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A study on cardiorespiratory endurance of the students commuting to schools by three different travelling mode

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Abstract

The aim of the study was to compare Cardio respiratory Endurance of the students commuting to Schools by three different travelling mode (Walking, Bicycling and Motor Vehicles). For the purpose of the study initially Six hundred (N = 600) school going boys students were selected as subject for the study. 14 to 18 years in age ranged class VIII to class XII grade school male students were purposely selected from seven higher secondary schools located at Birbhum district in West Bengal as subjects of the study. Each group consisted of 200 subjects, i.e. Walking group N = 200, Bicycle group N = 200 and Motor vehicle group N = 200. Category-wise number of subjects was selected from the different schools. The data was calculated by descriptive statistics, for all independent variables were computed by using SPSS, one way ANOVA test followed by t-tests were used.

The result it is concluded that the distance of bicycling, a commuting mode, increased Cardiorespiratory Endurance capacity (429.296**) were significantly improved. Here the level of significance was set at the 0.05 level.

Keywords: School students, cardio respiratory endurance, walking, bicycling and motor vehicle group

Introduction

Institutions are the most important group in the society which plays a great role in the development of the children after family. In the Vedic period children stayed in the Gurukulas and took their education and life skills from the Gurus. So they did not required to travel for acquiring their lessons from their home.

But on the contrary, in modern culture and society which is fully based on computer technologies; the future of the society is in deep trouble as they are surrounded by modern gadgets and automobiles. Children use comfortable travelling mode in every steps and everywhere. Even for commuting towards school they used various modes of transportation i.e. automobiles, bicycle as well as walking.

These various modes of transmission directly effect on the health of the children as they use commute their school in regular basis by those agents. Schools are located in different areas of the society and their distances are varying according to the distance of the home of the children.

Promoting increased levels of physical activity in the general population has been described as “an important element of any future public health strategy”. Physical activity is associated with positive effects on many health outcomes in childhood and adolescence, including benefits to skeletal health and several aspects of psychological health. Regular moderate physical activity in childhood can also help in the prevention and treatment of obesity.

Physical activity guidelines for children and young people recommend that all young people should participate in physical activity of at least moderate intensity for 1 hour per day. The Scottish Health Survey of 2003 found that one in three girls and one in four boys do not achieve this level. National transport studies have also shown that, over time, fewer children are walking or cycling to school, and at the same time there has been a marked increase in the use of cars to chauffeur children to school. The Scottish Household Survey of 2004 found that in 1999 walking was the usual method of travel to school for 54.7% of pupils in full time education, whereas in 2004 this had decreased to 51.1%.

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During the same period, the percentage of pupils whose usual method of travel to school was by car or van increased from 18.3% to 21.7%. Furthermore, there is evidence that children are becoming accustomed to being driven short distances and that car dependency is being established at an early age.

Aim of the study

The aim of the study was to compared Cardio respiratory Endurance of the students who commuting to Schools by three different travelling mode.

Methodology

Selection of the Subject

For the purpose of the study initially Six hundreds (N = 600) school going boys students were selected as subject for the study. 14 to18 years in age ranged class VIII to class XII grade school male students were purposely selected from seven higher secondary schools located at Birbhum district in West Bengal as subjects of the study. Each group consisted of 200 subjects, i.e. Walking group N = 200, Bicycling group N = 200 and Motor vehicle group N = 200. Category-wise number of subjects was selected from the different schools. The data was calculated by descriptive statistics, for all independent variables were computed by using SPSS, one way ANOVA test followed by t-tests were used. The level of significance was set at the 0.05 level.

Variable

Cardio Respiratory Endurance was considered as the variable for the study.

Test and Criterion Measure

Cardio respiratory endurance tested by field test is nine minute run and Walk, the score was recorded in meters. The data was recorded in miter/minute.

Collection of Data

For the purpose of study Six hundred school going boys students, age ranged between 14-18 years were randomly selected from Birbhum District, WB. Among them two hundred students were randomly selected for walking group, two hundred students were randomly selected as Bicycling group and two hundred students were randomly selected as Motor vehicle group for the study.

Statistical Analyses

For determining the three commuting groups i.e. walking, bicycling and motor vehicle groups of school going students, descriptive statistics, and one way ANOVA test followed by t-tests were used. The level of significance was set at the 0.05 level.

Result and Discussion

Statement of Statistical measures (Mean and SD) in Cardio respiratory endurance Personal data, of students commuting to school by the three different mode of travelling:

Table 1: Descriptive Statistics of Cardio respiratory Endurance of the students commuting to school by three different mode of travelling

Measures		Groups		
		Walking (N=200)	Bicycling (N=200)	Motor Vehicle (N=200)
Distance of commuting to school (km)		1.94 ± 0.81	2.33 ± 0.78	4.16 ± 1.51
Personal Data	Age (Yrs)	15.65 ± 1.07	15.39 ± 1.02	15.65 ± 1.01
	Height (cm)	1.59 ± 0.05	1.58 ± 0.04	1.59 ± 0.04
	Weight (Kg)	53.25 ± 3.50	51.99 ± 2.61	55.11 ± 3.36
Physical Fitness Measures	Cardio respiratory endurance (mtrs)	1071.32 ± 40.24	1072.65 ± 53.22	942.90 ± 57.55

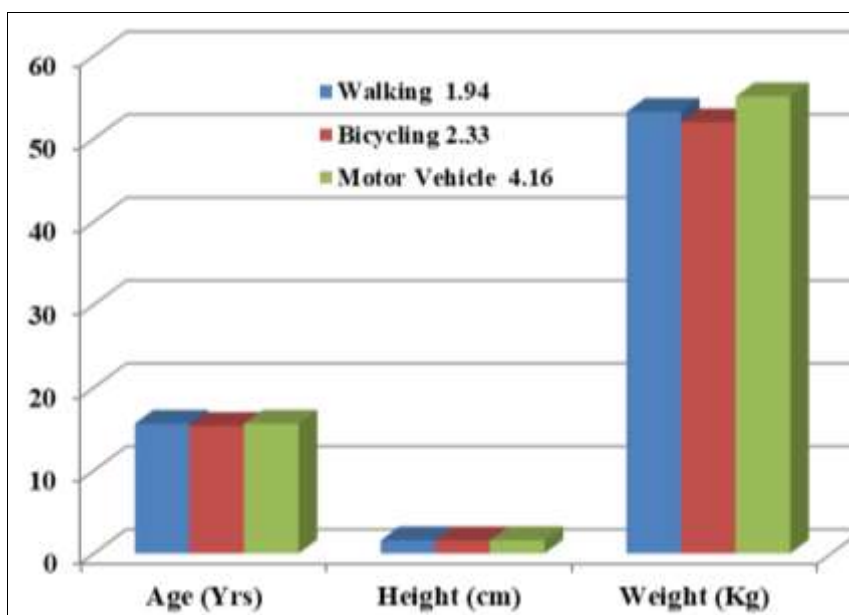


Fig 1: Graphical representation of personal data of students commuting to school by the three different mode of travelling

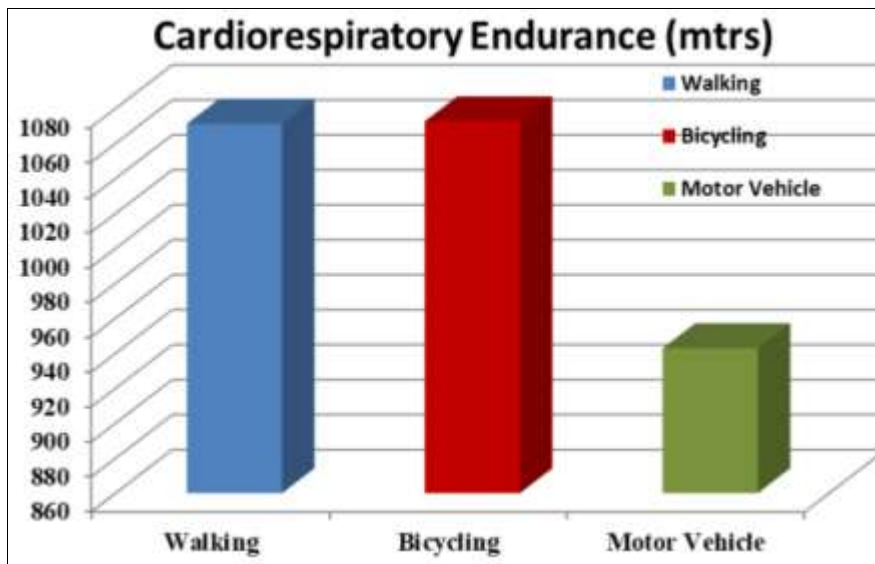


Fig 2: Graphical representation of Cardio respiratory endurance of the students commuting to school by the three different mode of travelling

Interpretations for the measures of the selected test items of the students commuting to school by the three different mode of travelling

Distance of Commuting to School

From the Table-1, it was observed that the mean distance travelled by the Walking groups (N=200), Bicycling groups (N=200), and Motor vehicle groups (N=200) to their school regularly were 1.94 ± 0.81 Km, 2.33 ± 0.78 Km, and 4.16 ± 1.51 Km respectively.

Age

The mean age of the three commuting groups i.e. Walking, Bicycling, and Motor vehicle were 15.65 ± 1.07, 15.39 ± 1.02, and 15.65 ± 1.01 years respectively. Selected subjects were exactly same age groups.

Height

It was evident that the mean height of the three commuting groups i.e. Walking, Bicycling, and Motor vehicle were 1.59 ± 0.05, 1.58 ± 0.04, and 1.59 ± 0.04 cm respectively. Selected subjects were exactly equal height. Mean height of the total subjects (N = 600) was 158 ± 0.04 cm that falls just at the bottom of the range of 159.9 – 173.6 cm, reference body

height for the Indians, recommended by ICMR -2020 for 14 to 18 years boys.

Weight

It was observed from the Table-1 that the mean weight of the three commuting groups i.e. Walking, Bicycling, and Motor vehicle were 53.25 ± 3.50, 51.99 ± 2.61, and 55.11 ± 3.36 Kg respectively. Motor vehicle groups were heavier than the Bicycle and Walking groups. Mean body weight of the total subjects (N = 600) was 53.45 ± 3.43 Kg that falls within the range of 48.2 – 61.6 Kg, reference body weight for the Indians, recommended by ICMR -2020 for 14 to 18 years boys.

Cardio respiratory Endurance

It was evident from the Table-1 that the mean cardiorespiratory endurance capacity of the Walking, Bicycling, and Motor vehicle commuting groups were found to be 1071.32 ± 40.24, 1072.65 ± 53.22, and 942.90 ± 57.55 mtrs respectively. Walking and Bicycling groups were more or less equal performer whereas Motor vehicle group showed too less performer in cardio respiratory endurance capacity.

Table 2: ANOVA of personal data among the students commuting to school by the three different mode of travelling

Measures	Source	Sum of Squares	df	Mean Squares	'F'
Age	Between Groups	9.013	2	4.507	4.213*
	Within Groups	638.580	597	1.070	
	Total	647.593	599		
Height	Between Groups	.014	2	0.007	3.812*
	Within Groups	1.126	597	0.002	
	Total	1.140	599		
Weight	Between Groups	990.176	2	495.088	48.865**
	Within Groups	6048.622	597	10.132	
	Total	7038.798	599		

At 2/597 df 'F' at * 0.05 level = 3.01 and at ** 0.01 level = 4.65

From the Table-2, it was observed that the F-values for the Age (4.213) and Height (3.812) among the Walking, Bicycling, and Motor Vehicle commuting groups were found significant at the 0.05 level and the F-value for the Weight (48.865) was significant at the 0.01 level. As the F-values in ANOVA test was found significant, therefore, there was necessity to find out the significance of differences between the groups.

As the F-values for the Age, Height, and Weight were found to be significant either at the 0.05 level or at the 0.01 level of confidence, the researcher intended to find out the significance of differences in the mean scores in Age, Height, and Weight between the Walking & Bicycling, between the Walking & Motor Vehicle, and between the Bicycling & Motor Vehicle commuting group students using t-tests and were presented in the Table-3.

Table 3: ANOVA among the students commuting to school by the three different mode of travelling

Measures	Source	Sum of Squares	df	Mean Squares	'F'
Cardiorespiratory Endurance	Between Groups	2221901.853	2	1110950.927	429.296**
	Within Groups	1544941.020	597	2587.841	
	Total	3766842.873	599		

At 2/597 df 'F' at * 0.05 level = 3.01 and at ** 0.01 level = 4.65

From the Table-3, it was observed that the F-values for the Cardio respiratory endurance (429.296) among the Walking, Bicycling, and Motor Vehicle commuting groups were found significant at the 0.01 level. As the F-values in ANOVA test was found significant, therefore, there was necessity to find out the significance of differences between the groups. As the F-values for the Cardiorespiratory endurance were

found to be significant at the 0.01 level of confidence, the researcher determined to find out the significance of differences in the mean scores in all physical fitness measures between the Walking & Bicycling, between the Walking & Motor Vehicle, and between the Bicycling & Motor Vehicle commuting group students using t-tests and were presented in the Table-4.

Table 4: Significance of differences in mean scores in Cardio respiratory Endurance among the students commuting to school by the three different mode of travelling by t- test

Measures	Mean Scores	Mean Scores	Mean Difference	SE _D	't'	
Cardio respiratory Endurance	Between Walking & Bicycling	Walking (1071.32)	Bicycling (1072.65)	1.33	5.09	0.261
	Between Walking & Motor Vehicle	Walking (1071.32)	Motor Vehicle (942.90)	128.42	5.09	25.24**
	Between Bicycling & Motor Vehicle	Bicycling (1072.65)	Motor Vehicle (942.90)	129.75	5.09	25.51**

At 398 df 't' at * 0.05 level = 1.97 and at ** 0.01 level = 2.59

Result was also observed in case of Cardio respiratory endurance capacity, i.e. both Walking (1071.32) and Bicycling (1072.65) groups differed significantly ($p < 0.01$) in Cardio respiratory endurance when compared with the Motor Vehicle (942.90) group but no significant difference was observed between the Walking and Bicycling groups.

Discussion

The results of the present study confirmed that there were significant differences in physical fitness measures i.e. cardiorespiratory endurance among the three commuting groups. "There would be significant differences in selected physical fitness variables of the students commuting to schools by walking bicycling and driving motor vehicles" was accepted.

Results indicated that there existed significant differences in most of the cases in physical fitness measures among the distance-wise two active commuter groups i.e. walking and bicycling. There would be significant differences in selected physical fitness measures of the distance-wise active commuter student commuting to schools by walking and bicycling was retained.

Conclusion

On the basis of the result it is concluded that the distance of bicycling, a commuting mode, increased Cardiorespiratory Endurance capacity were significantly improved.

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