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A comparative study on body composition of government and public school students

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Abstract
Health stood as a serious concern in the preceding years and will continue to be a matter of concern in coming years. Health status of developing countries especially India in lower than many other Neighboring developing countries which are financially aided by India. HALE (Healthy Life Expectancy) of Nepal (60.2 years) and Sri Lanka (66.6 years) is even higher than India. The child malnutrition and child obesity are the two major risk factors for our country in the coming decades. To avoid health risks in the near future, health assessment and disease prevention are two major weapons, one of which is being used in our study to make the people aware of the health condition of children. In our study we had selected 100 students from public and government schools within the age group of 5-10 years. Height and weight of the children were measured and eventually the BMI was calculated. No prevalence of overweight was found whereas underweight bearing students were present in government school. In public school there was no incidence of underweight whereas students with normal BMI were present. The study concluded that the fight is between underfed and overfed which can be balanced if the nutrient distribution is balanced amongst the children indiscriminately and equally.

Keywords: Body composition assessment, body mass index, body mass, standing height, health status

1. Introduction
The proverb 'Health is Wealth' is heard by almost all of us in today's world but the explanation of the mentioned proverb is known and understood by very few of us. Health is considered to be the greatest wealth of a living organism and we human beings are no different. A nation's wealth is greatly dependent upon the human resources or we can say the health of the people especially the children or the future generation. One of the major problems which India faces in terms of health is malnutrition. World's one third malnourished children live in India. India has been independent for almost 7 decades now with quite remarkable economic growth. Awareness of health led to the introduction of mid-day meal schemes in schools which promised meeting one third nutritional demand of a child in a day. Mid-day meal scheme was introduced as a supplementary meal rather than a substitution to other major meals. Malnutrition does not merely means undernourished but also over nourished. There is quite a huge gap between the rich and poor in India. In spite of the fact that India has developed a lot since independence the gap between the rich class of people and poor class of people is increasing day by day and the bridging of the gap is never thought of. Public school education is opted by middle class society and those staying in cities or towns whereas government school education is chosen by those belonging to low socio-economic groups. The fulfilment of nutritional demand can be classified into overfed or underfed which brought us to conduct this study to clarify the scenario of health and spread a spine-chilling awareness about the future generation, if not taken care of. In this very research we had our focus on the body composition status of the elder school going children of West Bengal, India.
Body composition is a major determinant of health-related physical fitness of an individual from the very early age. A prognostic study of the body composition of children can help in determining the risk of occurrence of diseases in future; moreover the chances of occurrence can be reduced following the means of prevention. Body composition is described by the percentage of different substances that constitute the body. Body composition can be described and classified on the basis of atomic content (Oxygen, Hydrogen, Carbon, Sodium, etc.), molecular content (Water, Fat, Glycogen, Myoglobin, Protein, Mineral), cellular content

(Cell Mass, Extracellular Fluid, Extracellular Solid, Fat, etc.), functional content (Skeletal Muscles, Bone, Blood, Adipose Tissue, Organs, etc.) and fat content (Fat Mass and Fat Free Mass). The main concern of health-related physical fitness lies over fat and fat free mass because the percentage of fat is related to a number of health-related issues or comorbidities. One of the major reasons behind the increment of obesity of the spread of the epidemic of obesity is 'sedentary lifestyle'. The sedentary lifestyle of children in today's world is one of the major contributors of obesity. Sedentary lifestyle gives birth to hypokinetic diseases like osteoporosis, osteoarthritis, cancer, insulin resistance, glucose intolerance, diabetes type ii, hyperlipidemia, cardiovascular diseases, visceral adipose tissue accumulation, increased plasma leptin levels, dyslipidemia, atherosclerosis and many more such diseases.
Therefore, the researcher was to find out if both the categories of student bears normal and healthy BMI or they differ from each other in terms of BMI.

2. Materials and Methods

A total of one hundred (100) primary school students between the age group of 5-11 years were chosen from West Bengal, India for conducting the study. Fifty (50) out of the 100 belonged to government schools and the rest 50 belonged to public schools. The data of Public School was collected from Techno India public School, Bolpur,Birbhum whereas the data of Government school were collected from Primary Government school of Bolpur, Birbhum. Data was collected using random sampling technique. A body weighing scale was used to measure the body mass. The major variable remained BMI and the supporting variables which were used to calculate BMI were standing height in meters and body mass in kg. Standing Height and Weight was put into the formula of BMI to find the BMI. BMI= weight in kgs/(height in meters)^2.
We have used BMI for measuring Body Composition as per the recommendation of WHO.

2.1 Testing Protocol

The Standing height of the participants was measured using Stadiometer in centimeters and then converted to meters for the convenience of calculation. Subjects were instructed to stand erect with their back vertical to the backboard of the stadiometer and their feet on the floor board of the stadiometer.
A body weighing scale was used to measure the body mass. The participants were asked to remain in minimal clothes and no shoes. They were asked to stand in a manner where the weight would evenly get distributed onto both the legs.

2.2 Statistical Procedure

In this study, mean, standard deviation (SD), and independent t-test were calculated by the SPSS software. The level of significance was set to 0.05.

3. Results and Discussions

Table 1: The characteristics of the participants (Mean ± SD)

Items	Government Schools (n=50)	Public Schools (n=50)
Height (m)	1.18 ± 1.16	1.14 ± 0.24
Weight (kg)	23.13 ± 5.98	31.36 ± 13.44

Table 2: Independent t-test of BMI between government and public school students

Variable	Government School		Public School		Inferential: Unpaired Sample t-test		
	Mean	SD	Mean	SD	t	df	Sig. (2-tailed)
BMI	16.55	2.93	21.69	3.10	8.54	98	0.000

Significance level at 38 df at 0.05 level = 1.984

Table: 2 of comparison between government and public school students shows that Government School BMI mean = 16.55 and SD = 2.92, on the other hand Public School BMI mean = 21.69 and SD = 3.10, $t_{(98)}$= 8.54 and p= 0.000, (2-tailed). It is statistically significant as tabulated value of t(0.05)(98) = 1.984 & $p \leq 0.05$.

4. Discussion

According to National Family Health Survey (NFHS) 32% of children are underweight in India. There is a 4% improvement in terms of underweight children since the previous survey. We found out that Students from Government school fall under the underweight category whereas students from the Public school fall under Normal BMI range category. A study conducted by Patnaik *et al*. (2015) [6] in Bhubaneswar contradicts our study where prevalence of overweight was 27.8% in both government and public schools taken together (Private School-45.2% and Government School-10.5%). Another study conducted by Prakash PS *et al*. (2016) in Andhra Pradesh found out 56% Children bore normal BMI and 44% were underweight with no incidence of overweight in government schools, whereas 93.14% children had normal BMI and 6.85% were overweight with no prevalence of underweight in private schools. Another study conducted by Rashmi *et al*. (2015) [7] in rural Bangalore found out the underweight was 61%. A study conducted by Jagadesan *et al*. (2014) [3] In Chennai showed that prevalence of overweight was 3.6% in government school and 21.4% in private schools. The percentage of overweight remained 20.45% in the study conducted by Goyal *et al*. (2011) [2] in Surat. Vohra *et al*. (2011) [12] at Lucknow found out that overweight was 4.91%. Hq *et al*. (2010) [10] in Hazara District of Pakistan found out that overweight prevalence was 4.78% whereas Warraich *et al*. (2009) [13] in Karachi found that overweight was 14%, underweight was 52% and 32% belonged to the normal range.

5. Conclusions

5.1 Summary

The normal range was found in public school students whereas underweight category hailed from government school. The normal BMI range presence was higher in public school students as compared to government school students. The probable reason behind this discrimination is the socio-economic background and the gap between the rich class and the poor class. The bridging of the gap can be done with the cooperation of both the classes equally where means of contribution of cooperation differs for each of them. Health status can only be improved when this gap is bridged completely.

5.2 Recommendations

There are many ways to assess body composition where BMI, WHR and skin fold are some field indirect methods with least of minimum cost involved.

According to World Health Organization (WHO), physical activity maintain to normal BMI. A child should engage in 60 minutes of moderate to vigorous intensity physical activity per day across the week. The training regimen should include high intensity aerobic activity and exercise that strengthens muscle and bone at least 3 times a week.

5.3 Conclusion

The study been conducted gives a brief picture of the condition or health status of Primary school children belonging to different strata but to get a more wider picture of the health status of the children of Birbhum District, more variants of subject from all around the district can be considered.

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