ORIGINAL RESEARCH PAPER

Medicine

AN OBSERVATIONAL STUDY ON NUTRITIONAL STATUS OF CHILDREN IN GOVERNMENT AND PRIVATE SCHOOLS OF MADHYA PRADESH.

KEY WORDS: nutritional status, school children, growth charts

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ABSTRACT

Introduction: Growth factor and hormonal growth spurt are additive factor along with availability of food and type of food, which is major cause hiding the genetic factors. Various multi-centric studies were conducted to develop the growth charts,few of them were extremely appreciating still faced many controversies one of them being differences in urban and rural grooming of children, featuring urgent requirement of growth charts for every nation.

Objectives:

1.To find average height, weight and mid arm circumference of study sample

2.To compare the height, weight, mid arm circumference and BMI in study sample of government and private school.

Materials and methods: the study is a cross sectional study, in which students of (age 11- 18 years) class VI - X of government school (n= 104) and private school (n=151) was taken for assessing height, weight and mid arm circumference. BMI was calculated from the data.Data was entered on MS Excel sheets and unpaired 't' test was applied.

Result: Unpaired t test results revealed no significant difference in the anthropometric indices, except for in 9th standard where significant difference was found in height, weight, MAC and BMI, also in MAC of 8th standard, this could be by chance that the difference was found to be significant as no significant difference was found in the students of tenth standard.

Conclusion: There is an urgent need for reference growth charts formation from both urban and rural sectors of India on a mass scale, this data then can be generalized to whole nation and contribute to the making of Indian national growth charts.

Introduction:

Primary school age is a dynamic period of physical growth and mental development, that leaves behind its deficiency marks even in adolescence. Research indicates that these nutritional deficiencies lead to poor health and are a cause for low school enrollment, high rate of absenteeism, school drop outs and low class performance. Prevalence of malnutrition in India is 42% according to NFHS-4 data.[1] Measurement of height and weight of children in centiles are used as principal criteria in assuming the adequacy of nutrition[2]. Though genetically determined, growth factor and hormonal growth spurt are additive factors along with availability of food and type of food, which is major cause. Various studies on growth charts for U.S.[3]have been published till date. Weight reference charts for breastfed infants and bottle fed infants have been developed for the British[4] and also Swedish population[5].

Various multi-centric studies were conducted to develop the growth charts [3,6].Work has been done in India by ICMR and Agarwal et al which face their controversies even today, featuring urgent requirement of growth charts for every nation.The growth charts for every nation must be reviewed after every decade as said by IAP. Beyond this, very few comparative studies have been conducted between government and private schools, my study being one of them.[7,8,9,10]

Objectives:

1.To find the average height,weight and mid arm circumference.

2.To compare the height, weight, mid arm circumference and BMI in children of government and private school.

Materials and methods:

This is a community based cross sectional study conducted in the month of October 2017 in a government school and private school in an urban area of Indore city.

All the students enrolled from VI to X in the government school (n=104) were present on the day of examination. All the students of VI- X std. (age 11-18 yrs.) were selected for the study where age was calculated by date of birth obtained from school register. Being 100% attendance all students (n=104) were taken for the study.

In the private school keeping similar criteria for age and standard of education, 200 students were enrolled, while 157 were present on the day of data collection, so study sample was restricted to 157.

Physical examination was done by standardized measurement for height, weight and mid arm circumference (MAC) of children. Body weight was measured by standard weighing machine nearest recording as 0.5 kg, stadiometer was placed in school corridors with nearest recording 0.1 cm.MAC was measured by measuring tape with cross method to avoid error, while measuring, nearest to 0.1 cm recorded. All the instruments were pre calibrated and tested for their least count in pilot study and same measuring instruments were used in both the schools.

Data was entered on MS Excel sheets, BMI was calculated and unpaired 't' test was applied.

After explaining the study and the methodologyof the present study permission was granted by the principle, chairman of the school and the trustee of the private school, informed consent was obtained from the parents a day before in the form of written consent and those who failed to give written consent were telephonically accessed to obtain consent and study was initiated with 100% consent obtained.

Results:

Unpaired t test results revealed no significant difference in the anthropometric indices, except for in 9th standard where significant difference was found in height, weight, MAC and BMI, also in MAC of 8th standard, this could be by chance that the difference was found to be significant as no significant difference was found in the students of tenth standard.

The result was sent to the schools in centiles where in majority of the boys in height, weight, MAC were lying below 25th centiles and 50th centiles according to who growth charts. Where below 50th centile data were reported as malnourished and this was 89% in private 93% in government.

Discussion:

In the present study we did not find any significant difference in BMI and the BMI of girls and boys has been found comparable which is contradictory to the findings of study in Himachal Pradesh[10,11].

In the Pakistani paediatric population a study of Sina Aziz et al[12] revealed the values lying at P5,P25,P50 percentiles and one value at P95 similar to data found in my study with the exception of P95.

Akram et al[13], did a longitudinal study todetermine anthropometric measurements in Pakistani childrenfrom a high socioeconomic back-ground and their results indicated weight and length curves of the study group duplicating NCHS standards at all centiles. Ogden et al[2] present a clinical version of the 2000CDC growth charts and give a comparison with the previousversion, the 1977 NCHS growth charts. It is important that the growth of children from South and East Asian populations be rigorously assessed in the process of developing the new international growth references.[14]

There is a need for ethnic specific growth chartsand Body Mass Index (BMI) cut-off points for underweight, overweight and obesity in children. Similar finding was observed by Deurenberget al[4], where a comparison in the relationship between BMI and body fat of children aged 7-12 years from Singapore, Netherlands and Beijing was done. This study strongly suggested that relationship between (BF %) Body for percentage and BMI is different among children of different background. Results of z scores for weight-for-age (zwfa), height-for-age (zhfa) and BMI-for-age (zbfa) indicate that boys fall in the overweight category with shorter height (SD >1<2) in all age groups except at age group 8 where the boys are significantly taller than reference values. In case of girls, zwfa and zbfa indicate that girls are overweight in all age groups (SD >1<2) except at age 6 and zhfa scores reflect that they are shorter than the reference values across all age groups[9]. Mean height and weight of boys and girls were higher than ICMR standards in both type of school[9]. The mean mid arm circumference of all girls and boys from both type of schools had higher value than the ICMR standards[10]. The overall prevalent rates of underweight, wasting and stunting were 61.2, 16.8 and 27.6%, respectively. In the rural area these were 70.5, 17.8 and 35.8%, while in the urban they were 52.2, 15.9 and 19.8%, respectively. The mean nutritional indices (Weight for Age, Weight for Height and Height for Age) were found to be significantly lower among the rural pupils than urban pupils ($P < 0.001$ in each case)[15]. Study done by Onis et al[16] compared the mean BMI-for-age of adolescent boys from Calcutta with French,Dutch, British and NCHS reference medians in which children from Calcutta plotted well below theother groups including NCHS standard. This and similar studies[7]supports our work. Growth standards developed in industrializedcountries may be appropriate for measuring childgrowth only of the privileged groups in developing countries.[13,17]Though WHO global data is available[18], updated,growth reference charts are essential for every country[5].

Conclusion and message by the author: in this study, it is evident that majority of children face malnutrition problem[1]in their growing age in India.inspite of mid day meal scheme,the problem of inadequacy in nutrition regarding mid day meals have come up[8] hence forth there are various differences in anthropometric measurements in children of different nations, these impending deficiencies in micronutrients and macronutrients can be a cause of India being the diabetic capital. So, there is an urgent need for reference growth charts formation from both urban and rural sectors of India on a mass scale, this data then can be generalized to whole nation and also contribute to Indian national growth charts ,thereby decreasing the lead time of diagnosis and reducing future sufferings and child mortality[19].

Conflict of interest: No conflict of interest.

Limitations:-The sample size taken is not sufficient enough to generalizethe result to the whole country,this study can be drop start for the future studies which in collaboration can give the result as national growth charts which can be amended every year.

TABLE 1: Table comparing nutritional status of boys of government and private schools

Std.	Govt. / Private	Height (cm.)			Weight (kg.)			BMI (Wt. in kgs./ Ht. in mt^2)			MAC (cm.)		
		mean	Sd	P	mean	sd	P	mean	sd	p	Mean	sd	p
10	Govt. (26)	162.8	2.6	0.08	48.2	8.7	0.431	18.0	2.0	0.94	23.2	1.07	0.56
	Private(22)	164.1	3.4		48.8	8.4		18.0	2.7		23.6	1.3	
9	Govt. (25)	155.2	1.7	0.0001*	41.4	5.7	0.013*	18.2	3.1	0.22	21.1	0.6	0.0008*
	Private(22)	164.08	2.9		49.0	8.3		17.3	1.9		24.4	1.3	
8	Govt. (5)	157.2	1.8	0.95	39.1	4.09	0.053	18.3	3.3	0.12	20.5	1.3	0.03*
	Private	156.97	3.3		45.4	6.3		15.7	1.3		23.2	0.7	
7	Govt.(4)	152.5	1.8	0.21	42.5	7.4	0.058	16.1	2.4	0.07	21.2	0.8	0.41
	Private(17)	148.05	2.5		35.2	6.2		19.1	2.9		20.19	0.9	
6	Govt. (13)	142.63	2.29	0.86	30.8	4.3	0.53	16.4	3.4	0.22	19.02	0.5	0.36
	Private(24)	142.24	2.74		32.3	7.7		15.1	1.12		19.8	1.24	

Table 2: Table Comparing nutritional status of Girls of government and private schools

Std.	Govt. / Private	Height (cm.)			Weight (kg.)			BMI (Wt. in kgs./ Ht. in mt^2)			MAC (cm.)		
10	Govt. (4)	154.9	1.5	0.83	43.5	5.5	0.62	18.2	2.7	0.79	23.0	0.8	0.86
	Private (10)	156.0	3.4		44.3	8.7		18.7	2.3		23.2	1.0	
9	Govt. (10)	146.3		0.76	38.7	5.7	0.29	15.9	2.5	0.07	21.9	0.8	0.93
	Private(10)	148.9			38.9	9.5		18.6	1.5		21.8	1.12	
8	Govt. (8)	146.1	2.0	0.45	35.5	7.0	0.65	17.1	2.2	0.45	18.9	0.5	0.02
	Private(9)	149.0	2.0		36.8	5.4		16.3	2.6		21.0	0.7	
7	Govt. (5)	139.7	0.7	0.27	29.1	1.2	0.87	15.4	1.6	0.50	17.4	0.4	0.10
	Private(11)	137.8	1.3		28.8	3.7		14.9	0.7		19.9	1.2	
6	Govt. (4)	135.2	0.5	0.92	34.0	2.4	0.24	15.9	2.5	0.07	20.3	0.4	0.44
	Private(10)	136.6	3.0		29.3	6.9		18.6	1.5		19.2	1.0	

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