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Comparison of Growth Parameters of School Age Children According to WHO and CDC Standard Growth Norms – A Descriptive Survey

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Abstract: ***A descriptive comparative carried out to assess the growth parameters of school children and to compare the growth parameters according to WHO and CDC standard growth norms. Materials and Method: Simple random sampling technique was used to select schools (government and private) from Udupi taluk and children from Ist to VIth standard were selected by using cluster sampling. The data was obtained using demographic proforma and anthropometric measurements (height and weight) of selected children. Based upon the anthropometry measurements, nutritional status of the children was assessed according to WHO and CDC standard growth norms Results: Among 450 school children, only 0.89% school children were tall according to WHO and CDC standard growth norms. According to WHO, 44.89% school children were stunted, whereas 40% school children were stunted according to CDC. On the other hand, according to WHO 53.11% school children were wasted, whereas 56.22% school children were wasted according to CDC. Only 0.67% school children were overweight according to WHO and CDC. No child was found obese according to WHO and CDC standard growth norms.***

Keywords: Growth Parameters, school age children, WHO, CDC

1. Introduction

Children represent the future, and ensuring their healthy growth and development ought to be a prime concern of all societies. In India, children under 18 years of age constitute about 40% of the population. School age children constitute a large pool (18.22%) of children of this age group.[1]Geographically, more than 70% of malnourished children live in Asia, 26% in Africa and 4% in Latin America and the Caribbean. India has the highest number of stunted children in the world. Almost 42% of the children in the country numbering over 61 million are malnourished and stunted according to the Hunger and Malnutrition Report (2012).[2]According to a UN study about 73% children in India were malnourished including underweight (45.9 %) and stunted (25.7%) as reported by Hedge. More than 50% of Indian school children suffer from subclinical under nutrition as indicated by low birth for age and 65% fall in a group which indicates long duration malnutrition.[3]

Silveira etal conducted a study to compare the NCHS, CDC and WHO growth charts in the nutritional assessment of 337 hospitalized children up to ten years. This study evaluated the agreement of growth charts proposed by National Center for Health Statistics (NCHS/1977), Centers for Disease Control and Prevention (CDC/2000) and World Health Organization (WHO/2006). Z-score indexes: stature/age (S/A), weight/age (W/A) and weight/stature (W/S) were evaluated, in each of the three references (NCHS, CDC and WHO). ANOVA and test Bland & Altman and Lin plots were used in the comparison of the 3 charts. Results showed high correlation and agreement among the criteria, but more patients were classified as presenting shortness through the WHO criteria.CDC and WHO criteria were more rigorous than the NCHS criteria for the diagnosis of underweight (W/A) and malnutrition (W/S). Despite the strong agreement of the 3 charts, the adoption of the WHO charts seems to be more helpful for the children's nutritional screening for admission, as it enables detection of a higher number of malnourished children or at nutritional risk, who will benefit from an early intervention.[4]

2. Objectives of the study:

- To assess the growth parameters of school age children in terms of height, weight and BMI.
- To compare the growth parameters of school age children in accordance with WHO and CDC standard

3. Materials and Methods

A survey was carried out to assess the growth parameters of school going children. Simple random sampling technique was used to select schools (government and private) from Udupi taluk. Children were selected from Ist to VIth standard from each school. Lottery method was used to select one section from each standard; students were selected from each section by using cluster sampling. The data was obtained using demographic proforma and anthropometric measurements (height and weight) of selected children. Sample size was calculated based on the pilot study and was 450 school children.

4. Data collection Instruments

Demographic proforma was developed for the purpose of collecting background information of the school children. Inch tape and weighing scale was used to measure Anthropometric measurement. Kuppuswamy socioeconomic status scale was modified to assess the socioeconomic status of the family. Tool was validated by experts and it was pretested. Inch tape and weighing scale were calibrated from Bio-physics department. Reliability was determined by inter-rater reliability and reliability coefficient was 1(r=1)

5. Procedure for Data Collection

Prior permission was taken from the school authorities after explaining the nature and objectives of the study. The purpose of the study was explained to the parents and informed written consent was obtained from each of them and they were assured about confidentiality of their responses. The data was collected from school age children (from 1st to VIth standard) from two Government and two private schools. Background information was collected by investigator and anthropometric measurements were taken. Socioeconomic status was assessed through the information given by parents. Data were analyzed by using descriptive analysis.

6. Results

Sample Characteristics

Table 1: Frequency and percentage distribution of sample characteristics, n=450

Sample Characteristics	f	%
Age (in years)		
6	68	15.11
7	54	12.0
8	73	16.22
9	56	12.44
10	142	31.56
11	57	12.67
12	0	0.0
Gender		
Male	237	52.7
Female	213	47.3
Religion		
Hindu	401	89.1
Muslim	39	8.7
Christian	10	2.2
Birth Order		
First	158	35.1
Second	243	54.0
Third	45	10.0
Fourth or above	4	0.9
Number of siblings		
Nil	40	8.9
One	243	54.0
Two	116	25.8
Three or more	51	11.3
Type of school		
Government	267	59.3
Private	183	40.7
Location of school		
Urban	174	38.7
Rural	276	61.3
Socioeconomic Status		
Upper I	0	0.0
Upper middle II	7	1.5
Lower middle III	36	8.0
Upper lower IV	246	54.7
Lower V	161	35.8

Majority, 31.6%of school age children were in the age of 10 years and most of the children 52.7% were males. There was no child under the age of 12 years. Maximum children 89.1% were Hindu by religion. Majority, 54%of children were in second birth order and 54% of children had one sibling. Majority, 59.3% of children were studying in government schools and 61.3% children were studying in schools located in rural area. Maximum, 54.7% of children belonged to upper lower IV socioeconomic status class (Table1)

Growth parameters of the school age children determined by measuring height and it was compared with WHO and CDC standard growth norms and depicted in fig 1.

Percentage distribution of height of school age children according to WHO and CDC standard growth norms **n=450**

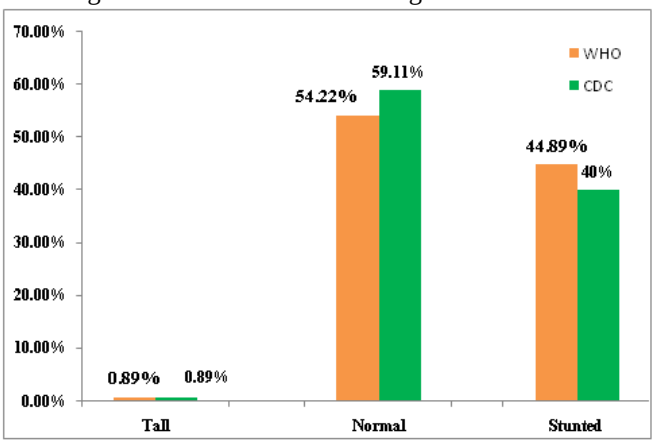

Figure1: Bar diagram distribution of height among school age children according to WHO and CDC standard growth norms

Among 450 school age children, only 4 (0.89%) school age children were tall according to WHO and CDC standard growth norms. According to WHO, 244 (54.22%) school age children were in normal category, whereas 266 (59.11%) school age children were found in normal category according to CDC. According to WHO, 202 (44.89%) school age children were stunted, whereas 180 (40%) school age children were stunted according to CDC. The results indicates that there is not much significant difference in the frequency percentage of children in stunted category and normal category, according to WHO and CDC standard growth norms(Fig 1)

Percentage distribution of BMI among school age children according to WHO and CDC standard growth norms n=450

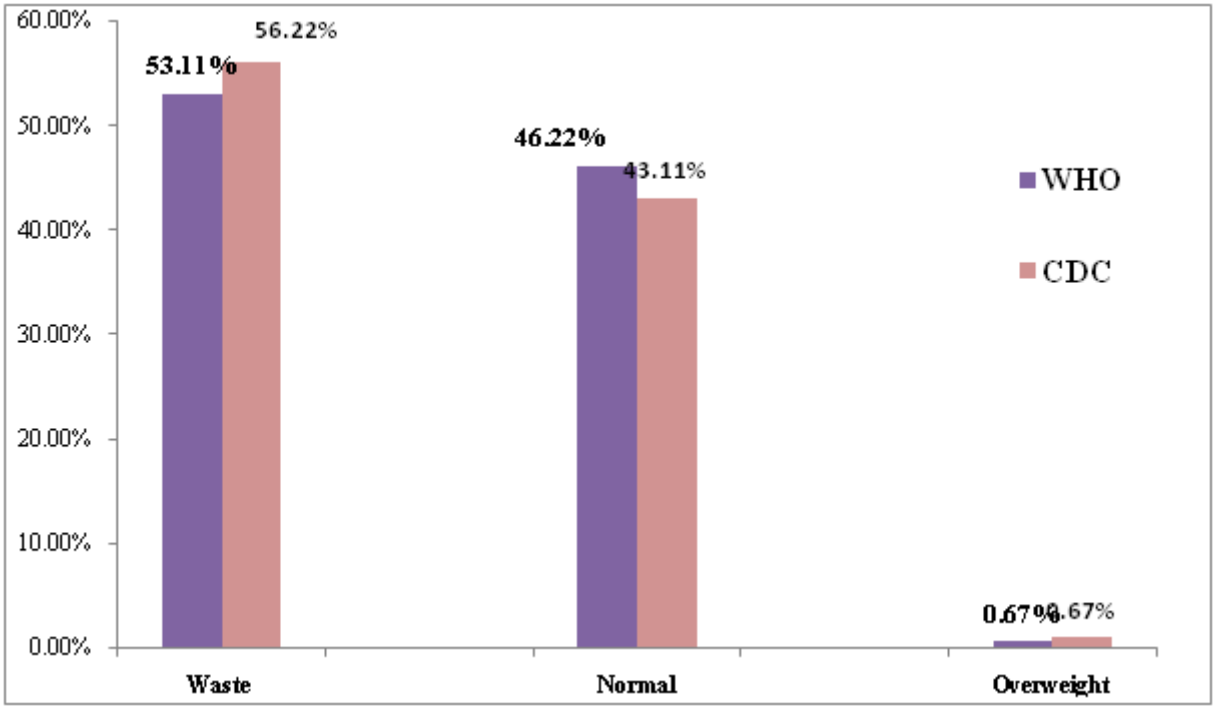

Figure 2: Bar Diagram of distribution of BMI among school age children according to WHO and CDC standard growth norms

Among 450 school age children, according to WHO 239 (53.11%) school age children were wasted, whereas 253 (56.22%) school age children were wasted according to CDC. According to WHO, 208 (46.22%) school age children had normal BMI, whereas 194 (43.11%) school age children had normal BMI according to CDC. Only 3 (0.67%) school age children were overweight according to WHO and CDC. No child was found obese according to WHO and CDC standard growth norms. The results indicates that there is not much significant difference in the frequency percentage of children in wasted category and normal category, according to WHO and CDC standard growth norms(Fig 2)

7. Discussion

In the present study, findings reveals that among 450 school age children, only 4 (0.89%) school age children were tall according to WHO and CDC standard growth norms, and according to WHO, 202 (44.89%) school age children were in stunted category, whereas 180 (40%) school age children were in stunted category according to CDC. In regard to BMI, according to WHO, 239 (53.11%) school age children were in wasted category, whereas 253 (56.22%) school age children were in wasted category according to CDC and only 3 (0.67%) school age children were overweight according to WHO and CDC. No child was found obese according to WHO and CDC standard growth norms.

A study conducted by Soares A, Barbosa S, Lanzillotti S compared the nutritional status of school children according to three different reference curves i.e. Cole, CDC and Conde and Monteiro. Weight and height of 181 children aged 5-10 years were obtained from a database for the nutritional surveillance of school children. Results showed that the prevalence rates for obesity in girls were similar using the Cole and Conde and Monteiro (3.1%) cutoffs, but the prevalence rate according to CDC standard was significantly lower (2%). For boys, the prevalence of obesity using the Conde and Monteiro cut off (4.8%) was lower than the rates obtained using the cutoffs suggested by Cole (7.2%) and by the CDC (7.2%).[5]

A study was conducted by Wang Z, Zhang B, Song Y, Hu P to establish the BMI percentiles among 232140 Chinese children between 7-18 years of age and to compare their BMI percentile curves with those in two recently developed international references: the WHO and US Centres for Disease control and Prevention (USCDC) growth references. BMI percentile curves were established using the LMS method, and were compared with the percentiles of the WHO and the USCDC references. Results showed that BMI distributions and growth patterns in Chinese children were dramatically different from those in the two international reference populations. Compared with the international reference populations, younger Chinese boys (7–12 years of age) had higher values of the percentiles above the median and lower values of the percentiles below the median, suggesting that they had larger proportions of extreme BMI values in both directions. Hence, higher proportions of children with extreme values in both directions indicate that China is currently facing both an increasing level of obesity and a high level of under nutrition, simultaneously.[6]

8. Conclusion

Hence, according to the present study there is difference in the results according to WHO and CDC, but WHO standard growth norms provide a better tool to monitor the rapid and changing rate of growth in children and it can be used to assess children everywhere.[7]

References

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