

The Immediate Effect of Yogasana On Oxygen Saturation Levels in Young Adults

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Abstract

Background : Consistent practice of yoga postures increases the lung's airflow, air capacity, stamina and efficiency. Back bending postures open the chest and improves both lung and heart functions. Changes in the different asanas affect ventilation-perfusion rates and also oxygen transport and lung volume in normal individuals lungs. There have been few studies which are not enough information about which positioning of healthy individuals in different yogasana can increase oxygenation of the body system.

Aim and Objectives:

The main aim of the study was to assess the effect of yogasana on oxygen saturation levels in young adults of age group 18-35 years.

Materials and Methods: A sample of 30 healthy young adults with no chronic disease, anaemia, pain, fracture was included in the research. Individuals were positioned in 13 different asanas: sitting, supine position, prone position and in standing position. While performing each asanas the pre and post readings will be recorded of oxygen saturation (spO₂) using pulse oximeter. The Participants will be in starting position oximeter will be placed on the index finger readings will be noted then asana will be performed and maintained for 5 min after which again readings will be noted.

Result: The result shows that there is significant increase in oxygen saturation levels in all the asanas.

Conclusion: The present study found significant improvement in the study to assess the effect of specific asana on oxygen saturation level. By this we can conclude that Yogasana is very effective in increase in oxygen saturation level.

Keywords: Asana, Oxygen Saturation Levels, Young Adults, Pulse Oximeter.

Introduction

The better resources for creativity, wealth and peace of mind are considered major contributors of good health. Concept of Health is dynamic & ever-changing. Good health comes along with good diet hence adequate amount of physical activity will lead to stress free mind. The changes in our day to day lifestyle, sedentary way of working, wrong dietary habits, and lack of physical activity, Addictions leading to many medical problems. So by proper yogic postures this disorder could be minimized keeping other complications at lower level and so one can lead healthy lifestyle and good quality life. Yogic breathing is considered an intermediary between the mind and body. Regular practice of yoga gives maximum benefits through complete and comprehensive utilization of the system.^[1]

Oxygen consumption changes with physical and mental activity. Although there is a strong relationship between yoga and metabolic parameters, and the relationship between yoga and oxygen consumption has not yet been formally reviewed or reviled.^[2] It is found out that oxygen consumption during physical activity is maximal and during resting conditions is lowest. Oxygen saturation is an essential element of patient care and treatment. Oxygen is the most tightly regulated within the body

because hypoxemia can lead to many acute and chronic adverse effects on individuals organ systems. These include the brain, heart, and kidneys. Oxygen saturation is a measure of how much hemoglobin is currently bound to oxygen compared to how much hemoglobin remains unbound.^[3]

Oxygen is the vital nutrient to our body. It is essential for the integrity of all the organs such as: brain, nerves, glands and internal organs. It is a systematic exercise of respiration which makes the lungs stronger and improves blood circulation makes the man healthier.^[1] Some physiological changes such as changes in cerebral blood volume and blood pressure occur during postural changes in healthy people. It is believed that gas exchange and cardiovascular system kinetics are affected when the body position is changed during spontaneous breathing. The change in position of the body determines effect of gravity acting on the cardiovascular and pulmonary systems as well as oxygen transport throughout the body. Gravity affects oxygen transport inside the body in many indirect ways. It affects lung volume and lung capacity as well as respiratory mechanisms throughout the body system. Research has shown that recumbent positions, the position of sitting upright increases lung volume and capacity as the position itself goes in thoracic expansion levels.^[4]

Yoga has proven to be the best way to strike a balance between physical and mental well being. Not only does it make you fit and flexible, but also aids in managing common symptoms like a drop in oxygen levels and shortness of breath. Asana and kriya helps improve your breathing capacity, ensuring that more and more oxygen is absorbed in the bloodstream. There are some asana that increase the oxygen levels naturally. There are some excellent exercises for increasing your lung capacity. When you go on your toes and stretch your arms above your head, you make more room for oxygen to enter your respiratory tract, this movement has to match your breathing pattern, and it also improves the coordination between your mind and body. Staying in that position for some time also builds your balance. Yoga therapy is the therapy that prevents and cures various diseases and disorders. The yogic practices mostly concentrates on purification of the body and mind, and through this integrated approach one can overcome several kinds of afflictions in day today life. Yoga is an ancient Indian science and a style of life that incorporates specific postures such as asans , pranayama i.e breathing practices, dhyana i.e meditation, mantras i.e chants and sutras i.e wisdom teaching.^[5]

This study will help to identify the effectiveness of specific asanas on oxygen saturation levels in young adults. This study is a resource material for understanding the physiological benefits of yoga on young adults. So this study can help to find out the effect of selected asana on oxygen saturation level and amongst the selected asana which asana can be more effective in improving oxygen saturation levels in young adults.

Material and Methods

The pre post experimental design , study was conducted in and around pune district. Participants were included using the inclusion and exclusion criteria. The total no. of participants were 30 from which 18 were males 12 were females, with ages ranging from 18 to 35 years. Exclusion criteria used was Subjects with fracture, neurological conditions, chronic co-morbidities, and chronic lung diseases are excluded from the study. The materials used were Demographic Data, Consent Form, Pulse Oximeter, Yoga Mat, Pen. Participants were explained about the aims and objectives. Instructions were delivered and proper starting position was explained. Particular asana was told to perform and hold the asana for 5 mins, pre and post readings were recorded.

Ethics:

A numbering code was provided to the participants at the time of assessment to keep their personal identity closed. Consent was signed from every individual before consideration. Their pre and post readings were exclusively used for the research purpose and were not disclosed to anyone. The project was approved by the Institutional Ethical Committee of Tilak Maharashtra Vidyapeeth, College of Physiotherapy.

Procedure: Permission was taken from the institutional ethical committee of Tilak Maharashtra Vidyapeeth, College of Physiotherapy. Participants are included according to the study's inclusion and exclusion criteria. Participants willing to give consent to participate in the study are included. The aim and objectives are explained to the patients. While performing each asana the pre and post readings will be recorded of oxygen saturation (spO₂) using pulse oximeter. The Participants will be in starting position oximeter will be placed on the index finger readings will be noted then asana will be performed and maintained for 5 min after which again readings will be noted. Then the collected data is analyzed using paired 't' Test. Positions of asana include: 6 in Standing, 2 in Sitting, 1 in supine and 3 in prone. And the interpretation is recorded for the analysis.

Results

The data was collected and statistical analysis was done.

Table No. 1: Age wise distribution

Age group	No. of subjects	Percentage
18-22	5	17%
23-26	19	63%
27-30	5	17%
31-35	1	3%

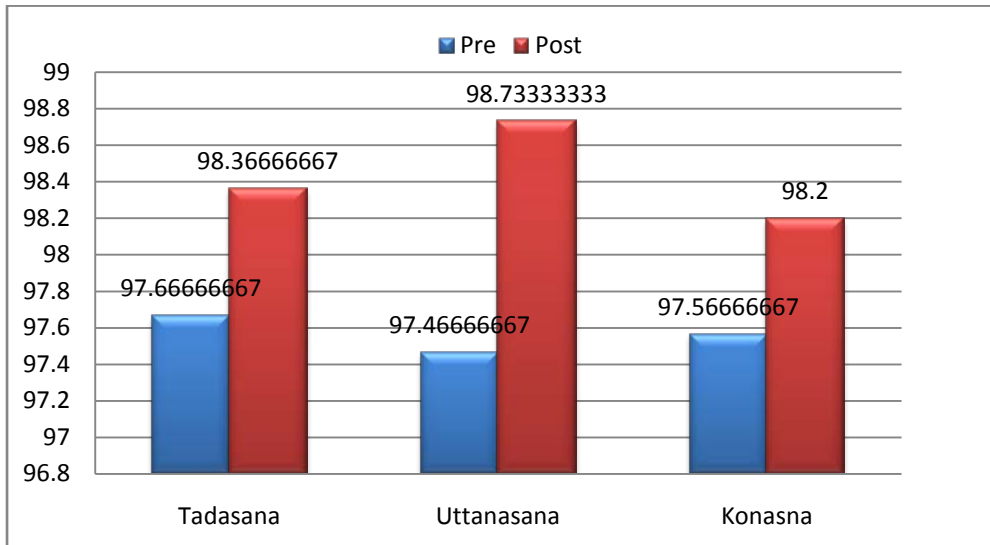
Table No. 2: Gender wise distribution

Gender	No of subjects	Percentage
Male	18	60%
Female	12	40%

Table No. 3: Oxygen Saturation Levels Of Tadasana, Uttanasana, Konasana.

Asana	Tadasana		Uttanasana		Konasana	
	Pre	Post	Pre	Post	Pre	Post
Mean ± SD	97.65±0.61	98.37±0.67	97.46±0.62	98.73±0.44	97.56±0.62	98.2±0.71
P value	<0.0001		<0.0001		<0.0001	

Graph No.3: Oxygen Saturation Levels Of Tadasana,Uttanasana,Konasana.

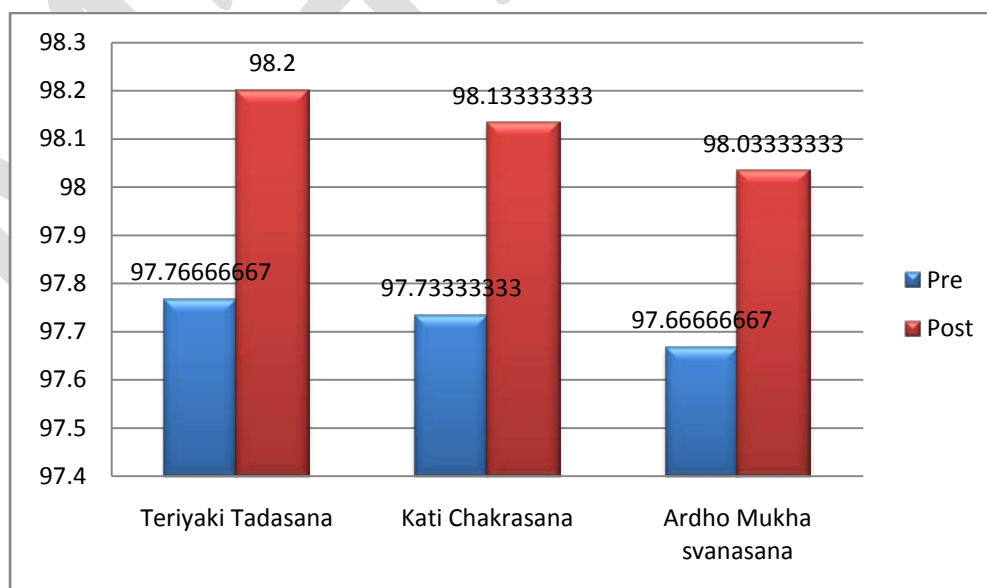


Interpretation: The mean of pre and post intervention of Tadasana is 97.65 ± 0.61 and 98.37 ± 0.67 , uttanasana is 97.46 ± 0.62 and 98.73 ± 0.44 , konasana is 97.56 ± 0.62 and 98.2 ± 0.71 and P value are <0.0001 , <0.0001 , and <0.0001 respectively.

Table No. 4: Oxygen Saturation Levels Of Teriyaki Tadasana,Kati Chakrasana, Adho Mukh Svanasana

Asana	Teriyaki Tadasana		Kati chakrasana		Adho Mukha svanasana	
Mean	Pre	Post	Pre	Post	Pre	Post
\pm SD	97.76 ± 0.67	98.2 ± 0.66	97.73 ± 0.63	98.13 ± 0.68	97.66 ± 0.66	98.03 ± 0.66
P value	0.0046		0.0081		0.0137	

Graph No. 4: Oxygen Saturation Levels Of Teriyaki Tadasana,Kati Chakrasana, Adho Mukh Svanasana

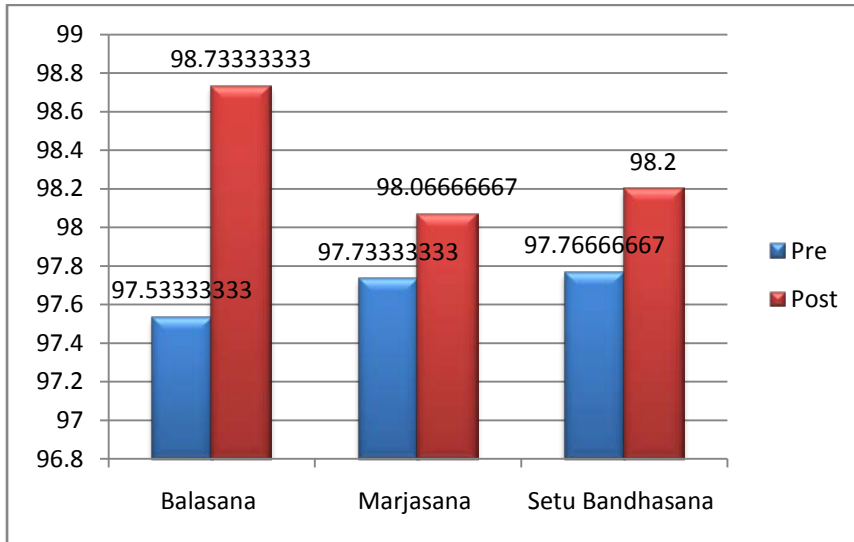


Interpretation: The mean of pre and post intervention of Teriyaki Tadasana is 97.76 ± 0.67 and 98.2 ± 0.66 , Kati Chakrasana is 97.73 ± 0.63 and 98.13 ± 0.68 , Ardho Mukha svanasana is 97.66 ± 0.66 and 98.03 ± 0.66 and their P value are 0.0046, 0.0081, and 0.0137 respectively.

Table No 5: Oxygen Saturation Levels Of Balasana, Marjasana, Setu Bandhasana.

Asana	Balasana		Marjasana		Setu Bandhasana	
Mean ± SD	Pre	Post	Pre	Post	Pre	Post
	97.53±0.57	98.73±0.44	97.73±0.63	98.06±0.69	97.76±0.67	98.2±0.66
P value	<0.0001		0.0389		0.0015	

Graph No.5: Oxygen Saturation Levels Of Balasana, Marjasana, Setu Bandhasana.

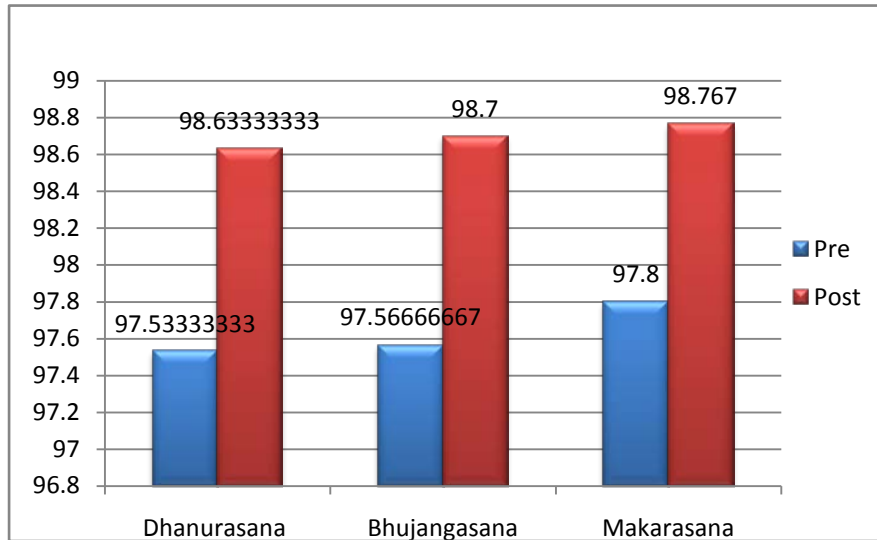


Interpretation: The mean of pre and post intervention of Balasana is 97.53±0.57 and 98.73±0.44, Marjasana is 97.73±0.63 and 98.06±0.69, Setu Bandhasana is 97.76±0.67 and 98.2±0.66 and their P value are < 0.0001, 0.0389, and 0.0015 respectively.

Table No 6: Oxygen Saturation Levels Of Dhanurasana, Bhujangasana, Makarasana.

Asana	Dhanurasana		Bhujangasana		Makarasana	
Mean ± SD	Pre	Post	Pre	Post	Pre	Post
	97.53±0.62	98.63±0.49	97.56±0.72	98.7±0.59	97.8±0.66	98.76±0.62
P value	<0.0001		<0.0001		<0.0001	

Graph No 6: Oxygen Saturation Levels Of Dhanurasana, Bhujangasana, Makarasana.



Interpretation: The mean of pre and post intervention of Dhanurasana is 97.53 ± 0.62 and 98.63 ± 0.49 , Bhujangasana is 97.56 ± 0.72 and 98.7 ± 0.59 , Makarasana is 97.8 ± 0.66 and 98.767 ± 0.43 and their P value are < 0.0001 , < 0.0001 , and < 0.0001 respectively.

Discussion

The present study aimed to find out the effect of Yogasana on Oxygen Saturation Levels in Young Adults of age group ranging from 18-35 years. In total 30 participants were selected depending upon the inclusion and exclusion criteria, which includes subjects between the age group of 18-35 years. The aim and objectives of the study were explained to the participants. The participants were given the asanas to perform and holding the position for 5 minutes, pre and post asans readings were recorded and then the data was analysed by descriptive analysis using .

Studies said that 18-35 years is young adult age group. In the current study, 17% participants belongs to age group 18-22, 63% participants belongs to age group 23-26, 17% subjects belongs to age group 27-30, 3% participants belongs to age group 31-35. (Table No.1)

Table no 2. Shows the study found that 60% participants were males and 40% participants were females which were randomly taken into consideration.

Graph 3. Shows oxygen saturation levels of Tadasana , Uttansana and Konasana. So among the three asans we found out that Tadasana and Uttansana has more increase in oxygen level than Konasana. Tadasana helps in increasing the lung capacity so while performing the asana we have to go on the toes and stretch the arms above the head, which makes more space for the oxygen to enter the respiratory tract. It also improves the coordination between the mind and body. Uttanasana is the standing forward bending posture (extension of the entire back body) in which head is below the heart and allows the oxygen rich blood to brain. Also the posterior side of the lungs gets wider and more air can enter which helps in increasing the saturation levels. So (Graph No.3) In this study we found out that konasana is less effective in increasing the saturation levels as compared to tadasana and uttanasna.

Graph 4. Shows the oxygen saturation levels of Teriyaki Tadasana, Kati Chakrasana, and Adho Mukh Svanasana. So among the three asans we found that all three are almost equally responsible in increasing in the oxygen saturation levels. In teriyaki Tadasana because of the sideways poses there in lateral opening of the chest which creates more space for the air to inter inside the lungs and hence

this asans helps in increasing oxygen saturation levels. Kati Chakrasana helps in expanding the lungs which also helps in oxygen intake. Adho mukh svanasana also called as downward facing pose which in search is an inverted asana so increase in saturation is seen. So graph no 4. States that all the three asans are equally less effective in increasing saturation levels.

Graph No.5 Shows the oxygen saturation levels of Balasana, Marjasana, Setu Bandhasana. Among the three asans we found that balasana is more effective in increasing saturation level than other two asans. While performing balasana the head should be lowered on the floor while kneeling down and keeping the legs apart, slight pull in lower back and inner thigh muscles will be felt, at the same time being in the same position helps to regulate breathing pattern and increase the intake of oxygen in lungs and thereby in the blood helping in increase in saturation level. So we found out that balasana is more effective than marjasana and setu bandhasana.

Graph No. 6 Shows the oxygen saturation levels of Dhanurasana, Bhujangasana and Makarasana. Among the three asans we found out that all the three asans are more effective in increasing the oxygen saturation level. In Dhanurasana also called as bow pose helps in oxygen intake as it opens the chest wall, neck, and shoulder muscles which help in more oxygen intake. Bhujangasana is a wonderful stretching exercise for lower back. It also corrects the posture and prevents back ache. In this position abdomen and chest are flared so lungs have more space to inhale oxygen which increases lungs capacity also helps in increasing concentration in the bloodstreams. Makarasana is the most effective asans among all the 13 asans in the project. As it is low impact stretching exercise of lower back more population can perform it. It also helps in bringing back strength and flexibility in the targeted muscles. Also abdomen and chest are flared in position the lungs have more space for oxygen intake. Taking deep breaths helps in increasing more capacity in this position.

Doing yogasans regularly, helps oxygen to reach each body organ and function properly. Asans involve legs, arms, and hips muscles which help the body responds quickly and increases breathing. This will increase the amount of oxygen in the blood as the heart will beat faster and blood flows to muscles and back to the lungs increases, small blood vessels will open up to deliver more oxygen, and the body will also release endorphins.

With regard to the cardio respiratory system, the inverted yogasana postures and pranayama are unique among the yoga practices in terms of their effect on cardio respiratory system. Inverted asanas like create a volume overload on the heart at the initial stage of practice, but in the long run, they act in a paradoxical way through sensitizing the baroreceptors, reducing the heart rate and blood pressure and oxygen saturation levels, although they need to be done with precautions under a competent teacher at the beginning stage.^[6]

Consistent practice of yoga postures increases the lung's airflow, air capacity, stamina and efficiency. Back bending postures open the chest and improves both lung and heart functions. Upper back bending postures and chest opening postures relieve hardness if it is harder to exhale during asthma attacks. Forward bends and lower back bending poses relieve difficulty if it is more difficult to inhale because of the harden mucus. Inverted postures drain the excess mucus from the lungs and balance the immune system and also makes a room for air to flow. A general yoga practice reduces stress with the physical tension, and muscle tightness which increases overall feelings of well being by activating the parasympathetic nervous system. Blood carries oxygen in two forms, the majority is bound to hemoglobin (oxyhaemoglobin) and the rest is dissolved in the aqueous phase of blood (the plasma). The dissolved fraction is dependent upon the partial pressure of oxygen saturation levels. As the partial pressure increases, the dissolved fraction of oxygen increases.^[7]

The important component is the holding of the breath, which causes increase in CO₂ level and decrease in oxygen level. The deep and slow breathing components of pranayama improve the inspiratory and expiratory volume also the vital capacity, and also reduce the dead space, as all

parts of respiratory tract are used by the system. Psychologically, the phase of kumbhaka with optimal increase in CO₂ level creates a state of alert calmness which is essential for the practice of meditation^[6]

Body position changes have an adverse effect on the optimal transport of blood and oxygen levels. Placing the patient in the right position improves gas exchange and contributes to fastest recovery. ^[8] A particular body position or asana, the time a body remains in a particular asana, or changes in body position may have an adverse effect on oxygen transport, especially in the very young or elderly.^[9]

For this reason, to avoid the adverse effects in oxygen transport in the neuromuscular, musculoskeletal systems and skin that positioning or changing the body position may cause, body position changes that improve oxygen transport and oxygenation should always be considered.^[10] It is known that body positions can increase ventilation-perfusion ratios.^[11] The imbalance between the ventilation and perfusion in the upper areas and lowest areas of the lungs causes a slight reduction in the efficiency of the lungs in terms of the exchange of oxygen levels.^[12]

Conclusion

The present study found significant improvement in the study to assess the effect of specific asana on oxygen saturation level. By this we can conclude that Yogasana is very effective in increase in oxygen saturation level.

Conflict of Interest: None

Funding : None

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