

## Consequences of Stunting

It has been demonstrated that early stunting and adolescent obesity may co-exist in the same socio-geographic population. As obesity and adult short stature are risk factors for metabolic syndrome and Type 2 diabetes, this combination of early stunting and adolescent obesity may be an explosive combination.<sup>[1]</sup> The poor nutritional outcomes may not only be associated with the quantity of food but also the quality. Food variety and dietary diversity, which are associated with nutritional status of South African children, are limited in poor communities in South Africa.<sup>[2]</sup> Malnourished children are more likely to have poor educational outcomes leading over time to lower incomes, higher fertility, and suboptimal care for their children, thereby contributing to the intergenerational transfer of poverty. Undernutrition in children has been linked to poor mental development and school achievement as well as behavioural abnormalities.<sup>[3]</sup>

A baby of low birthweight, who is stunted and underweight in infancy and gains weight rapidly in childhood and adult life, can represent a worst-case scenario for cardiovascular and metabolic disease. Strong evidence exists that adequate nutrition in utero and in the first 2 years of life is essential for formation of human capital. Undernourished children are more likely to become short adults, to have lower educational achievement, and to give birth to smaller infants.

The effect of undernutrition spans at least three generations, as suggested by the small but significant association between grandmother's height and birthweight of children born to women from the five cohorts. In auxology and biomedicine—"poor growth is poor health"—and evolutionary biology and anthropology—"poor growth is adaptive". PURE Study found people with in Low and Middle Income Countries (LMICs) had lower risk factor levels but a higher risk of cardiovascular disease compared to those with higher levels of education. This apparent paradox could be due to epigenetics, or weight gain during critical periods in childhood, adolescence, and adulthood.<sup>[4]</sup> The study also suggests that serum cholesterol is causally important, but other factors must also be operating.

Consequences of childhood malnutrition for adult health and human capital have been summarised by Victora et al as key messages:<sup>[5]</sup>

- Poor fetal growth or stunting in the first 2 years of life leads to irreversible damage, including shorter adult height, lower attained schooling, reduced adult income, and decreased offspring birthweight;
- Children who are undernourished in the first 2 years of life and who put on weight rapidly later in childhood and in adolescence are at high risk of chronic diseases related to nutrition;
- There is no evidence that rapid weight or length gain in the first 2 years of life increases the risk of chronic disease, even in children with poor fetal growth;
- The prevention of maternal and child undernutrition is a long-term investment that will benefit the present generation and their children.

Short-term effects of undernutrition, is sufficient for giving the prevention of undernutrition high priority in national health, education, and economic agendas in LMICs. At the same

time as investments are made against undernutrition, middle-income countries undergoing the nutrition transition should also address the negative consequences of rapid weight gain, especially in later childhood.

Conclusions of PURE study indicate that the prevalence of following the three important healthy lifestyle behaviours (*viz. stopping smoking, healthy diet and physical activity*) was low in individuals after their CHD or stroke event. These patterns were observed worldwide but more so in poorer countries. This requires development of simple, effective, and low-cost strategies for secondary prevention that is applicable worldwide<sup>[6]</sup>, but also to address these risk factors long before people succumb to the disease, in adolescents and young adults

In countries undergoing the nutrition transition, monitoring length-for-age and weight-for-length in young children has been argued to be more appropriate than monitoring weight-for-age, because weight gain can reflect children becoming taller, fatter, or both.

This brings us to the urgent need for universal coverage of all children under five years of age to be assessed for normal growth and development. Growth monitoring, in better run health centres, at present is voluntary service provided to those who visit primary health centres for other reasons. Whilst Immunisation services are more proactive, hence better coverage, consequently disappearance of a number of infectious diseases among children. A comprehensive Under-5 clinics or service approach is required, combining growth monitoring, immunisation and other maternal and child health services, including health education and nutritional education to mothers. (The subject has been discussed at length in earlier articles under *This Week*. See Old Items).

Comprehensive maternal and child health service is a cost effective and efficient investment which is sure to build on the adult health and human capital and secure our future generations.

## References

- [1] Elizabeth W Kimani-Murage et al. The prevalence of stunting, overweight and obesity, and metabolic disease risk in rural South African children. *BMC Public Health* 2010.
- [2] Steyn NP, Nel JH, Nantel G, Kennedy G, Labadarios D: Food variety and dietary diversity scores in children: are they good indicators of dietary adequacy?. *Public Health Nutr* 2006, 9(5):644-650
- [3] Vinicius et al. Long-Lasting Effects of Undernutrition. *Int. J. Environ. Res. Public Health* 2011.
- [4] PURE Study Group. Socioeconomic status and risk of cardiovascular disease in 20 low-income, middle-income, and high-income countries: the Prospective Urban Rural Epidemiology (PURE) study. *Lancet Global Health*. 23 April 2019. [http://dx.doi.org/10.1016/S2214-109X\(19\)30045-2](http://dx.doi.org/10.1016/S2214-109X(19)30045-2)
- [5] Victora CG et al. Maternal, Child Undernutrition Study: Maternal and child undernutrition: consequences for adult health and human capital. *Lancet* 2008, 371(9609):340-357
- [6] Koon Teo et al. Prevalence of a Healthy Lifestyle among Individuals with Cardiovascular Disease in High-, Middle- and Low-Income Countries. The Prospective Urban Rural Epidemiology (PURE) Study. *JAMA*, April 17, 2013—Vol 309, No. 15.