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UTILITY OF NUTRITIONAL INDICES DERIVED FROM BODY WEIGHT AND HEIGHT– A COMPARATIVE STUDY

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ABSTRACT

The commonly used mathematical formulas expressing relationship of weight to height–the weight height ratio, quetlet index and the ponderal index, were compared on the data from 622 school children. The quetlet index was observed to be the index of choice for community studies for evaluating the nutritional status of children.

Key words: *Nutritional status, Skin fold thickness, Undernutrition.*

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Weight in relation to height is commonly used as an indicator of nutritional status. The indices based on these two measurements have great merit as the measurements themselves can be taken easily, quickly and with a fair degree of accuracy. The three, commonly used indices based on weight (W) and height (H) are: W/H; W/H^2 (Quetelet's Index/Body Mass Index), and W/H^3 (Ponderal Index). The present study was conducted to compare the three indices in relation to body weight, height and subcutaneous fat (subscapular skinfold) to recommend the anthropometric index of choice for community studies for evaluating the nutritional status.

Material and Methods

The study was carried out on 622 boys, 6-15 years of age, of high school village Dayalpur, district Faridabad, Haryana. Weight was recorded with a portable bathroom type weighing machine (Gerbruden Suehnle, West Germany) which was standardised every week with standard weights. The subject was asked to take off footwear and have the minimal clothes (coats, cardigans, *etc.* were removed before weighing). The weight was recorded to the nearest half kg. The height was measured without foot wear. The person was asked to stand erect against wall with heals, buttocks and shoulders touching the wall and his gaze horizontal. Height was measured to the nearest half centimeter on a scale marked on the wall, using a non-strechable metallic tape.

The standard Harpenden skinfold calli-

per (John Bull, British indicators Ltd. England) with jaw pressure of 10 g/m^2 was used to measure left subscapular skinfold thickness by the accepted standard technique(1).

The various indices derived from weight (W) and height (H) of the subjects were calculated by the standard methods(2) as follows: $I_1 = W/H$; $I_2 = W/H^2 \times 100$; $I_3 = W/H^3 \times 10{,}000$.

The children with weight for age less than 80% of the reference standards(3) were termed undernourished. The mean values for three indices in normal and undernourished children were calculated and compared.

The pooled correlation coefficient of the various indices with weight, height and subscapular skinfold thickness were compared.

Results

Table I shows the mean values of the three indices in normal and undernourished children. The variance was the highest for index I_1, both in undernourished and normal subjects as compared to I_2 and I_3. The mean height, weight and subscapular skinfold thickness is shown in *Table II.*

All the indices correlated with weight, index I_2 had the highest value for correlation. The index I_1 correlated with height; I_3 had a negative correlation with height, whereas I_2 had a relatively low correlation with height. While calculating correlation coefficient with subscapular skinfold thickness, I_2 had the highest correlation value, followed by I_1 and I_3 (*Table III*).

TABLE II –*Mean Height, Weight and Subscapular Skinfold Thickness*

Parameter	Weight (kg)	Height (cm)	Subscapular skinfold thickness (mm)
Mean	27.7	135.4	5.10
SD	8.8	16.1	0.28

TABLE III – *Correlation Coefficient of the Indices with Weight, Height and Subscapular Skinfold Thickness*

Index	Weight	Height	Subscapular skinfold thickness
I_1	0.88	0.41	0.36
I_2	0.92	0.03	0.56
I_3	0.49	0.36	0.24

Discussion

Comparison of the three indices based on weight and height indicated that the in-

TABLE I –*Mean and Standard Deviation of the Three Indices, in Normal and Under-nourished Children*

Index	Normal (n=539)		*Under-nourished (n=83)		Total (n=622)	
	Mean	SD**	Mean	SD	Mean	SD
I_1	20.3	3.9	16.6	3.1	19.8	4.0
I_2	14.8	1.4	12.6	0.8	14.5	1.5
I_3	10.9	1.1	9.6	0.9	10.7	1.1

*Weight less than 80% of the reference standards.
**SD = Standard deviation.

dex I_2 was most satisfactory. Index I_2 was highly correlated with weight, subscapular skinfold thickness and was relatively independent of height. Rao(4) also found the index I_2 to have significant association with weight as well as with arm and calf circumferences (indicative of nutritional status).

In another study(5), the index I_2 was found to have high sensitivity, specificity and predictive value in detecting malnutrition in community surveys. Index I_2 has been shown to be very useful indicator of overweight in community surveys of obesity(6).

The index I_1 is well correlated with weight, it also has positive correlation with height, and a low correlation with subscapular skinfold measurement (*Table III*). This index is, however, unsatisfactory because it has a high correlation with height. Also in community surveys under-nutrition is believed to be independent of height(7,8).

The index, I_3 has the double disadvantage that it not only has a lower correlation with weight and subscapular skinfold thickness but also a negative correlation with height.

From the findings of the present study we recommend that the Quetelet's index (Body Mass Index) can be satisfactorily used in the nutritional surveys, this index being easy to calculate, independent of height, and is highly correlated with weight and the skinfold thickness.

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Hepatic Focal Nodular Hyperplasia

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Focal nodular hyperplasia is a rare benign hepatic tumor usually discovered in-

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