

HUMAN GROWTH: PARAMETERS AND REFLECTIONS ABOUT GROWTH REFERENCES

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The research "Growth parameter of Sri Lankan children during infancy: a comparison with world health organization multicentre growth reference study", by P.J. Perera et al.¹, published in this issue of the journal is basically whether the WHO reference 2006² is appropriate for the Sri Lanka, due to the results presented, it necessarily causes some reflections on the growth of children, the determinants and implications, both for the primary care of children and adolescents in general, as for the use of growth as an indicator of welfare of the population groups.

First of all we need to consider that such research, in its methodological aspects, was performed in a proper and careful manner, which confers robustness to their results, *sine qua non* characteristics to perform any considerations.

The first consideration is related to the extreme care that must be taken when evaluating growth based on results obtained from the use of a reference (curve) of growth. Whatever the reference used, the results must be carefully analyzed³, even when resorting to a reference done with the best methodological cares, as proposed by the WHO reference in 2006. We must always remember that this is only a reference; therefore it is more a descriptor of the growth trend than a standard that must be achieved by all in an absolute manner.

The authors reflection about possible negative repercussions for breastfeeding in their country is a good example¹, even assuming that the exchange of reference cannot be considered the only solution to such difficulties. A critically use, and not a purely mechanical analysis, when comparing the values obtained with the reference would probably be a better solution, including the educational aspects that would then arise.

In this sense, the results of the study, interpreted from another angle of view, the

collective, produce an estimation that 85% or more of the children from Sri Lanka in the first year of life are lower than the median of the reference or, what is even worse, that 50% of the total is below the 15th percentile of the reference length of WHO 2006, which indicates a very high prevalence of stunting.

This induces a second thought: however it is known that the growth is a result of the interaction between genetics and environment^{4,5}, it is not possible to consider that such growth deficit is due mainly to ethnic characteristics, therefore genetic, of the population of Sri Lanka, even accepting what the authors say about the sample, i.e. a population relatively well situated within the socio-economic scenario of the country.

It is not always possible to achieve an optimal growth pattern (if it exists). It is often important to try to understand whether a particular child (or a group of children) is having a growth that is compatible with the expression of their potential in the environment they live in, because if they are under, not in the referential, but the best possible under the circumstances, it will require for us to comprehend the reasons in order to produce some consistent way of intervention to optimize the growth in that particular environment.

As a result, a third reflection becomes necessary considering the demographic, epidemiological and, especially, the nutritional⁶ transitions. Popkin believes that the nutrition transition is composed of several stages, among which there is one in which coexist a population with absence of severe protein-energy malnutrition, the presence of stunting (possible sequel of chronic malnutrition in the first years of life) and a gradually increase of the prevalence of overweight and obesity that progressively ends up also extending towards the layers of lower socioeconomic status. In addition,

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throughout the evolution of the transition, overweight and obesity also end up affecting increasingly younger individuals, including children.

This scenario is consistent with the results described by Perera et al. The analysis of the evolution of children growth in the study from 2 to 12 months of life is consistent with this time of nutritional transition, thus, it shows a gain of weight and height that is virtually identical to that observed in the WHO reference 2006 for the same period of life, though remaining a low height that cannot be ignored.

This leads to a fourth reflection, the evolutionary, sequential analysis of growth, both individually and collectively, that is essential, even more than the current isolated moment of growth achieved by the children. Both analyzes, if combined and interpreted under the light of a particular historical moment, may produce results that exceed the simple sum of them.

The article in question is a good example of this¹. The analysis of the results which showed that at 12 months the children were still below of the values of the reference is added the fact that in the ten-month period of the study increased the range expected for normal children, at least it is logical to raise the hypothesis that the deficit was already installed in the period of life preceding the follow-up, i.e., before the first two months of life.

In this context, it becomes essential to study how these children were born, particularly their weight, length, head circumference, gestational age, in addition to anthropometric and history linked to childhood characteristics of their parents, not forgetting that it is also necessary to know whether the recommendations were monitored during pregnancy and which was the evolution of prenatal care.

The repercussions of maternal malnutrition, which occurred early during childhood, can last for more than a generation, thereby contributing for the birth of small children or underweight for their gestational age, even in historical periods with improvements in the welfare of the population.

These considerations are extremely important, in case of growth deficit at this stage of life, it has been currently questioned and even considered harmful to promote a rapid and intense growth catch-up in the initial years of life because it joins a future risk of developing obesity and all metabolic disorders that too often are associated to it^{7,8}.

The new reflection, the fifth is linked to the precedents: the validity of the use of growth monitoring as a tool for periodic and continuous evaluation of living conditions and nutrition of a population.

As it has already been concretely evidenced more than a century ago, the populations that improve their welfare over time present an increase in the average of growth values, reaching a phenomenon that was called Secular Trends of Growth⁹.

In Japan, Takahashi showed not only the presence of this trend, but even that it can already be measured after a relatively short time intervals, when environmental conditions also suffer severe changes in short periods of time. In that country, some years after the second world war the 17-year-old people over a period of 15 years (between 1960 and 1975) had increased the mean height of 163 to 168 cm (a gain of 5 cm), while between 1930 and 1960 (30 years) it had increased only 4.1 centimeters¹⁰.

The next reflection, the sixth, is about the need for a policy of surveillance of growth and, as a consequence, the nutritional status, as an effective tool to identify possible inequities in welfare conditions across regions, communities or other groups of population of a country as well as the natural evolution of these conditions over time and/or after intervention policies specifically geared to promoting the welfare of the population.

Returning to the data presented by the researchers from Sri Lanka, if there were a historical series of children growth assessment in this age group in this country, the analysis could become even more important and productive. Unfortunately, even the data from another study cited in the article, in the authors opinions, do not allow reliable comparisons.

Another article, published by Martorell et al¹¹, with data related to Sri Lanka in the 80s, showed that the average growth achieved by preschoolers was around -2.2 and -1.7 z scores, respectively for height and weight, which could suggest that since then there has been a better growth of the children in this country. However, although this may seem likely, it is impossible to confirm and scaled up, because the two groups of data were transformed into scores z from distinct references of growth, known as differentials in weight and height values for children under 5 years of age.

From all these considerations it is evident that there is no reference for optimal growth in the true sense of the word, but it is necessary to adopt a standard, the best possible, and that their use is made in a very critical way, recognizing the advantages and disadvantages of their use in a given population, in order to extract the best information possible under the circumstances.

The study of growth is important and thought-provoking, if not for other reasons, would be suffice to consider what is established by the Convention

on the Rights of the Child adopted by the General Assembly of the United Nations in 1989 : "*the child must be allowed to develop normally both physically and mentally*"¹².

Thus, while achieving normal growth can be considered almost a utopia, it is clear that the growth reference, instrument used in health care programs to promote and protect the growth of children, must portray a good growth pattern.

In conclusion, if it weren't for the publication of Perera et al. in the Journal of Human Growth and

Development (2014) these considerations, even partially, would not have been triggered, which would be a pity for all who are interested in the study of human growth and that propose the discussing about the references of growth.

Consider it all a provocation, read the article, contribute with new reflections and questions will be welcome since the season for discussion must always be open. This is the major purpose of a scientific journal: to promote debate among those who are interested in a particular field of knowledge.

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