

Beneficial Effects of Forty Days of Pranayama Training on Cardiorespiratory Parameters

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Abstract

Rapid industrialization, environmental pollution, overcrowding, sedentary lifestyle and various stress factors are responsible for the deterioration of the physical health of a person. Also, prevalence of obesity in developing countries is believed to be on the rise. This requires special and specific techniques to transcend the limits of our physical and mental abilities experienced in everyday life. Hence, in the present study beneficial effect of Pranayama on cardio-respiratory function was studied. MATERIALS AND METHOD: Study was conducted in Santosh Medical College and Hospital in Ghaziabad after the institutional ethical clearance and written consent from each participant. A total of 50 normal subjects were recruited in the study, were divided into study and control groups, each group containing 25 subjects. The study group was asked to perform Kapalbhatai Nadishuddhi and Bhramari pranayama for duration of 40 days. Cardio-respiratory parameters were assessed before and after 40 days in both the groups. STATISTICAL ANALYSIS: Paired t- test was applied for statistical analysis and p value <0.05 was considered the level of significance. RESULTS AND CONCLUSION: In study group, heart rate, respiratory rate, systolic blood pressure decreased whereas peak expiratory flow rate increased significantly as compared to that of control group. This shows that Bhramari, Nadishuddhi and Kapalbhatai pranayama have improving impact on these cardio respiratory parameters.

Key words : Pranayama Cardiorespiratory function

Introduction

“Yoga” is Sanskrit word derived from the root “yuj” which means union. Yoga is a psycho-somatic-spiritual discipline for achieving union & harmony between our mind, body and soul and the ultimate union of our individual consciousness with the Universal consciousness.¹

Pranayama, the fourth limb in the Ashtanga Yoga, is made up of two words, *Prana* and *Ayama*. *Prana* stands for the capacity to keep body alive by air, i.e breathe and *Ayama* means expansion, stretching or

extension and control of breathe². Thus, Pranayama means the art of controlling prana. *Pranayama* is basically undertaken for somatic and psychic purification, regulation of *prana* to each body organ and to optimize the cardio-pulmonary and autonomic functions.³

Pranayama is the first step towards re-orienting and improving the functioning of mind and body by learning to utilize the air we breathe. Pranayama implies correct breathing and control over prana².

The cranial and spinal nerves spread throughout the body. These nerves send out and send in to the brain pain and motor impulses. Prana flows throughout these pathways. It also flows through all the nadis, or energetic pathways, which have been studied by ancient Yogis. *Nadis* means channels or vehicles. These are astral nerve channels which are beyond the physical body that regulate various functions of the body. Some texts describe 72,000 nadis in the body, but fourteen are considered important, and only six of them are the most important of all. They are called the *ida*, *pingala*, *sushumna*, *brahmuni*, *chitrana*, and the *vijnana*. Among these six, three are even more important than any others. The techniques of Pranayama are designed

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to bring the central nadi, the sushumna, into primary function, rather than the ida or pingala dominating the functions of prana flow. With activation of the sushumna as the primary flow for prana, the Yogi experiences freedom from the human condition, and joy. However these are very subtle (*suksham*) and cannot be scientifically seen or their presence proved by our gross instruments. However, their effects can be felt and their beneficial effects measured on the physical body. Pranayama involves systemic and disciplined inspiration and expiration with retention or holding of breathe in specific proportion or specific manner. It also aims at conditioning the speed of breathing. When we breathe very fast the storehouse of power that sustains life dries up speedily and thus a long life span is not possible. The more the breathing is slow the more our life span attains longevity.^{3,4}

Various studies are there correlating our ancient scriptural knowledge with science. However, we found no study in our city of Ghaziabad. To help understand the beneficial effects of yoga on our subjects this study was designed. This study attempts to assess the effect of 40 days of Pranayama training on cardiovascular and respiratory system in normal young healthy individuals in Ghaziabad.

Material and Methods

Ethical clearance for the study protocol was obtained from institute ethical committee. 50 healthy subjects of age group 18-30 years, who were willing to complete the study were selected. Subjects who were trained in yoga before, subjects with history of previous surgery, recent cardio-respiratory diseases, diabetes, asthma, atopic skin diseases and with any major chronic illness or drug therapy (ATT etc) were excluded from the study. The health of the subject was assessed by noting the present, past, family and personal history and also by a thorough general and systemic examination. The subjects were explained about the importance and procedure of the study. An informed written consent was obtained from all the members. The subjects were informed about the procedures in brief. Subjects were divided in 2 groups, **Yoga Group A** (Case): 25 subjects who were subjected to Pranayama training for a period of 40 days were compared with **Non Yoga Group B** (Control): 25 subjects who were not subjected to any Yoga training. The various parameters compared are:

→ HR (heart rate) was measured by counting the Radial pulse

- Blood Pressure was measured by standard mercury Sphygmomanometer (Prolix, Primepack Meditech Industries, New Delhi, India)
- RR (respiratory rate) by inspection / palpation of chest movement
- PEFV by was measured in Lit/min by Wrights Peak Flow Meter (Lifeline Surgicals, New Delhi, India).

In this study the subjects were trained for Pranayama for two weeks. Then they practiced the same under our direct supervision, twice per week for 40 minutes, for a total duration of 40 days. They were encouraged to practice pranayama in their house. Monitoring was done after two weeks. Pranayama was practiced in Padmasana or Sukhasan position. The Yoga practice consisted of:

- Warm up (5 min)
- Pranayama (25 min), Pranayamas adapted for study purpose were:
 - Nadishuddhi (ratio 25:12:25 of inhalation, holding and exhalation)
 - Kapalbhati and
 - Bhramari
- Meditation (10 min). The subject was asked to merely watch the course of the incoming and outgoing breath.

The first phase of the recording of the parameters was done at the beginning of their course. The second phase of the recording was done after 6 weeks of the regular pranayama practice. The parameters were measured after pranayama practice on the 40th day.

Both groups were matched in age, sex and height and weight. Age is equally distributed across both groups. Matching the age is necessary as pulmonary function decreases with age. For statistical analysis of data, paired samples 't' test was employed for the present study using SPSS 17.0 for Windows. The level of significance was set at 0.05 so 'p' value less than 0.05 was considered statistically significant.

Results

There is statistically significant decrease in heart rate, respiratory rate and systolic blood pressure and a significant increase in peak expiratory flow rate of Yoga Group after 40 days of Pranayama training.