

## ORIGINAL ARTICLE

ROLE OF ANULOMA VILOMA PRANAYAMA IN REDUCING STRESS  
IN CHRONIC ALCOHOLICS

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**Background:** Despite improved clinical care, heightened public awareness and wide spread use of health innovations, alcoholism remains a leading cause of death in many parts of the world. Chronic alcoholics suffer from stress and multitude of symptoms. The progressive addiction to alcohol will gradually nullify all other interests in the patient's life so that a deterioration of the physical, psychological, social, cultural and religious values takes place. The role of yoga in healing asthma, arthritis and other disorders has been known. **Methods:** Breathing technique (Anuloma Viloma Pranayama) was taught to chronic alcoholics. Using galvanic skin resistance, stress levels were measured before and after anuloma viloma yoga in controls and chronic alcoholics. **Results:** Reduced stress levels were noted using the galvanic skin resistance in both controls and chronic alcoholics after yogic breathing. **Conclusion:** There is a promising effect of simple yoga techniques in organising effective rehabilitation and treatment programmes to reduce stress in chronic alcoholics. This study would help to chart out a better management programme for enhancing relapse and alleviate the symptoms.

**Keywords:** Yoga, Alcoholics, Stress, Anuloma Viloma Pranayama

## INTRODUCTION

Yoga refers to traditional physical and mental disciplines that originated in India.<sup>1</sup> Yoga (Sanskrit) is a group of Indian spiritual practices designed for the purpose of cultivating a steady mind. Yoga has been defined as 'technologies or disciplines of asceticism and meditation which are thought to lead to spiritual experiences and a profound understanding or insight into the nature of existence.' Yoga is thus an effective ancient method used from Vedic days to improve the mental and physical health of the young and old.<sup>2</sup>

Breathing is a vital process which starts at the time of birth and stops at the death. All the metabolic processes require oxygen. Oxygen is life, a vital force. This vital energy is called Prana. The process of controlling the Prana is called Pranayama. So Pranayama is the science related to vital force supplying energy and controlling the body mind complex.<sup>3</sup>

During breathing for Pranayama inhalation (puraka) stimulates the system and fills the lungs with fresh air; retention (kumbhaka) raises the internal temperature and plays an important part in increasing the absorption of oxygen; exhalation (rechak) causes the diaphragm to return to the original position and air full of toxins and impurities is forced out by the contraction of inter-costal muscles. Due to the proper functions of these organs, vital energy flows to all the systems. The success of Pranayama depends on proper ratios being maintained between inhalation, exhalation and retention. Retention of air, increases the level of prana (energy) in the body, also it regulates the flow of pranic energy through out the body. Therefore Pranayama helps to remove all the toxic metabolites and also can probably prolong the aging process of the body.<sup>4-6</sup>

The mind, consisting of thoughts and emotions is closely related to the breath. When the mind is calm and relaxed, the breathing is smooth and slow and when the mind is stressed breathing is fast and shallow. The diaphragm and the intercostal muscles are utilised efficiently in yogic breathing to get more oxygen by using yogic techniques. The breathing has specific rhythms like the heart, brain, gastrointestinal systems, endocrine glands. Pranayama is rhythmic breathing, bringing the breath in natural rhythm by controlling the process of inhalation, exhalation and retention.<sup>7-9</sup>

Stanescu,<sup>7</sup> Sequeira,<sup>8</sup> and Roggla *et al*,<sup>9</sup> have reported the effect of yoga and Pranayama on various systems. Gupta *et al*<sup>10</sup> have reported the role of pranayama on stress by focusing our mind on our breath. The only dynamic process is breathing. The true aim of the various techniques and breath ratios of breathing in Pranayama is to follow the breath and the mind is drawn into the activities of the breath.

Social drinking and stress may be linked and the physiological response to stress is different in actively drinking alcoholics compared with non alcoholics.<sup>11</sup> Animals preferring alcohol over water have a different physiological response to stress than animals that do not prefer alcohol.<sup>12</sup> Though a clear association between stress, drinking behaviour, and the development of alcoholism in humans has not been established, there may, in the already established alcoholic, be a clearer connection between stress and relapse: Among abstinent alcoholics, personally threatening, severe, and chronic life stressors may lead to alcohol relapse.<sup>13</sup> Acute exposure to low doses of alcohol may reduce the response to a stressor in animals and humans. For example, low doses of alcohol reduced the stress response in rats subjected to strenuous activity

in a running wheel.<sup>14</sup> In humans, a low dose of alcohol improved performance of a complex mental problem-solving task under stressful conditions.<sup>14</sup> However, in some individuals, at certain doses, alcohol may induce rather than reduce the body's stress response.<sup>15</sup>

Studies report that alcohol actually induces the stress response by stimulating hormone release by the hypothalamus, pituitary, and adrenal glands.<sup>16,17</sup> In one study with rats, the administration of alcohol initiated the physiological stress response, measured by increased levels of corticosterone.<sup>18</sup> In addition to stimulating the hormonal stress response, chronic exposure to alcohol also results in an increase in adrenaline.<sup>19</sup>

The sympathetic skin response (SSR) is a slow wave, generated in deep layers of the skin, resulting from reflex activation of the sudomotor sympathetic efferent fibres. This slow galvanic reflex response is known to occur following a deep breath, an unexpected or arousing stimulus.<sup>20</sup> Its possible clinical uses in the diagnosis of autonomic disorders are gaining importance. As the spontaneous response is a relatively new, inadequately worked out parameter in alcoholics, the measurements were evaluated in the present study before and after pranayama. There are many varieties of pranayama, but the alcoholic subjects could not be motivated to do many due to their physical condition.

The exercise of the Anuloma Viloma produces optimum function to both sides of the brain: that is optimum creativity and optimum logical verbal activity. This will make both sides of the brain, the left side which is responsible for logical thinking and the right side which is responsible for creative thinking to balance well. We do not breathe equally on both nostrils that are one nostril is much easier to breathe through than the other at any particular time. Each nostril alternates about every three hours. The nasal cycle corresponds with brain function. The electrical activity of the brain was found to be greater on the side opposite the less congested nostril.

Literature review has revealed the importance of Anuloma Viloma Pranayama in reducing stress. Ancient yogic texts have described a rapid breathing cleansing practice (Kapalabhati) as stimulating, and slow regulated breathing, particularly through alternate nostrils (Nadisuddhi Pranayama) as calming. These descriptions have been substantiated by scientific studies. Kapalabhati was found to cause "autonomic activation". This was observed as an immediate effect during three contiguous sessions of 5 minutes each, in terms of an increased heart rate and systolic blood pressure during Kapalabhati.<sup>21</sup> In contrast, Nadisuddhi Pranayama practiced for four weeks, caused decreased heart rate, as well as systolic and diastolic blood pressure levels.<sup>22</sup> Anuloma-Viloma-Nadisuddhi Pranayama<sup>23</sup> has been reported to have calming effects in normal subjects, it involved alternate nostril breathing

which many alcoholic subjects could practice. We have reported the use of galvanic skin resistance to determine stress in chronic alcoholics.<sup>24,25</sup>

Chronic alcoholics are known to suffer from the physical and psycho social effects of drinking. Medication and counselling plays a major role in rehabilitation. It was our attempt to look at the possibility of using a simple pranayama technique to help alcoholics overcome the challenges of stress. Anuloma Viloma breathing technique was chosen for its simplicity and its effects to improve brain circulation. Chronic alcoholics could master this method easily. Complicated breathing techniques couldn't be attempted and taught to the inpatients of Vailankanni ward.

## MATERIAL AND METHODS

Chronic asymptomatic alcoholics admitted to the Vailankanni Rehabilitation ward, Father Muller's Medical Hospital were selected as subjects. Equal number (n=28) of age matched male controls was selected to measure the GSR values before and after pranayama. Ethical committee clearance was obtained from our Institute and Informed consent was received from all the subjects. 28 male alcoholics were chosen for the study.

The classic sitting lotus pose (Figure-1), also known as Padmasana, is greatly revered as a position for meditation and Pranayama because it enhances concentration. Since all alcoholic subjects couldn't adopt the padmasana posture, only those who were able to sit in this position were encouraged to do so. The others rested comfortably on a chair (Figure-2).

The control group could adopt padmasana posture. Those who could adopt the Padmasana pose were instructed to sit in a regular cross-legged sitting position, take hold of the right foot with both hands and place it on their left thigh. The foot would turn slightly so that the sole faces upwards. Then, the left foot is held and brought up onto the right thigh. Only 4 subjects could adopt this procedure.

The breathing exercise was done in the ground floor room with a quiet atmosphere. Windows were opened to allow plenty of fresh air into the room. The pranayama was done early in the morning between 6:30 AM to 7:00 AM.



**Figure-1: Technique of Anuloma Viloma Pranayama**

Source: [http://naveenyoga.com/images/left\\_Pranayama.JPG](http://naveenyoga.com/images/left_Pranayama.JPG)



**Figure-2: Vailankanni Ward during Yoga session**

The demonstration and instructions were given in all sessions. The spine has to be erect, lest some of the benefits of the breathing exercises will be lost. The exercises were done on an empty stomach as a heavy meal will reduce concentration and food in the stomach causes blood and oxygen supply to be diverted to the stomach for digestion. This would reduce the blood and oxygen available for directing to the brain during the breathing exercises. To gain maximum benefit subjects were instructed not to eat for about fifteen minutes after the exercises. Subjects with high blood pressure, chest pain, and throat infections, blocked nose, abdominal pain, were excluded from the study.

The session was started with an initial Om Kara. The loud and clear repetition of particular sounds, used by yogis for hundreds of years, has healing value. 'OM'—pronounced o-o-o, u-u-u, m-m-m—vibrates through the spine to vitalise the whole body. The sound 'OM' not only helps in rejuvenating the whole body, it also very effectively prepares one for meditation.

#### **Anuloma Viloma Pranayama (Alternate Nostril Breathing):**

The correct ratio between inhalation and retention is 1:4. The beginners were advised to follow the 1:2 ratio for a few days before taking up 1:4 ratio. The minimum starting proportion is 4 Sec. inhalation, 8 Sec. retention, and 8 Sec. exhalation. After a month, increase to 5:10:10. Increase gradually, until 8:16:16 is reached.

The air is inhaled through the left nostril while counting, mentally, the numbers 1 to 4. The air is then retained while counting 1 to 8. It is exhaled, through the right nostril, while counting 1 to 8. Then without stopping, air is inhaled through the right nostril, the breath is retained and, then, exhaled through the left nostril. This is one round and was followed for 10 rounds. When holding the breath, the right nostril is closed with the right thumb, and the left nostril is closed with the right ring finger and little finger (Figure-2).

#### **GSR measurement:**<sup>26,27</sup>

The GSR was measured by the GSR Biofeedback Biotrainer, GBF-2000 (St. John's Medical College, Bangalore, India) with digital display in KΩ, which measured the sympathetic activity. The recording was done in the sitting position. GSR recordings were taken

before an after pranayama. For right-handed individuals, left hand values were taken. The left hand was placed comfortably resting from elbow to fingers on the table. The subject was seated in a revolving stool raised 20 inches from the ground. 2 points were marked exactly 1 inch away from each other in the hypothenar eminence using a scale, and jelly was applied liberally. The electrodes were placed on the marked points and secured with a transparent white cellophane tape. The subject was asked to relax completely, and was not allowed to watch the values. The instrument was switched on and 2 values were taken at an interval of 3 minutes, following, which the subject's hand was wiped clean and the average was calculated. The recordings were done before and after pranayama sessions for 10 days for both the control group and alcoholic group. The days included Monday to Friday for 2 weeks.

Data was entered and analysed with SPSS-15.0. Mean $\pm$ SD of all observations of GSR were calculated and comparisons were done between values of control and alcoholics before and after Pranayama. Student's unpaired *t*-test was used to look for difference between control and alcoholics Paired *t*-test was used to calculate statistical differences before pranayama and after pranayama groups in normal subjects and alcoholics. Statistical significance was assigned at  $p<0.05$ .

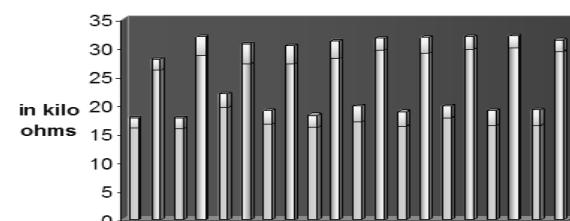
## **RESULTS**

The GSR was recorded before and after Pranayama for 10 days in normal subjects and chronic alcoholics. The results (Table-1) revealed that the normal subjects had an average GSR value of  $24.45\pm1.15$  kilo ohms before Pranayama ( $p<0.001$ ) and an average GSR of  $35.74\pm1.21$  KΩ after Pranayama. The chronic alcoholics recorded an average of  $16.83\pm1.13$  KΩ before Pranayama and an average GSR value of  $28.50\pm1.29$  KΩ after pranayama ( $p<0.001$ ), (Table-1).

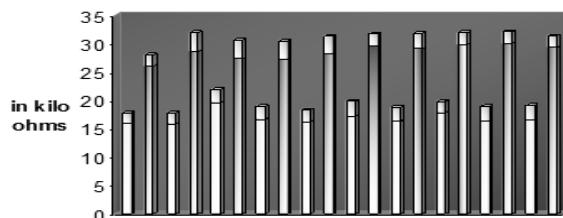
**Table-1: Effect of Pranayama on GSR in normal subjects and chronic alcoholics**

	Normal subjects (28)	Chronic alcoholics (28)
Average GSR (KΩ)		
Before Pranayama	$24.45\pm1.15$	$16.83\pm1.13$
After Pranayama	$35.74\pm1.21$	$28.50\pm1.29$

Values are Mean $\pm$ SD. Chronic alcoholics versus Normal subjects:  $p<0.001$ . Figures in parenthesis represent the number of subjects studied.



**Figure-3: Mean and Standard deviation of Galvanic skin resistance of normal patients before and after Anuloma Viloma Pranayama**



**Figure-4: Galvanic skin resistance of alcoholics before and after Anuloma Viloma Pranayama (Mean $\pm$ SD)**

**Table-2: Galvanic skin resistance recorded for 10 days in chronic alcoholics before and after Pranayama (Mean $\pm$ SD)**

Days	GSR Before Anuloma Viloma Pranayama (KΩ)	GSR After Anuloma Viloma Pranayama (KΩ)
Day 1	16.03 $\pm$ 1.75	26.07 $\pm$ 1.94
Day 2	15.82 $\pm$ 1.98	28.57 $\pm$ 3.32
Day 3	19.64 $\pm$ 2.28	27.28 $\pm$ 3.39
Day 4	16.67 $\pm$ 2.29	27.21 $\pm$ 3.20
Day 5	16.14 $\pm$ 2.12	28.17 $\pm$ 3.06
Day 6	17.14 $\pm$ 2.75	29.57 $\pm$ 2.15
Day 7	16.32 $\pm$ 2.49	29.07 $\pm$ 2.72
Day 8	17.78 $\pm$ 2.06	29.78 $\pm$ 2.21
Day 9	16.39 $\pm$ 2.62	29.96 $\pm$ 2.11
Day 10	16.46 $\pm$ 2.64	29.38 $\pm$ 2.00

Values are Mean $\pm$ SD, GSR values Chronic alcoholics before and after pranayama:  $p<0.001$

## DISCUSSION

The effects of yoga and counseling on reducing alcohol consumption have been worked on and reported by many authors.<sup>28-34</sup> Four areas discussed under, 'Yoga, the heart and breath', are

1. Effect of inverted postures on increasing the efficiency of the heart through compensatory physiological mechanisms.
2. Effect of yoga on sympathetic tone, through touch, heat or movement and the movements produced in yoga through breathing practices and twists can alter visceral function and sympathetic tone
3. Humans exhibit a reflex which is described as diving and submersion response. Certain yogic practices activate this reflex, accounting for decreased oxygen consumption.
4. Physiological and behavioral effects of yoga practice are initiated through alterations in blood gas concentrations which results from various breathing practices like pranayama.

Subrahmanyam *et al*<sup>35</sup> have reported improvement in alcoholics using yoga meditation, psycho therapy, stereotaxic surgery, nonvolitional biofeedback, and low frequency pulse magnetic field. Stress response dampening indexed by cortisol in subjects at risk for alcoholism has been reported in earlier studies.<sup>36</sup>

The promising effect of pranayama has been evaluated using galvanic skin response. The science of breath has its foundations in the control of prana or vital energy. The purpose of doing alternate breathing exercise or Anuloma Viloma Pranayama is that the breath alternates between two nostrils. By placing the palm near the nostrils this can be felt. One of the nostrils will always be partially blocked, and the flow of air in and out of the lungs will be mainly through only one of the nostrils. If a person is in normal health, the breath will alternate approximately every hour and fifty minutes. This normal period of breath alternation is established only when one has perfected pranayama, starting with alternate nostril breathing.

Yogic teachings claim that the breath in the right nostril is said to be hot, while the flow from the left is cool. Consequently, the right channel is known as 'sun breath', and the left channel is referred to as 'moon breath'. The energy that flows through the sun breath produces heat in the body; this is catabolic, efferent and acceleratory to the bodily organs. Conversely, the energy that flows through the moon breath produces coolness in the body; this is anabolic, afferent, and inhibitory to the organs. When the breath continues to flow through one nostril for more than two hours, it is a symptom of derangement caused by excessive heat or cold. Consequently, if the sun breath is more active, the heat of the body increases and there can be mental and nervous disturbances. Conversely, when the moon breath is more active, the metabolic activity of the body becomes low, cold and lethargic, and mental activity is suspended. This Alternate Nostril Breathing Exercise is mainly for maintaining equilibrium in the catabolic and anabolic processes in the body. Anuloma Viloma Pranayama which aids in improved circulation and digestion removes impurities from the blood, and tones up the circulatory and respiratory systems. The residual air in the lungs is cleared and the blood saturation with oxygen is enhanced. Large amounts of carbon dioxide and toxins are released and this reduces the stress.

The probable mechanism of increase in GSR in chronic alcoholics could be as follows: It is also known that the sympathetic outflow to palmer sweat glands and cutaneous blood vessels change with the mental state.<sup>37</sup> Since these nerves influence the GSR, we may speculate that reduced mental stress or arousal caused the increase in GSR. Galvanic Skin Response is one of the several electro dermal responses (EDRs). Electro-dermal responses are changes in the electrical properties of a person's skin caused by an interaction between environmental events and the individual's psychological state. Human skin is a good conductor of electricity and when a weak electrical current is delivered to the skin, changes in the skin conductance of the skin can be measured. The variable that is measured is either skin resistance or its reciprocal, skin

conductance. In alcoholics, excessive sweating occurs causing a change in conductance and resistance and thus the fall in GSR. Hyperhydrosis have been reported in chronic alcoholics without peripheral neuropathy.<sup>38</sup> Increase sweating causes increase conductance across skin. As conductance is inversely proportional to resistance, a decrease in GSR has been observed in chronic alcoholics. The exact mechanism by which nostril breathing influences the function of the autonomic nervous system is not known, though it has been speculated that this is through a neural reflex mechanism in the superior nasal meatus.<sup>39,40</sup>

Previous studies<sup>22,41-43</sup> have reported no conclusive change in GSR after Nadishodhana (anuloma viloma) Pranayama. The absence of change following Nadisuddhi Pranayama in this report could be because the earlier study described baseline changes after 4 weeks of practice, whereas in the present study, the immediate effect was assessed. Pranayama or breathing technique of yoga is thus very important in reducing stress.

## CONCLUSION

Anuloma Viloma Pranayama has shown to reduce stress in chronic alcoholics. Regular Pranayama may thus help in stress management and enhance relaxation skills in alcoholics facilitating recovery. The effects of other Pranayama like Kapalabhati can also be studied and compared with the present study results. The estimation of cortisol can be done in addition to demonstrate the reduction in stress.

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