countries, have signed on and have committed to address undernutrition. In line with this, multisectoral platforms have been established and national nutrition platforms have been developed. These are important steps, but they must be followed by resource (human and financial) commitment. Nutrition must be seen as one of the priority national agendas to which adequate resources must be allocated.

There is the need to create conducive environment for mothers to follow feeding recommendations. Policies to protect, support and promote breastfeeding will be needed. Adequate complementary feeding using local food ingredients would require that a variety of nutrient-dense crops and animal source foods are accessible to vulnerable groups. Formulated complementary foods fortified with the needed nutrients to address prevailing nutritional deficiencies of the country or region should

be considered. In this regard, it is important that countries adopt the relevant Codex Standards and Guidelines such as the Guidelines on Formulated Complementary Foods for Older Infant and Young Children<sup>(18)</sup> to ensure that such foods are formulated and used appropriately.

Water, sanitation and hygiene have been highlighted as important direct interventions for improving child stunting<sup>(9)</sup>. Efforts to improve sanitation and reduce infections should include making potable water available to communities and households. The promotion of adequate toilet facilities to prevent open defecation can be an important intervention in stunting prevention. Open defecation is widespread; it is estimated that 215 million people in sub-Saharan Africa engage in the practice<sup>(19)</sup>.

National programmes must include length/height measurements to enable early stunting detection. What is not measured is not likely to get attention. Presently a majority of countries do not have length measurement as part of their regular child welfare programmes<sup>(20)</sup>. Concerns raised by country programme managers about length measurements include lack of skill, heavy staff workload, and lack of equipment<sup>(21)</sup>. These concerns should be quickly addressed. The WHO Child Growth Standards have been adopted by 125 countries, facilitating the use of the same standard for monitoring of stunting prevalence across countries and regions.

The complex and multiple causes of stunting offer the opportunity to address the problem in a multisectoral and within a food systems approach. The food system covers the entire processes from inputs, food production, processing, storage, transport and retailing to consumption<sup>(22)</sup>. Countries that have high stunting rates also have high micronutrient deficiencies. The eighteen countries in sub-Saharan Africa with micronutrient deficiencies also have high child stunting rates<sup>(23)</sup>. Using integrated actions across the sectors health, education, social protection and agriculture, and with a food systems approach, we can tackle malnutrition in all its forms. Looking at the food systems with a nutrition lens ensures that every aspect of the system supports good nutrition. The current state of the food system is not aligned with better nutrition and thus results in the co-existence of undernutrition and obesity and the increased prevalence of diet-related non-communicable diseases. The current food system is not delivering on good nutrition. Re-shaping the food system to deliver on healthy diets has now become a global call. In November 2014, the Food and Agriculture Organization of the United Nations and the WHO held the Second International Conference on Nutrition. In the Rome Declaration on Nutrition<sup>(6)</sup> drafted by Member States, they committed to 'enhance the food system by developing coherent public policies from production to consumption and across sectors to provide year round access to food that meets people's nutrition needs and promote safe and diversified healthy diets'. This global resolve to address stunting and make food systems deliver on healthy diets is a paradigm shift that calls for all stakeholders to work together to achieve these goals.





### Acknowledgements

The author is grateful to the ANEC VI conference organisers for the opportunity to present the paper.

### Financial Support

None.

### Conflict of Interest

None.

### Authorship

The author had sole responsibility for all aspects of the preparation of this paper.

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