Analysis of Physical Growth and its Relationship with Obesity among Private Aided and International School Children in Bengaluru Metro City

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Abstract: Overweight and obesity are rapidly increasing among school children in developing countries. Adolescence is one of the critical period for obesity and is related to morbidity and mortality in adulthood. In India the problem of obesity has been scantily explored even in the affluent population groups. Despite the growing numbers of adolescent school girls and the overall increasing obesity over the years, only few studies are available in India to determine the prevalence of obesity out of which one is from Bengaluru city. Thus, the present study is an attempt to find out the prevalence of obesity school going girls of private aided and international schools and also its relationship among them. For this purpose 300 school going girls from private aided and international schools situated at Bengaluru Metro city were selected. For this purpose descriptive survey research was followed. For data collection purpose, the permission was taken from school heads and parents for prior test procedures conducted to school girls. The physical growth variables standing height, body weight measurements were taken. BMI, BMR and body fat % were calculated with Body Composition Monitor HBF-361 Omron instrument. The statistical techniques mean, standard deviation, t-test and correlation were utilized to test the formulated hypotheses and the level of significance was fixed at 0.05 and 0.01 level of confidence. These techniques were done with the help of Windows based SPSS Statistical Package and MS Excel. From the correlation it was found that physical growth variables correlated with body fat percentage and from the 't' test analysis it was also found that private aided children had better physical growth (standing height and body weight) and body fat percentage when compared with international school girls of Bengalore Metro city. The BMI and BMR do not show any significant differences between the aided and international school girls group. The findings of these studies and our study show a markedly higher prevalence of fat among children attending international schools when compared to aided school children. School health program should incorporate health education of teachers, students, parents and a convergence of education and health sector, strict adherence to physical education and training period, NCC, Scout and regulation on use of modern gadgets can reduce the modifiable lifestyle behaviours.

Index Terms - Physical Growth, Relationship, Obesity, Private Aided, International, School Going Girls.

I. INTRODUCTION

Overweight and obesity fundamentally happen either because of abundant calorie consumption or inadequate physical action or both. Besides, different hereditary, behavioral, and natural components assume a part in its pathogenesis. Youth obesity is a trailblazer of metabolic disorder, poor physical well-being, mental diseases, respiratory issues and glucose intolerance, all of which can track into adulthood. Developing nations like India have an extraordinary issue of 'double burden' wherein toward one side of the range we have obesity in youngsters while at the opposite end we have malnutrition and underweight.

Overweight and obesity are quickly expanding among school youngsters in developing nations. Youth is one of the basic time frames for weight and is identified with morbidity and mortality in adulthood and like corpulence among grown-ups too. The growing-up process is unpredictable; it incorporates dimensional development. The first is usually estimated basically, by the expansion in weight and stature.

BMI is standardized in light of the fact that it is a factual estimation. BMI diagrams can give an essential range. BMI for women normally fluctuate from men as men have more muscle fat; be that as it may, with age and way of life propensities (if sedentary) body may have more fat inspite of the fact that demonstrating an ordinary BMI. BMR is portrayed relying on singular age, weight, and stature. BMR bases on indispensable requirements of the body like breathing, heart pulsating, absorption and so on. BMR can give a customized estimation. BMR relies upon physiological and natural energy mechanisms of the body and is to some degree dictated by hereditary qualities.

BMI and BMR have turned out to be basic terms with regards to weight administration. BMI proposes weight and is an estimation of body composition from tallness and weight of a person. Typical BMI calculators are depend on factual estimation. BMR is an biological albeit process which demonstrates how much calories a body consumes when very still. BMR is that vitality framework which is required for our vital organs and body parts to work viably.

Obesity among kids from private schools in metropolitan urban communities were found in the vicinity of 20% and 29% individually. In youngsters, the advancement of weight is related with the synchronous crumbling in interminable illnesses chance profiles (Misra and others, 2011). A current report in private and government schools in Delhi has featured the elements, for example, "westernization" and sustenance, physical movement and dietary practices (Harrell and others, 2016). In India the issue of obesity has been sparsely investigated even in the affluent populaces. Karnataka is a State with broad developmental exercises and isn't excluded from cultural assimilation that is spreading in the nation. In spite of the developing quantities of pre-adult school girls and the general expanding obesity throughout the years, just couple of studies is accessible in India to decide the predominance of weight out of which one is from Bengaluru. The information on the pervasiveness of overweight and corpulence and its determinants can help execute populace based preventive measures. In this manner, the present investigation is an endeavor to discover the prevalence of obesity along with selected physical growth of school going girls of private aided and international schools in Bengaluru Metro city.

II. OBJECTIVES OF THE STUDY

To investigate the relationship of obesity with physical growth variables and also compare physical growth and obesity between private aided and international school going girls.

III. STATEMENT OF HYPOTHESES

1. It was hypothesized that there might not be any significant relationship between selected physical growth variables and Obesity.
2. It was hypothesized that there might not be any significant differences in the Physical Growth and Obesity of private aided and international school going girls.

IV. METHODOLOGY

For the present study descriptive survey method was used and secondary school going girls were selected as population from Bengaluru Metro city, Karnataka India. For this purpose 300 school going girls from private aided and international schools situated at Bengaluru Metro city were selected. For this purpose descriptive survey research was followed. For data collection purpose, the permission was taken from school heads and parents for prior test procedures conducted to school girls. The physical growth variables standing height, body weight measurements were taken. BMI, BMR and body fat % were calculated with Body Composition Monitor HBF-361 Omron instrument. The statistical techniques mean, standard deviation, t-test and correlation were utilized to test the formulated hypotheses and the level of significance was fixed at 0.05 and 0.01 level of confidence. These techniques were done with the help of Windows based SPSS Statistical Package and MS Excel.

V. ANALYSIS AND INTERPRETATION OF DATA

Correlation Analysis : To find out the relationship between physical growth variables and obesity of school going girls, Karl Pearson's Product Moment Coefficient of Correlation technique was applied and the results is given in the following Table-1.

Table-1: Results pertaining to Correlation pertaining to physical growth and obesity of school going girls (N=300, df =298)

Variable	Descriptive Statistics		'r' value Sig. level	P Value
	Mean scores	Standard Deviation		
Obesity (Body Fat %) with Physical Growth variables	23.679	5.157	-	
a) Standing Height	153.200	5.924	0.149**	0.010
b) Body Weight	44.670	6.432	0.602**	0.000
c) Body Mass Index (BMI)	18.166	2.712	0.371**	0.000
d) Basal Metabolic Rate (BMR)	1225.660	180.668	0.350**	0.000

Table r value @ 0.05 =0.113; @ 0.01 =0.148 **Significant at 0.01 level.

From the table-1 revealed that, the obtained 'r' values 0.149, 0.602, 0.371 and 0.350 are greater than the table value at 0.01 level of confidence. Therefore, the stated hypothesis was rejected and an alternate hypothesis has been accepted that is "there is significant relationship of physical growth variables of standing height, body weight, BMI and BMR with body fat percentage school going girls." The result concludes that selected physical growth variables found positive relationship with prevalence of obesity of school going girls. The prevalence of obesity of school going girls is influenced by the said physical growth variables.

't' test Results: The independent one tailed unequal variance t-test was used to find out the significant differences in the said criterion variables and obtained results have been shown in the following Table-2.

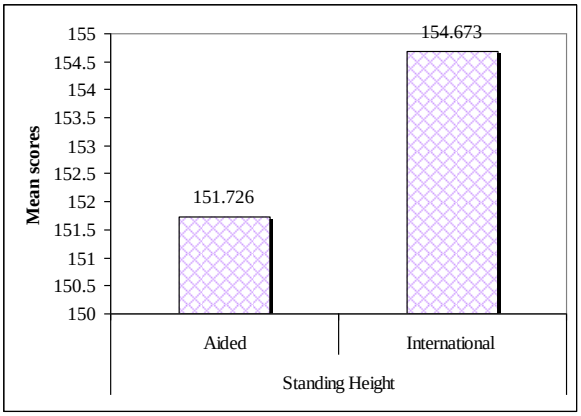
Table-2: Comparison of Physical Growth and Obesity (Body Fat %) of school going girls between private aided and international schools of Bengaluru Metro city.

Group		N	Mean	Standard Deviation	't' Value and sig. level	P Value
Standing Height	Aided	150	151.726	5.647	4.44**	0.000
	International	150	154.673	5.845		
Body Weight	Aided	150	42.373	7.095	6.61**	0.000
	International	150	46.966	4.698		
BMI	Aided	150	18.363	2.854	1.25@	0.210
	International	150	17.970	2.556		
BMR	Aided	150	1214.653	170.923	1.06@	0.292
	International	150	1236.666	189.848		
Body Fat %	Aided	150	21.826	5.868	6.66**	0.000
	International	150	25.532	3.468		

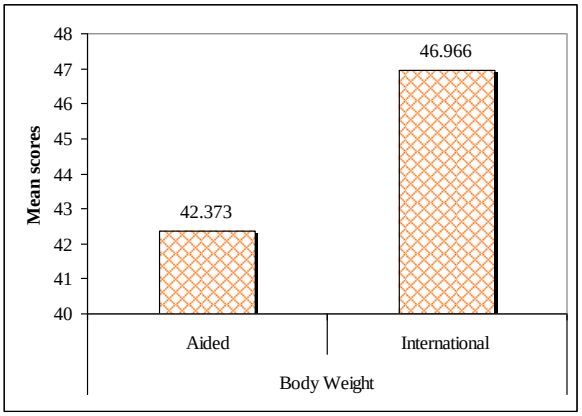
@Not Significant; **Significant at 0.01 level. (Table 't' value 0.05=1.97; 0.01=2.59)

Table-2 shows independent t test result on physical growth and body fat percentage between private aided and international school girls. The obtained 't' values 4.44, 6.61 and 6.66 (Standing height, body weight and body fat percentage respectively) are greater than table value 2.59 at 0.01 level and it is found significant. So, stated null hypothesis rejected and an alternate hypothesis has been accepted that "there is significant difference in the physical growth variables such as standing

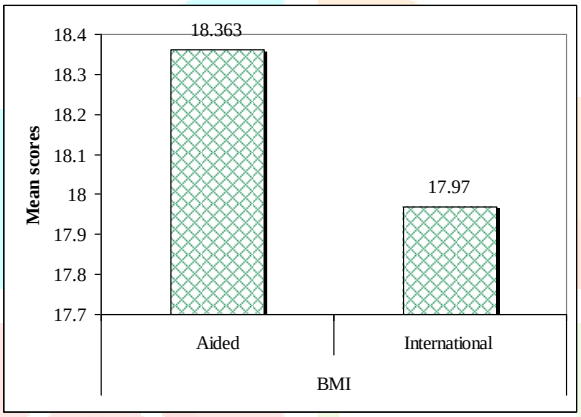
height, body weight and body Fat percentage between Private Aided and International school girls. Further the table also found that the obtained 't' values of 1.25 and 1.06 (BMI and BMR respectively) are less than table value 1.97 at 0.05 level and hence it is not found significant even at 0.05 level confidence. So, the stated null hypothesis accepted for the said variables. The results found that private aided girls had better physical growth in standing height and body weight and obesity when compared with international school girls.



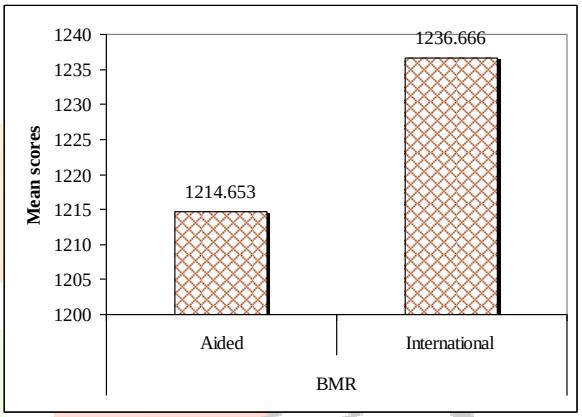
(a) Standing Height



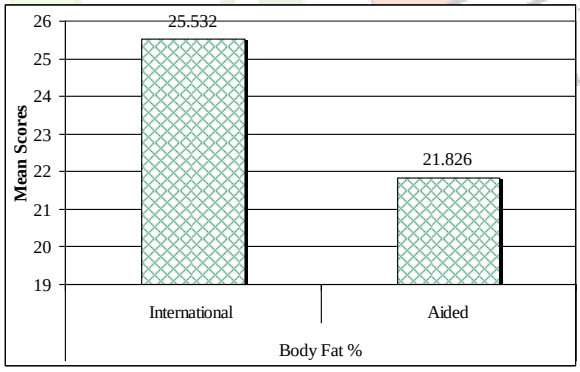
(b) Body Weight



(c) BMI



(d) BMR



(e) Body Fat Percentage

Fig.1. Bar graph showing comparison of physical growth and body fat percentage between aided and international school girls

VI. DISCUSSION OF RESULTS

The results concludes that only 4.00% of school girls facing obesity problem. The correlation outcome found that physical growth variables standing height, body weight, BMI and BMR correlated with body fat percentage The 't' test results shows significant difference in the Body Fat Percentage between aided and international school girls and proved that international school going girls ($\bar{X}$=25.532) were more fat when compared to aided school going girls ($\bar{X}$=21.826). Similar results found by Pawar et al. (2016) and Jagadesan (2014). The BMI and BMR pulse rate between aided and international school girls did not differ statistically. The 't' test results proves significant difference in the Physical Growth between international and aided school girls and proved that international school going girls (Standing Height $\bar{X}$=154.673; Body Weight $\bar{X}$=46.966) were better when

compared to aided school going girls (Standing Height $\bar{X}$=151.726; Body Weight $\bar{X}$=42.373). The similar results found by Patnaik (2015) suggested that private schools (45.2%) as high prevalence of overweight and obesity when compared with government schools (10.5%). Healthy nutrition and regular physical activity should be promoted to prevent obesity to reduce body weight as well as lean body fat. More aided school children were involved in helping with the household chores as compared to those from international schools. Healthy nutrition and regular physical activity should be promoted to prevent obesity to reduce body weight as well as lean body fat.

VII. CONCLUSION

From the correlation it was found that physical growth variables correlated with body fat percentage and from the 't' test analysis it was also found that private aided children had better physical growth (standing height and body weight) and body fat percentage when compared with international school girls of Bengaluru Metro city. The BMI and BMR does not shows any significant difference between the aided and international school girls group. The discoveries of these investigations and our examination demonstrate a notably higher pervasiveness of overweight/weight among school girls of international schools when compared with aided school kids. School health services should incorporate health instruction of educators, students, guardians and a merging of training and health component, strict adherence to physical training and preparing period, NCC, Scout and control on utilization of present day new electronic devices can diminish the modifiable way of life practices. Rules for physical activities which are appropriate to consistently expanding various tuition based schools which give excessively weight on scholastic execution, generally ruling out after-school physical action likewise should be encircled and implemented. This will contribute in making proof for school-health arrangements and implement adjusted educational module that is invigorating for children. There is a need to improve physical activities, sports, and recreational indoor activities at school and in addition to home forestall to overweight and obesity in kids. These will be vital counteractive action measures to battle the pandemic of non-transmittable sicknesses mainly obesity in India.

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