

**Research Article****Immediate Effect of Jacobson's Progressive Muscular Relaxation in Hypertension**Nisha Shinde <sup>1</sup> Shinde KJ <sup>2</sup>, Khatri SM <sup>3</sup>, Deepali Hande, <sup>4</sup> Vichare Bhushan <sup>5</sup><sup>1</sup>Associate Professor, College of Physiotherapy, Pravara Institute of Medical Sciences, Loni. (M.S.), India - 413 736..<sup>2</sup>Professor & HOD, Dept. of ENT, Pravara Institute of Medical Sciences, Loni. (M.S.), India - 413 736.<sup>3</sup>Professor & Principal, College of Physiotherapy, Pravara Institute of Medical Sciences, Loni. (M.S.), India - 413 736.<sup>4</sup>Lecture, College of Physiotherapy, Pravara Institute of Medical Sciences, Loni. (M.S.), India - 413 736.<sup>5</sup>Post graduate student, College of Physiotherapy, Pravara Institute of Medical Sciences, Loni. (M.S.), India - 413 736.**Corresponding author****Nisha Shinde**Email: [nishakiran63@yahoo.com](mailto:nishakiran63@yahoo.com)

**Abstract:** Hypertension is ranked as fourth top most disease on the basis of its prevalence. It affects approximately one billion individuals worldwide. In India, the prevalence of hypertension in adult population varies from 3 to 10% and the average figure is 4.8%. The population at risk above the age of 20 years is 330 million. It is a major health problem and biggest of the challenges of the 21st century. Hypertension is major risk factor for causing cardiac, cerebral and renal disease. A total of 250 college and school teachers were examined. The necessary information such as history, socio-demographic profile, clinical examination findings were noted. Out of that 105 subjects were found as hypertensive & were willing to participate in study. All subjects explained the relaxation technique. Their baseline data includes Blood Pressure and Heart Rate were measured in sitting position. Investigator demonstrated technique (Jacobson's Progressive muscular relaxation) to contract and relax various groups of muscles. After the trial session every subject performed this supervised Jacobson's progressive muscular relaxation for 30 min, after 30 min of training. Outcome measures were reassessed immediately after the JPMR in sitting position that is Blood Pressure and Heart Rate. There were highly significant differences in Pre & Post Blood pressure (systolic & diastolic) Heart Rate. There was statistically significant difference in systolic Blood pressure ( $p < 0.01$ ), diastolic Blood pressure ( $p = 0.05$ ) and Heart rate ( $p < 0.05$ ) significant reduction in post session (Jacobson's progressive muscular relaxation). The current results indicate that a cost-effective, group program in a "real-world" setting can result in clinically significant benefits for patients with Hypertension. 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.

**Keywords:** Hypertension, Relaxation, Blood pressure and Heart rate.

**INTRODUCTION:**

Hypertension is ranked as fourth top most disease on the basis of its prevalence [1]. 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 [2]. probably; hypertension is a major health problem and biggest of the challenges of the 21st century. It affects approximately one billion individuals worldwide [3]. In India, the prevalence of hypertension in adult population varies from 3 to 10% and the average figure is 4.8%. The population at risk above the age of 20 years is 330 million as per 1981 population figures[4]. High blood pressure is major risk factor for causing cardiac, cerebral and renal disease. Hypertension experts still debate the level of blood pressure considered abnormal. A great deal of effort has been devoted to search for a dividing line between normal tension and hypertension. Systolic blood pressure above 140 mm Hg and or diastolic blood pressure above 90 mmHg are the currently accepted dividing line based on epidemiological and interventional studies. From 1983 onwards, World Health Organization recommended the

use of non-pharmacological approaches in the treatment of hypertension [5,6]. Various Non-pharmacological measures for hypertension includes; life style modification, weight reduction, regular physical exercises, cessation of smoking, tobacco use cessation, increase in intake of fruits & vegetable, reduction in alcohol, sodium intake and potassium supplementation. Beneficial effects of Jacobson's progressive relaxation technique have been reported by various authors [7, 8]. However, there is hardly any study that has investigated the immediate effectiveness of this technique since it is believed that the information about immediate effectiveness may increase the hypertensive individuals' adherence to this technique and may serve as a non-pharmacological option for immediate control of hypertension [8,9].

There are several types of relaxation therapies such as stretch release relaxation (SRR), Jacobson's progressive muscle relaxation (JPMR), cognitive imagery relaxation (COG), and some types of meditations. Here, the JPMR technique is used because of its better reported results, its simplicity in

performance and easy independent practice at home. The deep relaxation technique produces an immediate reduction in state of anxiety [10]. The possible relationship between the findings on anxiety and those on sustained attention. Previous work has also observed improvements in sustained attention as a result in anxiety reduction, resulting in decreased distraction. Significant anxiety reduction was great and anxiety reduction is responsible for some of the improvement on the attention. The results of the three measures reported in present study show that anxiety reduction may have an effect on blood pressure [11,12].

The main idea of initiating the relaxation response in this way is to take control of the voluntary muscles through creation of tension in them, followed by forcing them into a state of relaxation. When the body is aware of the presence of the tension, it will respond by triggering the muscles to relax, where the rest of the other components of the relaxation response will naturally follow [11,13]. In addition to the findings, this study demonstrates a number of possibilities for the implementation of complementary therapies in an evidence-based medicine environment. The existing evidence can be validated in practice in the form of small-scale studies in the context of implementation

Relaxation is highly beneficial if practiced routinely in one's everyday life [11, 14, 15]. Techniques involving relaxation are widely used by people to reduce anxiety and cope with stress-related problems. There are countless methods used to achieve relaxation, but the procedures that are most commonly practiced in the clinical setting are Jacobson's (1938) Progressive Muscular Relaxation, Schultz and Luthe's (1969) Autogenic Training, and Benson's (1975) Relaxation Response (Weiten & Lloyd, 1998). In the last few decades, a substantial amount of data has been collected on many factors relating to relaxation such as specific effects of different methods of relaxation; individual differences in response to treatment; variables that increase adherence to treatment and relaxation therapy effects on specific health problems [16,17]. "Silent water, It is said that they are deep and dangerous", "A volcano is also quiet till interrupts with devastating results". 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. Unlike volcano, which cannot be predicted, high blood pressure can be detected in the silent phase and if treated adequately the hypertension volcano can be prevented from eruption.

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rest of the other components of the relaxation response will naturally follows.[11,18] The relaxation technique is one of the most powerful tools in controlling a number of diseases caused by tension such as hypertension and insomnia [11]. It is also very helpful for calming down the mind leading to meditation. Both guided relaxation and supine rest reduce physiological arousal, though the first produces changes in a larger number of autonomic measures [10, 19].

The goal in treating high blood pressure by simple method that is relaxation is to reduce the risk of serious complications, including heart disease and stroke, by getting blood pressure under control, ideally which means reducing blood pressure upto 120/80 mm Hg. However, even a partial lowering of blood pressure may bring major benefits. There is a need of medication prescriptions to treat hypertension, but changes in lifestyle including diet, exercise, and relaxation are also needed [11,12, 20] for control of hypertension.

## MATERIALS AND METHOD

### Study design

The study was designed as an experimental study.

### Study period

September 2011 to December 2011.

### Study settings

Various colleges in the vicinity of the place of study and department of physiotherapy, Pravara institute of medical sciences, Loni, Tal. Rahata, Ahmednagar, state Maharashtra, India.

### Population for study

A total of one hundred and five subjects with primary hypertension without any known associated major health problem and who were working as teachers in various colleges in the vicinity of the place of study.

### Study tool

A structured interview schedule was prepared comprising of clinical examination and health check-up, and routine systematic technique developed by Dr. Edmund Jacobson (1938), used for achieving a deep state of relaxation. That is Jacobson's Progressive muscular relaxation (JPMR).

### Inclusion criteria

1. Having blood pressure above 140 / 90 mm of Hg.
2. Able to follow instructions.
3. Above 25- 55 years of age.

### Exclusion criteria

Subjects who are;

1. Not able to perform relaxation exercise.
2. Psychologically unstable.
3. Subjects who were not regular in taking medications and who reported about aggravation of any symptom due to exercise
4. Subjects who are having any systemic illness.

## Procedure

Jacobson's progressive muscle relaxation technique: in this study, it refers to a 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.

The study received approval from Ethical Committee of Pravara Institute of Medical Sciences, Loni. Participants were screened based on the inclusion and exclusion criteria and those willing to participate were briefed about the nature of the study and intervention in the language best understood by them and written informed consent was obtained. They were encouraged to clarify questions regarding the study, if any. Each subject underwent a standardized history and physical examination. As well as the data was collected for the baseline blood pressure and heart rate. Systematic technique developed by Dr. Edmund Jacobson (1938), used for achieving a deep state of relaxation. All subjects received supervised Jacobson's relaxation (JPMR). The investigator demonstrated technique (Jacobson's Progressive muscular relaxation), to contract and relax various groups of muscles, to coordinate contractions and relaxations with deep breaths and to perform the entire procedure with eyes closed in supine lying down position. After the trial session every subject performed this supervised Jacobson's progressive muscular relaxation for 30 min. After 30 min of training, Outcome measures were reassessed immediately after the JPMR that is Blood Pressure and Heart Rate in sitting position. The data, thus obtained were considered for statistical analysis.

## Validity of study

A consecutive sample of 118 subjects attending a Physiotherapy department outpatient clinic were recruited into this study, of whom 57 were diagnosed as having High blood pressure. Evaluation done as above mentioned and, after a five-minute rest, using a sophisticated blood pressure apparatus previously tested for reproducibility and reliability ( Digital B.P. apparatus Omron- CE-0197). This sphygmomanometer recorded the Blood pressure. The same patient position (see above) was used for each subject.

## Inter-examiner Reliability Study

Ten subjects were independently assessed by two examiners at the same visit. All the subjects were with high blood pressure, mean age 46.7 years (range 25 to 55), Each subject was tested for Blood pressure and

heart rate. The order of examination between physiotherapists was randomised in order to eliminate systematic bias. Inter-examiner reliability over the two assessments was determined using correlation and graphical techniques. Each examiner recorded the values of the assessment independently without knowledge of the other's result.

## RESULTS

Statistical analysis was done by using Statistical Package of Social Sciences (SPSS) 13.0 using various statistical measures such as mean, standard deviation (SD) and tests of significance such as unpaired 't' test. The results were concluded to be statistically significant with  $p < 0.05$  and highly significant with  $p < 0.01$ . Unpaired 't' test was used to compare differences between the Pre and post session of relaxation.

In table 1, the score showed statistically significant difference in pre and post measurement in systolic and Diastolic blood pressure. There was statistically significant difference in the systolic ( $t = 2.163$ ,  $P < 0.05$ ) and Diastolic blood pressure ( $t = 2.144$ ,  $P < 0.05$ ) for male. And for female systolic ( $t = 2.449$ ,  $P < 0.05$ ) and Diastolic blood pressure ( $t = 2.207$ ,  $P < 0.05$ ).

Table 2 shows age wise distribution of male and females. There is statistically significant difference in pre and post measurements of systolic and diastolic blood pressure. There was statistically significant difference in the first group that is 25 to 35 age systolic ( $t = 2.741$ ,  $P < 0.05$ ) and Diastolic blood pressure is ( $t = 2.258$ ,  $p < 0.05$ ). In the age group 35 to 45 systolic ( $t = 2.250$ ,  $P < 0.05$ ) and diastolic ( $t = 2.711$ ,  $P < 0.05$ ) and in last age group 45 to 55 age, systolic blood pressure ( $t = 2.305$ ,  $P < 0.05$ ), and diastolic ( $t = 2.105$ ,  $p < 0.05$ ).

In table 3, the score showed statistically significant difference in pre and post measurement in heart rate. There was statistically significant difference in the mean and SD of heart rate. For male ( $t = 2.819$ ,  $P < 0.01$ ) and for female ( $t = 3.806$ ,  $P < 0.01$ ).

Table 4 shows age wise distribution of male and females. There is statistically significant difference in pre and post measurements of heart rate. There was statistically significant difference in the mean and SD of all the age groups. There is significant difference in age group 25 to 35 ( $t = 2.626$ ,  $P < 0.05$ ), age group 35 to 45 ( $t = 2.741$ ,  $P < 0.05$ ), age group 45 to 55 ( $t = 2.449$ ,  $P < 0.05$ ).

**Table\_1: Representing sex wise mean and standard deviation of systolic & diastolic BP**

	Male		Female	
	Systolic	Diastolic	Systolic	Diastolic
<b>Pre Mean<math>\pm</math> SD</b>	144.4 $\pm$ 2.06	91.6 $\pm$ 2.27	143 $\pm$ 3.16	89.4 $\pm$ 2.31
<b>Post Mean<math>\pm</math> SD</b>	141.8 $\pm$ 3.19	88.4 $\pm$ 2.31	139.4 $\pm$ 3.40	86.6 $\pm$ 3.27
<b>'t' Value</b>	2.163	2.144	2.449	2.207

**Table:2 Representing Age wise distribution of mean and standard deviation of systolic & diastolic BP**

	25-35 years		35-45 years		45-55 years	
	Systolic	Diastolic	Systolic	Diastolic	Systolic	Diastolic
<b>Pre Mean <math>\pm</math> SD</b>	124.8 $\pm$ 1.93	78.4 $\pm$ 2.63	130 $\pm$ 2.10	87.2 $\pm$ 2.15	142.8 $\pm$ 1.90	94.2 $\pm$ 1.75
<b>Post Mean <math>\pm</math> SD</b>	122.6 $\pm$ 1.64	75.4 $\pm$ 3.27	127.6 $\pm$ 2.63	84.4 $\pm$ 2.45	140 $\pm$ 2.31	92.6 $\pm$ 1.64
<b>'t' Value</b>	2.741	2.258	2.250	2.711	2.305	2.105

**Table 3: Representing mean and standard deviation of Heart rate (Pre and post Intervention)**

	Male	Female
<b>Pre</b>	85.6 $\pm$ 2.17	87.4 $\pm$ 3.14
<b>Post</b>	81.3 $\pm$ 3.12	84.5 $\pm$ 2.49
<b>'t' Value</b>	2.819	3.806

**Table 4: Representing Age wise distribution of mean and standard deviation of Heart rate (Pre and Post Intervention)**

	25 – 35	35 – 45	45 - 55
<b>Pre</b>	85.2 $\pm$ 2.19	87.9 $\pm$ 3.14	88.6 $\pm$ 3.17
<b>Post</b>	81.9 $\pm$ 2.31	84.6 $\pm$ 2.39	84.5 $\pm$ 2.91
<b>'t' Value</b>	2.626	2.741	2.449

## DISCUSSION

This study shows that Jacobson's progressive muscular relaxation techniques helps in better control of blood pressure in hypertensive patients, regardless of their initial level of hypertension. New research shows that the simple act of becoming relaxed can have surprising health benefits. In addition to the obvious psychological effects of relieving stress and mental tension, the new findings indicate that the deep relaxation, if practiced regularly, can strengthen the

immune system and produce a host of other medically valuable physiological changes [5, 13, 20].

The greatest reduction was found in blood pressure and heart rate. The present findings are consistent with the cross cultural studies conducted on USA & USSR populations. The research process can be used as a structured form of monitoring the effects of complementary practice. These observations encourage the belief that such small-scale studies can be replicated

or maintained on a long-term basis as a part of everyday practice [17, 20]. The data thus obtained are amenable to meta-analysis at a later date, and as such make it more likely that complementary therapies are included in the systematic reviews.

## CONCLUSION

The current results indicate that a cost-effective, group program in a “real-world” setting can result in clinically significant benefits for patients with hypertension. Present study has shown JPMR training to result in significant decrease in blood pressure and decrease in respiratory rate. Technique is simple and easy to use. This can be well adopted by people who face stressful work conditions. The limitation of this study includes its relatively short duration and lack of follow up to assess the long term effects of these techniques. This technique can be combined with medications and other therapeutic interventions for treating other clinical conditions also. Jacobson’s progressive muscle relaxation may be used as an adjunct to conventional physiotherapy in hypertension.

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**Ethical approval:** Ethical Committee of Pravara Institute of Medical Sciences, Loni, Maharashtra state, India. (PMT/PIMS/RC/2012/06).

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