

Effect Of Relaxation Technique On Blood Pressure In Essential Hypertension.

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Abstracts: Background & objectives: For almost a century, there has been constant speculation on the relationship between life stress, the individual's response and the blood pressure changes. Various studies have shown that actual decline in blood pressure with non invasive behaviour therapy vary widely. We studied the effectiveness of progressive muscular relaxation technique in re-establishing normalcy in systolic and diastolic blood pressure in young hypertensive subjects in Baroda. Methods: 84 hypertensive individuals were randomly divided in group Ia and group Ib of which 24 subjects in group Ia and 26 subjects in group Ib completed the study. Group Ib subjects were instructed to practice relaxation technique as per pre-recorded cassette twice daily for three months. Age and sex matched 23 normotensive subjects served as controls (group II). Systolic and diastolic blood pressure was measured in sitting and lying down position before and after 3 months of practice. Results show a significantly higher systolic (143.1 vs 121 mmHg) and diastolic (92.13 vs 76.35 mmHg) blood pressure in hypertensive group compared to control in basal condition. After 3 months of relaxation practice systolic (137.87 vs 142.93 mmHg) blood pressure was significantly lower in experimental group Ib while diastolic blood pressure shows no significant change with relaxation practice. Compared to control the blood pressure was still higher in experimental group Ib after relaxation practice. Conclusion: The progressive muscle relaxation technique by decreasing sympathetic tone probably reduces systolic blood pressure. Thus it is found to be a valuable adjunct to the treatment of essential hypertension in young hypertensive. [Kathrotia R G et al NJIRM 2012; 3(4) : 10-14]

Key Words: essential hypertension, progressive muscular relaxation, systolic blood pressure.

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Introduction In modern life, many caught struggling to fulfil a number of complex demands in a limited time, giving rise to high degree of stress. For almost a century, there has been constant speculation on the relationship between life stress, the individual's response and the blood pressure changes. A gift of modern civilisation, essential hypertension has no specific cause but stress plays a possible role in its aetiology and aggravation. Essential hypertension is one of the conditions seen in almost each family worldwide and with increase of obesity it has covered all age groups¹.

Prolonged high blood pressure can lead to long term permanent physical damage such as hardening of arteries (atherosclerosis), heart kidney or liver damage. With availability of wide array of pharmacological treatment, management of essential hypertension continues to pose a difficult problem for the physicians. There are patients who do not respond to pharmacological treatment, or face intolerable side effects or who adhere poorly to drug regime². These have lead to

search of non- pharmacological methods to reduce blood pressure such as progressive muscular relaxation which reduces sympathetic nervous system activity mediated through hypothalamus. Progressive muscular relaxation is non invasive behaviour therapy which has reported beneficial effects in reducing blood pressure in hypertensive patients^{2,3}.

Various studies have shown that actual decline in blood pressure with non invasive behaviour therapy vary widely. Consequently there is growing interest in determining the efficacy, applicability, patients' compliance and safety of technique for hypertension³⁻⁵.

Hence we studied the effectiveness of progressive muscular relaxation technique in re-establishing normalcy in systolic and diastolic blood pressure in young hypertensive subjects in Baroda.

Material and Methods: The study, approved by the institutional ethical committee, was conducted in the department of physiology, Medical College,

Baroda and SSG Hospital. Total of 102 subjects expressed interest in the pilot replication study. The subjects were selected considering following criteria:

- Cooperative and willing to take part in study.
- Age between 20 and 45 years
- Combined mean blood pressure level at 3 most recent visits of at least 140 mm Hg systolic and / or 90 mm Hg diastolic blood pressure.
- Subjects with or without antihypertensive medications
- Subjects with no clinical and laboratory evidence of chronic renal failure, diabetes mellitus, chronic liver disease and endocrine disorders.
- No history of smoking or alcohol consumption.
- Female subjects not taking oral contraceptives.

84 hypertensive individuals meeting the eligibility criteria were chosen. Of these 50 subjects completed the study. Mean age in experimental group was 38 years and 18 subjects were taking anti hypertensive medications. Age and sex matched 23 normotensive subjects who completed the study served as controls.

During the first visit the subjects were explained the purpose and importance of study. The aim of first visit was to establish a rapport with the subjects, to take consent for participation in study and to record the personal details. Systolic and diastolic blood pressure was recorded in the morning between 8 to 10 am to avoid diurnal variation and in basal condition.

Blood pressure was recorded over the left brachial artery, applying a cuff just above the cubital fossa, using a mercury sphygmomanometer kept at level of subjects' heart with supine and sitting position. Systolic blood pressure was recorded by palpatory method and then systolic and diastolic blood pressure was recorded by auscultatory method.

At the beginning, 84 subjects in experimental group were randomly divided in group Ia and group Ib of which 24 subjects in group Ia and 26 subjects in group Ib completed the study. Subjects in both groups were free to take antihypertensive medication or other diet and lifestyle measures as

directed by their physicians. However the medications were not changed by any of the subjects during study period. Group Ia consisted of subjects who were hypertensive and were not exposed to relaxation technique. 26 participants of group Ib made to practice relaxation technique twice a day by listening to audio cassette with pre-recorded instructions for relaxation in his/her local language with help of cassette player for three months at home.

The tape followed following format:

- Subjects were instructed to remain engaged in breathing process to elicit initial feeling of relaxation.
- Subjects were instructed to imagine relaxing image while concentrating on suggestions of relaxation.
- Subjects were given prompts to relax certain muscle groups.
- Subjects were instructed to visualise their relaxing image again until the relaxation exercise was completed.

After three months blood pressure was measured with same protocol as done pre training in hypertensive groups Ia and group Ib.

Statistical analysis was done by Microsoft excel 2007. Values are expressed as mean \pm SD. The comparison between hypertensive and normotensive and between two hypertension groups was done by student 't' test. Within hypertensive group comparison before and after relaxation training was done by paired t test. The P value of <0.05 was considered as statistical significant.

Result: Study included 23 control subjects (male/female=12/11) and 50 hypertensives (male /female = 32/18) who were grouped into group Ia- without relaxation training and group Ib- with relaxation training.

Table 1 shows the mean and SD values of age, height, weight and BMI of subjects of control and hypertensive groups without and with relaxation training. There is no much difference in age group but the mean age is slightly more in hypertensive

groups than control. Mean values for weight and BMI are higher in hypertensive subjects (with and without relaxation training) than control subjects.

TABLE 1. Age, Height, Weight and BMI(Body Mass Index) of subjects of control(Gr. II), Hypertensive without relaxation training (Gr. Ia) and Hypertensive with relaxation training (Gr. Ib). (values are mean±SD)

	Control (Gr. II) (n=23)	Hypertensive without relaxation (Gr.Ia) (n=24)	Hypertensive with relaxation (Gr.Ib) (n=26)
Age (Yr.)	31.2 ± 7.35	37.3± 7.7	37.67± 7.41
Height (Cm.)	159.65± 9.02	162.68± 9.87	160.7± 8.20
Weight (Kg.)	58.75± 8.52	67.25± 11.74	66.93± 10.81
BMI (Kg/m ²)	22.96± 1.72	25.29 ± 2.55	25.75± 2.52

*P< 0.05 compared to control group.

In table 2, mean values of systolic and diastolic pressures were slightly higher in sitting postures in all three groups. The values in both the postures for systolic as well as diastolic blood pressures were higher in hypertensive groups than controlled groups.

TABLE 2. Systolic and diastolic blood pressure in subjects of control, Hypertensive without relaxation, Hypertensive with relaxation groups. (values are mean±SD)

	Control (Gr. II)	Hypertensive without relaxation (Gr.Ia)	Hypertensive with relaxation (Gr.Ib)
SBPs	121.00± 10.25	143.3±8.71*	142.93±6.68*
SBPI	120.1 ± 10.17	142.1±8.32*	141.67±6.26*
DBPs	76.3± 5.04	91.00±4.61*	92.13±4.03*
DBPI	75.9± 5.29	90.9±4.61 *	91.67±3.72*

*P< 0.05 compared to control group.

SBPs = Systolic blood pressure in sitting posture, SBPI = Systolic blood pressure in lying down posture, DBPs = Diastolic blood pressure in sitting posture, DBPI = Diastolic blood pressure in lying down posture.

TABLE 3. Comparison of Post-relaxation (follow up after three months) systolic and diastolic blood pressures of Hypertensive subjects without and with relaxation. (values are mean±SD)

	Hypertensive without relaxation (Gr.Ia)	Hypertensive with relaxation (Gr.Ib)
SBPs	142.30 ± 7.55	137.87 ± 5.04*
SBPI	141.70 ± 7.46	137.20 ± 5.35*
DBPs	90.70 ± 3.85	89.60 ± 3.54
DBPI	90.50 ± 3.78	89.73 ± 3.59

*P< 0.05 compared to Ia group.

The table 3 above shows that there was significant difference of values of systolic blood pressure (in both the postures) of hypertensive subjects without and with relaxation when compared after three months of practice of relaxation techniques. There was no significant difference in the values for diastolic blood pressure. Also the blood pressure was significantly higher in relaxation group Ib compared to control even after training.

Discussion: The body has limitations but the mind does not. A large number of positive psychosomatic responses can be achieved by training the mind through various techniques. One such technique – ‘the progressive muscle relaxation’ was employed in the present study on essential hypertension⁵.

The hypertensive group had significantly higher BMI and weight compared to control normotensive group. As named the hypertensive group has significantly higher systolic and diastolic blood pressure in basal condition. The role of cortico- limbic- hypothalamo- pituitary pathway is active in hypertensives leading to activation of symapathetic nervous system and raised blood pressure.

The overweight in hypertensive group is one of the contributor to the higher blood pressure. However our study was planned to study the effect of progressive muscular relaxation which is supposed to relieve stress. Our study of progressive muscular relaxation and imagery in essential hypertension patients showed a significant decline in systolic blood pressure after 3 months of regular practice. These finding were in accordance with Goldstein et al and Pender^{6,7}. We found about 5 mm Hg decline in systolic blood pressure only after 3 months of training which was similar to Goldstein however Dickinson found systolic blood pressure decline of 5.5 mmHg and a decrease of diastolic blood pressure of 3.5 mm Hg^{5,6}. Shue also found a decline of 5.1mmHg systolic blood pressure and 3.1 mmHg diastolic blood pressure after 4 weeks of progressive muscular relaxation therapy⁵.

The possible mechanism underlying this observation could be that relaxation reduces the arousability of cerebral cortex, thereby decreasing the impulse from various centres to the hypothalamus, decreasing the sympathetic tone and thus a decrease in blood pressure^{8,9}.

Goldstein has compared the effect of relaxation technique on blood pressure at home and laboratory found that home intervention was much more effective.

There was no difference in diastolic blood pressure between relaxation training and non training group in our study. Some of the studies have found a similar decline in systolic blood pressure of 5 mm Hg but no change in diastolic blood pressure⁶. Hermann in the review found a significant decline of 10mmHg systolic blood pressure and 5mm Hg decline of diastolic blood pressure in various studies involving progressive muscular relaxation and biofeedback techniques¹⁰. This could be because of combination of therapies used in this studies whereas we used only one method.

However we found that both systolic and diastolic blood pressure, in experimental group Ib which underwent relaxation training, was still significantly higher compared to control subjects.

Thus the relaxation technique is an excellent method of reducing blood pressure but did not return blood pressure to normal levels. This supports the suggestion from other researchers like Wadden et al and Irvine et al that the progressive muscle relaxation technique can be considered as a adjuvant therapy rather than exclusive^{11,12}.

Conclusion: The progressive muscle relaxation technique, in causing a relaxation response, is found to be a valuable adjunct to the treatment of essential hypertension in young hypertensive. The greatest advantage of relaxation technique is that it does not require complex and sophisticated equipments and there is no fear of side effects of the drugs and is relatively cheap.

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