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Assessment of aerobic capacity in offspring of hypertensive versus normotensive parents

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Abstract

Objective: To assess the aerobic capacity in offspring of hypertensive versus normotensive parents.

Background: Cardiovascular reactivity to exercise has been investigated in the offspring of HTP in a few studies, but not much done to determine aerobic capacity. This study aims to investigate aerobic capacity and effects of parental hypertension in the children of hypertensive parents through a physical test i.e., 6 minute walk test.

Study Design: Comparative study.

Methods: The ethical clearance was taken from the college and consent was taken from the 30 subjects (offspring of hypertensive and normotensive parents) taken into consideration using 6 minute walk test. The comparison is done on the basis of physiological parameters mainly as 6MWD, VO₂ Max, Pre and Post outcome measures were taken and VO₂ max was calculated using formula $VO_2 \text{ max (mL}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}) = 70.161 + (0.023 \times 6MWT [m]) - (0.276 \times \text{weight [kg]}) - (6.79 \times \text{sex, where m = 0, f = 1}) - (0.193 \times \text{resting HR [beats per minute]}) - (0.191 \times \text{age [y]})$.

Results: The results of present study have shown significant difference in cardiovascular parameters like post SBP, pre and post DBP, 6 minute walk distance and VO₂MAX between Group A (normotensive offspring of hypertensive parents) and Group B. Comparing the values of Group A (normotensive offspring of hypertensive parents) and Group B (normotensive offspring of normotensive parents). There is significant difference between post SBP (129.8±3.6 in group A and 123.47±4.7 in group B), pre DBP with mean value (84.27±4.5 and 78.00±4.1) and post DBP with mean value (90.40±3.8 and 79.73±4.1) in Group A and Group B respectively. There is significant difference in mean values of 6 minute walk distance (530.93±22.0 in Group A and 698.13±25.2 Group B) and VO₂MAX between Group A (41.91±1.8) and Group B (49.01) respectively.

Conclusion: There is decrease in physical fitness and increase in blood pressure to exercise test in Group A subjects compared to Group B subjects therefore offspring of hypertensive parents with increased BP and decreased physical fitness levels should be considered as high risk group for development of future cardiovascular events.

Keywords: VO₂MAX, 6MWD, 6 minute walk test, SBP, DBP

1. Introduction

- High blood pressure (BP) is ranked as the third most important risk factor for attributable burden of disease in south Asia (2010) [1]. Hypertension (HTN) exerts a substantial public health burden on cardiovascular health status and healthcare systems in India [2, 3]. HTN is directly responsible for 57% of all stroke deaths and 24% of all coronary heart disease (CHD) deaths in India [4]. The WHO rates HTN as one of the most important causes of premature death worldwide [5]. The Global and Regional Burden of Disease and Risk Factors study (2001), in a systematic analysis of population health data for attributable deaths and attributable disease burden, has ranked HTN in south Asia as second [6].
- About 33% urban and 25% rural Indians are hypertensive. Of these, 25% rural and 42% urban Indians are aware of their hypertensive status. Only 25% rural and 38% of urban Indians are being treated for hypertension. One-tenth of rural and one-fifth of urban Indian hypertensive population have their BP under control [7].
- Blood pressure in human population has a normal distribution. Accordingly, the definitions of “normal” BP and of various forms of hypertension are arbitrary, but are needed for practical reasons in assessing and treating patients. The WHO and other organizations define hypertension as a systolic blood pressure (SBP) of 140 mm Hg or

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or greater and a diastolic blood pressure (DBP) of 90 mm Hg or greater in persons not taking antihypertensive medication.

- Those with a BP of 120-139 mm Hg systolic and 80-89 mm Hg diastolic are classified as high normal or “prehypertension,” a level now thought to increase the risk of any CV event by two- to fourfold compared with a normal BP(120/80 mm Hg). Older persons, in whom hypertension is both more prevalent and more likely to have elevations in SBP in the presence of normal DBP. The positive correlation between BP and risk of CVD morbidity and mortality is stronger for SBP than for DBP [8].
- Genetic predisposition to hypertension is likely to involve multiple genes [9]. It is probable that genetic substratum may manifest in form of physiological variations and abnormalities before onset of clinical Hypertension. Normotensive subjects with parental history of hypertensive provide a model system for the study of genetic factors in Hypertension. Several features related to Hypertension have been reported in normotensive offspring of HTP, they have greater BMI [10], elevated BP [11] and exaggerated BP response to exercise [12].
- The 6 minute walk test is an objective measure of functional exercise capacity in individuals with cardiovascular conditions. Using 6 minute walk distance (6MWD) and other physiological parameters, this test targets to find out effects of parental hypertension by comparing functional exercise capacity of offspring of hypertensive and normotensive parents [13].
- VO_{2MAX} (Maximal oxygen Consumption, Maximal oxygen uptake, peak oxygen uptake or maximal aerobic capacity) is the maximum capacity of an individual's body to transport and use oxygen during incremental exercise, which reflects the physical fitness of the individual. VO_{2max} is the primary indicator of aerobic fitness, cardiovascular health and endurance performance [14].

2. Need for study

- Emerging as a major health problem in most of the developing countries, hypertension is a multifactorial disease influenced by environmental and genetic factors.
- Although the identification of environmental risk factors has led to the treatment of disease, our knowledge of its heritability is very limited to the predictive importance of a positive family history or to the observation of familial segregation.
- Cardiovascular reactivity to exercise has been investigated in the offspring of HTP in a few studies, but not much done to determine aerobic capacity. This study aims to investigate aerobic capacity and effects of parental hypertension in the children of hypertensive parents through a physical test i.e., 6 minute walk test.
- This study was undertaken with an intention to find out risk of future hypertension by assessing aerobic capacity through 6 MWT in children of hypertensive versus normotensive parents, so that appropriate preventive and treatment measures can be taken.

3. Aim

- This study aims to assess aerobic capacity of offspring of hypertensive and normotensive parents.

- To compare offspring of hypertensive and normotensive

4. Objectives

- To know the cardiovascular response in offspring of hypertensive and normotensive parents.

5. Hypothesis

Alternate hypothesis

- H1: There may be significant changes in aerobic capacity between offspring of hypertensive than normotensive parents.
- H2: There may not be significant changes in aerobic capacity between offspring of normotensive than hypertensive parents.

Null hypothesis

- The changes in aerobic capacity may be same between offspring of hypertensive and normotensive parents. Both may be equally effective.

6. Materials

- Sphygmomanometer
- Stethoscope
- Weighing and height machine
- Inch tape
- Pulse oxymeter
- Countdown timer (or stopwatch)
- A chair that can be easily moved along the walking course
- A Pen and Worksheets on a clipboard
- Telephone

7. Methodology

- Study design: A Comparative Study
- Study place: Durgabai Deshmukh College Of Physiotherapy
- Source of data: Offspring of Hypertensive and Normotensive Parents.
- Study population: Males Under Age 18-25 And With Normal BMI
- Sample size: 30 Subjects Who Met the Inclusion Criteria and Signed the Informed Consent.
- Sampling technique: Selective Sampling
- Study groups: Subjects Were Grouped Into Two Groups Based On Non-Probability Convenience Sampling Taking On Same Age Group.
- Group ‘A’-Normotensive Offspring Of Hypertensive Parents -15 Subjects
- Group ‘B’-Normotensive Offspring Of Normotensive Parents-15 Subjects

8. Inclusion criteria

- Age: 18-25.
- Male subjects
- Normal subjects of hypertensive and non-hypertensive parents.
- BMI-Normal 18-25
- Not undergoing any other concurrent treatment

9. Exclusion Criteria

- Subjects with known history of hypertension.
- Systemic diseases
- Diabetes Mellitus
- Tuberculosis
- Asthma

- Smokers and drug addict's
- Inability to perform 6 Minute Walk Test.
- Recent fractures of lower limb or other medical conditions.
- Subjects with pre-existing disorders such as cardiovascular disorders, respiratory diseases.
- Subjects who did not give consent.

10. Procedure

Ethical clearance was taken from the ethical committee of the college the purpose of the study was explained to the subjects of both Group A (Normotensive offspring of Hypertensive parents) and Group B (Normotensive offspring of Normotensive parents) and they were encouraged to participate in the study. Subjects were taken in the study, only if they met the inclusion criteria.

The study was initiated only after taking an informed consent (Annexure 1) from the subject. Complete assessment (Annexure 2) was taken. Verbal description of the procedure was given to the subject. The subjects were instructed to inform immediately in case of any discomfort during the test. The subject was made to sit in a comfortable chair for 10-15 minutes. During this time, check for contraindications and demographic data was collected, before the test, which included: Age (years), Weight (kg), Height (cm), and BMI.

After completion of demographic data, BHR, SBP, DBP, Exertion (by Borg scale) were recorded in sitting position using the standard methods. The ATS guidelines were followed to conduct the test.

A long, flat, straight, enclosed 30 m college corridor marked by colour tape at each end has been used. Subjects were instructed to walk from end to end at their self-selected pace, while attempting to cover as much distance as possible in 6 minute.

Subject preparation

1. Comfortable clothing should be worn.
2. Appropriate shoes for walking should be worn.
3. A light meal is acceptable before early morning or early afternoon tests.
4. Subjects should not have exercised vigorously within 2 hours of beginning the test.
5. No warm-up period.

The stopwatch is set for six minutes. As sooner the timer was on, subjects were instructed to walk as far as possible for six minutes. Standardised encouragement was provided every 60 seconds during the test, with the following phrases: 'You're doing well' and 'Keep up the good work'. Subjects were allowed to stop if they developed symptoms of dyspnoea, dizziness, chest pain or leg cramps, but were encouraged to continue walking as soon as they could.



Fig: Person performing 6 minute's walk test

At 6 minutes on the stopwatch the subject was told to stop. At the end of the test, each subject's HR, Blood pressure and Borg value was measured along with the distance covered in the allotted 6 min. Distance covered during 6MWT was recorded for each individual in meters.

Subjects of both the groups A (15 subjects) and B (15 subjects) performed 6MWT. None of the subject stopped during the test.

After measuring the distance covered by subjects during 6 minute walk, VO_{2MAX} was calculated for each subject by using formula:

$$VO_2 \text{ max (mL}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}) = 70.161 + (0.023 \times 6MWT [m]) - (0.276 \times \text{weight [kg]}) - (6.79 \times \text{sex, where m = 0, f = 1}) - (0.193 \times \text{resting HR [beats per minute]}) - (0.191 \times \text{age [y]})$$

11. Outcome measures

- Heart rate
- Blood pressure
- VO_{2MAX}

12. Review of literature

- Srinivas S *et al.* (2015) Concluded that their study confirms that there is increasing prevalence of hypertension with in-crease in age and is associated with overweight and obesity. Children and adolescents should be considered as priority population for interventional strategies. Prevention may be achieved through physical activity and diet control. There is an urgent need for initial prevention and treatment of obesity in children. Obesity, family history of hypertension are risk factors for adolescent hypertension. Findings of our study suggest a need for larger population based studies to accurately estimate the prevalence and risk factors for hypertension among adolescents and young adults in our country.
- Noopur Srivastava *et al.* (2014) this study recommends that offspring of hypertensive parents with increased BMI and decreased physical fitness levels should be considered as high risk group for development of future cardiovascular events. Health education, lifestyle modification, exercise promotion, and primary prophylaxis to avoid the risk of developing hypertension and other cardiovascular morbidities should be adhered and implemented in this group. This study concluded that functional capacity of normotensive offspring of hypertensive parents is less than the offspring's of normotensive parents suggesting remedial intervention to increase fitness levels and avoid future cardiovascular risks. 6-minute walk test is a simple, effective tool to detect the fitness levels in these high risk population.
- Tarpan shah *et al.* (2013) [17] the study revealed that resting DBP was significantly higher in the offspring of hypertensive parents. There was decreased DBP response to exercise in the offspring of hypertensive parents. The study concludes that there is an early trend in higher blood pressure in the offspring of hypertensive parents. Offspring of hypertensive parents also exhibit an abnormal pattern of HR and BP recovery from the exercise.
- Sanjay Kalbande *et al.* (2012) [18] the study comprised of 200 college students. One group of 100 students having parental history of hypertension constituted the

study group whereas another 100 students having no parental history of hypertension constituted the control group. The participants were matched across age (18-25) and sex. Out of the total 30 males who were reported to have the BMI greater than 25, 22(76%) belonged to the study group, that is, those who have positive parental history of hypertension whereas out of the 12 females who were having their Body Mass Index greater than 25, 10 (80.8%) belonged to the study group. This shows a positive relation of the increasing Body Mass Index and its association in becoming a risk factor for developing hypertension in future. The findings of the study suggest the need of regular monitoring the BP of children of hypertensive parents and also other non-communicable diseases like diabetes and obesity to prevent the occurrence of the disease in the future.

- Surekharani Chinagudi *et al.* (2012) the present study reveals that incidence of prehypertension and the risk of cardiovascular dysfunction linked to their degree of sympathovagal imbalance is more in the offspring of hypertensive parents than in the offspring of normotensive parents. Sympathovagal imbalance in the form of increased sympathetic drive and decreased parasympathetic drive would lead to causation of prehypertension in these genetically predisposed individuals.
- Miguel Chiacchio Sieira *et al.* (2010)^[20] concluded that in general, the abnormal response of the BP during effort is related to an increased risk of future hypertension or cardiovascular events and mortality. Significant increases in the SBP and DBP during effort, low or falling levels of SBP during effort, and slow recovery of the SBP are considered abnormal responses of the BP and have a significant prognostic value of future hypertension and/or cardiovascular events and indicate the need for additional studies.

13. Discussion

Genetic influence on the variability of blood pressure (BP) in populations has been well established. This effect has been repeatedly demonstrated by strong evidence of familial aggregation of BP. Significant correlations exist between offspring's and parent's blood pressure, and more so between twins. This familial influence on BP can be detected from early childhood and tends to track over the years increasing in magnitude as the child progresses towards adolescence. Children of hypertensive parents have higher average systolic and diastolic BP than children of normotensive parents, and are about 3.8 times more likely to have high BP before the age of 55. Research indicates that essential hypertension has origins in childhood^[26].

It is now accepted that genetic effects underlying an individual's genetic susceptibility to complex traits and disorders (including, among many others, blood pressure levels, essential hypertension and obesity) are transmitted in recessive manners^[21]. There are a large number of genes that are responsible for hypertension. Single-gene-related hypertension is, however, rare. Intermediate phenotypes are more important and prevalent than gene mutations. These phenotypes are familial dyslipidaemia, metabolic syndrome, insulin resistance, body-fat distribution, kallikrein deficiency, sodium sensitivity, non-modulation of aldosterone and renal blood flow, abnormal cellular ion

transport systems (Na, Li, K, H transport systems) and BP reactivity. The nature of the genetic contribution to hypertension needs more studies among Indians. Essential hypertension may be considered to be the result of interactions between genes and environment^[4].

6MWT is currently the test of choice while using functional walk tests for Clinical or Research purposes. So my aim of the study was to assess aerobic capacity in offspring of hypertensive and normotensive parents.

This study was undertaken to provide a statistical data regarding any variation in amount of aerobic capacity in offspring of hypertensive and normotensive parents. All the subjects were of the same sex, BMI of 18-25 and same age group, thereby eliminating the possible interaction of such factors.

The two study groups i.e., normotensive offspring of hypertensive parents (Group A) and normotensive offspring of normotensive parents (Group B) were matched for age, sex and BMI. They only differed in the genetic propensity for developing Hypertension in Later life. It was found that there is considerable variability in outcome measure (SBP, DBP, 6MWD and VO_{2MAX}) between the two groups.

The result of the study showed that resting DBP was significantly higher in normotensive offspring of hypertensive parents compared to normotensive offspring of normotensive parents. Difference in resting SBP of both groups was not statistically significant. However, resting HR was comparable between the groups. Studies have supported the findings, those who have a family history of hypertension, their DBP was higher in preadolescent and adolescent groups. Previous studies have found that individuals with high-normal BP progress towards Hypertension twofold to threefold more frequently than subjects with normal BP on 26 years follow up. A study suggested resting BP to be a better predictor of future Hypertension^[17].

There was significant increment in HR, SBP and DBP following 6MWT in the both study group. And there was statistical significant in post SBP and DBP between both group A (normotensive offspring of hypertensive parents) and B (normotensive offspring of normotensive parents). These results are in agreement with other studies in which levels of hypertensive heredity have revealed inclinations towards higher systolic and/or diastolic BP as well as higher BP reactivity to mental stress. We can only speculate on the mechanism responsible for this variation between groups. Some studies have proposed that the exaggerated cardiovascular responses to stress are provoked by a differential sensitivity of adrenergic receptors and sympathetic over activity. Enhanced sympathetic activity may occur because of increased sympathetic stimulation and/or attenuated sympathoinhibition. Over activity starts in childhood and is easily evident in of patients with incipient hypertension. It is possible that there is a genetic component in sympathetic over activity expressed with more vigour in high risk individuals. Although environmental factors do have a role in the development of high BP in humans, of BP variations are attributed to genetic factors, and even this would probably be an underestimation in our and other similar populations^[26].

The 6MWT is useful measurement of functional capacity for people with normal to moderately severe impairment. In the present study; the six minute distance covered shows significant difference in the two study groups. The 6 minute

walk distance in children of hypertensive parents (530.93 meters) was less than children of normotensive parents (698.13 meters). In a study the 6 minute walk distance (6MWD), VO₂ max in children of hypertensive parents was less than children of normotensive parents and the results were statistically significant. This significant difference was true for the male and the female offspring separately. Though the young adults of hypertensive parents were healthy still their capacity to walk more in a limited period of time which demanded fitness was less, suggesting that the cardiovascular and respiratory fitness was more in children of normotensive parents [13].

VO₂MAX (Maximal oxygen Consumption, Maximal oxygen uptake, peak oxygen uptake or maximal aerobic capacity) is the maximum capacity of an individual's body to transport and use oxygen during incremental exercise, which reflects the physical fitness of the individual. The maximum oxygen uptake [VO₂ max], an internationally accepted parameter to evaluate the cardio respiratory fitness reflects the amount of oxygen utilized by working muscles during maximal exercise. It is the best index of aerobic capacity and gold standard for cardio respiratory fitness. Thus measure of maximum oxygen consumption offer insight into ability of cardiovascular, respiratory and muscular system to deliver and utilize oxygen. During exercise, up to a point the increase in oxygen consumption is proportionate to energy expended and all the energy needs are met by aerobic process. So in a person, the more is the maximum oxygen consumption capacity [VO₂max], the more will be his/ her aerobic capacity. VO₂max is the measure of the functional limit of the cardio-respiratory system and the single most valid index of maximal exercise capacity [39].

Decrease in VO₂ max is therefore an indicator of reduced exercise capacity or tolerance. It is the product of maximum cardiac output and maximal arterio-venous oxygen difference. Aerobic capacity was less in offspring of hypertensive parents (41.91) compared to offspring of normotensive parents (49.01) and the results were statistically significant. Children with a parental history of hypertension displayed a significant decrease in physical fitness and a significant increase in obesity and systolic and diastolic blood pressure compared with the rest of the population⁴¹. Genetic make-up has a very strong influence over your VO₂max and it is ultimately what defines your

upper limit for VO₂max improvements. The capacity of your circulatory system to deliver oxygenated blood to your muscles and also the specific physiology of your muscles are both genetically predetermined to a certain extent. For example, in regards to your circulatory system, hemoglobin (the molecule in your blood that binds and carries oxygen) concentrations are genetically influenced [4].

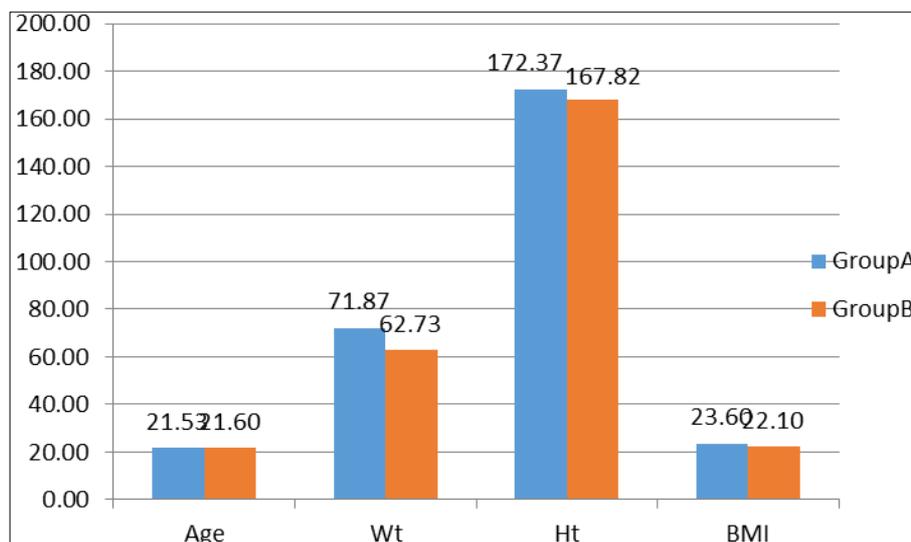
14. Conclusion

The results of present study have shown significant difference in cardiovascular parameters like post SBP, pre and post DBP, 6 minute walk distance and VO₂MAX between Group A (normotensive offspring of hypertensive parents) and Group B. There is decrease in physical fitness and increase in blood pressure to exercise test in Group A subjects compared to Group B subjects therefore offspring of hypertensive parents with increased BP and decreased physical fitness levels should be considered as high risk group for development of future cardiovascular events. The augmented BP reactivity found in the offspring of hypertensive parents might have prognostic implications and serve as an important early sign of familial predisposition to hypertension. Thus normotensive children of hypertensive parents should increase their level of physical fitness and exercise capacity. Weight reduction, dietary modification and regular exercise are mandatory for these subjects to prevent future catastrophes. Findings emphasise the need for special follow up of children with family histories of hypertension.

15. Statistical analysis

Table 1: This table is calculating the Mean, Standard Deviation and standard error mean values for Age, weight, height and BMI in Group-A and Group-B

	Groups	N	Mean	Std. Deviation	Std. Error Mean
Age	GroupA	15	21.5333	1.76743	.45635
	GroupB	15	21.6000	2.16465	.55891
Weight	GroupA	15	71.8667	4.53347	1.17054
	GroupB	15	62.7333	7.91442	2.04350
Height	GroupA	15	172.3733	6.27938	1.62133
	GroupB	15	167.8200	8.91958	2.30302
BMI	GroupA	15	23.6000	1.08759	.28082
	GroupB	15	22.1000	2.03189	.52463

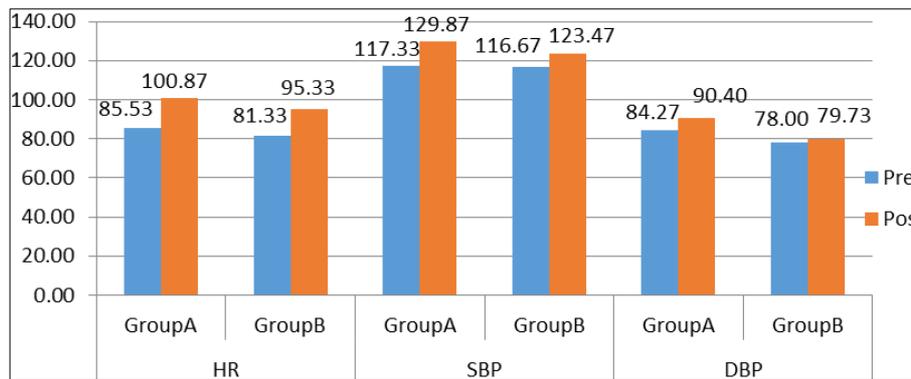


Graph 1: This graph represents the mean values of Age, Weight, Height and BMI in Group A and B

Group A vs group B

Table 2: Comparing Mean, Standard Deviation and Standard error mean of Heart Rate, Systolic and Diastolic Blood pressure of Pre and Post in Group A and Group B

Group Statistics					
	Groups	N	Mean	Std. Deviation	Std. Error Mean
HR pre	Group A	15	85.5333	5.79244	1.49560
	Group B	15	81.3333	8.31235	2.14624
HR post	Group A	15	100.8667	7.44376	1.92197
	Group B	15	95.3333	9.81010	2.53296
SBP pre	Group A	15	117.3333	4.57738	1.18187
	Group B	15	116.6667	4.87950	1.25988
SBP post	Group A	15	129.8667	3.66190	.94550
	Group B	15	123.4667	4.74893	1.22617
DBP pre	Group A	15	84.2667	4.58984	1.18509
	Group B	15	78.0000	4.14039	1.06904
DBP post	Group A	15	90.4000	3.86929	.99905
	Group B	15	79.7333	4.19977	1.08438



Graph 2: This graph represents the mean values for Heart rate, Systolic and Diastolic blood pressure of Pre and Post in Group A and Group B.

There is increase values of post heart rate (HR), post systolic blood pressure (SBP), and post diastolic blood pressure (DBP) of Group A compared to Group B.

Table 3: This table is calculating independent t-test for equality of means of pre and post HR, SBP, DBP in Group A and B

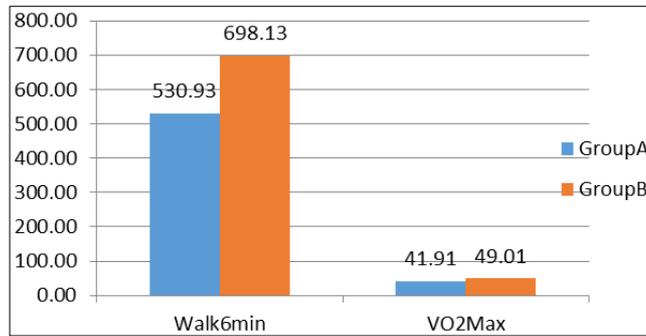
Independent Samples Test						
		t-test for Equality of Means				
		T	DF	Sig. (2-tailed)	Mean Difference	Std. Error Difference
HR pre	Equal variances assumed Group A and B	1.606	28	.120	4.20000	2.61595
HR post	Equal variances assumed Group A and B	1.740	28	.093	5.53333	3.17960
SBP pre	Equal variances assumed Group A and B	.386	28	.702	.66667	1.72746
SBP post	Equal variances assumed Group A and B	4.133	28	.000	6.40000	1.54837
DBP pre	Equal variances assumed Group A and B	3.926	28	.001	6.26667	1.59603
DBP post	Equal variances assumed Group A and B	7.234	28	.000	10.66667	1.47444

As can be seen from the output, not significant difference exists between Group A and Group B in HR of Pre. Since t-test value is 1.606 and its p-value 0.120 is greater than 0.05. As can be seen from the output, not significant difference exists between Group A and Group B in HR of Post. Since t-test value is 1.74 and its p-value 0.093 is greater than 0.05. As can be seen from the output, not significant difference exists between Group A and Group B in SBP of Pre. Since t-test value is 0.386 and its p-value 0.702 is greater than 0.05. As can be seen from the output, a significant difference exists between Group A and Group B in SBP of Post. Since t-test value is 4.133 and its p-value 0.0001 is less than 0.05. As can be seen from the output, a significant difference exists between Group A and Group B in DBP of Pre. Since t-test value is 3.926 and its p-value 0.001 is less than 0.05.

As can be seen from the output, a significant difference exists between Group A and Group B in DBP of Post. Since t-test value is 7.234 and its p-value 0.0001 is less than 0.05.

Table 4: This table is calculating the Mean, Standard Deviation and standard error mean values for 6 minute walk distance and VO_{2max} of Group A and Group B.

Group Statistics					
	Groups	N	Mean	Std. Deviation	Std. Error Mean
Walk 6 min	Group A	15	530.9333	22.03071	5.68831
	Group B	15	698.1333	25.27242	6.52531
VO ₂ Max	Group A	15	41.9133	1.89166	.48842
	Group B	15	49.0147	2.01969	.52148



Graph 3: This graph represents the mean values for Pre and Post of 6 Minute walk distance and VO₂MAX between Group A and Group B.

There is increase in values of 6 minute walk distance and VO₂MAX of Group B (normotensive offspring of

normotensive parents) compared to Group A (normotensive offspring of hypertensive parents)

Table 5: This table is calculating t-test for equality of means of 6 minute walk distance and VO₂MAX in Group A and Group B

		Independent Samples Test				
		t-test for Equality of Means				
		T	DF	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Walk6min	Equal variances assumed	-19.315	28	.000	-167.20000	8.65659
VO2Max	Equal variances assumed	-9.939	28	.000	-7.10133	.71449

As can be seen from the output, a significant difference exists between Group A and Group B in 6-Minute Walk Distance. Since t-test value is -19.315 and its p-value 0.001 is less than 0.05.

As can be seen from the output, a significant difference exists between Group A and Group B in VO₂Max. Since t-test value is -9.939 and its p-value 0.0001 is less than 0.05.

16. Results

The present study is designed to assess aerobic capacity in offspring of hypertensive and normotensive parents. Comparing the values of Group A (normotensive offspring of hypertensive parents) and Group B (normotensive offspring of normotensive parents). There is significant difference between post SBP (129.8±3.6 in group A and 123.47±4.7 in group B), pre DBP with mean value (84.27±4.5 and 78.00±4.1) and post DBP with mean value (90.40±3.8 and 79.73±4.1) in Group A and Group B respectively. There is significant difference in mean values of 6 minute walk distance (530.93±22.0 in Group A and 698.13±25.2 Group B) and VO₂MAX between Group A (41.91±1.8) and Group B(49.01) respectively.

17. Limitations

- Small Sample size
- Limited to male population
- Cardiac outcome measures were not considered other than blood pressure

18. Recommendations

- Follow up for further complications
- Further study can be done on obese child of hypertensive parents

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