May growth of healthy breastfed infants differ from who 2006 child growth standards?

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In the last 10 years, the major efforts of paediatricians (not just nutritionists) throughout the world have been aimed at two major tasks:

- Supporting breastfeeding for as long as possible, firstly as exclusive for the first 6 months, and then adequately complemented with solids (up to 24 months and beyond if the mother and the infant like it) in agreement with WHO indications (1)
- Preventing overweight and obesity development from the earlier stages to receive a more effective preventive success to counteract the obesity pandemic not just in industrialized, but also developing and transition countries (2). Crucial to this policy is the early recognition of anthropometric or biochemical markers able to target groups ‘at risks’.

Both the two points meet in the issue of the growth curves of breastfed infants to be considered as standard. Indeed, breastfeeding (or ‘feeding human milk’) has been associated with reduced risk of overweight and obesity later on (3) with an effect even superior to the treatment of adolescent obesity once it has been established (4). Incidentally, but not secondarily, maintaining breastfeeding as long as possible through the dietary diversification may have positive effects across the infant’s inflammatory response and immune network, as pointed out by the minor incidence of some infections and immune-related disorders (5,6). Therefore, breastfeeding should be supported correctly, and to prevent any untoward and confusing interpretation, the growth of infants that are breastfed should be matched by paediatricians with that of healthy infants who have been breastfed within favourable environments on a worldwide basis. The primary operative consequence is represented by the prevention of introducing human milk substitutes or anticipating solid introduction improperly. To this aim, the WHO has issued the child growth standards including growth data of infants exclusively breastfed for at least 4 months from Norway, Ghana, Oman, India, Brazil and the United States (7), rapidly disseminated, but whose usefulness and limits have also been matter of scientific questions, mainly concerning the potential underestimation of malnutrition (8).

In any case, while there is consensus that WHO child growth standards should be used to monitor growth in all children in the 0–2 years age range, either breast or formula fed, the limited data on subjects with Asian ethnicity and the definitive lack of data from East Asia have been looked at as a partial limitation for the use in these geographical areas. Indeed, a first report from a Hong Kong Chinese birth cohort of ~7500 children has raised doubts on the appropriateness of WHO growth standards as far height of Hong Kong Chinese (9). However, the study did not report on breastfeeding practices and did not apply the same strict socio-economic exclusion criteria as in the data collection for the WHO standards.

In the present issue of Acta Paediatrica (10), Tanaka and colleagues describe in a first report the growth of breastfed Japanese infants exclusively breastfed for at least 4 months, regularly followed up to 24 months by measuring weight, length and head circumference (at birth and 1, 4, 6, 10, 12, 24 months).
18 and 24 months of age) and compared with national reference values and the WHO growth standards. While the differences with the national reference were expected (they were built on infants that were predominantly formula and mixed fed and revised in the 2000s when infant formulas were still providing a high protein supply), the comparison with WHO 2006 standards is almost surprising. Indeed, the shape of the curves of both weight and length starts lower, then reaches (and goes over) at 6 months to further decrease later on, while head circumference, starting lower as well, progressively increases up to 24 months. These details stand for an ethnic peculiarity of the Japanese population and maybe explained by an epigenetic effect on growth (as stated by the authors).

It would have been of interest to see whether using internal z scores the adjustment for variability could have paralleled the same shape of the curves, or maybe smoothed or emphasized it as well, and whether the same ‘hen’s back’ like fashion would have been confirmed when compared with WHO standards as z scores. But the personal feeling is that we must be open-minded to prevent any aprioristic conclusion and accept the concept that some observations could not match the present standards. On an operative standpoint, the take-home message is that it is true that breastfed infants grow in general less than their formula fed counterparts and with partly different modalities. But as it is recognized that they may have better health, psychosocial and cognitive outcomes, any reasonable effort should be carried out to support breastfeeding by maximally improving the mother-infant relationship. The identification of regional differences in growth rates is in any case welcome as it may suggest differentiated strategies to improve the local breastfeeding policies, without underestimating the meaning of the WHO work aimed at creating a common language for those dealing with breastfeeding.

These data should be expanded with longitudinal and cross-sectional data, as it is case for WHO, in the 3- to 6-year period, to check the distribution in the weight and weight/length percentiles at the time of rebound of body mass index, to assess the skewness of weight and weight/length distribution towards the upper percentiles, as indicator of progressively increasing number of severe cases of obesity. These peculiarities may be even more relevant for Japanese and eastern Asiatic groups who immigrated in western countries. Indeed, as reported by the Millenium Cohort Study, infants from immigrant Asiatic parents seem more prone to develop overweight and obesity with the years (11), probably due to the epigenetic pressure of a tremendously different environment over the one locally established through evolution. Within this context, Japanese curves could also indicate different infants’ dietary needs, as dictated by developing anthropometric measures and corroborated by the knowledge of differences in composition of local human milk. Long-chain polyunsaturated fatty acids, particularly docosahexaenoic acid, constitute an appropriate example, given the different growth rates, particularly head circumference, here reported on one side and their quite higher levels in milk from Japanese women on the other (12). Accordingly, milk fat composition may be dictated by the genetic background, in turn influencing the phenotypic expressions of the epigenetic variability (13). This concept, which should always be considered for either research or practice, was nicely depicted many years before the spread out of epigenetics by the traditional representations of breastfeeding in the African cultures, with the passage of ancestors’ souls through the breastfeeding mother to the recipient infant. Accordingly, Rolf Zetterstrom defined breastfeeding as a biological type of behaviour with deep roots in human societies, although there are great variations across settings (14).

Paediatricians should not remit uniquely to numbers, matches and pure evaluation of growth curves for their final judgement on the adequacy of growth and development of an infant, particularly when breastfed. The mother-infant interaction is so complex today (working mothers, working parents, lack of stable caregivers, immigrants, mothers alone as mono-individual families, multi-ethnic mothers and many other situations) that the classic paradigm based on the maintenance of growth percentiles within an acceptable range could become no longer sufficient, at least in some cases. The paediatrician is definitely welcome and appreciated, as opens new field of investigations in Eastern Asia, but should not deviate from interpreting the WHO 2006 growth standards in their deep and unreplaceable meaning, that is, primarily, giving paediatricians a cultural (in a broad sense) instrument to further support breastfeeding.

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References


