

## Cardio Respiratory Fitness in Children on Various Body Mass Index

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**Citation:** Velkumar V, Shanmugananth EGS, Charumathi T, Senthil S (2020) Cardio Respiratory Fitness in Children on Various Body Mass Index. J Physiother Res Vol.4 No.7:12

### Abstract

**Background:** Cardio respiratory fitness is important for paediatric population. Many of the parents not aware of this. Children are not allowed to play outside in terms of safety and over caring so they prone to have poor cardio respiratory fitness. So this study is aimed to find out the effect of Body Mass Index on cardio respiratory fitness in children.

**Methods:** This is a cross sectional study involved with 60 healthy children aged between 8-12 years. All the samples are collected in convenient manner and allocated in three groups according through their BMI rate (normal, overweight, and obese). Those who are under any medications, having history of neuromuscular or heart disease or injuries and having any limitation in physical activity were excluded from this study. The study duration is 2 months. Six minute walk test was explained to the samples and made them to perform it after explanation. Distance through the six minute walk test was measured and estimated the maximum oxygen consumption ( $VO_{2\max}$ ) through the Cahaline formula, data's are collected.

**Results:** The obtained data's are analysed with Kruskal Wallis test and compared. The p value showed  $< 0.00001$  ( $P < 0.05$ ). The mean value of the group A is higher than the other 2 groups.

**Conclusion:** It is concluded that the normal body mass index children have good cardio respiratory fitness than the overweight and obese children.

**Keywords:** Cardio Respiratory Fitness; Body Mass Index (BMI);  $VO_{2\max}$ ; Children

**Received:** October 15, 2020; **Accepted:** November 21, 2020; **Published:** November 28, 2020

### Introduction

Cardio Respiratory Fitness (CRF) refers to the ability of the circulatory and respiratory systems to supply oxygen to skeletal muscles during sustained physical activity. Exercise improves not just the respiratory system but the heart by increasing the amount of oxygen that is inhaled and distributed to body tissue.  $VO_{2\max}$  or maximal oxygen consumption, refers to the maximum amount of oxygen that an individual can utilize during intense or maximal exercise. This measurement is generally considered the best indicator of cardiovascular fitness.

Improving cardiovascular fitness can reduce your risk of developing heart disease by increasing the efficiency of your heart, lungs, and blood vessels. The easier it is to pump blood through your body, the less taxing it is on your heart. Children in now days are having poor cardio respiratory fitness due to their

sedentary life habit. Going out and playing regularly has become a rare sight due to so many reasons [1].

Body Mass Index is a correlation between weight and height. BMI can be calculated by weight in kilogram and height in metres (weight/height in meter square). It is classified into following categories as underweight, normal, overweight, and obese.

Body Mass Index and cardio respiratory fitness are interrelated links of the health chain. Generally children are at good BMI will have good cardio respiratory fitness and most of the studies also strengthen the same. So it is understood that BMI is a classical reflector for cardio respiratory fitness. To have a good cardio respiratory fitness child should be in ideal BMI [2].

### Research Methodology

This is a cross sectional study involved with 60 healthy children

aged between 8-12 years. All the samples are collected in convenient manner and allocated in three groups according through their BMI rate (normal, overweight, and obese). The samples who are having normal BMI are allocated in Group A, overweight samples are allocated in group B and obese samples are allocated in group C. Those who reported that they used any other medications, having history of neuromuscular or heart disease or injuries and having any limitation in physical activity were excluded from this study. After getting their informed consent six minute walk test was explained to the samples and made them to perform it. Distance covered through the six minute walk test was measured and estimated the maximum oxygen consumption ( $VO_{2\max}$ ) through the Cahaline formula ( $VO_{2\max} = 0.006 \times 6MWD \text{ (feet)} + 3.38$ ), data's are collected [3,4].

**Duration of the study:** 2 Months

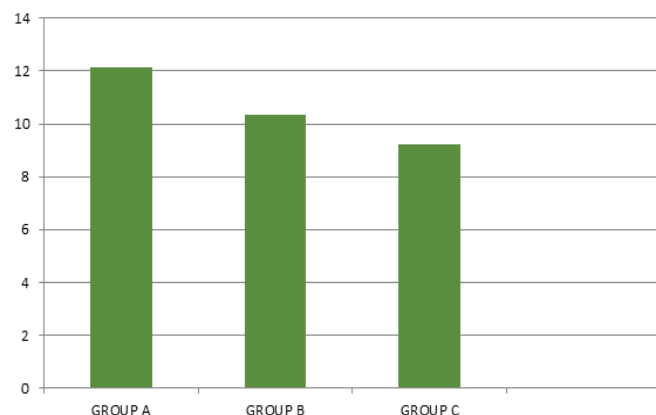
**Statistical analysis and result:** The collected data are tabulated and analysed with Kruskal Wallis Test.

**Tabulation ( $VO_{2\max}$ ): (Table 1)**

- H statistic is 43.782 (2, N=60)
- The p value is < 0.00001. The result is significant at  $p < 0.05$ . So the hypothesis is true.
- The average  $VO_{2\max}$  is higher in the group A (12.16) than the group B (10.32) and C (9.24).
- Hence statistically the group A is better than the other groups [5-7].

**Table 1** Tabulation.

S. No	Group A	Group B	Group C
1.	12.98	10.11	8.34
2.	13.22	10.50	8.38
3.	12.47	9.20	9.52
4.	11.72	9.81	8.65
5.	13.33	9.79	9.52
6.	13.02	11.13	9.24
7.	14.00	10.78	10.11
8.	10.86	9.71	9.46
9.	11.05	9.51	9.40
10.	11.44	11.21	8.87
11.	11.49	10.62	9.07
12.	11.21	10.84	9.72
13.	12.67	11.49	8.53
14.	13.26	9.28	8.34
15.	13.45	9.71	9.24
16.	11.05	9.64	9.81
17.	11.49	10.14	9.52
18.	11.88	10.95	10.11
19.	11.44	11.29	9.60
20.	11.25	10.62	9.29
Mean	12.16	10.32	9.24



**Figure 1** Schematic representation of the mean value of the groups.

Schematic representation of the mean value of the groups is discussed in **Figure 1**.

## Results and Discussion

The p value is 0.00001 which is statistically significant. The mean value of the Group A is higher (12.16) than the group B (10.32) and group C (9.24).

Since the samples are children, getting their cooperation and involvement to this study was challenging. After completed the six minute walk test some of the samples complained about knee pain especially the Group C samples.

The collected data are tabulated and analysed with Kruskal Wallis test and the interpretations states that H statistic is 43.782 (2, N=60).

The p value is < 0.00001. The result is significant at  $p < 0.05$ . So the hypothesis is true.

The mean value of the  $VO_{2\max}$  was calculated among all three groups and compared. It states that the group A has the higher value than the group B and C.

## Conclusion

It is concluded that the normal body mass index children have good cardio respiratory fitness than the overweight and obese children.

## Recommendations

- A study of this kind can be performed in young adults.
- A study of this kind can be performed in young women.
- This study can be done in larger sample size.

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