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Research Article

EFFECTS OF RESISTANCE EXERCISE ON BLOOD PRESSURE IN HYPERTENSIVE PATIENTS OF CENTRAL INDIA: A PROSPECTIVE STUDY

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ABSTRACT

Objectives: The objectives of this research were to see whether practicing resistance exercises alone can help to reduce the hypertension and can be considered as an adjunct to treat the hypertension.

Methods: It is a prospective, cross-sectional, and descriptive study conducted in the Department of Physiology, Malwanchal University over a period of 3 years. This study was carried out with a sample of 60 participants who were explained the procedure of experiment and informed consent was taken from all the participants included in the study.

Results: Systolic blood pressure, diastolic blood pressure, pulse pressure, and pulse rate were observed. Pre-test of resistance exercise group mean pulse rate is 79.52±4.14 beats/min (Mean±SD) reduced to 76.36±4.01 in post-test. Resistance exercise mean systolic blood pressure of pre-test 137.34±6.36 mmHg (Mean±SD) is reduced to post-test 134.65±6.35mm of Hg (Mean±SD). Pre-test of resistance exercise mean diastolic blood pressure 91.52±4.45 mmHg (Mean±SD) is reduced to post-test 88.45±4.31 mm of Hg.

Conclusion: Resistance exercise alone lowers systolic and diastolic blood pressure in prehypertensive and stage-1 hypertensive patients. Hence, resistance training is advised as a technique for managing the systemic hypertension.

Keywords: Diastolic blood pressure, Hypertension, Hypertensive, Pulse pressure, Pulse rate, Resistance training, Strength training, Systolic blood pressure.

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INTRODUCTION

One of the largest health issues of the 21st century is hypertension, a widespread illness that affects 15% of adult population in India [1]. By 2025, there will be 1.5 billion adults that is around 30% of the world's population suffering with hypertension. In India, it has been discovered that the prevalence of hypertension is rising at epidemic rates across urban, rural, and tribal populations [2].

Hypertension is important not only because of its high prevalence, but also because cardiovascular disorders such as coronary heart disease, CHF, ischemic and hemorrhagic stroke, renal failure, and peripheral arterial disease risks are doubled more likely by hypertension. About 9 million people died worldwide from cardiovascular disorders in developing nations, including one and half million in India. The number of cardiovascular fatalities in India is expected to climb by 111% by the year 2020 [3,4]. However, primary prevention has been proposed as the thirteen most cost-effective approaches to the emerging epidemic [5].

To treat the hypertension many patients, require combination of two or more drugs. The unfavourable drug side effects that patients experience have an impact on their health. Thus, in addition to medications, lifestyle modifications, dietary changes, and other therapies are crucial in the treatment of essential hypertension [6]. The etiological factors for essential hypertension are stress, alcohol, smoking, and obesity. Out of these, stress is one of the influencing factors [7]. It has been suggested that mild repeated stressors through exercise, may be health promoting by affecting neural networks that are shaped by prior experience, resulting in 26 altered regulations in response to future stress [8]. Thus, management of hypertension must take an integrative strategy.

The previous studies have examined the effects of combined aerobics and resistance training. The purpose of this study was to determine the effects of only resistance exercises on blood pressure in Indian patients diagnosed with prehypertension or stage-1 hypertension.

METHODS

It is a prospective, cross-sectional, and experimental study which has been conducted in the Department of Physiology, Malwanchal University. Experimental study of resistance training was carried out in 60 participants of age group 30–60 years. Participants were explained the purpose and procedure of experiment and informed consent was taken from all the participants included in the study. Due permission for conduction of this study was obtained from the relevant ethical committee of Malwanchal University, Indore. Subjects were having either pre-or stage-1 hypertension. The inclusive subjects were non-alcoholic, non-smokers. We excluded the patients with secondary hypertension, left ventricular hypertrophy, recent myocardial infarction, mentally unstable, or uncooperative patients. Furthermore, the patients with history of liver disease, kidney disease, and diabetes were excluded from the study.

Intervention

Hypertension subjects treated with resistance exercise.

RESULTS AND DISCUSSION

A total of 60 patients who fulfilled the selection criteria during the study were enrolled. The data were analyzed, and the final observations were tabulated as below.

In this study, Table 1 shows that out of the 60 subjects 31 were males and 29 females, which correspond to 51.6% of males and 48.3% of females suffering with either prehypertension or stage-1 hypertension.

The mean(±SD) age of this study group was 47.35(±8.40) years. The maximum number of patients were in the age group of 51–60 years which were 45% (n=27) of total followed by age group 41–50 years having 36.6% (n=22), followed by age group 30–40 years with 18.3% (n=11) (Table 2).

It is observed from Table 3 that, pre-test of resistance exercise group mean pulse rate is 89.70±12.12 beats/min (Mean±SD) reduced to 87.93±11.23 in post-test.

It is observed from Tables 4 and 5, pre-test mean systolic blood pressure 147.00±7.59 mmHg (Mean±SD) is reduced to post-test 144.30±7.08 mm of Hg (Mean±SD) and pre-test of resistance exercise mean diastolic blood pressure 97.67±7.31 mmHg (Mean±SD) is reduced to Post-test 94.93±6.75 mm of Hg.

The major finding of this study showed that resistance training is a useful physical training technique in lowering the systolic and diastolic blood pressures as well as pulse rate in the patients suffering with prehypertension or hypertension.

In the present study, it is observed that after a training of 12 weeks of resistance exercises, mean pulse rate is decreased by 3.16 beats/min (p value <0.001), mean systolic blood pressure is reduced by 2.69 mm Hg and mean diastolic blood pressure is reduced by 3.07 mm Hg (p<0.05) which is statistically significant.

Training in isometric, dynamic, and endurance resistance techniques lowers SBP and DBP, whereas combination of aerobics and resistance training only lowers DBP [9]. Isometric resistance training appears to have the greatest potential for lowering SBP, according to data from a few researches on the subject. Further studies could focus on long term benefits of physical therapy in this condition.

Table 1: Distribution of gender

Sex	n (%)
Male	31 (51.6)
Female	29 (48.3)
Total	60 (100)

Table 2: Distribution of the subjects according to age group

Age group (years)	n (%)
30–40	11 (18.3)
41–50	22 (36.6)
51–60	27 (45.0)
Total	60 (100)

Table 3: Mean pulse rate (beats/minute) of resistance exercise

Resistance exercise group	Mean±SD	p-value
Pre-test	89.70±12.12	0.000
Post-test	87.93±11.23	<0.001

S: Statistically significant

Table 4: Mean SBP (mmHg) of resistance exercise

Resistance exercise group	Mean±SD	p-value
Pre-test	147.00±7.59	0.000
Post-test	144.30±7.08	<0.001

Table 5: Mean DBP (mmHg) of resistance exercise

Resistance exercise group	Mean±SD	p-value
Pre-test	97.67±7.31	0.000
Post-test	94.93±6.75	<0.001

CONCLUSION

The present study concludes that only resistance training lowers systolic and diastolic blood pressure in prehypertensive and stage-1 hypertensive patients. Hence, resistance training is advised as a technique for managing the systemic hypertension in Indians.

LIMITATIONS

This study and other similar studies are limited by the relative lack of data especially about the chronic effects of resistance training in the patients with pre- and stage 1- hypertension.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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