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Cardio-respiratory Function among Rural School Girls of Rajasthan

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Abstract

Background: The purpose of the present study was to find out the cardio-respiratory function among different age groups of rural school girls of Rajasthan.
Methods: 9 minute run/ walk test was conducted on 350 female ranging between 14 to 16 years school students. Random sampling technique was used to select the subjects. To find out the significance differences among the different three age groups of school girls, Analysis of Variance (ANOVA) was applied. Further Scheffe's post-hoc test was used to see the direction and significance of differences where 'F' ratio was found significant. The level of significance chosen was .05. **Results:** There were significant differences obtained on Cardiorespiratory function (9-minute run-walk test), among different three age groups of rural school girls. The finding reveals that 16year age group of rural school girls demonstrated significantly better than their counterparts.
Keywords: Cardio-respiratory Function, Rural, School Girls, Rajasthan.

INTRODUCTION

Cardio-respiratory function, or aerobic fitness, is probably what most people identify as physical fitness. Aerobic fitness refers to the integrated functional capacity of the heart, lungs, vascular system, and skeletal muscles to expend energy. The basic activity that underlies this type of fitness is aerobic metabolism in the muscle cell, a process in which oxygen is combined with a fuel source (fats or carbohydrates) to release energy and produce carbon dioxide and water. The energy is used by the muscle to contract, thereby exerting force that can be used for movement. For the aerobic reaction to take place, the cardio-respiratory system (*i.e.,* the circulatory and pulmonary systems) must constantly supply oxygen and fuel to the muscle cell and remove carbon dioxide from it. The maximal rate at which aerobic metabolism can occur is thus determined by the functional capacity of the cardio-respiratory system and is measured in the laboratory as maximal oxygen intake. As will be discussed in detail below, aerobic fitness is inversely related to the incidence of coronary heart disease and hypertension. Physical fitness should be the result of the balance of activities that are provided in the physical education programs at school and continued by the family and in other community activities outside of school. The four performance objectives can be practiced at home with a minimum of adult supervision. Practicing at home initiates the opportunity for parents and students to exercise and be physically active together, making fitness a family activity.

Exercise, Training of the body to improve health and fitness, different types have different purposes, including aerobics for heart and respiratory function and weight loss, weight-bearing exercise for bone strength, weight training for muscle strength, and stretching for flexibility. Specific exercises are used in physical medicine and rehabilitation. Benefits include lower blood pressure, higher HDL cholesterol, improved disease resistance, and better general well-being.

Carnethon et al. (2003) studied cardio-respiratory fitness in young adulthood and the development of cardio-vascular disease risk factors and found that participants with low fitness were 3 to 6 fold more likely to develop diabetes, hypertension and the metabolic syndrome than participants with high fitness. The association between low fitness and hypercholesterolemia was modest 95% confidence interval and attenuated to marginal significant after body mass index adjustment improved fitness over 7 years was associated with a reduced risk of developing and the significance of these associations was reduced after accounting for changes in weight. Jonatan (2009) investigated whether physical fitness in childhood and adolescence is a predictor for cardiovascular disease risk factors, events and syndromes, quality of life and low back pain later in life. Physical fitness-related components were: cardio respiratory fitness, musculoskeletal fitness, motor fitness and body composition. Adiposity was considered as both exposure and outcome. They found strong evidence indicating that: higher levels of cardio respiratory fitness at childhood and adolescence are associated with healthier cardiovascular profile later in life. Muscular strength improvements from childhood to adolescence are negatively associated with changes in overall adiposity. A healthier body composition at childhood and adolescence is associated with a healthier cardiovascular profile later in life, and with a lower risk of death.

METHODS AND PROCEDURES

In this study, a sample of 350 rural school girls ranging between 14 to 16 years studying in different schools from rural area of Rajasthan was taken as subjects. Random sampling technique was used to select the subjects. The 9 minute run/walk test was used to measure cardiorespiratory function. To determine the significance differences among the different three age groups of school girls, Analysis of Variance (ANOVA) was applied. Scheffe's post-hoc test was applied to see the direction and significance of differences where 'F' ratio was found significant. The level of significance chosen was .05.

Fig-I: Illustration of 9-Minute run/walk test

RESULTS

Descriptive analysis of cardiorespiratory function among different three age groups is presented in table-1.

VARIABLES	14 YEARS (N=350)		15 YEARS (N=350)		16 YEARS (N=350)	
	Mean	SD	Mean	SD	Mean	SD
Cardiorespiratory Function ***(9-Minute run-walk test)***	1672.94	300.56	1807.97	322.41	1923.94	329.53

Table- 1: Descriptive Analysis of Cardio-respiratory Function of Rajasthan Rural School Girls

The Analysis of Variance (ANOVA) among different three age groups of rural school girls on cardiorespiratory function is presented in Table 2.

Table-2: Analysis of Variance of Rural School Girls on Cardiorespiratory Function

Variable	Source of Variance	Sum of Squares	Df	Mean Square	F
Cardiorespiratory Function ***(9-Minute run-walk test)***	Between Group	1034607.57	2	517303.78	8.14*
	Within Group	66461346.92	1047	63477.88	
	Total	67495954.50	1049		

**Significant at .05 level*
$F_{.05}(2, 1047) = 2.99$

The result presented in table 2 reveals that there was a significant difference between 14 to 16 year age groups of rural school girls. The obtained F-value in 9-Minute run-walk test variable was 8.14. F value was greater than the table value of 2.99, which is required to be significant at .05 level.

Table-3: Significant Differences between the Paired Means of Cardio-respiratory Function among Different Three Age Groups

VARIABLE	GROUPS			MEAN DIFFERENCE	Sig.
Cardiorespiratory Function ***(9-Minute run-walk test)***	**14 Year**	**15 Year**	**16 Year**		
	1354.27	1359.22		4.95	.967
	1354.27		1423.20	68.92*	.001
		1359.22	1423.20	63.97*	.004

Table 3 clearly indicates that the significant differences existed between 14 years and 16 years & 15 years and 16 years on cardiorespiratory function since the value obtained were 68.92, and 63.97 respectively. No significant difference was obtained between 14 years and 15 years since the value obtained was 4.95.

Discussion

There was significant difference obtained on cardiorespiratory function among different three age groups of rural school girls. When the paired mean difference of cardiorespiratory function was found that a significant difference existed between 14 years & 16 years, and 15 years & 16 years of rural school girls of Rajasthan. Above mentioned findings in the case of rural school girls all the three age groups differs significantly. It may be attributed to the facts that the subjects of this study were during growth period and their cardiorespiratory function

differed because of their age differences though they were living under the same tropical as well as environmental conditions. Hence, the three different age groups of rural school girls of Rajasthan were differed significantly.

CONCLUSION

In the light of the findings and limitations of the present study the following conclusions were drawn:

- There were significant differences obtained on cardiorespiratory function among different three age groups of Rajasthan rural school girls.
- 16year group rural school girls performed significantly better in cardiorespiratory function than their counterparts.

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