

Effects of Thirty Minutes Regular Brisk Walk on Blood Pressure in Hypertensive Subjects

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ABSTRACT

Objective: The present prospective study was conducted to observe the physiological effects of brisk walk on the systemic blood pressure in hypertensive subjects.

Study Design: Observational study

Place and Duration of Study: This study was conducted at Outpatient Department, NICVD- Jinnah Postgraduate Medical Center (JPMC) / Physiology department, BMSI, Karachi from December 2001 to May 2002.

Materials and Methods: A sample of 30 diagnosed cases of mild uncomplicated systemic hypertension and 30 healthy controls were selected as per study criteria. Aerobic exercise was explained as of doing regular brisk walking of 30 minutes on alternate days for 60 days. Systolic blood pressure (SBP), diastolic BP (DBP), heart rate (HR) and respiratory rate (RR) were checked at baseline and after 60 days of aerobic exercise. Consent of subjects and approval of ethics committee of institute was observed. Data was analyzed on the SPSS 10.0. Continuous and categorical data was analyzed by student's t- test & Chi square test respectively as 95% confidence interval.

Results: Baseline systolic BP, diastolic BP, HR and RR were raised in hypertensive subjects compared to controls ($p=0.001$). After 60 days aerobic exercise, the systolic BP, diastolic BP, HR and RR were reduced in hypertensive subjects compared to controls ($p > 0.05$).

Conclusion: The present study concludes that the aerobic exercise improves Systolic blood pressure (SBP), diastolic BP (DBP), heart rate (HR) and respiratory rate (RR) in hypertensive subjects.

Key Words: Aerobic Exercise, Systemic Hypertension, Heart Rate, Respiratory Rate

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INTRODUCTION

Ischemic heart disease (IHD) ranks as leading cause of morbidity and mortality the World over.¹ Similar to World scenario, a rising trend of IHD is reported for Pakistan and also related burden of mortality. In the United States, the mortality rate has greatly decreased during last two decades, has been reported. This reduction is reported due to a favorable trend of physical exertion as risk factor modifier.² Because the physical inactivity is a contributing risk factor due to its predisposition for the co morbidities of rise in systemic blood pressure, physical obesity, and a reduction in good cholesterol (HDL-C).³ American Heart Association (AHA) has reported the "Physical inactivity" is a proven risk factor for coronary ischemic heart disease (CHD) independent to other risk factors.⁴ Increased physical activity as during brisk walk, increases the respiratory rate, fastens the heart rate and increases the muscle contraction.⁵ Thus brisk walk is one of the recommended way of aerobic exercise. During brisk walk, the body mobilizes various food

stuffs- carbohydrates, good and bad cholesterol and fats, and moreover improves renal functioning and thus improved water & electrolyte balance of body. This brings a favorable change in systemic blood pressure and facilitates the body weight loss.⁶

Previous studies had reported favorable effects of aerobic exercise on the physiological factors regulating the systemic blood pressure and a reduction in cardiovascular mortality.⁷⁻⁸ The National High Blood Pressure Education Program Coordinating Committee (NHBPECC) recommended six approaches for primary prevention of systemic hypertension; viz. moderate physical activity, maintenance of body weight, avoidance of alcohol consumption, a reduction in sodium intake, adequate potassium intake and consumption of vegetables, fruits, low saturated oils/fats and low dairy products.⁹ Moderately tailored exercise as determined by exercise testing helps to regulate systemic blood pressure within physiological limits.¹⁰ The present study was planned to evaluate effectiveness of physical aerobic exercise in regulating systemic blood pressure in hypertensive subjects.

MATERIALS AND METHODS

The present observational study was conducted at the outpatient department, NICVD- Jinnah Postgraduate

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Medical Center/ Physiology department, BMSI, Karachi from December 2001 to May 2002. A sample of 30 diagnosed cases of T2DM subjects and 30 healthy, age and gender matched, controls were selected according to pre defined study criteria. Study participants were divided into Group A- controls and Group B- diagnosed cases of systemic hypertension. Hypertension was diagnosed as per criteria set out by JNC criteria. Uncomplicated systemic hypertensive cases not yet taking any medicament were included. Subjects suffering from concomitant systemic disease such as diabetes mellitus, cardiac failure, etc were excluded from study protocol. Physical examination was carried out. Subjects were informed about purpose of study, and willingness to participate. Volunteers were briefed about the merits and demerits of study. Volunteers were informed that they are free to withdraw from study protocol at any stage if they feeling problems. Willing subjects were asked to sign the consent form. Aerobic exercise was explained to participants. Subjects were asked to do brisk walking of 30 minutes duration regularly on alternate days for 60 days. Systolic blood pressure (SBP), diastolic BP (DBP), heart rate (HR) and respiratory rate (RR) were checked at baseline and after 60 days of aerobic exercise. Consent of subjects and approval of ethics committee of institute was observed. Data was collected in pre structured proforma. Data was analyzed on the SPSS 10.0. Continuous and categorical data was analyzed by student's t- test & Chi square test respectively at 95% confidence interval.

RESULTS

Baseline SBP, DBP, heart (HR) and respiratory rates (RR) were found elevated in cases compared to controls ($p=0.001$). Table 1 shows the details of study variables of controls and cases at baseline. After 60 days aerobic exercise, the SBP, DBP and respiratory rate (RR) were reduced hypertensive subjects compared to controls ($p > 0.05$). Heart rate showed significant differences $p < 0.05$. Table 2 shows the details of study variables of controls and cases after 60 days of aerobic exercise.

Table No.1: Systolic and diastolic blood pressure, heart and respiratory rates of controls and cases before aerobic exercise

group	Parameters			
	Blood pressure (mmHg)		Heart rate	Respiratory rate
	Systolic	Diastolic	per minute	per minute
A (controls)	132.70±0.50	87.30±0.50	69.60±0.61	16.30±0.30
B (Cases)	166.80±3.70	111.50±1.30	98.50±3.10	19.80±0.50
P value	P=0.001	P=0.001	P=0.001	P=0.001

Table No.2: Systolic and diastolic blood pressure, heart and respiratory rates of control and cases after aerobic exercise

Group	Parameters			
	Blood pressure (mmHg)		Heart rate (bpm)	Respiratory rate (bpm)
	Systolic	Diastolic		
A (controls)	121.90±1.20	82.30±1.10	70.10±0.40	16.00±0.20
B (Cases)	124.50±1.00	83.20±1.10	73.30±0.90	16.10±0.30
P value	P>0.05	P>0.05	P<0.05	P>0.05

DISCUSSION

Modern life style, urbanization and industrialization are major menaces for the human health, as they have reduced the physical activity. Reduced physical activity of modern life has increased the incidence and prevalence of furious disease such as systemic hypertension, DM, and metabolic abnormalities of lipids and lipoproteins.¹¹ Previous reports had pointed that increasing the physical activity reduces risk factors for development of metabolic disorders and produces favorable changes in systemic blood pressure, blood glucose levels, lipids and lipoprotein fractions.^{8,12}

The observations of present confirmed the findings of above cited studies, as we had observed favorable effects of aerobic exercise on the systemic systolic and diastolic BP in present prospective study. Our results are also in keeping to a previously cited report.⁸

A recent meta analysis had reported the effects of aerobic exercise in normotensive subjects. It was reported that from meta analysis of many RCTs that the aerobic exercise reduced the SBP and DBP by 4 mmHg in normotensive subjects. The observations of above study¹³ are in agreement to our present study in terms of SBP and DBP. 25.3% reduction in SBP and 25.4% reduction in DBP were observed after aerobic exercise in hypertensive subjects in our present study, this much reduction in BP is a valuable clinical finding in reducing the cardiac and vascular diseases, and associated morbidity and mortality.

Aerobic exercise increases the integrity of vascular endothelium, and increase synthesis and release of NO/EDRF which improves the circulation, is one of the postulated underlying mechanism in reducing the systemic BP.¹² The findings of our present study are in agreement to above cited study as regards clinical observation of BP reduction, however, the finding of NO/EDRF of above study is incomparable as we could not measure the NO levels in our study subjects due to issues of funding and methodology.

On the basis of above discussion and available evidence, it is suggested that the aerobic exercise is very good for health as it improves normal circulation and blood pressure. Endothelium dependent vasodilatation is a proposed mechanism. Whatever, the underlying mechanism, the present study reports a

blood pressure normalizing tendency by aerobic exercise in mild hypertensive subjects.

CONCLUSION

Aerobic exercise improves systolic blood pressure (SBP), diastolic BP (DBP), heart rate (HR) and respiratory rate (RR) in hypertensive subjects. Future recommendations are suggested to find the underlying mechanisms of how the systemic blood pressure is reduced by aerobic exercise.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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