EDITORIAL

Humans are equal: lessons to learn from the World Health Organization prescriptive growth standards

Human growth monitoring to help detect pathologies is a long-adopted approach to child health care, for which growth references have been the key supporting tool.

The World Health Organization (WHO) pioneered the Multicentre Growth Reference Study (MGRS) from 1997 to 2003 and generated a set of 'Universal' Child Growth Standards for children aged 0 to 5 years. Drawing on various observations and epidemiological studies,[1,2] including the demonstration of similar growth patterns in breastfed infants from different ethnic origins,[3] WHO MGRS growth experts were convinced that all children could eventually grow equally when allowed to do so in an unrestricted healthy environment. As opposed to developing regular population-based 'growth references', children were meticulously selected for MGRS in order to produce data to represent ideal infant and child growth. In 2006, the WHO Child Growth Standards so generated were launched and it was hoped that would be adopted by policy-makers from all nations as 'prescriptive standards' for implementing health care measures conducive to optimal child growth. As such, these Growth Standards could also serve as aids to child advocates negotiating improvement conditions for child populations not exhibiting the prescribed growth patterns.

There are concerns over the misuse of descriptive secular growth references based on a substantial proportion of overweight and obese subjects, and also there is the need to have similar standards for older children based on the same conceptual and statistical methodological analysis of raw data. These experts therefore went on to develop a complementary set of new Growth Standards (WHO 2007) for 6-19 years old school-aged children and adolescents. The data eventually relied on three previous United States Health Surveys (complete sets of HES Cycle II and III and partial set, 1-24 years old groups, of HANES Cycle I).[4] However, no evidence was provided to explain how or why these 1963-1974 US data constituted good reference standards for optimal growth of youngsters from all nations.

In the current issue, So et al[5] took on the task of assessing whether WHO 2007 should be adopted for Hong Kong children. Significant differences were noted between a set of Hong Kong children growth data that they collected in 2005/6 and the WHO 2007 standards. Furthermore, assuming that the third centile for height-for-age be used as a single measure cut-off for referral to a specialty service, adoption of the WHO standards could translate into a substantially increased clinical workload. Similar conclusion could be drawn when considering the potential impact on referrals for underweight. They have therefore suggested that the old HK 1993 Growth References be retained.

Another research group compared the MGRS 2006 Growth Standards for 0-5 years olds with their own cohort of young persons born in 1997,[6] and also concluded that as of now WHO 2006 Growth Standards were inappropriate for Hong Kong children. While neither component of the new WHO Growth Standards is in use in Hong Kong, whether the datasets from these two local research programmes could be combined to develop updated growth references for Hong Kong children needs to be addressed.

On the other hand, as a tool for growth monitoring, the criteria for referring children for further specialist evaluation also warrant careful consideration. Hall,[7] reporting on behalf of the Coventry Meeting delegates, recommended that a single-measure cut-off of absolute height below the 0.4th centile on their National Growth Charts should be used to identify severe short stature for referral. He suggested that school entry would offer a good screening opportunity in the UK system. Based on real growth data from patients with Turner's syndrome, growth hormone deficiency, coeliac disease and cystic fibrosis, a Dutch study provided evidence[8] suggesting other derived parameters as additional criteria for enhancing the sensitivity and specificity of picking up these disorders for referral. The latter parameters were based on parental heights, and entailed the distance to target height standard deviation score (SDS) and a height deflection of more than 1 SDS per year, which were all used in combination with absolute height SDS. The suitability of Growth Standards for use in Hong Kong may be enhanced by evaluating similar elements specific to the local health care system.

Assuming that the premise that equivalent human growth potentials could be unleashed by suitably affluent, prosperous, and conducive living environments supports the validity of generating Universal Growth Standards for children in future

holds true, could there be a finite limit for the secular trend of height gain through successive generations? If not, is an ever-increasing body height advantageous to human health? Recently, a down-regulated insulin-like growth factor (IGF) signalling pathway (a major determinant of height) was found to be positively linked to longevity and slowing of ageing phenotypes in a number of model systems.[9] Should the secular height increase be in part linked to an over-active IGF signalling pathway, there could be a hidden toll to pay, in exchange for being taller. In fact there are data challenging the assumption that maximum height attainment is desirable,[10] and may provide additional perspectives on what constitutes desirable human growth standards.

PT Cheung, FHKAM (Paediatrics)
Email: ptcheung@hku.hk
Department of Paediatrics and Adolescent Medicine
The University of Hong Kong
Queen Mary Hospital
102 Pokfulam Road
Hong Kong

References

1. Habicht JP, Martorell R, Yarbrough O, Malina RM, Klein RE. Height and weight standards for preschool children. How relevant are ethnic differences in growth potential? Lancet 1974;1:611-4.
2. Graitcer PL, Gentry EM. Measuring children: one reference for all. Lancet 1981;2:297-9.
3. Growth patterns of breastfed infants in seven countries. WHO Working Group on the Growth Reference Protocol and WHO Task Force on Methods for the Natural Regulation of Fertility. Acta Paediatr 2000;89:215-22.
4. Hamill PV. NCHS growth curves for children. Vital and health statistics – Series 11-No.165. DHEW Pub. No (PHS) 78-1650. November 1977.
5. So HK, Nelson EA, Sung RY, Ng PC. Implications of using World Health Organization growth reference (2007) for identifying growth problems in Hong Kong children aged 6 to 18 years. Hong Kong Med J 2011;17:174-9.
6. Hui LL, Schooling CM, Cowling BJ, Leung SS, Lam TH, Leung GM. Are universal standards for optimal infant growth appropriate? Evidence from a Hong Kong Chinese birth cohort. Arch Dis Child 2008;93:561-5.
7. Hall DM. Growth monitoring. Arch Dis Child 2000;82:10-5.
8. Grote FK, van Dommelen P, Oostdijk W, et al. Developing evidence-based guidelines for referral for short stature. Arch Dis Child 2008;93:212-7.
9. Ziv E, Hu D. Genetic variation in insulin/IGF-1 signaling pathways and longevity. Ageing Res Rev 2011;10:201-4.
10. Samaras TT. Should we be concerned over increasing body height and weight? Exp Gerontol 2009;44:83-92.

Clinical Epidemiology Workshops

Due to space constraints in this issue, the new series on Clinical Epidemiology Workshops will start in the next (August) issue.

Editorial Office
Hong Kong Medical Journal