

Effect of Aerobic Exercise versus Jacobson's Progressive Muscular Relaxation Technique in Patients with Hypertension

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ABSTRACT

Introduction: In the last few decades, the prevalence of hypertension has been drastically increased in India. Hypertension is defined by the presence of a chronic elevation of systemic arterial pressure above a certain threshold value. Proper management of hypertension may require both pharmacological and non-pharmacological interventions. Aerobic exercise and Jacobson's Progressive Muscular relaxation (JPMR) technique both are Non-pharmacological interventions for reducing blood pressure.

Method: Interventional study was done by Random sampling method and conducted on 20 hypertensive subjects. Subject willing to participate, age group 20-55 year both male and female and blood pressure above 140/90 mmHg were included. Subjects not able to understand, psychologically unstable, systemic illness and subject who were not regularly taking medications were excluded. 20 hypertensive subjects, randomly divided into 2 groups. The first group was asked to do 5 sessions of Aerobic exercise for 30-45 minutes per week for 4 week and the second group was asked to do 5 sessions of JPMR for 30 minutes per week for 4 weeks. In both the groups pre and post systolic blood pressure (SBP), diastolic blood pressure (DBP) and heart rate (HR) were measured in sitting position. Subjective results were established.

Results: Statistical analysis was done using SPSS16. There was statistically significant difference between pre and post value of SBP ($p < 0.05$), DBP ($p < 0.05$) in both groups, but the aerobic exercise showed more significant results as compared to the JPMR.

Conclusion: Hence it can be concluded that Aerobic Exercise is more effective in hypertensive than Jacobson's Progressive Muscular relaxation technique.

Keywords: Aerobic Exercise, Jacobson's Progressive Muscular relaxation technique (JPMR), hypertension

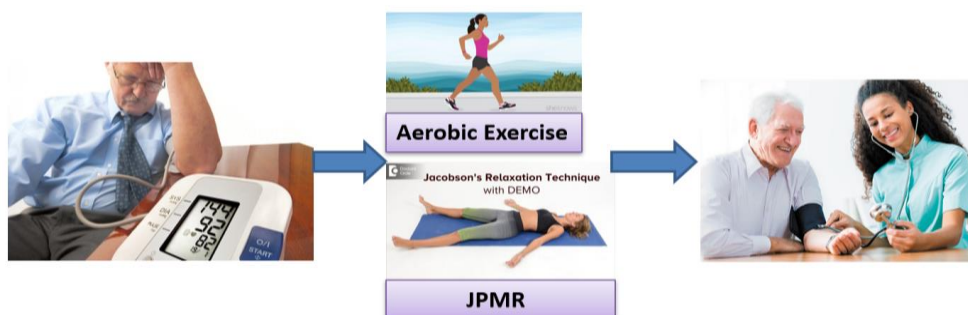
INTRODUCTION

An estimated 1.13 billion people worldwide have hypertension.^[1] In the last few decades, the prevalence of hypertension has been drastically increased in India.^[2] Overall prevalence of hypertension was 30.7% in Indian adults.^[3] Hypertension is defined by the presence of a chronic elevation of systemic arterial pressure above a certain threshold value.^[4] Since most of the individuals who suffer from hypertension do not have specific symptoms related to their elevated blood pressure, it is often called as the silent killer disease. High blood pressure is somewhat such a situation and if left undetected and untreated it results in brain attack (stroke), heart attack, heart

enlargement, heart failure and kidney failure.^[5]

From 1983 onwards, World Health Organization recommended the use of non-pharmacological approaches in the treatment of hypertension. Proper management of hypertension may require both pharmacological and non-pharmacological interventions. Various Nonpharmacological measures for hypertension includes; life style

modification, weight reduction, regular aerobic exercises, cessation of smoking, tobacco use cessation, increase in intake of fruits & vegetable, reduction in alcohol, sodium intake and potassium supplementation. Aerobic exercise and Jacobson's Progressive Muscular relaxation (JPMR) technique both are Non-pharmacological interventions for reducing blood pressure in Hypertensive subjects.^[4,5]



(Reference: - <https://www.tctmd.com/news/study-questions-role-bp-meds-patients-hypertension-no-other-cvd-risk-factors>, <https://www.health.harvard.edu/diseases-and-conditions/overcoming-resistant-hypertension>)

Aerobic exercise is defined as repetitive and rhythmic movement of large muscle groups to improve the efficiency of energy producing systems that use oxygen. Hypertensives are encouraged to engage in aerobic exercise on a regular basis, such as brisk walking, jogging or swimming for 30–45 min daily. A recent meta-analysis indicated a mean reduction of 8 mm Hg systolic and 5 mm Hg diastolic by regular exercise in patients with hypertension.^[6,7]

JPMR Technique is a non-pharmacological alternative therapy in the management of stress and hypertension. Beneficial effects of Jacobson's progressive relaxation technique has been reported by various authors. Jacobson's progressive muscle relaxation technique in which a person first tenses and releases major muscle groups of the body in a prefixed and systematic order, usually beginning at the distal body parts and progressing proximal parts and is performed for about 30 minutes.^[5]

The study was carried out to know and to compare the effect of aerobic exercise and

Jacobson's progressive muscular relaxation technique in hypertensive subjects.

LITERATURE REVIEW

- 1) **Nisha Shinde, Shinde KJ et al.** conducted a study on Immediate Effect of Jacobson's Progressive Muscular Relaxation in Hypertension and they found that Jacobson's progressive muscular relaxation may be used as an adjunct to conventional physiotherapy as an antihypertensive treatment results in better control of blood pressure & reduces heart rate.^[5]
- 2) **Fernando Dimeo, Nikolaos Pagonas et al.** Conducted a study on Aerobic Exercise Reduces Blood Pressure in Resistant Hypertension and found that Aerobic exercise on a regular basis is a helpful adjunct to control blood pressure and should be included in the therapeutic approach to resistant hypertension.^[7]

MATERIALS & METHODS

➤ Materials Required: -

1. Sphygmomanometer
2. Stethoscope
3. Pulse Oximeter
4. Yoga Mat
5. Table
6. Chair
7. Pen, Paper

➤ **Ethical approval:** Ethical approval was obtained from institutional ethical committee.

➤ **Study design:** Interventional study.

➤ **Study setting:** Ahmedabad, Gujarat, India.

➤ **Sampling technique:** Simple Random sampling method.

➤ **Study duration:** 3 months.

➤ **Sample size:** 20 Hypertensive Subject. [Sample size calculated by using the G power software using 80% power and 95% confidence interval]

➤ SELECTION CRITERIA: -

❖ Inclusion Criteria:

- ✓ Age Group between 25-55 years.
- ✓ Both male and female will be included.
- ✓ Hypertensives (blood pressure above 140/90 mm of Hg) who are on regular medicines.
- ✓ Willing to participate.

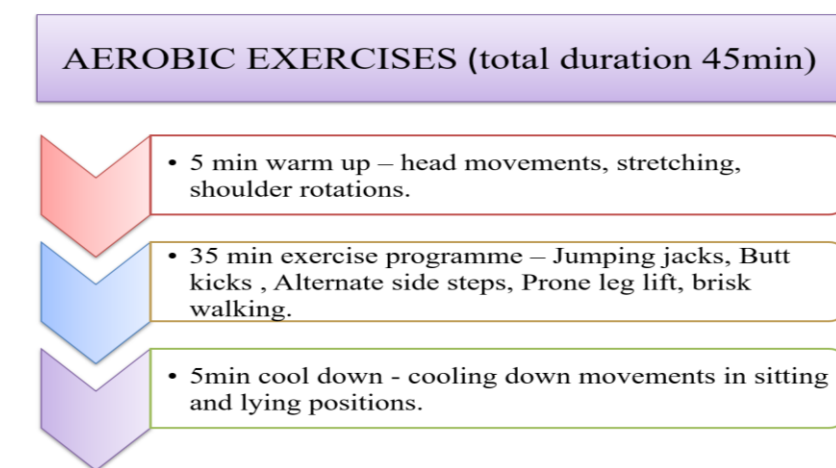
❖ Exclusion Criteria:

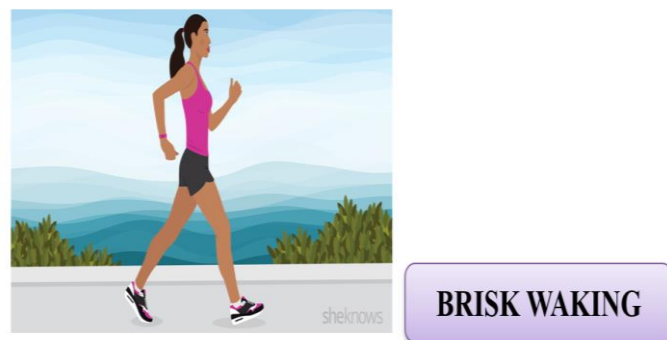
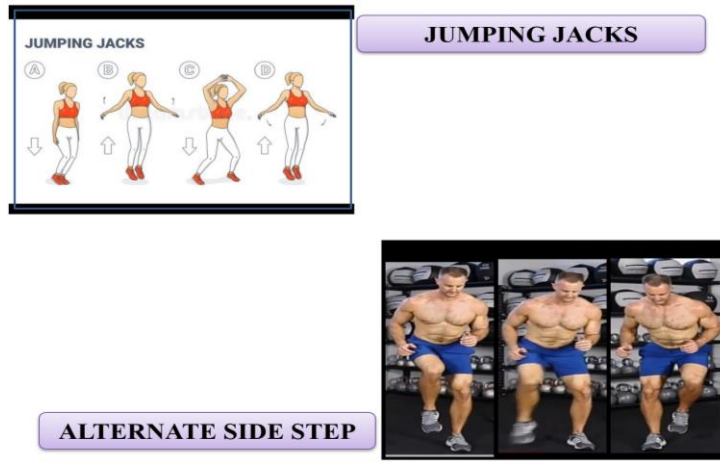
- ✓ Psychologically unstable.
- ✓ Subjects not taking medication regularly.
- ✓ Subjects having any systemic illness other than Hypertension.

➤ PROCEDURE:

- Hypertensive subjects who fulfilled the above inclusion criteria.
- Prior consent of the subjects was taken.
- Subject and therapist are blinded in present study.
- 20 hypertensive subjects, randomly allocated into 2 groups (allocation was concealed).
- Aerobic group: - 10 Subjects
JPMR group: - 10 Subjects
- Pre systolic blood pressure (SBP), diastolic blood pressure (DBP) and heart rate (HR) were measured in sitting position.
- The first group was given 5 sessions of Aerobic exercise for 30-45 minutes per week for 4 week and the second group was given 5 sessions of JPMR for 30 minutes per week for 4 week.
- Post systolic blood pressure (SBP), diastolic blood pressure (DBP) and heart rate (HR) were measured in sitting position.
Subjective results were established.

✚ Aerobic Exercises:^[8] -





✚ **Jacobson's Progressive Muscular Relaxation Technique: -**



[Reference: <https://youtu.be/xkOtnbB3b4>]

Jacobson's progressive muscle relaxation technique in which a person first tenses and releases major muscle groups of the body in a prefixed and systematic order, usually beginning at the distal body parts and progressing proximal parts and is performed for about 30 minutes. JPMR was done by contracting and relaxing a group of muscles sequentially, namely the muscles of the hands, upper arms, forearms, forehead, face, jaw, neck, chest, shoulders, upper back, abdomen, thighs, and calves. Muscle contraction is done 5-10 seconds and relaxation for about 10-20 seconds. The patient's attention is directed to being able to feel the difference between when the muscles are contracted and when they are relaxed. Exercise is done in a quiet room on a chair or comfortable bed that supports the body well. Patients are encouraged to wear comfortable, not tight clothing, and remove shoes, glasses and contact lenses.

➤ **Data Collection Tool:**

- **Blood Pressure:** Systolic Blood Pressure, Diastolic Blood Pressure
- The examination room should be quiet, with a comfortable ambient temperature. Ideally, blood pressure should not be measured if the patient has engaged in recent physical activity within the past 30 minutes.
- Place the bell of the stethoscope over the brachial artery, using sufficient pressure to provide good sound transmission without over-compressing the artery. To avoid extraneous noise during cuff deflation, ensure that the stethoscope is not in contact with the patient's clothing or with the blood-pressure cuff. Once the pulse-obliteration pressure is determined, initiate the auscultatory blood-pressure measurement by rapidly inflating the cuff to a level 20 to 30 mm

Hg above the pulse-obliteration pressure. Then deflate the cuff at a rate of 2 mm Hg per second while listening for the Korotkoff sounds.

- **Pulse Oximeter:** For Heart Rate

✚ At the end of the 4 weeks post Blood pressure and Heart rate was taken in both the groups to know the changes.

STATISTICAL ANALYSIS

- The present study done to know the effect of aerobic versus Jacobson's progressive muscular relaxation technique in subject with hypertension. Total 20 hypertensive subjects enrolled in the study according to inclusion and exclusion criteria. Both group were similar at baseline. Statistical analysis was done using SPSS 16 and Microsoft Excel. Paired t test was applied to analyze the significance of the subject pre intervention and post intervention. Level of significance was (p value < 0.05).

RESULT

All data analysis was done using SPSS 16. Paired t test was applied to analyze the significance of the subjects pre intervention and post intervention. Level of significance was (p value < 0.05)

Table no 1: Shows the number of hypertensive subjects and distribution of age.

NUMBER OF SUBJECTS	20
MEAN AGE	39.15
STD. DEVIATION	9.58
MINIMUM AGE	25
MAXIMUM AGE	55

Table no: 2 Pre and Post exercise comparison of Aerobic vs. JPMR

Parameter	Mean ± Std.deviation				p value	Result
	Aerobic exercise		JPMR			
	Pre	Post	Pre	Post		
SBP	149.2 ± 5.57	143.2 ± 5.59	150.9 ± 5.021	147.6 ± 5.25	<0.05	Significant
DBP	98.9 ± 8.49	96.6 ± 8.167	99.5 ± 7.41	97.5 ± 7.60	<0.05	Significant
HR	96.9 ± 8.29	92.6 ± 7.07	94.1 ± 7.74	91.9 ± 6.62	<0.05	Significant

INFERENCE: The result shows significant difference for pre and post **SBP, DBP** and **HR** of Both technique.

Table no.:3 and Graph no.: - 1

REDUCTION OF BLOOD PRESSURE	Aerobic Exercise	JPMR
SBP	6 (mmHg)	3 (mmHg)
DBP	2.3 (mmHg)	2 (mmHg)
HR	4.3 bpm	2.2 bpm



INFERENCE – Bar chart and table no. 3 shows that reduction of SBP, DBP and HR is 6mmHg, 2.3mmHg and 4.3bpm respectively in aerobic exercise & reduction of SBP, DBP and HR is 3mmHg, 2mmHg and 2.2bpm respectively in JPMR technique.

Results show that there is significant difference in post exercise SBP, DBP and HR but Aerobic training shows more significant difference compare with JPMR technique.

DISCUSSION

There is a high prevalence of hypertension, with almost one in every three Indian adults affected.^[3] From 1983 onwards, World Health Organization recommended the use of non-pharmacological approaches in the treatment of hypertension. Proper management of hypertension may require both pharmacological and non-pharmacological interventions. Various Nonpharmacological measures for hypertension includes; life style modification, weight reduction, regular

aerobic exercises, cessation of smoking, tobacco use cessation, increase in intake of fruits & vegetable, reduction in alcohol, sodium intake and potassium supplementation.

The study was carried out to know and to compare the effect of aerobic exercise and Jacobson's progressive muscular relaxation technique in hypertensive subjects.

Nisha Shinde, Shinde KJ et al (2013) conducted a study on Immediate Effect of Jacobson's Progressive Muscular Relaxation in Hypertension and they found

that Jacobson's progressive muscular relaxation may be used as an adjunct to conventional physiotherapy as an antihypertensive treatment results in better control of blood pressure & reduces heart rate.^[5]

Ida Rosdiana, Yanti Cahyati conducted a study on "Effect of Progressive Muscle Relaxation on Blood Pressure among Patients with Hypertension" and found that the intervention group that did PMR training and consumed anti-hypertensive drugs experienced a greater decrease in blood pressure compared to the control group who only received antihypertensive therapy.^[10]

Response from the relaxation technique is expected to inhibit the autonomic nervous system and the central nervous system, and will increase parasympathetic activity which will reduce the heart rate so cardiac output decreases and eventually blood pressure will also decrease.^[10]

Fernando Dimeo, Nikolaos Pagonas et al. Conducted a study on Aerobic Exercise Reduces Blood Pressure in Resistant Hypertension and found that Aerobic exercise on a regular basis is a helpful adjunct to control blood pressure and should be included in the therapeutic approach to resistant hypertension.^[7] The mechanisms for the blood-pressure lowering effect of exercise are complex and not fully understood.

Aerobic exercise (AE) such as walking and jogging as a relatively cheap, safe, and available nonpharmacological method has been recommended to prevent/treat hypertension by recent European and American hypertension guidelines.^[9]

So, there are studies which have shown that aerobic training and JPMR both are Non-pharmacological interventions for reducing blood pressure in Hypertensive patients but this study found that the aerobic training is more effective in comparison with JPMR.

CONCLUSION

Hence it can be concluded that Aerobic training is more effective in reducing blood

pressure in hypertensives than Jacobson's Progressive Muscular relaxation technique.

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Conflict of Interest: None

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Ethical Approval: Approved

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