RESEARCH LETTERS

Multiethnic WHO Growth Charts May Not Be Optimal in the Screening of Disorders Affecting Height: Turner Syndrome as a Model

In 2006, the World Health Organization (WHO) published multiethnic growth charts for children younger than 5 years compiled of growth data of 6669 infants from 6 different countries (the United States, Norway, Oman, Brazil, India, and Ghana).[1] Originally, the rationale for the construction of the multiethnic WHO standards stemmed from an earlier study[2] that reported nearly similar growth patterns in infants and children from diverse ethnic backgrounds when their physiological needs are met and the environment supports healthy development.

Adult height varies significantly among populations and is strongly genetically determined, with heritability estimates around 80%.[3] Therefore, the childhood linear growth patterns are probably not as strongly determined by the optimal nutritional, environmental, and psychosocial factors as the weight patterns. In this respect, the original assumption of uniform growth among populations may be incorrect and adversely affect the screening of growth disorders.

At least 125 countries have adopted the WHO growth charts for nationwide use in childhood growth monitoring (Mercedes de Onis, WHO, written communication, November 7, 2011). Nevertheless, the WHO charts have not been sufficiently tested in the context of the screening of abnormal linear growth in the general population in developed countries. We tested the performance of the WHO charts against a population-specific growth reference in the screening of Turner syndrome (TS). This condition is often regarded as a model condition to justify screening of height disorders because short stature or poor growth may be the only presenting sign, and an early diagnosis is important because of treatable comorbidities and timely introduction of height-promoting therapies to improve adult height.[4]

Methods. Longitudinal height data of 124 Finnish girls with TS (64 with karyotype 45,XO) containing 2020 measurements were assessed either by using the WHO charts or a recently renewed population-specific growth reference based on growth data of 26 636 individuals.[1,5] The accuracy of both growth references for detecting growth patterns associated with TS was studied by calculating the cumulative percentage of girls with TS with at least 1 measurement either less than the third or the first height-for-age percentile.

Results. The cumulative percentage (ie, sensitivity) for detecting TS was significantly higher when the population-specific growth reference was used (**Figure**). By the age of 2 years, 72% and 55% of all girls with TS (81% and 67% of girls with karyotype 45,XO) had at least 1 height measurement less than the third and first percentiles, respectively, in population-specific growth reference. In contrast, only 36% and 20% of all girls with TS (41% and 23% of girls with karyotype 45,XO) had a height measurement less than these percentiles when the WHO standard was used ($P \leq .001$, McNemar test). From age 2 to 5 years, the gap in the cumulative sensitivity between the 2 growth references grew even wider, especially if the first percentile was used as a cutoff (Figure).

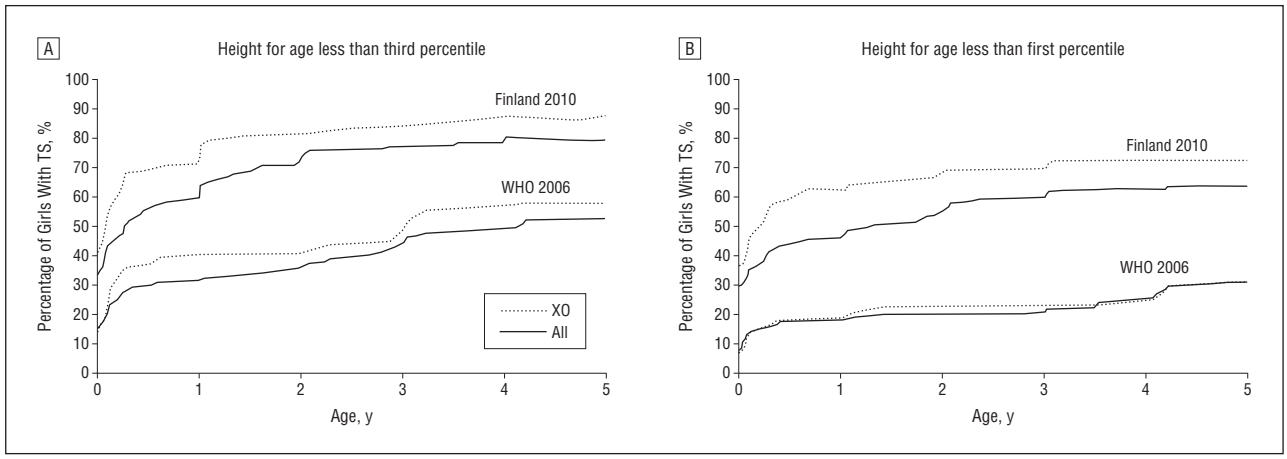

Figure. Percentage of girls with Turner syndrome (TS) with height for age less than the third (A) or the first (B) percentile of either the Finnish (upper lines) or the World Health Organization (WHO) (lower lines) growth reference for all girls with TS (n=124, solid lines) and those with an XO karyotype (n=60, dashed lines).

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Comment. Height assessment in children growing at the outer percentiles with potential morbidity may be flawed if we use WHO standards. In a recent study from Norway and Belgium, proportions of the healthy children outside the ±2 SDs of WHO standards were different than expected.[6] Furthermore, Finnish children are 0.2 to 0.8 SD taller on average than the WHO standards.[1,5] Thus, the concept of "similarity" of heights among children from different ethnic backgrounds is questionable because genetic differences have an impact on linear growth.

Our study is, to our knowledge, the first to report the suboptimal accuracy of screening of a height disorder with the WHO standard in comparison with population-specific reference. Further studies in other populations and with other growth disorders are warranted. Before implementing the WHO growth charts in height screening, their performance should ideally be tested in the population they are intended for.

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Bond, James Bond: A Review of 46 Years of Violence in Films

We tested the hypothesis that popular movies are becoming more violent by analyzing James Bond films. This series of 22 films spans 46 years and is one of the world's longest-running and highest-grossing film franchises.[1] As these films are rated either PG or (since 1989) PG-13, they are deemed suitable for, and marketed to, children and adolescents. Given the popularity of the franchise, not only is the probability of exposure to a James Bond film reasonably high, but it is likely that these films reflect the levels of violence in other, similarly rated, popular films. Since ratings systems are generally designed to protect children and adolescents from sexual content, not violence, this is of interest.

Methods. DVDs for all 22 James Bond films produced by Eon Productions were viewed in random order and coded for portrayals of violence. Violent imagery was defined as any scene in which there was an intentional attempt by any individual to harm another.[2] This definition includes failed attempts at violence (eg, gunshots that miss) but excludes accidental acts that lead to harm.[2]

Using a scheme modified from the 1997 National Television Violence Study,[3] each time the perpetrator, action, or target (PAT) changed, a new instance of violence was counted.[3] The total violence in each film equaled the number of PATs. Violent acts were further divided into whether the violence was trivial (eg, an open-handed slap) or severe (punching or kicking, attacks with weapons). Mass scenes of violence, in which it was unclear how many people were engaged in a fight and how many were actually harmed, were noted and an arbitrary 10 PATs per mass scene were added to the total violence score for each film. To ensure reliability, 6 randomly selected films were independently coded by a second coder. There were no differences in the mean number of violence instances each coder recorded across these 6 films ($t=0.258$; $P=.80$).

Analyses used Stata (version 10; StataCorp) to determine whether violence increased with time using the Spearman correlation coefficient between year and PAT scores.

Results. The total violence in each film was associated with the year the film was released, indicating that portrayals of violence tended to increase over time ($\rho=0.64$; $P=.001$). There was also a significant increase in the portrayals of severe violence over time ($\rho=0.74$; $P>.001$) but not trivial violence ($\rho=-0.07$; $P=.75$) (**Figure**). These findings remained significant when controlling for the length of each film. While the 1997 film had the highest total violence, the most recent film (2008) still contained 250 PATs compared with only 109 in the first film (1962): more than twice as many acts of violence in total and nearly 3 times as many acts of severe violence.

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