



Surveillance of Health of a Child through Lifestyle Adjustment, Diet and Exercise Plans

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Keywords: Build assignment •
 Estimated-adult BMI • Height •
 Modified-scaled percentiles •
 Weight



Do you know that:

- Your child becomes as much as 2 centimeters taller in the morning as compared to bedtime.
- A child grows very slowly just before reaching puberty (most of the mothers bring their kids to doctors during this period).
- Regular growth monitoring can result in saving lives of some children, in particular, those suffering from acute malnutrition (our group was able to alert cardiologist of such a child, who had undergone multiple cardiac surgeries since birth).
- Body-mass index cannot be interpreted for a child in the same way as is done for adults.

Would you like to know beforehand how tall or how heavy your child could become as an adult?

Would you be interested to find out if your school-age child would be able to reach the required height for induction in the Armed Forces of Pakistan?

As per directives of Governor Sindh/Chancellor, University of Karachi, a retired Lieutenant General of the Pakistan Army, a team from University of Karachi, led by the speaker, accepted the assignment to establish **National Growth and Developmental Standards (NGDS) for the Pakistani Children**. In 1998, this team initiated the NGDS Pilot Project (following 'Opt-in Policy' based on protocols of 'Institutional Review Process') in 3 institutions administered by the Armed Forces of Pakistan — Army Public School, 'O' Levels; Fazaia Degree College, PAF Base 'Faisal' and Bahria College, NORE I; adding a civilian school (Beacon Light Academy); all of them located in Karachi, in 2011. A few accomplishments are:

- Procedures established, documented as well as step-by-step, illustrated and labeled instructions prepared and validated for height measurements to least counts of 0.005 cm and mass (weight) measurements to least counts of 0.005 kg; CDC Growth Charts and Tables extended to percentile range 0.01^P-99.99^P, scaled percentiles and modified-scaled percentiles introduced.
- Model developed, which computed estimated-adult height and difference of measured height and current-age-army-cutoff height; 6 monthly recommendations for height gain given to students and height-gain-target-achievement index computed based on current and previous checkups.
- The first- to the ninth-generation solutions of childhood obesity put forward. The tenth-generation solution is expected to be unveiled this year.
- Concepts of energy channelization (Fig. 1), estimated-adult BMI, specific BMI, degree-of-obesity/wasting and tallness/stunting as well as pseudo-gain of height/mass introduced.
- Definitions of true obesity, true wasting, true tallness, true stunting as well as instantaneous obesity/wasting/tallness/stunting given; 6 monthly recommendations for mass management, on the basis of height-percentile-based-optimal mass and BMI-based-optimal mass, provided to students and mass-management-target-achievement index computed based on current and previous checkups.
- Nutritional-status categories extended to 23 from 3 categories in literature before 2014.
- Mathematical expressions to compute severity of acute malnutrition given in terms of CDC and scaled percentiles (in terms of modified-scaled percentiles in April 2022).
- Concept of build proposed and re-expressed in terms of scaled and modified-scaled percentiles. Sport teams as well as classroom sections should be formed according to build. Brain function dominates body function in small-build children, body function dominates brain function in big-build children, whereas brain and body functions contribute equally in medium-build children. Determination of build at a younger age may help choosing career for a child.

Optimal-mass management is the optimal solution among three factors: diet and exercise plans combined with lifestyle adjustment (Fig. 2), creating a positive mindset, an effective social interaction and a balanced daily routine.

Pictures of the Event

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Fig. 1. Venn-diagrammatic (set-theoretic) representation of EC, ON and UN

EC: Energy-Channelization
 ON: Over-Nutrition
 UN: Under-Nutrition

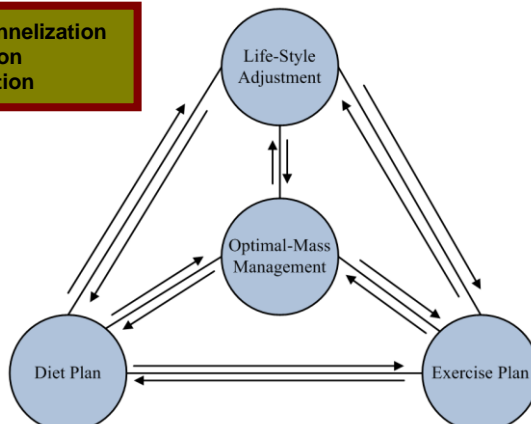


Fig. 2. Lifestyle adjustment as well as diet and exercise plans needed for optimal-mass management

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Additional File 5 — Lifestyle Adjustment, Diet and Exercise Plans: https://www.ngds-ku.org/Papers/J54/Additional_File_5.pdf

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