

# Analysis of Cardio Respiratory Endurance Among Adolescent School Boys of North-Eastern States of India



## Physical Education

**KEYWORDS :** North-Eastern state, Adolescent, Cardio respiratory endurance and ANOVA.

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### ABSTRACT

*In the present electronic era most of the adolescent are not participating in leisure activities and concentrate on academics. Regular physical activity would be important for life's quality even if it had no relationship to disease and longevity. Physical activity is a significant ingredient in the quality of life, because it increases energy and promotes, physical and mental, well being in addition to conferring health benefits. For the present investigation boys from various schools of [Tripura (TR), Meghalaya (ML), Assam (AS), Mizoram (MZ), Manipur (MN), Nagaland (NL) and Arunachal Pradesh (A.R.)] (N=21000) North-Eastern states of India were selected as subjects at random. Their age ranged from 13, 14 & 15 years (studying from 7th to 10th standard). Cardio respiratory endurance was measured by coppers 12 min run/walk test. The collected data were analyzed by using one-way ANOVA. Among the groups if any significant difference, scheffe's post hoc test was used to find out the paired mean difference (P ≤ 0.05). The results of the study show that the adolescent boys of North-Eastern states were differ on Cardio-respiratory endurance. Hence it was concluded that, age, geographical region, growth, social behaviour, food habits and level of physical activity may influence the Cardio-respiratory endurance of adolescent boys.*

### INTRODUCTION

Life styles affect people's health with eating habits and regular physical activity being the two most influential factors (Panagiotakos 2004), irrespective of sex, age or country of residence (Yusuf 2004). Current study focuses school going adolescents are facing health hazard that leads to physical, physiological and psychological problems. Basic data among adolescent's shows, they are not receiving adequate physical activities and capacity building to equip them for the future. Studies need to conduct in India to high light various areas of concern with respect to adolescent life style (Sidra 2009).

### METHODOLOGY

To achieve this purpose (n= 3000) boys from various schools of each state of Tripura (TR), Meghalaya (ML), Assam (AS), Mizoram (MZ), Manipur (MN), Nagaland (NL) and Arunachal Pradesh (A.R.) N=21000 adolescent boys from whole North-Eastern states of India were selected as subjects at random. Their age ranged from 13, 14 & 15 years (studying from 7<sup>th</sup> to 10<sup>th</sup> standard). Cardio respiratory endurance was measured by coopers 12 min run/walk test. The collected data were analyzed by using one-way ANOVA. Among the group if any significant difference, sceeffe's post hoc test was used to find out the paired mean difference. The confidence level to test the significance was fixed at 0.05 (P ≤ 0.05).

### RESULT

**Table-1 ANOVA FOR DIFERENT AGES AND STATES ADOLESCENT BOYS OF NORTH-EASTERN STATES OF INDIA ON CARDIO-RESPIRATORY ENDURANCE**

Age	Variable		TR	ML	AS	MZ	MN	NL	A.R.		Sum of squares	df	Mean square	'F'
13 Yrs	Cardio- respiratory Endurance	X	2017	2133	1939	2208	2168	2396	2234	B	80057641.73	6	13342940.28	383.20*
		σ	289.09	147.89	239.75	125.60	191.02	146.39	87.51	W	145997424.62	4193	34819.32	
14 Yrs	Cardio- respiratory Endurance	X	2048	2311	2005	2265	2135	2417	2276	B	80421071.06	6	13403511.84	308.50*
		σ	240.43	143.82	194.31	155.05	299.85	269.94	109.27	W	182171903.86	4193	43446.67	
15 Yrs	Cardio- respiratory Endurance	X	2034	2276	2054	2368	2214	2420	2342	B	83377245.37	6	13896207.56	292.02*
		σ	209.43	252.08	178.35	141.15	253.13	306.57	168.74	W	199524382.60	4193	47585.11	

\*Significant at 0.05 level table value 2.09 with 6 & 4193

The table- 1 shows the mean, standard deviation and 'F' value of muscular strength for different North-Eastern states of India of 13 years, 14 years and 15 years adolescent boys. The obtained 'F' for cardio-respiratory endurance for different North-Eastern states of India 13, 14 and 15 years boys were 383.20, 308.50 and 292.02 respectively, and were greater than the table value 2.09 required for significant at 0.05 level with df 6 and 4193. The result of the study shows that, there was a significant difference among different North-Eastern states adolescent boys of 13, 14 and 15 years on cardio-respiratory endurance. To find out the paired mean difference the Scheffe's test was applied and presented in table- 2, 3and 4 for 13, 14 and 15 years adolescent boys respectively.

**Table-2 SCHEFE'S TEST FOR MEAN DIFFERENCE OF NORTH-EASTERN STATES ADOLESCENT BOYS ON CARDIO-RESPIRATORY ENDURANCE**

13 Yrs	TR	ML	AS	MZ	MN	NL	AR	C.I.
TR	-	116*	78*	191*	151*	379*	217*	36.17
ML		-	194*	75*	35*	263*	101*	
AS			-	269*	229*	457*	295*	
MZ				-	40*	188*	26	
MN					-	228*	66*	
NL						-	162*	

Table-3

14 Yrs	TR	ML	AS	MZ	MN	NL	AR	C.I.
TR	-	263°	43°	217°	87°	369°	228°	40.39
ML		-	306°	46°	176°	106°	35°	
AS			-	260°	130°	412°	271°	
MZ				-	130°	152°	11	
MN					-	282°	141°	
NL						-	141°	

Table-4

15 Yrs	TR	ML	AS	MZ	MN	NL	AR	C.I.
TR	-	242°	20	334°	180°	386°	309°	42.26
ML		-	222°	92°	62°	144°	67°	
AS			-	314°	160°	366°	289°	
MZ				-	154°	52°	25	
MN					-	206°	129°	
NL						-	77°	

TR: Tripura, ML: Meghalaya, AS: Assam, MZ: Mizoram, MN: Manipur, NL: Nagaland and A.R.: Arunachal Pradesh.

In table-2, the comparison of 21 paired means shows, except 1 paired mean reviewing all other pairs are having significance on cardio-respiratory endurance. From the result it was concluded that, TR, ML and AS boys of 13 years are showing better cardio-respiratory endurance than the rest of the population under studied.

In table-3, the comparison of 21 paired means shows, except 1 paired mean reviewing all other pairs are having significance on cardio-respiratory endurance. From the result it was concluded that, TR, ML and AS boys of 14 years are showing better cardio-respiratory endurance than the rest of the population under studied.

In table-4, the comparison of 21 paired means shows, except 2 paired means reviewing all other pairs are having significance on cardio-respiratory endurance. From the result it was concluded that, TR, ML and AS boys of 15 years are showing better cardio-respiratory endurance than the rest of the population under studied.

**DISCUSSION:**

Cardiovascular endurance is the ability of the heart, lungs and blood vessels to deliver oxygen to working muscles and tissues, as well as the ability of those muscles and tissues to utilize that oxygen. A person's ability to deliver oxygen to the working muscles is affected by many physiological parameters, including heart rate, stroke volume, cardiac output, and maximal oxygen consumption.

While all physical activities involve some level of cardio-respiratory support, cardio-respiratory endurance typically refers to the ability of a person to perform activities that raise the heart to a training level and maintain that level for a sustained period of time, typically 10-15 minutes. A "training level" is typically expressed as percentage of a person's maximum heart rate (RMR), usually between 60-80 percent of an individual's RMR. (*E-source-1*).

Understanding the relationship between cardio respiratory endurance training and other categories of conditioning requires a review of changes that occur with increased aerobic or anaero-

bic capacity. As aerobic/anaerobic capacity increases, general metabolism rises, muscle metabolism is enhanced, hemoglobin rises, buffers in the bloodstream increase, venous return is improved stroke volume is improved, and the blood becomes more able to adapt readily to varying demands. Each of these results of cardio-respiratory fitness/cardio respiratory conditioning will have a direct positive effect on muscular endurance, and an indirect effect on strength and flexibility (*E-source-2*).

Age-related changes in the heart include a reduction in maximum cardiac output, changes in the activities of nodal and conductive fibbers, a reduction in the elasticity of the heart's fibrous tissues, progressive atherosclerosis (fatty build up or plaques) that can restrict coronary circulation, and replacement of damaged cardiac muscle fibbers by scar tissue. Aging affects aerobic capacity and cardiovascular performance during exercise. Peak exercise capacity and peak oxygen consumption decrease with age, but there is great variation from one individual to another. Aerobic capacity decreases by 50% between ages 20 and 80.

The increased cardiovascular fitness can affect improvements in the plasticity of the aging human brain, and may serve to reduce both biological and cognitive senescence in humans (*Stanley 2004*).

The physical exercise could be an important instrument for public health initiatives to optimize educational achievements, cognitive performance, as well as disease prevention at the society level (*Maria 2009*).

Maximal oxygen consumption (VO2 max) is the most frequently used indicator of overall cardiovascular function and maximum capacity. Consistent findings indicate that VO2max decreases approximately five to 15 percent per decade beginning at 25-30 years of age. This decline in VO2max can be attributed to age-related reductions in both maximal cardiac output and maximal arteriovenous oxygen (a-v O2) difference. Maximal heart rate decreases about six to ten beats per minute per decade, and is responsible for much of the age-associated decrease in maximal cardiac output. However, a reduction in stroke volume during maximal exercise in older adults also contributes to the decline in cardiac output. In addition, left ventricular contractility appears to be reduced in older adults during maximal exercise compared to young adults. Decreases in vascular capacity and local blood flow regulation, along with a decline in muscle oxidative capacity, contribute to the overall reduction in maximal a-v O2 difference observed with age. Coupled with poor oxygen delivery mechanisms, mitochondrial alterations also lead to a reduction in maximal capacity to utilize oxygen at the level of active skeletal muscle.

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Longitudinal studies from childhood through adolescence have the potential of defining maturational changes in cardiovascular risk factors and may provide insight into the prediction of future cardiovascular disease. Childhood health promotion programs that specifically target increases in physical fitness may help to reduce the increasing prevalence of adolescent obesity (*lanz 2002*).

The cardiovascular fitness of obese adolescents improves by physical training, especially high-intensity physical training. The physical training also reduces both visceral and total-body adiposity, but there is no clear effect of the intensity of physical training (*Bernard 2002*).

Cardio-respiratory endurance linearly increases since childhood and reaches its jumping point in puberty. Maximal oxygen consumption is an index of efficiency measurement for oxygen transmission system. Children and adolescents with equal

chronological age have different growth levels. This biological parameter affects behaviour of sex hormones, climatic conditions, genetic mutations and body composition. Hence, it is very important to consider growth level of puberty while drawing physic motor fitness norms or processes of sports talent programs. Maximal oxygen consumption tended to increase and decrease proportional to growth level in 8 to 14 year old girls in terms of absolute and relative values, respectively (Attari 2013).

From the result of the study it was clear that, when age advances the Cardio respiratory endurance also increased during adolescent years. Among the states NL and A.R. state boys of 13, 14 and 15 years are having better cardio respiratory endurance than the rest of the North-Eastern states.

#### CONCLUSION

1. Cardio respiratory endurance is directly proportional to the age of adolescent periods.
2. Among the states NL, A.R. and MZ boys of 13 years, NL, ML and A.R. boys of 14 years and NL, MZ and A.R. boys of 15 years show better Cardio-respiratory endurance.
3. The life style, food habits, curriculum design and health awareness of NL and A.R. States adolescent boys were better than the rest of the North-Eastern state boys.

#### IMPLICATION:

Curriculum and health awareness will be reformed for the adolescent boys of North-Eastern states. The role of cardio respiratory may explain to the parents, pupils and teachers. The state government and M.H.R.D. may give importance for health of the adolescents.

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