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# EFFECTS OF PRANAYAMA ON CARDIO-RESPIRATORY PARAMETERS OF YOUNG HEALTHY VOLUNTEERS

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## **Abstract:**

**Background:** The modern life styles of the individuals pose to get risk of cardiorespiratory diseases and disabilities. The yogic practice like pranayama can be the solution to overcome the situation by significantly reducing the risk of developing cardiorespiratory diseases and eventually to reduce the risk of morbidity and mortality

**Objectives:** To see the significant effects of pranayamas on cardiorespiratory variables among healthy individuals.

**Materials and methods:** The healthy individuals willing to participate in present study were screened for cardio-respiratory parameters and subjected to practice of pranayamas, after successful training of pranayamas, again cardiorespiratory variables were evaluated.

**Results:** A total of 181 students were screened for Cardio-respiratory parameters and there was significant reduction in Pulse Rate, Systolic blood pressure, Diastolic blood pressure, and Respiratory rate.

**Key words:** *Pranayama, cardiorespiratory, healthy individuals*

## **I. INTRODUCTION**

The modern life styles of the individuals pose to get risk of cardiorespiratory diseases and disabilities, especially in developing countries where lack of health awareness and resources<sup>1</sup>. In India, cardiovascular diseases (CVD) are the leading cause of death and more than 80% of CVD is due to ischemic heart disease<sup>2</sup>. The death rate due to CVD in India is approximately 300 per one lakh population which is higher than global average death rate (approx. 250 per one lakh population)<sup>3</sup>. It is reported that lower socioeconomic background, tobacco use, low consumption of fruits and vegetables are the major risk factors associated with cardiorespiratory diseases<sup>4</sup>. The yogic practice like pranayama can be the solution to overcome the situation by significantly reducing the risk of developing cardiorespiratory diseases and eventually to reduce the risk of morbidity and mortality<sup>5</sup>.

Yogic techniques are well known for overall improvement in health and performances, in light pranayama are the breathing technique which enhances the health and functions of lungs and heart as well that has to be evaluated time to time<sup>6</sup>. Patanjali has described Ashtang yoga that is yama, niyama, asana, pranayama, pratyadhara, dharana, dhyana and samadhi that helps in built up the capacity of respiratory system and eventually cardiac functions<sup>7</sup>.

Among them pranayama, a breathing technique found to be effective and it is given in modern medicine as well. Pranayamas are routinely prescribed for the patients with cardiac disorders and also in those who have arthritis, back pain, depression etc<sup>8</sup>. The different scientific studies carried out in world reported that pranayama is having beneficial effects on vital systems by proving different pranayama yielded different physiological benefits on vital systems of the individuals<sup>9, 10, 11</sup>.

The pranayamas, a low energy consuming practice is found to be more effective than aerobic exercise and significantly reduces basal metabolic index<sup>12</sup>. The alternate nostril breathing known as anulom-vilom is the most effective technique followed by kapalbhati and bhastrika, which is very easy and can be practiced at home only<sup>13</sup>.

Regular practice of pranayama can reduce the risk of cardiorespiratory morbidity and mortality, and it can also help to overcome stress, anxiety and depressive state of mind<sup>14</sup>. Hence the study established to see the effects of pranayamas among medical students at our institution.

## II. MATERIALS AND METHODS

After the clearance of institutional ethical committee, present study was carried out in the department of physiology. A total of 181 male students studying at SMBT medical college Nashik, age group of 19-22 years were enrolled for the study. All subjects willing to participate in the study were explained about the purpose and method of the study in the beginning only and written informed consent was taken. The subjects were screened for cardio-vascular parameters like pulse rate, systolic blood pressure, diastolic blood pressure and respiratory parameter (Respiratory rate)<sup>15</sup> as per standard guidelines and labelled as Group-I (before pranayama). The practice session of pranayama (Anulom-vilom, Bhasrika, Kapalbhathi, Bhramari, Bahyakumbhak and Agnisar,) was conducted under supervision of a certified pranayama trainer for the period of six months (4 days/week and 1 hour per day) without changing in routine diet plan<sup>16</sup>. After successful completion of six months practice of pranayamas, all the subjects were again evaluated for the cardio-respiratory parameters and labelled as Group-II (after pranayamas). The results were calculated by using appropriate statistical test to rule out significance of pranayama with Cardio-respiratory functions.

## III. RESULTS

A total of 181 students were screened for Cardio-respiratory parameters and there was significant reduction in Pulse Rate (before pranayama: 77.19±6.788 PR/min, after pranayama: 75.16±5.830 PR/min), Systolic blood pressure (before pranayama: 117.96 ± 2.624 mmHg, after pranayama: 115.24±2.784 mmHg), Diastolic blood pressure (before pranayama: 78.21±1.820 mmHg, after pranayama: 78.18±1.805 mmHg), and Respiratory rate (before pranayama: 16.07±0.888 RR/min, after pranayama: 14.69±1.041 RR/min).

**Table-1: Comparison of cardio-respiratory parameters**

Variable	Before (mean ± SD)	After (mean ± SD)	P value
Pulse Rate (PR/min)	77.19 ± 6.788	75.16 ± 5.830	p < 0.001
Systolic BP (mmHg)	117.96 ± 2.624	115.24 ± 2.784	p < 0.001
Diastolic BP(mmHg)	78.21 ± 1.820	78.18 ± 1.805	p < 0.001
Respiratory Rate (RR/min)	16.07± 0.888	14.69 ± 1.041	p < 0.001

## IV. DISCUSSION

Pranayama is an ancient science of voluntary control of breathing to calm the mind and earn the ultimate goal of peace proposed by Rishi patanjali. It is an art to control breath and keeping attention on act of breathing which enhances concentration of mind. Cardiovascular functions are usually controlled by neural, hormonal and temperature mechanism of the body, any defects on which leads to consequences related to cardiovascular diseases. Pranayamas are crucial technique to control these parameters and hence to overcome the life threatening events of life. Present study was carried out to see the significant effects of pranayamas on healthy volunteers having modern lifestyle.

The practice of pranayamas for six months (four days per week and one hour daily) showed that significant decrease in pulse rate, blood pressure and respiratory rate indicating that practice of pranayamas on regular basis can serve the crucial daily activity in terms of health concerns. Similar observation were noted by L. Nivethita *et.al* (2016)<sup>17</sup>, evaluated the different types of pranayamas techniques have different effects; slow breathing techniques were reported to improve cardiovascular variables which helps to prevent cardiovascular diseases.

Having said that every action have reaction, taking in account it was also observed to the side effects of pranayamas on cardiorespiratory parameters, and found out there was no significant side effects on

cardiorespiratory function. Similar study were carried out by Vivek Kumar Sharma *et.al* (2013)<sup>18</sup> to see the side effects of pranayamas on cardiovascular variables, and reported that there is no significant risk (side effects like confusion, cardiovascular accident, and dyspnea) associated with pranayamas on cardiovascular diseases.

## V. CONCLUSION

The results of presents study concludes that regular practice of pranayama improves heart functioning by reducing pulse rate & blood pressure and respiratory function by reducing respiratory rate. Hence pranayama is advisable to all healthy individuals for good health.

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