

# EFFECTIVENESS OF PROGRESSIVE RESISTED EXERCISE VS AEROBIC EXERCISE IN BORDERLINE HYPERTENSION OF YOUNG ADULTS

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## ABSTRACT

**BACKGROUND:** Hypertension seems to be an alarming risk factor for majority of the diseases. Many people lack in maintaining a good life style in their day today life. As a result people tend to get diseases in the early stages of their life;this study is probing in to such kind of condition where young adults have been diagnosed to have borderline hypertension.The study aims to predict an effective therapy in resolving the borderline hypertension among young adults.

**AIM:** This study aims to explore the effectiveness of progressive resisted exercise vs aerobic exercise in reducing borderline hypertension in young adults

**METHODS:** An Experimental study was carried out with 30 participants. On the basis of inclusion and exclusion criteria, all of these participants were categorized into Group A and Group B. Group A received progressive resisted exercise and the Group B received aerobic exercise. Mean arterial pressure was recorded pre and post to the intervention as an outcome measure.

**RESULT:** Between the group analysis showed, Post test progressive resisted exercise mean value as 96.2413, standard deviation of 2.8573, T value 5.5726 , where the p value <.0001. It shows significant difference in Progressive resisted exercises group.

**CONCLUSION:** It is concluded that, there is effectiveness of progressive resisted exercise in reducing borderline hypertension in young adults.

**KEYWORDS:** Borderline Hypertension, Young adults, Progressive resisted exercise, aerobic exercise, Mean arterial pressure

## I. INTRODUCTION

Hypertension is one of the important risk factor for Coronary artery disease; cerebral vascular disease, peripheral vascular disease, and congestive heart failure are also significant risk factors.<sup>1</sup>

Hypertension usually develops in early adulthood, affecting 5% to 10% of adults between the ages of 20 and 30. Hypertension is more common as people become older, with 20 percent to 25 percent of middle-aged adults having it and 50 percent to 60 percent of adults over 65 having it. Men are more likely than females to develop hypertension.<sup>1,2</sup>

The likelihood of developing hypertension is influenced by a number of risk factors. Genetic, physiological, and behavioral causes are among them Obesity, insulin resistance, and glucose sensitivity are three metabolic risk factors. This widespread health conditions lead to abnormal artery thickness and peripheral resistance, resulting in a rise in blood pressure.<sup>3</sup>

Borderline hypertension is described as blood pressure readings ranges from 120 to 139 mm Hg for the systolic pressure and 80 to 89 mm Hg for the diastolic pressure. Hypertension is characterized as a blood pressure reading of 140/90 mm Hg or higher. The condition in India is much more concerning. Cardiovascular disorders were responsible for 2.3 million deaths in India, out of a total of 9.4 million deaths (25 percent). Coronary heart attacks killed 1.2 million people and stroke killed 0.5 million.<sup>4,5</sup> Basic hypertension pathogenesis is multifactorial and extremely complex<sup>5</sup>. Blood pressure (BP) is modulated by a number of variables, including humoral mediators, vascular reactivity, flowing blood flow, vascular caliber, blood viscosity, cardiac function, blood vessel elasticity, and neuronal activation, to ensure sufficient tissue perfusion. Researchers analyzed current Framingham Study results and discovered that a borderline hypertensive person is more than three times more likely to have a heart attack and 1.7 times more likely to have heart disease than a typical blood pressure person.<sup>6-10</sup>

Adopting a healthier lifestyle is important aspect for preventing elevated blood pressure and it is an essential component of hypertension therapy. Progressive resisted workouts have traditionally been used by active young adults to increase physical performance; however, new reviews have highlighted the possible health advantages of incorporating progressive resisted exercise as part of the routine.<sup>11</sup> Apart from the above mentioned exercise, there are few other studies that support hypertensive patients to do aerobic exercise daily, such as walking, jogging or swimming for 30 to 45 minutes daily.<sup>12</sup>

Hence the objective of the study is to compare and identify the effects of MacQueen's technique of progressive resisted exercises and Aerobic exercises in reducing of borderline blood pressure in young adults.

## II. MATERIALS AND METHODS

An experimental study design was framed and a total of 32 participants, who were willing to participate in the study, were recruited from Saveetha Medical College & Hospital, Chennai. On the basis of selection criteria, 2 participants were excluded and 30 participants were selected. The participants were informed about the intent of the study and therapeutic procedures were explained to the patients and received informed consent from them. The study was approved by institutional review board.

Young adults with borderline hypertension were identified including both genders, aged from 18 to 25 years were included. Participants with recent surgery, cardio vascular diseases, renal diseases, Hypertensive medication were excluded from the study. Participants were randomly allotted using lottery method into experimental and control group with 15 participants in each group. Group A received Mac Queen's technique of progressive resisted exercises. Group B received Aerobic exercises.

## III. PROCEDURE

Macqueen's technique of progressive resisted exercises Group A. The participants in this group did exercise with weighted cuffs. Each set consists of ten repetitions and totally each exercise should be repeated 4 times. Every set was separated by a 60-second rest time. The subject begins with max weight and continues through all the sets with the same amount of weight, the weight is increased after 3 sessions (after one week). Following exercises were performed front raises, reverse flies, bicep curls, overhead triceps extensions, quadriceps, hamstring and calf strengthening exercises. All these exercises were done for a period of 6 weeks.

Group B participants were asked to do cycling as an aerobic exercise for 30 minutes daily for a period of 6 weeks. Mean arterial Blood pressure was used as an outcome measurement. It was recorded on the first day of the therapy (1<sup>st</sup> week) and last day of the therapy (6<sup>th</sup> week).

## IV. RESULT

Table 1 shows the pre test for progressive resisted exercise (MABP) with a mean value of 98.9307 and standard deviation of 3.7915, t value of 0.272, p Value 0.7692. Pre test mean value of aerobic exercise 98.578, standard deviation value as 3.2927, post test progressive resisted exercise mean value as 96.2413, standard deviation of 2.8573, T value 5.5726, where the p value <.0001. Post test aerobic exercise mean value of 93.8 and standard deviation of 5.7178.

Table 2 shows within the group analysis of MABP. Progressive resisted exercise pretest mean value is 98.9307, standard deviation 3.7915. Post test mean value 96.2413, standard deviation of 2.8573, t value of 6.8819, p value <.0001. Aerobic exercise pre test mean value as 98.578, standard deviation of 3.2927. Post test mean value as 93.8. Standard deviation of 5.7178, where the t value is 3.6311 and p value showed <.0001.

## V. DISCUSSION

Hypertension is one of the major risk factors in many diseases. It is well known that it is associated with ageing process. But it is astonishing, that juvenile hypertension and hypertension at very young age is commonly seen now a days.<sup>12</sup> Researchers put forward that, inadequate blood pressure control has been linked to weight gain, physical inactivity, and a high salt consumption.<sup>13,14</sup> Few studies conclude that Physical exercise, staying away from drinking and cigarettes, consuming more fresh vegetables, and consuming less sweets, sugar, and fats all have a favorable effect on blood pressure regulation. Lifestyle influences a major role of supplementing pharmacotherapy in hypertension regulation.<sup>15</sup>

Our group has conducted research relevant to physiotherapeutic intervention on various neurological and musculoskeletal ailments<sup>16-21</sup>, and warrants further experimental research by our group in signifying the results. Researchers put forward that inadequate blood pressure control has been linked to weight gain, physical inactivity, and a high salt consumption. Hence this study had a prime objective to involve the young hypertensive subjects in to exercises regimen and improve their physical activity and to improve their quality of life by facilitating good nutritive diet, life style modifications and exercises either in the form of progressive resisted exercise or aerobic exercise. The future studies may be explored to give recreational sports as an effective regimen for this kind of population.

## VI. CONCLUSION

It is concluded that, there is effectiveness of progressive resisted exercise in reducing borderline hypertension in young adults.

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Table 1: Between group analysis of Mean Arterial Blood Pressure (MABP) for pre and posttest values of Experimental group and Control Group

Groups		Mean	Standard Deviation	t value	p value
Pre test	Progressive resisted exercises - MABP	98.9307	3.7915	0.272	0.7692
	Aerobic exercises - MABP	98.578	3.2927		
Post test	Progressive resisted exercises - MABP	96.2413	2.8573	5.5726	<.0001
	Aerobic exercises - MABP	93.8	5.7178		

Table 2: Within group analysis of Mean Arterial Blood Pressure (MABP) for Experimental group and Control Group

Groups		Mean	Standard Deviation	t value	p value
Progressive resisted exercises	Pretest - MABP	98.9307	3.7915	6.8819	<.0001
	Post test - MABP	96.2413	2.8573		
Aerobic exercises	Pretest - MABP	98.578	3.2927	3.6311	<.0001
	Post test - MABP	93.8	5.7178		