

From stunting to overweight – identifying the turning point

The double burden, caused by the nutritional transition, includes stunting and overweight. But this is not a steady-state. At a particular point in time, the balance is leaning from stunting to overweight.

For the health delivery systems around the globe, the so-called ‘epidemiological transition’ resulted in a double burden, that forced the authorities to work not only against infectious- but also non-infectious diseases (1). One of the driving factors in the development of non-communicable diseases was the ‘nutritional transition’, causing an escalation of overnutrition and obesity (2, 3). Subsequently, the incidence and prevalence of nutritional related NCDs rose. However, nutritional deficiencies, related to micronutrients and undernutrition remained a serious public health problem. This particularly is true for many low- and middle-income countries. The occurrences of both, over- and undernutrition at the same time and in the same country, is termed the ‘double burden of malnutrition’ (DBM) (4).

PEM from marasmus and kwashiorkor to stunting

Children from birth up to 60 months of age are the most vulnerable group for nutritional deficiencies. Over time, [marasmus](#), [kwashiorkor](#) and intermediate forms of severe undernutrition ceased to be a public health problem, but insufficient weight and growth increase throughout the child’s development remained. Waterlow et al. (1977) suggested using simple anthropometric measurements to separate distinct groups of children experiencing protein-energy malnutrition (PEM) (5). Since then, deficits of preschool children in weight for a given height termed as wasting, and height to a given age termed as stunting became a common tool to measure ‘[subclinical](#) undernutrition’ in the community. A wasted child was thought to be in a state of protein-energy deficiency.

What entails stunting?

Originally stunting was thought to be the result of wasting, that is the remaining chronic status of a previously wasted child. This understanding of stunting however was not true. A wasted child, after recovery, didn’t turn out to be stunted and a stunted child was not found wasted before. During the course of the nutritional transition, wasting declined significantly as a public health problem, while stunting remained to be a useful ‘[proxy indicator](#)’ of a nutritional deficiency.

Explanations to what stunting stands for varies from being an ‘adaptation process’ to marginal nutritional intake (6), and to be the result of a ‘combined effect of poor nutrition, repeated infection, and inadequate psychosocial stimulation’ (7). For the [World Health Organization](#) stunting is a result of all that is mentioned above, including environmental conditions. Generally, it is accepted that a ‘deficiency in linear growth’ is a good indicator of the general health of the children (7) and an indicator of inequalities in human development (8). Considering the nutritional transition, DBM consists of stunting, on the one hand, indicating a nutritional deficiency, and on the other hand overnutrition and obesity.

The turning point

However, the word 'transition' involves a dynamic process and not a steady state. The situation should not be understood as some sort of steadiness. At a particular point of time, the balance is leaning more and more to one or the other side. This is of importance for public health planning and intervention. Among all the numerous health problems the authorities face, setting priorities is a necessity. The question then is, at what time not stunting, but overnutrition and obesity demand the full attention of the public health authorities.

A recent publication from Brazil tried to identify such a turning point (9). The investigation took place in the State of [Alagoas](#), situated in the eastern part of the Northeastern region of Brazil. The area is trailing behind the more affluent states of Brazil. So, not surprisingly, a national nutritional survey, undertaken in 1989, found that the percentage of stunted preschool children, with 36.8% exceeded by far the 4.9% of stunted children in the socio-economically more advantaged State of Catarina. By and large, the states in the south/southeast region of Brazil are faring better compared to those in the north/northeastern part of the country. The north/northeastern states, therefore, are particularly in the focus of investigators for health and nutrition in order to identify problems and suggest improvements.

A team from the Federal University of Alagoas conducted three consecutive household surveys in 1992, 2005 and 2015 and included representative samples of children under 5 years old. The number of children exceeded more than 1000 individuals for the first two measuring points and reached almost 1000 participants for the last one. Stunting was defined by stature-for-age <-2 standard deviation(SD) based on the WHO standard (10). Overweight was assessed by weight-for-stature >2 SD.

Over the three measuring points, the prevalence of stunting continuously decreased from 22.6% over 11.2% down to 3.2%, while at the same time overweight increased from 6.9% in 1992 to 7.5% in 2005 to 14.9% in 2015. While stunting decreased overweight steadily increased with a [turning point](#) from 'stunting' to 'overweight' somewhere around 2005.

Factors related to stunting and overweight

Factors assessed for **1992** for **stunting** included being over the age of 24 months, borne with low birth weight, and having a mother with more than two children and 'low' schooling. Children from mothers with no more than two children tended to be **overweight** and being male.

In the year **2015** those, who still were found to be '**stunted**' tended to be males, aged two years old or below, born with low birth weight and to a mother with 'low' schooling. There was no difference between males and girls to be **overweight**, but the risk increased for children borne with a birth weight of 4000g and above.

Discussion and recommendation

In an extensive discussion, the authors mirrored their results with similar investigations from the same area their surveys were conducted but also from other parts of Brazil. Throughout the country, the socio-economic situation improved also for those regions before trailing behind. While observing a decline in stunting also child mortality decreased. The increase in overweight

was more prevalent for children than for adults. However, since high birth weight seems to play a role, probably not only pregnant females but also adults, in general, might have changed their nutritional intake. While 'low' maternal schooling seemed to be a factor for stunting, the educational background of mothers seems not to be related to overweight. The negative impact of overweight for public health is emphasized and to increase taxes on 'unhealthy foods, like soft-drinks and ultra-processed foods', is recommended. Here the authors are in agreement with the 'Lancet Taskforce for NCDs' (11). This initiative, however, failed to be included in the UN High-Level Meeting about NCD's recommendations in 2018 (see (12)).

Finally, the discussion ends with a gloomy outlook on Brazil's future economic and political developments, which might reverse the balance between overweight and 'stunting' again. The paper was most probably submitted for publication before the onset of Covid-19. Supposed the authors could have foreseen this unsuspected and devastating event, affecting the economy of the globe and to a great extent Brazil, their outlook might have been even more pessimistic.

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Points of views expressed are those from the author and might not reflect the stance and policy of the Faculty of Public Health, Khon Kaen University, Thailand