

EFFECT OF AEROBIC EXERCISE ON BLOOD PRESSURE IN NORMOTENSIVE YOUNG HEALTHY ADULTS



Physiology

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ABSTRACT

Physical fitness is essential to lead a healthy life. Blood pressure is the lateral pressure exerted by column of blood on wall of blood vessels and it is affected by the exercise. There is lack of data evaluating the impact of aerobic exercise on blood pressure in central India context; therefore the purpose of the study is to observe the effect of aerobic exercise on blood pressure in young adults. Blood pressure was measured on first day and after 42 days of aerobic exercise in young healthy adults. Systolic blood pressure is reduced from 120.93 ± 7.82 mmHg to 119.043 ± 8.78 mmHg with p value, 0.0005 and diastolic blood pressure is reduced from 80.82 ± 2.93 mmHg to 78.23 ± 3.73 mmHg with p value, 0.00001. Aerobic exercise has effect on blood pressure or it may be one of preventive measure to reduce blood pressure.

INTRODUCTION:

Era has begun where one tries to prevent the disease or wish to detect it at very early stage. There is no question that, being physically active and attaining minimum level of fitness are the essential ingredients of healthy life. Lifestyles, nutrition habits and physical training have positive influence on the risk factors of the heart diseases. Aerobic exercise in the form of brisk walking, jogging, running, and cycling would result reduction in BP. Brisk walking on sand beach and grass surface effect systolic and diastolic blood pressure². Only a few investigators have documented the effect of running on blood pressure in Indian adults. Therefore, the purpose of this study was to examine the effect of 42 days running (aerobic exercise) on blood pressure in young healthy adults and to fulfill the lacuna of knowledge in these aspects in central Indian context.

Elevated blood pressure is one of the most important modifiable risk factors for cardiovascular disease and is accounting for 10% of overall deaths in India. Many meta-analytical studies from western world confirm this. These studies suggest that there was mean reduction of 5.00mmHg in SBP and 3.09mmHg in DBP after aerobic exercise. This study concluded that Aerobic training reduces the blood pressure in Indian population¹. A small reduction of 2 mm Hg in DBP in the mean of the population distribution, in addition to medical treatment, could have a great public health impact on the number of CHD and stroke events prevented³. Physical activity has an independent capacity to lower blood pressure⁴.

Physical exercise has ability to decrease blood pressure even in subjects with low responsiveness to medical treatment. It should be included in the therapeutic approach to resistant hypertension. Regular physical exercise is broadly recommended by current European and American hypertension guidelines⁵. Regular aerobic exercise reduces blood pressure and it is a helpful adjunct to control blood pressure in hypertension⁶. Aerobic exercise training is effective in producing a small but statistically-significant decrease in both systolic and diastolic BP and these effects appeared to be independent of the intensity or frequency of exercise⁷. Walking an extra 30 minutes a day is associated with lower mean blood pressure among adult African Americans with newly diagnosed hypertension⁸. Aerobic exercise reduces blood pressure in both hypertensive and normotensive persons. An increase in aerobic physical activity should be considered an important component of lifestyle modification for prevention and treatment of high blood pressure⁹.

MATERIAL AND METHODS:

This study was carried out in the Department of Physiology, MGM Medical College, Indore. 46 healthy young adults aged between 18 to 25 years were included in the study to test effect of running on blood

pressure. Written informed consent was obtained from all of the participants.

Criteria of inclusion: Subjects were included who do not have any history of cardiac, respiratory, neuromuscular and endocrine disease.

Criteria of exclusion: Subjects who develop any kind of discomfort during running.

Blood Pressure: Blood pressure is the lateral pressure exerted by column of blood on walls of blood vessels. In adults, systolic blood pressure ranges between 100-140 mmHg and diastolic blood pressure ranges between 60-90 mmHg⁹. Blood pressure was measured on left arm by auscultatory method using mercury Sphygmomanometer. The subjects were sit comfortably for five minutes before measuring blood pressure.

Aerobic Exercise: Running was done in morning for 30 minutes daily for 42 days on dry mud track in stadium.

OBSERVATION:

The study group was comprised of 46 healthy young adults. Blood pressure was recorded pre- and post- running. The exercise program was well tolerated by all of the participants. Data obtained was compiled, tabulated. Data was analyzed with the help of microsoft excel and SPSS software. Pair "t" test was applied to compare the effect of running on blood pressure. P value less than 0.005 is considered as statically significant.

Table 1: Systolic Blood Pressure in subjects

SBP (mmHg)	Pre –running		Post-running	
	Number of subjects	Percentage (%)	Number of subjects	Percentage (%)
Interval				
100- 110	5	10.86	11	23.91
111-120	23	50.00	20	43.37
121-130	10	21.73	10	21.73
131-140	8	17.39	5	10.86
TOTAL	46	100	46	100

Above table shows distribution of systolic blood pressure during pre and post running in studied sample. It depicts change in number of subjects from higher range of blood pressure to lower range after running.

Table 2: Diastolic blood pressure in subjects

DBP(mmHg)	Pre-running		Post-running	
	Interval	Number of subjects	Percentage (%)	Number of subjects
61 -70	00	00.00	2	4.30
71-80	32	69.56	38	82.60
81-90	14	30.43	6	13.04
Total	30	100	30	100

Above table shows distribution of diastolic blood pressure during pre and post running in studied sample. It depicts the change in number of subjects from higher range to lower range after running

Table 3: Means Value and Standard Deviation of systolic blood pressure and diastolic blood pressure.

Parameters	Pre- running	Post-running	Pair t test	P value
Blood pressure (mmHg)	Mean ± SD	Mean ± SD	t	P
SBP	120.93 ± 7.82	119.04 ± 8.78	3.47	0.0005
DBP	80.82 ± 2.93	78.23 ± 3.73	6.33	0.00001

Mean ± SD of systolic blood pressure in studied sample is 120.93 ± 7.82 mmHg before the running and after the running it became 119.04 ± 8.78 mmHg after running. Pair t test value is 3.47 and p value is 0.0005, which is statistically significant.

Mean ± SD of diastolic blood pressure is 80.82 ± 2.93 mmHg in studied sample before the running and it became 78.23 ± 3.73 mmHg after running, t value is 6.33 and p value is 0.00001, which is statistically significant.

RESULT:

The study entitled "Effect of aerobic exercise on blood pressure in young healthy adults" showed that there is in change systolic and diastolic blood pressure after 42 days of running. There is 1.89 mmHg drop in SBP and 2.89 mmHg drop in DBP respectively.

DISCUSSION:

It was observed that systolic blood pressure reduced from the 120.93 ± 7.82 mmHg to 119.04 ± 8.78 mmHg with the p value of 0.0005 which is statistically significant (p < 0.05) and diastolic blood pressure reduced from the 80.82 ± 2.93 mmHg to 78.23 ± 3.73 mmHg with the p value of 0.00001 which is statistically significant (p < 0.05). In our study it was observed that regular aerobic exercise effect SBP and DBP. Heart and arterial system are innervated by sympathetic fibers⁹. It is well known fact that regular exercise reduces sympathetic tone. This might be responsible for change in blood pressures. Seamus P. Whelton; et.al study was also concluded that aerobic exercise reduces blood pressure in both hypertensive and normotensive persons¹⁰. Kelley G, et.al in their study also concluded that aerobic exercise results reductions in resting systolic and diastolic blood pressure among adults.¹¹

CONCLUSION:

Hypertension is a growing problem in India with every third to fifth Indian as hypertensive and approximately 10% of death in India was attributable to high blood pressure.¹ So aerobic exercise like running might be used as primary prevention in high risk population and as secondary prevention in hypertension patients.

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