



ASSESSMENT OF NUTRITIONAL STATUS OF UNDER -5 CHILDREN USING WHO GROWTH STANDARDS

Food & Nutrition

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ABSTRACT

The World Health Organization considers that poor nutrition as the single most important threat to the world's health. Overall undernutrition represents the single largest killer of under-five children, being responsible for 3.1 million child deaths each year (45% of total as under 5 years' deaths). In 2013, 52 million children under age 5 (10% of the global population) were wasted, while other 165 million children in the world, a quarter of the world's under-5 population, were too short for their age, or stunted, which can impact the child's physical and mental development. The present study reports the result analysis of data for 150 under five children on growth patterns and prevalence of undernutrition amongst them. The objective of the study is to assess the nutritional status of under 5 years of age using anthropometric measurements as compared to WHO 2006 standards for weight for age, and height for age. The study reports the overall prevalence of underweight and stunting in the study population to be 20.65 %, and 31.33% respectively.

KEYWORDS

malnutrition, undernutrition, underweight, stunting, WHO growth standards

Introduction:

Nutrition plays a vital role in growth and development of children. Inadequate nutrition may lead to malnutrition, growth retardation, reduced work capacity and poor mental and social development^{1,2}. The World Health Organization considers that poor nutrition is the single most important threat to the world's health³. Overall undernutrition represents the single largest killer of under-five children, being responsible for 3.1 million child deaths each year (45% of the total under 5 years' deaths)⁴. In 2013, 52 million children under age 5 (10% of the global population) were wasted, meaning that, due to acute malnourishment, they had low weight for their height. Other 165 million children in the world, a quarter of the world's under-5 population, were too short for their age, or stunted, which can impact the child's physical and mental development⁴. India presents a typical scenario of South-Asia, where progress in childhood malnutrition seems to have sunk into an apparent undernutrition trap, lagging far behind the other Asian countries characterized by similar levels of economic development⁵. The recent findings in NFHS – 4, total 38.4% of children under 5 years of age in India are stunted, 21% are wasted and 35.7% are underweight while in NCT –Delhi 32.3% children under 5 years of age are stunted (height-for-age), 17.1% Children under 5 years in Delhi are wasted (weight-for-height) and 27% Children under 5 years in Delhi are underweight (weight-for-age)⁶.

The present study reports the result analysis of data of 150 pre-school children on growth patterns and prevalence of undernutrition in children under 5 years of age. The objective of the study is to assess the nutritional status of under 5 years of age using anthropometric measurements as compared to WHO 2006 standards for weight for age, and height for age.

Methods:

Present cross section was conducted on 150 under-five children in Delhi who were randomly selected.

Inclusion Criteria:

- (i) Apparently healthy children under 5 years of age.
- (ii) Willing subjects (whose parents gave orally expressed consent to be a part of the present study)

Exclusion Criteria:

- (i) Children having any chronic/acute or genetic disorders were excluded from the study.

Tools and Techniques:

- (i) Interview – cum- questionnaire schedule was conducted with the mothers of the subjects (as preferred respondents) to gain information about their socio-demographic characteristics like age, religion, region, family size etc. In case mother was not available than either father or grandparent was chosen as a responder.
- (ii) Anthropometric Measures: are used to assess the size, shape, and composition of the human body. The two basic anthropometric measures that were taken for the subjects were weight and height. Indicators based on weight, height, and age were further assessed and compared with WHO growth reference standards(2006) to assess the nutritional status of the children.

Weight: Weight of the subjects were taken in kilograms with the weighing scale to assess their growth and nutritional status using the standard technique to the nearest 0.5 kg.

Height: Height of subjects were taken using stadiometer / infantometer to the nearest 0.1 cm using the standard technique.

WHO growth standards⁷:

Weight for age: Weight for age is a commonly used indicator of body size and it reflects the level of food intake. The weight recorded was compared with the median values and alternatively, the weight of subjects was plotted against age on a graph for comparison with the normal curve. A Low Weight-for-Age is termed as Underweight and is a composite indicator that includes elements of stunting and wasting.

Height for age: Height is a very reliable measure that reflects the total increase in the size of the child up to the moment it is determined and could indicate adequate nutritional status. Low Height for Age is indicative of stunting and depicts early chronic exposure to undernutrition.

Statistical Analysis:

The raw data related to subjects socio-demographic profile and anthropometric measures were entered in MS Excel sheet in duplicate to avoid any manual error. Data were analyzed using appropriate statistical tests and results are depicted in form of frequencies, percentage, means and standard deviations to withdraw conclusion.

Results:

Socio-demographic profile of the subjects:

A total of 150 children under the age of 5 years were recruited in the study. Of the total study subjects majority were boys i.e 61.33%(n=92) while rest 38.66 % were girls(n=58).As illustrated in table 1, it can be seen, that 27.35% of the study population comprised of children aged 0-36 months, while the majority of them were in the age group between the ages of 36-60 months.

Out of the total study subjects 61.33% (n=92) comprised boys while 38.66% (n=58) were girls.

Table 1: Distribution of subjects by age

Age group	Boys(n=92)	Girls(n=58)	Total(n=150)
0-36 months	24(26.08)	17(29.31)	41(27.33)
36-60 months	68(73.91)	41(70.68)	109(72.66)

It is observed that majority of children belonged to joint families and were in middle or upper-middle-income group of the community. As far as religion is considered it is reported that 94% (n=141) of the subjects were Hindus followed by Muslims(2.6%), Sikhs (2%)and Christians(1.3%).

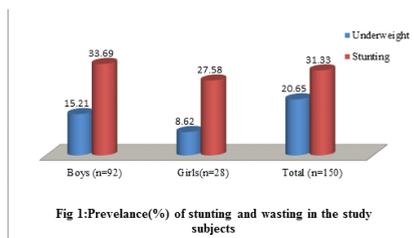
Anthropometric measures:

Height and weight:

The mean weight and height of the study sample were reported to be 14.13± 2.74kg and 92.21± 13.60cm respectively. Mean weight and height of the boys was 14.40±3.62 kg and 92.81±11.86cms and for the girls, it was reported to be 13.69±3.56 kg and 91.25 ±13.74cms respectively. The difference in the means of the two groups(i.e. boys and girls)was statistically insignificant @p<0.05.

Anthropometric Indices:

As depicted in Fig1, it is observed that the overall prevalence of underweight and stunting in the study population was found to be 20.65 %, and 31.33% respectively.



It is observed that prevalence of underweight and stunting is higher amongst boys in comparison to the girl subjects.

Table 2: Distribution of subjects by weight for age

	Boys(n=92)	Girls(n=58)	Total(n=150)
Growth problem (better depicted using BMI for age)	4(4.34)	5(8.62)	9(6)
Normal	74(0.80)	48(82.75)	122(81.33)
Underweight	12(13.04)	3(5.17)	15(10)
Severely underweight	2(2.17)	2(3.44)	4(2.66)

(X2-3.52, p-value-0.317, result not significant @p<0.05)

It was observed that 13.04% of boys and 5.17% of girls were underweight, while 2.17% of boys and 3.44% of girls were severely underweight. Stunting was also more prevalent in the boys (19.56%) than the girls (10.34%) but these differences were not found to be statistically significant.

Table 3: Distribution of subjects by height for age

	Boys(n=92)	Girls(n=58)	Total(n=150)
Normal	61(66.30)	42(72.41)	103(68.66)
Stunted	18(19.56)	6(10.34)	24(16)
Severely stunted	13(14.13)	10(17.24)	23(15.33)

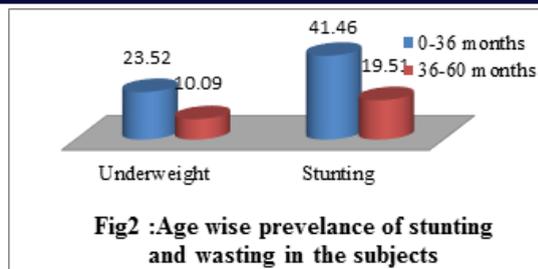


Fig2 :Age wise prevalence of stunting and wasting in the subjects

(X2-2.30, p- value-0.315, result not significant @p<0.05)

Age wise stratification of the data reveals that the prevalence of underweight and stunting is more prevalent in the age group of 0-36 months (underweight -23.25%, stunting-41.46%) than 36-60 months (underweight -10.09%, stunting-19.51%).The differences are not statistically significant @p<0.05.

Median Percentage values

Analyzing the above data, standard deviations with respect to Median values for both the indicators i.e. weight for age and height for age was calculated using the median values from WHO reference standards7.

% Median is calculated using median values from WHO reference standards.

$$\bullet \text{ \% Median} = \frac{\text{Subject's Value}}{\text{Median Value}} \times 100$$

Table 4: Distribution of subjects based on their % median values

Gender	No. of Subjects	Weight-for-Age				Height-for-Age			
		No. of Subjects below Median	% of Subjects Below Median	No. of Subjects Above Median	% of Subjects Above Median	No. of Subjects Below Median	% of Subjects Below Median	No. of Subjects Above Median	% of Subjects Above Median
Boys	92	61	66.30 %	30	32.60 %	74	80.43 %	18	20.44%
Girls	58	42	72.41%	14	24.13 %	48	82.75 %	10	17.24%
Total	150	103	68.66%	44	29.33 %	122	81.33 %	28	18.66%

Data represents that a maximum number of the subjects are below the median for both the indicators i.e weight for age (68.66%) and height for age (81.33%). In comparison to the boys, the number of girls falling below the median is higher.

Srivastava et al (2012)8 reported that the mean height and weight of boys and girls in the study group were lower than the CDC 2000 (Centers for Disease Control and Prevention) standards in all age groups. Regarding nutritional status, the prevalence of stunting and underweight was highest in the age group 11 yrs to 13 years whereas the prevalence of wasting was highest in the age group 5-7 years. In another, in another Cross-sectional Study done in an urban slum area in Meerut city among children in the age group of 5-14 years, it was reported that the prevalence of underweight in children was found 48.0% where, 56% of the undernourished children were boys9.The rates of growth of mean weight and length/ height were far lower in India than the international norms up to the age of 2 years. The temporal trend indicates declines in the percentages of undernourished (low weight-for-age) and stunted (low height-for-age) children over the 7-year period, although the degree of improvement was far better for stunting than for underweight10. In a study by Gupta and Jindal (2016)11 malnutrition was more prevalent in 12--60 months age group children and was found statistically significant. It was more prevalent in boys. As per WHO growth standards, 41.9%, 47.2%, 18.9% of children had underweight, stunted and wasting, respectively. Total malnutrition prevalence was 66.4%.a similar study was conducted by Ghane and Kumar (2017) among under 5 children in Mumbai it was reported that as per WHO classification, moderate

underweight (W/A) was present in 74 (23.49%) and severe underweight in 38 (18.71%). Wasting (W/H) in the form of moderate acute malnutrition (MAM) was noted in 64 (20.32%) and severe acute malnutrition (SAM) in 42 (13.33%). Height for age revealed moderate stunting in 37 (11.75%) and severe stunting in 5 (1.59%)¹².

Conclusion:

The study concludes that prevalence of underweight and stunting among under 5 children, with reference to WHO growth standards are 20.65 %, and 31.33% respectively. Results signify the need to improve the health-related policies especially for under five children so as to improve their health and nutritional status.

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