Utility of Body Mass Index Quick Screening Tool for Assessing Nutritional Category of Children

Body mass index (BMI) quick screening tool was used on retrospective data of 415 boys and 428 girls (8-14 years). Sensitivity and specificity of the BMI tool were assessed by comparing with the Indian Academy of Pediatrics BMI charts. The BMI tool had high sensitivity and specificity to identify children with normal BMI and underweight. However, its sensitivity varied between 50.57.4% for overweight and obese children, respectively.

**Keywords:** Growth chart, Underweight

The double burden of malnutrition, defined as the simultaneous manifestation of both undernutrition and overweight and obesity, has increased in most low-income and middle-income countries [1]. It is important to identify both undernutrition and overnutrition so that preventive and corrective measures can be implemented at the earliest.

The Indian Academy of Paediatrics (IAP) Revised Growth Charts 2015 are recommended for assessment of growth in children Between 5-18 years of age and provide body mass index (BMI) charts to screen for under or over-nutrition [2]. In a busy paediatric practice, it has been observed that weight and height are recorded but BMI is overlooked as it is not calculated [3]. This poses a risk of missing undernutrition, overweight and obesity which if undiagnosed have serious consequences on the health of the child.

Recently gender-specific BMI quick screening tool (children 2-18 years) [4] has been developed which overcomes this problem of computing the BMI. The child can be identified as underweight, normal weight, overweight and obese by plotting the weight and the height. The present study was planned to assess the utility of this BMI quick screening tool in terms of sensitivity and specificity by comparing with the Revised IAP BMI charts.

The BMI tool [4] was used as per the recommendation on the retrospective data of children and adolescents in the age group 8-14 years (unpublished data). The height and weight were plotted on X-axis and Y-axis, respectively. The meeting point of the two lines gave the BMI. Depending on where the BMI point rested, the child was classified as being obese, overweight, normal BMI or underweight. BMI was also calculated and plotted on the IAP BMI charts [2], and nutritional status identified.

Statistical analyses were conducted using SPSS version 26 (SPSS Inc). Frequency (percentage) of underweight, normal BMI, overweight and obesity were calculated using BMI quick-screening tool and Revised IAP BMI chart. Sensitivity and specificity of the BMI quick-screening tool against IAP charts were calculated.

Data on 843 (415 boys) children and adolescents were analyzed. The mean (SD) age of boys and girls was 10.8 (1.7) and 10.8 (1.6) years, respectively. According to BMI quick-screening tool, 9.88% of boys were underweight, 72.87% had normal BMI, 12.05% were overweight and 5.3% were obese. As per IAP BMI charts, the percentage of boys with underweight, normal BMI, overweight and obesity was 4.34%, 68.67%, 18.55%, 8.43%, respectively. According to BMI
quick-screening tool, 11.92% of girls were underweight, 71.26% had normal BMI, 13.79% were overweight and 3.04% were obese. According to the IAP BMI charts, the percentage of girls with underweight, normal BMI, overweight and obesity was 4.67%, 67.77%, 20.56% and 7.01%, respectively. The sensitivity and specificity of the BMI quick screening tool is shown in Table I.

The BMI tool had high sensitivity and specificity to identify children with normal BMI and underweight. However, its sensitivity varied between 50-57.4% for overweight and obese children. It was observed that a proportion of children and adolescents with normal BMI by the BMI quick tool were overweight as per IAP BMI charts. Similarly, a proportion of the children diagnosed as overweight by the tool were in the obese category as per the BMI charts. This significant false-negative group needs to be identified accurately as they may progress towards the health risks associated with overweight and obesity. Utility of this tool can be evaluated in comparison with other obesity indices like waist circumference and weight/height ratio.

Use of BMI quick screening tool alone for the identification of overweight and obesity will leave a significant proportion of undiagnosed children. Whether the sensitivity be improved with help of a statistical tool, such as revising the cutoff percentiles to match the accuracy of BMI charts needs to be explored. BMI cutoff with higher sensitivity and minimal false-negative proportion will be of great benefit.

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