



# “EFFECT OF DEEP BREATHING EXERCISE ON CARDIORESPIRATORY FUNCTIONS IN PREHYPERTENSIVE YOUNG ADULTS: A PILOT STUDY”

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## ABSTRACT

**INTRODUCTION:** Prehypertension is viewed as one of the most widely recognized conditions that are influencing individuals everywhere throughout the world. Prehypertension is for the most part connected with a few different difficulties including hypertension. As per the Seventh Report Joint National Committee (JNC-7) arrangement, the circulatory strain among typical and hypertension for example SBP 120-139 mmHg or DBP 80-89 mmHg is considered as Prehypertension. Deep breathing activity increase blood and oxygen stream to the cerebrum to work ordinarily. Breathing is the main capacity of the body that is both wilful and uncontrollable. Breathing procedure can affect wellbeing emphatically. **METHODOLOGY:** The study sample consists of 15 subjects having a prehypertension with age between 18 to 35 years. The subjects who met the inclusion criteria were included in this study. Inform and written consent was taken from the subjects. BP, RR and PR also taken as an outcome measure. Deep breathing exercise, Duration: 10 min every day for 4 weeks. **RESULT:** Outcome measurement was measured using Blood pressure (BP), Pulse rate (PR) and Respiratory rate (RR). Significance was assessed at 5% level of significance  $p < 0.05$  (2 tailed hypothesis test considered). **CONCLUSION:** our study has shown that active regular deep breathing exercise 10 minutes daily has considerably reduced each the pulse, blood pressure from 4 weeks. Thus, deep breathing exercise is suitable as a primary preventive strategy to attain blood pressure management in prehypertensive subjects.

**KEY WORDS:** young adult, Prehypertension, Deep breathing Exercise.

## I. INTRODUCTION:

Prehypertension is viewed as one of the most widely recognized conditions that are influencing individuals everywhere throughout the world. Prehypertension is for the most part connected with a few different difficulties including hypertension. As per the Seventh Report Joint National Committee (JNC-7) arrangement, the circulatory strain among typical and hypertension for example SBP 120-139 mmHg or DBP 80-89 mmHg is considered as Prehypertension. <sup>(1)</sup>

Deep breathing activity increase blood and oxygen stream to the cerebrum to work ordinarily. Breathing is the main capacity of the body that is both wilful and uncontrollable. Breathing procedure can affect wellbeing emphatically. Breathing can be settled on in a deep way to forestall the evil impacts of shallow relaxing. Chest breathing needs effectiveness as the most measure of

blood flow happens in the lung's lower projections bringing about shallow breaths. Breathing from the midsection is a way to breathe deeply.

Blood pressure is the weight applied to the dividers of the supply routes. Circulatory strain is composed as two numbers, for example, 120/80 millimetre of mercury (mm Hg). Sound circulatory strain for a grown-up, loose very still, is viewed as a perusing under 120/80 mm Hg. A systolic bp of 120-139 mmHg or a diastolic bp of 80-89 mmHg is considered "**Prehypertension**" and ought to be firmly checked. Circulatory strain that remaining parts high for an all-inclusive timeframe can bring about such medical issues as atherosclerosis (solidifying of the supply routes), cardiovascular breakdown and stroke. Some factors that can influence a blood pressure reading include: Stress, Smoking, Cold temperature, Exercise, Full stomach, Full bladder, Caffeine, alcohol consumption, Certain medicines, Gaining or losing weight, Salt intake. <sup>(2)</sup>

Heartrates shift from individual to individual. Your heartrate is lower when you are very still and increments when you work out (on the grounds that more oxygen-rich blood is required by the body when you work out). A typical heartrate for a solid grown-up very still ranges from 60 to 80 pulse rate every moment. Ladies will in general have quicker heartrates than men. <sup>(3)</sup>

An individual's respiratory rate is the quantity of breaths you take every moment. The ordinary breath rate for a grown-up very still is 12 to 20 breaths for every moment. A breath rate under 12 or more than 25 breaths for each moment while resting is viewed as anomalous. Among the conditions that can change a typical respiratory rate are asthma, tension, pneumonia, congestive cardiovascular breakdown, lung infection, utilization of opiates or medication overdose.

The current examination was, in this way, undertaken to research the impact of exchange Deep breathing exercise on cardio respiratory functions in prehypertensive young adult.

The current study is focused on measuring the outcomes of respiratory rate, blood pressure and heart rate for prehypertension patients and check if there is any significant difference.

## **II. METHODOLOGY:**

### **A. SOURCE OF DATA:**

- Parul Institute of Physiotherapy

### **B. INCLUSION CRITERIA:**

- Both male and female between age 18 – 35 year.
- Participants who can understand English language.
- The mean of three readings, recorded 2 min apart, was taken. If these readings differed by more than 5 mm Hg, a further three readings were recorded at 2 min intervals, and the mean of all six readings taken.
- Pre-hypertensive participants
  - Systolic BP 120 – 139 mmHg
  - Diastolic BP 80 – 89 mmHg

### **C. EXCLUSION CRITERIA:**

- Those who have cardiopulmonary deficit chronic illness, chronic respiratory disease, chronic kidney disease, neurological problems & congenital deficit, malignant hypertension.
- Not willing to join
- Individuals with medical conditions like: - Cardiovascular disorders, Diabetes mellitus, Bronchial asthma, Endocrinal disorders, Depression, Epilepsy, Psychological disorders.

**D. METHOD OF COLLECTION OF DATA:**

- I) **Study design:** - Experimental Study
- II) **Sampling design:** - Convenient sampling
- III) **Sample size:** - 10 patients
- IV) **Intervention Duration:** - Everyday in a week for 4 weeks.

**E. OUTCOME MEASURES:**

- **Blood pressure(mmHg)** by use of Digital Sphygmomanometer
- **Pulse rate (beats/min)** by Radial Pulse palpation
- **Respiratory rate (breaths/min)** by Observational counting

**F. MATERIAL USED:**

- Assessment form
- Consent form
- Paper
- Pen
- Pencil
- Rubber
- Chair
- Plinth
- Digital Sphygmomanometer & Stethoscope

**G. ETHICAL CLEARANCE:**

- In the act of research consists of human subjects, ethical clearance was obtained from ethical committee of Parul University Institutional Ethics Committee for Human Research (PU-IECHR). Also written consent was taken from every subject who associate in study.

**H. PROCEDURE:**

- The study sample consists of 15 subjects having a prehypertension with age between 18 to 35 years. The subjects who met the inclusion criteria were included in this study. Inform and written consent was taken from the subjects. Initially mean of three readings, recorded 2 min apart, was taken. If these readings differed by more than 5 mm Hg, a further three readings were recorded at 2 min intervals, and the mean of all six readings taken.
- Deep breathing exercise  
Duration: 10 min everyday

**Deep breathing exercise****Treatment time: 10 minutes**

Subject position: Relaxed and comfortable position in which gravity assists the diaphragm, such as a semi fowler 's position.

Therapist position: side of the subject 's bed.

Instruction to the subject place the hand on the rectus abdominis (abdomen) just below the anterior costal margin, breathe in slowly and deeply through the nose. Keep the shoulders relaxed and upper chest quiet, allowing the abdomen to rise slightly. Relax and exhale slowly through the mouth.

### III. DATA ANALYSIS

In present study 10 people with the age group of 18 to 35 Years were taken. 10 subjects follow the session, 10 subjects were analyzed.

#### STATISTICAL ANALYSIS

- Descriptive statistical analysis was accomplished in the present study. Outcome measurement was measured using Blood pressure (BP), Pulse rate (PR) and Respiratory rate (RR). Significance was assessed at 5% level of significance  $p < 0.05$  (2 tailed hypothesis test considered).

#### Statistical tests:

- Paired 't' test as a parametric will be used for analysis of Blood Pressure, Pulse Rate and Respiratory Rate variables within the group.

#### Statistical software:

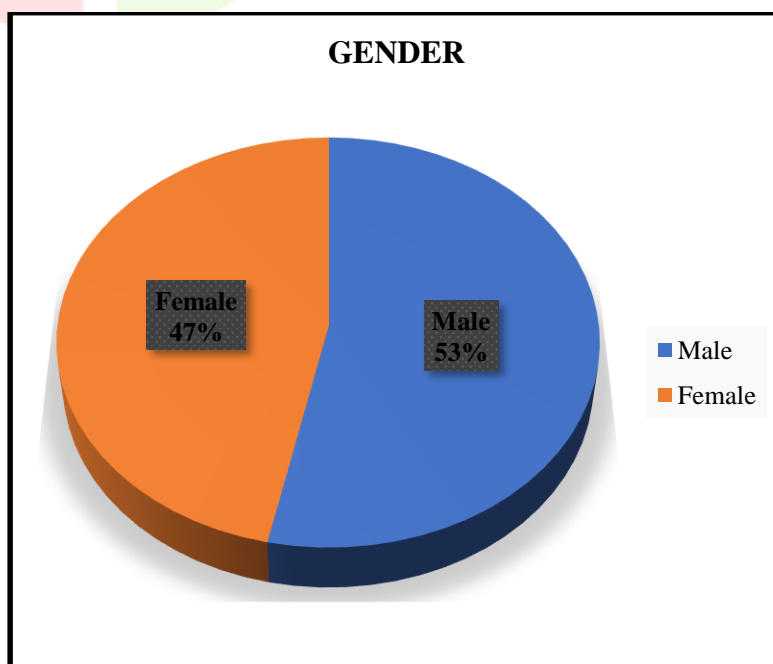
The statistical software namely SPSS2.0 will be used for the analysis of the data, Micro soft Word and Excel will be used to generate graphs, tables etc.

- Deep breathing exercise  
Duration: 10 min everyday

### IV. RESULT

**Table: 1: - Gender distribution of subjects.**

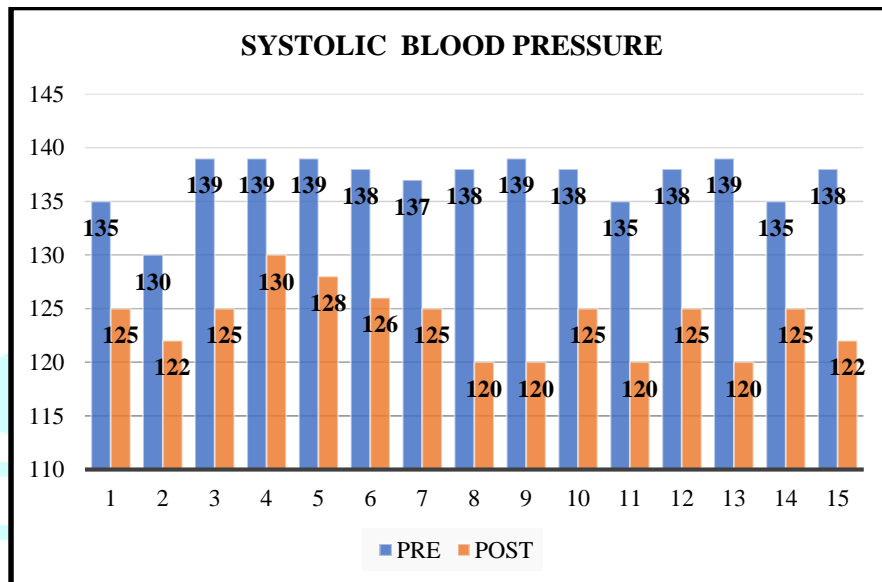
Gender	No. of subjects	Percentage
Female	07	47%
Male	08	53%
Total	15	100%



**Inference:** The above pie graph shows 47% of female and 53% of male are affected with neurological conditions.

**Table 2: Analysis of Systolic Blood Pressure**

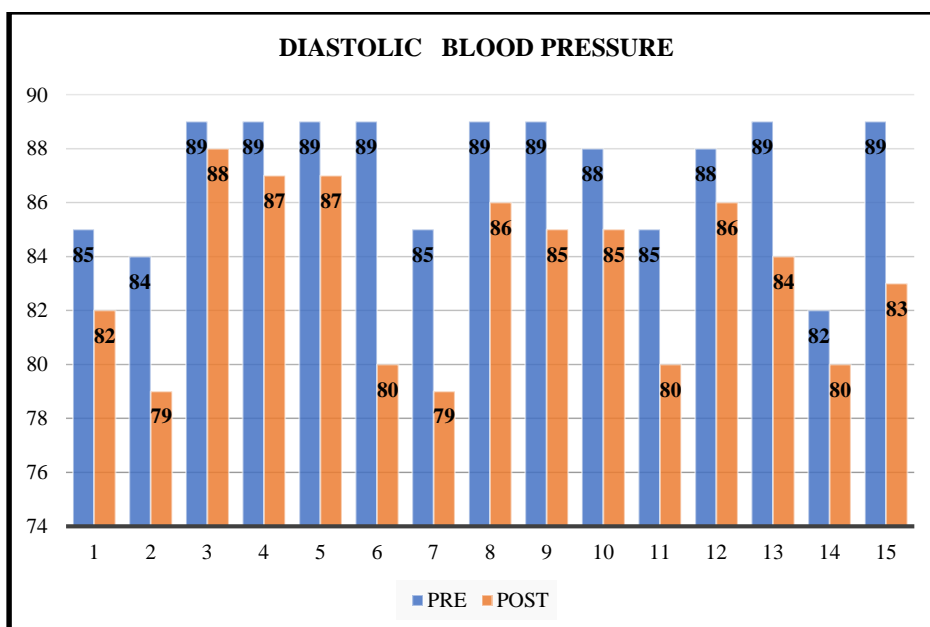
Parameters	Pre	Post
Mean	1.3713	2.47463
SD	1.2387	3.09069
p value	<0.005	



**Inference:** The above graph shows the difference in the Pre-& Post Systolic Blood Pressure.

**Table 3: Analysis of Diastolic Blood Pressure**

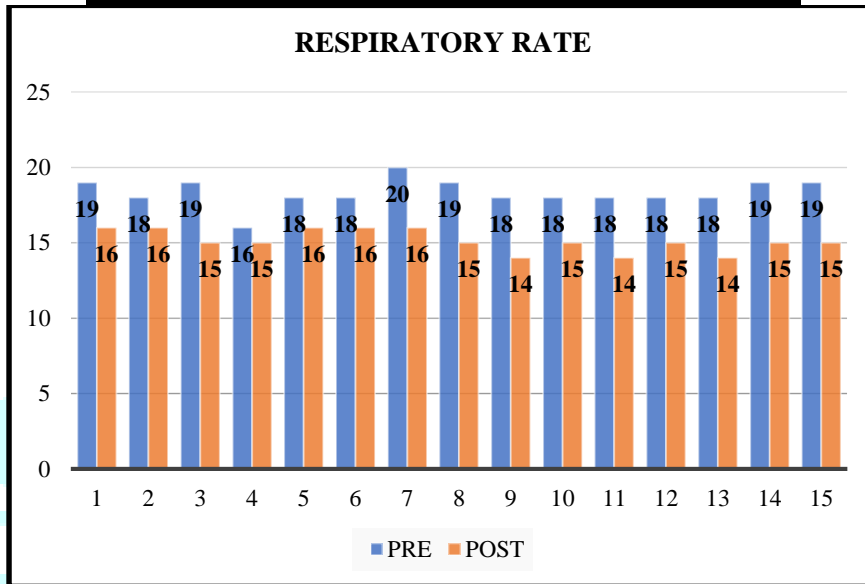
Parameters	Pre	Post
Mean	87.2667	83.4000
SD	2.37447	3.18030
p value	<0.005	



**Inference:** The above graph shows the difference in the Pre-& Post Diastolic Blood Pressure.

**Table 4: Analysis of Respiratory Rate**

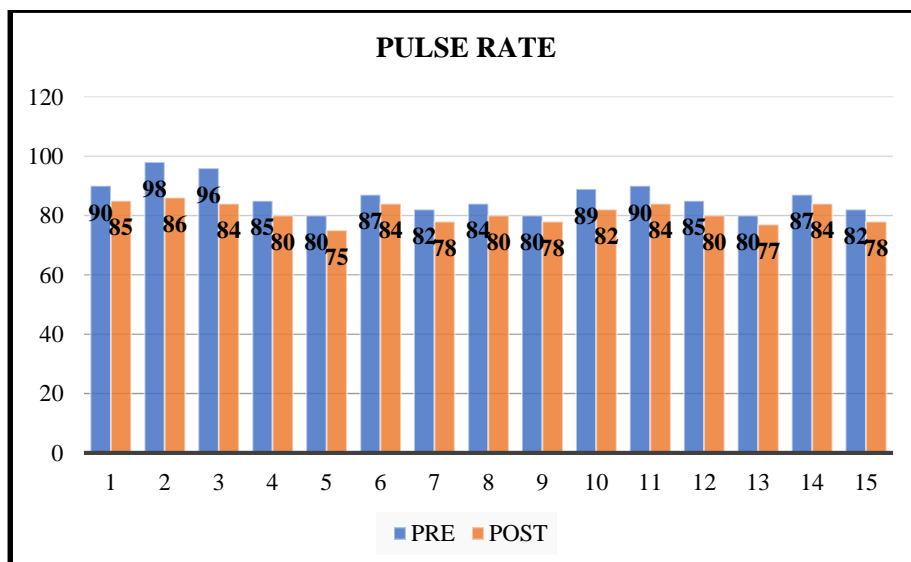
Parameters	Pre	Post
Mean	18.3333	15.1333
SD	0.89974	0.74322
p value	<0.005	



**Inference:** The above graph shows the difference in the Pre-& Post Respiratory Rate.

**Table 5: Analysis of Pulse Rate**

Parameters	Pre	Post
Mean	86.3333	81.0000
SD	5.55063	3.38062
p value	<0.005	



**Inference:** The above graph shows the difference in the Pre-& Post Pulse Rate.

## V. DISCUSSION

There is critical decrease in blood pressure in the pre-hypertensive people at about a month. This can be clarified as the lung swelling which increments with diminishing respiratory rate, animates gradually adjusting pneumonic stretch receptors and this physiological reflex tweak fills in as a contribution to the medulla and is coordinated with the data about pulse level produced by blood vessel baroreceptors and as an intense reaction to circulatory strain height and/or lung expansion, vasodilation happens in various vascular domains, for example, the appendages, skin, muscles, kidney and splanchnic vascular bed.

Slow breathing achieves a summed-up decline in the excitatory pathways controlling respiratory and cardiovascular framework.

<sup>(4)</sup> Additionally, with moderate Deep breathing at 6 cycles/min, by physiological neural regulation, driving forces from the respiratory focus quit repressing the cardiovagal focus and subsequently expands the vagal tone. This prompt easing back of pulse and decrease in circulatory strain as proposed by Pal G et al.

It is essential to feature that respiratory and cardiovascular frameworks share comparable control instruments, along these lines modifications in a single framework will change the working of the other. <sup>(6)</sup> In basic prehypertension, the thoughtful hyperactivity is related with a summed-up improvement of the excitatory pathways, driving not exclusively to thoughtful vasoconstriction, yet in addition chemoreflex actuation. Subsequently, any adjustment in the respiratory control would likewise create changes in the cardiovascular capacity.

Different researches have demonstrated that normal act of moderate Deep breathing expands parasympathetic tone, diminishes thoughtful movement, improves cardiovascular and respiratory capacities, diminishes the impact of anxiety on the body in this way improving physical and psychological well-being.

Our examination shows that Deep breathing prompts a decline in the focal chemoreflex affectability which thusly pushes down the vasomotor focus. This diminishes the thoughtful outpouring, causing fringe arteriolar vasodilatation, diminishing fringe vascular opposition and along these lines lessening Diastolic Blood Pressure. The abatement in release further declines the tone of venules with increase in its capacitance, reduction in mean fundamental filling pressure, reduction in venous return and consequently bringing down the systolic pulse. Diet and exercise are fundamental components to keep up pulse. <sup>(5)</sup> Albeit numerous elective treatments are advanced for the administration of prehypertension, few are genuinely helpful. The current examination inspected the impact of Deep breathing activity intercession on the decrease of pulse among prehypertensive patients. Present examination discoveries uncover that rehearsing Deep breathing activity consistently in every day for a 4 week prompts significant decrease in Systolic Blood Pressure. Quantities of studies identified with the impacts of breathing activity in decrease of pulse attempted and which demonstrated the constructive outcome.

## VI. CONCLUSION

Hence, we tend to conclude that active deep breathing exercise enhances parasympathetic activity, cranial nerve tone and reduces the sympathetic excitability, thereby effectively reducing the blood pressure. Moreover, our study has shown that active regular deep breathing exercise 10 minutes daily has considerably reduced each the pulse, blood pressure from 4 weeks. Thus, deep breathing exercise is suitable as a primary preventive strategy to attain blood pressure management in prehypertensive subjects. It will be stressed as a non-pharmacologic adjunct in prehypertensive patients at the side of drug treatment. Deep breathing exercise together with other life style modifications can definitely ensure a healthy living in prehypertensive individuals.

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