Pediatrician-Friendly IAP Growth Charts for Children Aged 0-18 Years

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Growth is the fundamental physiologic process that characterizes childhood. Secular trends in growth patterns are followed as indicators of children's health on a population level. Growth can be worrisome along two variables: height (short stature) and velocity (growth failure). Anthropometry is an invaluable tool in the hands of a pediatrician to monitor growth.We must get into the habit of regularly plotting these anthropometric data on the appropriate growth chart until the age of 18 years, as this will help in picking up the reason for failure to thrive early and thereby help to reduce expensive investigations.

Growth charts are invaluable tools in the assessment of childhood nutrition and growth. Indian Academy of Pediatrics (IAP) produced and recommended IAP 2015 Growth charts for monitoring Indian children between the ages of 5 and 18 years, and recommended simplified World Health Organization (WHO) growth charts for monitoring of children under the age of five years. A combined WHO-IAP height and weight chart allows us to monitor growth from birth to 18 years on a single chart, and the relation between the child's height and the mid-parental height (MPH) can be readily observed on the same chart even for children younger than 5 years, which is not possible on the split chart (separate charts for under-5 and older children).

IAP 2015 body mass index (BMI) charts were designed to define overweight and obesity at 23 kg/m^2 and 27 kg/m^2 adult-equivalent BMI cut-offs, and overweight and obese lines were color coded as orange and red, respectively. However, deriving BMI involves a calculation (weight in kg/height in meters squared) which takes time and hence is often omitted by a busy practitioner. Prevalence of overweight and obesity increases in children as they get older, especially beyond the age of 8 years. A quick BMI screening tool based on weight for height that eliminates the need to calculate BMI will help to rapidly decide if a child is overweight, obese, normal or underweight. The tool has three lines which depict obese (OB), overweight (OW) and underweight (UW), the overweight line is orange and obese line is red (same color code as the IAP BMI charts). Based on where the child's weight lies on y axis for the height on x axis, the child can be classified as having BMI within the normal range (between UW and OW lines), overweight (between OW and OB lines), obese (above the OB line) or underweight (under the UW line).

MPH is necessary to understand a child's genetic potential so that the current height percentile can be checked against MPH percentile. MPH is based on parents' heights, but again involves a calculation and plotting at 18 years to know the mid parental percentile. MPH calculation is gender-specific and the formula is father's height+mother's height divided by 2, and then subtract 6.5 cm for a girl or add 6.5 cm for a boy. Pediatricians find this cumbersome and hence MPH assessment often gets omitted. Here we present a MPH percentile lookup tool which was designed in such a way that by joining the father's height on left to the mother's height on the right (both in cm) gives the MPH percentile (on the middle line) for that specific gender *e.g.,* joining mothers' height of 150 cm to father's height of 170 cm gives an approximate value of 25th percentile of MPH on both scales. Using formula for a boy the MPH is 166.5 cm and for a girl it is 154.5 cm. These correspond to 25th percentile of height both for boys and girls at 18 years, confirming the accuracy of the lookup scale.

We present user-friendly growth charts for everyday use by pediatricians (charts available at *https://iapindia.org/pdf/4422_Pediatrician-friendly-growth-charts-for-0-18-year-old-Indian-children-Dr-Bakul-Parekh-and-Dr-Vaman-khadilkar.pdf*). No calculations are involved while using these charts, neither for BMI nor for MPH. In a busy clinic, lesser the calculations the pediatrician performs, the better. Both these important parameters can be read-off directly from the tools provided on the chart.

An important reason for the popularity of United Kingdom Royal College of Paediatrics and Child Health (RCPCH) growth charts is that along with the standard

percentile lines, many tools such as the MPH percentile calculator, lower percentile lines and BMI z score look up tool are provided, which eliminate calculations. No such attempt has been made to incorporate all these tools in the IAP growth charts so far; although, it is the need of the hour. We believe that this need will be fulfilled by these user-friendly charts.

The percentile curves for height and weight in children below the age of 1 year are placed too close together, making it cumbersome to plot and despite using statistical smoothing, a small blip is evident at junction of 5 years (where WHO and IAP charts meet). We hope to improve these shortcomings in future charts.

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