

A STUDY TO COMPARE THE EFFECT OF LAUGHTER THERAPY VERSUS AEROBIC EXERCISE ON BLOOD PRESSURE IN PRE-HYPERTENSIVE SUBJECTS- A COMPARATIVE STUDY

Physiotherapy

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ABSTRACT

INTRODUCTION: Laughter therapy and Aerobic exercise showed the effect on blood pressure. None of the study has been done which compare laughter therapy and Aerobic exercise in Prehypertension.

AIM: compare the effect of Laughter therapy versus Aerobic exercise on blood pressure and Subjective well being in Pre-hypertension.

PROCEDURE: The duration of treatment for each participants was 6 weeks. There were 12 participants in Group A-Laughter therapy and 13 participants in Group B- Aerobic exercise. Blood pressure was measured and WHO-5 well being index scale was filled before and after training intervention in both groups.

RESULT: Effect of Laughter therapy and Aerobic exercise on blood pressure and WHO 5 well being index score was statistically significant. But there was no statistical difference of effect of both intervention on blood pressure and WHO 5 well being index score between both groups.

CONCLUSION: Both intervention are equally effective to reduce blood pressure and improve subjective well being.

KEYWORDS

Laughter Therapy, Aerobic Exercise, Prehypertension, Blood Pressure, Subjective Well-being

INTRODUCTION :

Blood pressure is defined as the lateral pressure exerted by column of blood on wall of arteries. Generally, the term 'blood pressure' refers to arterial blood pressure.^[1]

According to **ACSM guideline and JNC 7th report** Prehypertension is categorized as blood pressure between 120–139/80–89 mm Hg—is a major public health concern.^[2,3]

Laughter Yoga is a method in which there is a combination of unconditional laughter with Yoga breathing exercise (Pranayama). As a matter of fact, laughter is first artificial, but it is quickly changed to natural laughter and increases the oxygen saturation of brain and body. Enhanced feeling of security and self-belief, positive energy, and distraction from negative thoughts are among the positive treatment effects of Laughter Yoga. It is a combination of stimulated laughter with Yoga breathing exercises that is typically conducted in a group setting. It includes clapping, arm and leg movement, deep breathing exercises, gentle neck and shoulder stretches as well as facilitated laugh and smile exercises.^[4,5]

American college of sports medicine (ACSM) recommends dynamic aerobic endurance training for at least 30 minutes daily to reduce blood pressure.^[6] Aerobic exercise helps to reduce blood pressure.^[8]

Laughter can be useful for subjects who can not do aerobic exercise due to any orthopedic or neurologic condition that hamper the use of limbs (i.e. fracture in upper /lower limb, nerve injury). None of the study has been done which compare laughter therapy and Aerobic exercise.

MATERIALS AND METHODOLOGY:

Study design:

This is Single blinded, Randomized control, Comparative Study. 28 participants were selected from different area of Ahmedabad. Study was done in Physiotherapy department of general hospital. Duration of intervention : 5 days/week for 6 weeks.

Randomization and sampling:

Participants were allocated randomly by lottery method of Simple Random Sampling into two groups. Sample size: calculated using following formula^[8] : $N = 2 \left(\frac{\sigma}{\Delta} \right)^2 \left(Z_{\alpha} + Z_{\beta} \right)^2$. Power of the study was kept at 80% with 5% level of significance. 28 participants were included in the study. 25 completed the study, 2 participants in Laughter therapy group and 1 participants in Aerobic exercise did not complete the study. So, there were 3 dropouts. So, there were 12 participants in Group A (Laughter therapy) and 13 participants in Group B (Aerobic exercise).

INCLUSION CRITERIA

- Subjects with Pre-hypertension
- Subjects willing to participate
- Age: 18 to 50 years
- Gender: both male and female

EXCLUSION CRITERIA

- Subjects any musculoskeletal, cardiovascular or neurological disorders
- Subjects with Hypertension stage 1 and stage 2

MATERIALS USED IN STUDY

- Stethoscope
- Treadmill
- Proforma and Consent form
- Chair
- WHO-5 well being index^[9,10] [Content validity-0.77, Construct validity – higher, Criterion related validity- good][Reliability - 0.89]
- Stadiometer
- Weighing machine
- Pulse Oximeter
- Mercury Sphygmomanometer

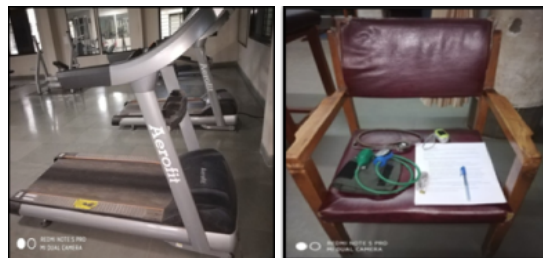


Figure 1: Materials used in study

OUTCOME MEASURES :

1. Blood pressure:^[11]

- Blood pressure was measured by Mercury Sphygmomanometer in 2 visits.
- Participants seated in chair with back support quietly 5 minutes before measuring blood pressure. Blood pressure was measured in morning in each participants. The average value of blood pressure of two visits were used as a baseline value for each participants.
- Systolic Blood pressure is a point at which the first korotkoff sounds is heard (phase 1). Diastolic blood pressure is a point at

which last korotkoff sound heard or before korotkoff sounds disappear(phase 5).

2. WHO-5 well being index:^[9]

- The 5-item World Health Organization Well-Being Index(WHO-5) is a short and generic global rating scale measuring subjective well-being. WHO-5 only contains positively phrased items.
- The WHO-5 items are: (1) 'I have felt cheerful and in good spirits', (2) 'I have felt calm and relaxed', (3) 'I have felt active and vigorous', (4) 'I woke up feeling fresh and rested' and (5) 'My daily life has been filled with things that interest me'.
- The respondent is asked to rate how well each of the 5 statements applies to him or her when considering the last 14 days. Each of the 5 items is scored from 5 (all of the time) to 0 (none of the time). The raw score therefore ranges from 0 (absence of well-being) to 25(maximal well-being).Then score is translated to a percentage scale from 0 (absent) to 100 (maximal), it is recommended to multiply the raw score by 4.

LAUGHTER THERAPY INTERVENTION:^[12]

- Laughter therapy intervention can be divided mainly into two parts: deep breathing exercises and laughter yoga.

WARM UP EXERCISES^[13]

- Deep breathing exercise
- General body mobility exercise all joints
- Hands are raised with sounds – 'HO,HO,HA,HA' given out.

LAUGHTER EXERCISE:

3 Basic laughter exercise:

- Attahasya- laugh freely and loudly with open mouth
- Maun Hasya- laugh without any sound with closed mouth.
- Ashwa Hasya- Laugh with loud outburst of laughter through throat like neighing of horse
- Other laughter exercise:
- Milkshake laughter , Namaste laughter , Silent laughter Clock watching laughter and etc.

COOL DOWN/ LAUGHTER MEDITATION:

- Deep breathing exercise
- Affirmation (I am happy, I am healthy ,Be whole world is happy and healthy)
- Laughter goodbye

AEROBIC EXERCISE INTERVENTION:^[14]

WARM PERIOD:

- Duration 5 minutes
- General mobility exercise of all joints of body and slow paced walking on treadmill to reach exercise heart rate.

AEROBIC PERIOD: Aerobic exercise done with FITT protocol.

- Frequency: 5 day/week
- Intensity: Moderate intensity aerobic exercise with 40-60% of Heart Rate Reserve[HRR] Exercise Heart rate = HRrest + 40-60% (HRmax-HRrest) HRmax = 220 – Age
- Type: Treadmill walking
- Time: Each session lasted for 30 minutes including 5 minute warm up, 20 minutes continuous treadmill training and 5 minutes of cool down.

COOL DOWN:

- Duration 5 minutes
- Slow paced treadmill walking and general stretching exercise of body.

Warm up and cool down comprised of active movements of limbs, low intensity treadmill training on self pace and rhythmic stretching.



Figure 2 : Laughter therapy



Figure 3: Aerobic exercise

RESULTS:

Data was analyzed by using Microsoft excel 2007. Since the data did not follow the normal distribution, a Non-parametric test was used to analyze the data. The confidence interval 95 %, 80 % power of the study.

Baseline data was calculated by using Mann-Whitney U test. Except height, all other baseline characteristics are under normal distribution. This suggests that except height, 2 groups were at same baseline characteristics.

Table 1: Baseline characteristics

Baseline characteristics	P value
Age	0.503
Height	0.034
Weight	0.077
BMI	0.109
SBP	0.207
DBP	0.406

Within group analysis was done by using Wilcoxon signed rank test. There was statistical significant difference($p < 0.05$) between pre and post SBP, DBP and Who 5 score of both groups. Table 2 showed within group analysis.

Table 2 : Within group analysis

OUTCOME MEASURE	PRE Means± SD	POST Means± SD	P VALUE
SBP(mm Hg)	129.16±5.21	123.83± 3.46	0.003
	132±4.54	125.53±4.09	0.002
DBP(mm Hg)	85.5±2.27	82.3±2.05	0.002
	87.23± 1.33	83.23±1.80	0.001
WHO 5 WELL BEING SCORE	72.67±13.49	81±8.88	0.002
	69.85±13.45	87.54±9.02	0.001

Between group analysis for SBP, DBP and WHO 5 well being score were done by using Mann whitney U test. There was no statistical difference($p > 0.05$) between both groups for SBP, DBP and WHO 5 score. Table 3 showed between group analysis.

Table 3 : Between group analysis

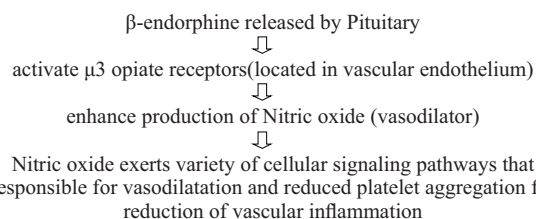
OUTCOME MEASUSRE	GROUP A (Laughter therapy)	GROUP B (Aerobic exercise)	P VALUE
SBP(mm Hg)	4.33±2.05	6.46±3.17	0.06
DBP(mm Hg)	3.16±1.02	4.15± 1.72	0.187
WHO 5 WELL BEING SCORE	18.33±15.11	17.38±13.98	0.936

DISCUSSION:

The study was conducted to determine the comparative effectiveness of 6 weeks programme of Laughter therapy(Group A) and Aerobic exercise(Group B) on SBP,DBP and WHO 5 well being index score in Pre-hypertensive participants. SBP , DBP decreased and WHO 5 well being score post training as compared to pre training in both groups which was statistically significant($p < 0.05$). There was no significant difference when between group analysis was done in SBP,DBP and WHO 5 well being scale ($p > 0.05$) in Laughter therapy group as compared to Aerobic exercise group.

Result of present study indicate that Laughter therapy and Aerobic exercise both helps to reduce blood pressure and improve subjective well being. Both are equally effective in reducing blood pressure and improving well being index.

Improvement in blood pressure by laughter therapy may be due to following mechanism:^[14]





By vasodilatation and reduced inflammation helps to reduce blood pressure.

Mechanism of laughter to improve subjective well being as followed: Laughter therapy reduces serum cortisol level(stress hormone) and increases serotonin and dopamine levels(happy hormone), thereby reduces stress, depression, anxiety and increase in subjective well being of person.^[15]

It is proved that aerobic exercise reduces blood pressure, so in present study also aerobic exercise showed reduction in blood pressure. Reduction in blood pressure following exercise mediated by:^[16] reduction in total peripheral resistance, reduction in sympathetic activity, reduction in plasma levels of norepinephrine and reduction in cardiac output.

Mechanism of Aerobic exercise to reduce stress, anxiety and improve subjective well being is hypothesized as follow:

Exercise produces changes in concentration of certain biological molecules such as Adreno-corticotrophic hormone, cortisol, opiod (β endorphin) , cytokines which helps to reduce stress causing hormone(cortisol) and increase subjective well being by enhancing mood.^[17]

Although laughter therapy helps to reduce blood pressure and reduce stress and increase well being , further study done by **Mahvash Shahidi at el** to compare laughter yoga versus groups exercise to see effect on depression and life satisfaction .They took aerobic exercise including walking and general mobility exercise as group exercise. After completion of intervention, they found significant reduction in depression in both group but no significant difference between group analysis. They concluded that laughter yoga is as effective as group exercise to reduce depression and life satisfaction.^[18]

CONCLUSION:

Results showed significant improvement in laughter therapy and aerobic exercise groups. But there was no statistical difference between effects of Laughter therapy and Aerobic exercise on SBP,DBP and WHO 5 well being index score.

We conclude that laughter therapy and aerobic exercise are equally effective.

CLINICAL IMPLICATION:

Laughter therapy can be used for participants who have any neurological or orthopaedic condition which hamper his ability to do aerobic exercise.

FUTURE RECOMMENDATION:

- It is recommended to see the effect of laughter therapy and aerobic exercise versus only aerobic exercise on blood pressure and other parameters.
- Effect of laughter therapy on blood pressure in hypertension.

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