

<https://doi.org/10.48047/AFJBS.6.7.2024.2466-2470>



ORIGINAL RESEARCH

Effect Of Yogic Eye Exercises Along With Pranayama On Visual Acuity On Computer Science Students Of Madhya-Pradesh

¹Sonali Tripathi, ²Dr. Naveen Banke, ³Dr. Hemant Gadekar

¹Phd scholar, Sarvapalli Radhakrishnan University, Bhopal, M.P., India

²Professor and Head, ³Professor and Dean, RKDF Medical College and Research Center, Bhopal, M.P., India

Corresponding author:

Sonali Tripathi

Phd scholar, Sarvapalli Radhakrishnan University, Bhopal, M.P., India

Article History

Volume:6, Issue7, 2024

Received: 26 April 2024

Accepted: 24 May 2024

doi:10.48047/AFJBS.6.7.2024.

2466-2470

ABSTRACT

The effectiveness and synchronization of the accommodation and vergence systems must be maximized in order to reduce the eye strain that comes with near and intermediate tasks. The need for close and intermediate visual tasks has increased dramatically due to the current requirement for extended participation in computer and gazette-related jobs. The extraocular and ciliary muscles are overworked as a result of this increased exertion, which may cause eye tiredness and associated asthenopic symptoms. Among the non-presbyopic population with asthenopic symptoms, eye fatigue is one of the most commonly reported conditions worldwide. Reducing ocular tiredness is essential for improving near- and intermediate-range performance.

Materials and Method: Thirty computer science students from central M.P were split evenly into study and control groups for this study. For a duration of twelve weeks, the study group individuals engaged in regular practice of Pranayama, Kapalabhati, and Yogic eye exercises, whereas the control group participants did not engage in any physical activity. Snellen's chart was used to evaluate visual acuity and assess the effects of Pranayama and eye exercises.

Result: Thirty people took part in the control group as well as the study group. Prior to intervention, the right eye's visual acuity in the study group was 34.30 ± 20.28 ; following intervention, this improved to 30.70 ± 21.89 . In a similar way, the left eye's visual acuity was 34.60 ± 20.08 prior to intervention and 30.46 ± 21.62 following Yogic eye exercises.

The values in the control group were 34.10 ± 19.22 on day one and 36.90 ± 19.15 after twelve weeks for the left eye. In a similar way, 32.60 ± 20.37 on day one and 34.30 ± 20.44 after twelve weeks for the right eye. The study group members' visual acuity ratings improved statistically significantly, according to paired t-test statistical analysis. For the subjects in the control group, the results were statistically not significant. The results indicate that pranayama and yogic eye exercises improve eyesight, which is reflected in better visual acuity.

Conclusion: This study suggests that Yogic eye exercises in addition to Pranayama might be used as a non-pharmacological intervention to improve visual acuity.

Keywords: Pranayama, Yogic eye exercises, Snellen's chart, visual acuity

INTRODUCTION

People's daily lives depend greatly on their eyes. Both at work and at home, the eyes process a wide variety of visual information, with the exception of sleep. Eye strain, irritation, burning sensations, redness, double vision, and fatigued, dry, and/or irritated eyes are common complaints from visual display users. ¹ Students now experience increased environmental eye fatigue due to their frequent computer screen usage. When using a

computer for business, play, or social networking, eye tiredness is a typical complaint⁵. In general, artificial or inadequate lighting, prolonged visual display watching, poor food, eye muscle fatigue from lengthy workplace and academic study hours, mental and emotional tension, and aging can all have an impact on eye tiredness.⁵ Previous research has shown that functional abnormalities in the ocular muscles, which are exacerbated by discomfort and tension from computer use, are frequently linked to eye problems^{6, 7}. Consequently, eye fatigue may be lessened by relaxing techniques⁸. Yoga has been associated with positive effects on both mental and physical health through the suppression of the sympathetic nervous system and the hypothalamic-pituitary-adrenal axis⁹.

Yoga poses have been linked to better self-rated relaxation and noticeably lower stress levels in nursing students^{10-12, 13}, according to earlier research. By raising blink frequency and decreasing the severity of the optical illusion that a flicker is continuous, these activities have been demonstrated to improve visual perceptual sensitivity and the capacity to differentiate a flickering input. Over the course of the 12-week study period, stress levels among nursing students significantly decreased in the yoga exercise group whereas they increased in the control group. Nevertheless, not many research have shown that doing eye yoga relieves eye fatigue. Therefore, the purpose of this study is to evaluate how yoga eye workouts affect the visual acuity of central Indian computer science students.

MATERIALS AND METHOD

Students studying computer science in central India participated in the current study. For the study, a total of thirty healthy participants—man and female—in the 18–30 age range and from comparable socioeconomic backgrounds were gathered. Every study participant shared comparable sleeping and eating schedules while residing in a college dorm. The following predetermined inclusion and exclusion criteria were used to choose the study participants:

Criteria for Inclusion

1. Indian individuals, whether or not they had refractory errors
2. Both male and female.
3. Participants aged between 18 and 30yrs.

Criteria for Exclusion

1. Individuals who are colour blind.
2. Individuals who have organic disorders such as squinting, glaucoma, eye infections, trauma, cancer, or post-operative refractive defects.
3. Individuals with illnesses such as neurological disorders, head injuries, cardiovascular diseases, and diabetes that are known to affect cognitive performance.
4. Participants unwilling to provide written approval.

Every participant received a thorough explanation of the study's purpose and was asked to provide written, informed consent. The institutional ethics committee approved the study.

A control group and a study group were formed. The subjects were split into two groups . 30 subjects (with 18 male and 12 female)each . Prior to the commencement of the investigation, all participants' visual acuity levels were documented. Study group members were instructed in Pranayama, Kapalbhathi, and Yogic eye exercises. Under supervision, they consistently practiced Yogic eye exercises and Pranayama twice a day for a total of one hour over a period of twelve weeks. The control group's members weren't exercising because they were too preoccupied with their regular tasks. At the conclusion of the 12-week period, visual acuity was measured in each participant to assess the impact of the exercises on eyesight.¹³⁻¹⁴

Study Methodology: For a period of 12 weeks, participants in the study group faithfully followed the set protocol while performing the recommended exercise regimens.

1. **Using Kapalbhathi for Palming and Visualization:** Gently press your palms together to warm them. To allow the fingers to cross over the forehead, both eyes should be closed and covered with the palms. In order to prevent causing pressure to the eyes, the palms should be cupped. The person should open their eyes to check if any light is entering. The two tight eyes relax due to the warmth of the hands and the complete blockage of outside light. In addition to palming, participants in Kapalbhathi must sharpen their diaphragm by abruptly and quickly exhaling through both nostrils. The process of inhaling is passive and automatic. A quick, powerful inward motion of the abdominal muscles is required to expel the air from the lungs. The abdominal stroke should be finished, and a vigorous exhalation of breath should occur. It is not necessary to consciously expand during inhalation, and the abdominal muscles should remain relaxed. Three phases should be used to complete the workout, each including 20 to 30 strokes per minute. It is possible to include a little rest period in between each step. You can take a brief break in between. The thoracic muscles should remain engaged during the workout.¹⁵ The subject should practice it for five to ten minutes, at least twice a day.
2. **Blinking:** It is instructed that subjects establish a habit of blinking once or twice every ten seconds. It is especially helpful for people who wear glasses or contact lenses as it cleans and lubricates the eyes.
3. **Near and distant concentrating with Kapalbhathi:** The subject should hold two pencils, one at arm's length and the other at 7.5 cm away, or their index fingers in front of their faces. Subject must fix their wide eyes on one, blink, then shift their attention to the other. Anytime the chance presents itself, it need to be done several times. The Kapalbhathi pranayama should be included by the subjects in their concentration activities.
4. **Shifting using Kapalbhathi:** Eye strain can be avoided by moving the eyes. Our eyes can be harmed by prolonged looking. It is not advisable to stare at anything all the time. The participant must visualize themselves staring straight ahead at the centre of an enormous clock. Head must remain still at all times. The subject must look as far as they can toward the 12 o'clock position, hold that gaze for two seconds, then rotate their head to look at 3 o'clock, 6 o'clock, 9 o'clock, and finally back to the 12 o'clock position. The patient must maintain eye contact for two seconds in each posture, and they must extinguish their breath in three separate bursts by contracting their abdominal muscles. that is, Kapalbhathi. It is necessary to repeat this cycle counterclockwise. This exercise must be completed by the individual three times in a clockwise and three times counterclockwise rotation.
5. **Splashing:** Participants are required to splash their eyes 20 times in the morning, 20 times with warm water and 20 times with cold water. Splash the closed eyelids 20 times with cold water and then 20 times with warm water to repeat the process at night. This increases blood circulation.

Final Measures

Acuity of vision

It is the extent to which an object's outlines and features are understood. Snellen's chart was used to measure each subject's visual acuity. Snellen's chart: Snellen produced a new set of charts in 1875 with six meters serving as the accepted unit of measurement for distance. This chart measures a person's ability to see distant objects by having them identify test letters on the chart. The examination Black block letters with a white backdrop come in various sizes. A number in the form of 60, 36, 24, 18, 12, 9, 6, and 5 meters is written next to each line of letters. The chart is made such that every letter, at a certain distance, a typical person can read subtends a visual angle of five minutes. Each letter stroke has a width of one minute, and there is a one-minute arc between each line of the letter. As a result, a regular person's "minimum separable" is equivalent to a visual angle of around one minute. The subject's

visual acuity is 6/24 if, when standing at a distance of 6 meters (20 feet), he studies the chart with one eye at a time and is only able to read the line marked "24 meters." It indicates that a letter that a typical person might read at a distance of 24 meters is only being read at 6 meters. The average eye acuity ranges from 6/6 or 6/5¹⁶⁻¹⁷.

Visual Acuity Findings in Study Group

Intervention	Right Eye			Left Eye		
	Mean	Std Dev	SEM	Mean	Std Dev	SEM
Before Yoga	34.30	20.28	2.61	34.60	20.08	3.66
After Yoga	30.70	21.89	2.82	30.46	21.62	3.94
P value=0.00(S)			P value=0.00(S)			

Visual Acuity Findings in Control Group

Intervention	Right Eye			Left Eye		
	Mean	Std Dev	SEM	Mean	Std Dev	SEM
Day 1	34.60	20.37	3.71	32.10	19.22	3.51
After 120 days	36.30	20.44	3.73	34.90	19.15	3.49
P value=0.00(S)			P value=0.00(S)			

DISCUSSION

Snellen's chart was utilized in this study to measure the visual acuity of healthy, normal volunteers and to assess the impact of Yogic and Pranayama eye exercises. According to the results, those who practiced Pranayama in addition to Yogic eye relaxation techniques showed a substantial increase in visual acuity when compared to the control group. Our study's findings are similar to those of Shirley Telles et al¹⁷, who examined 30 professional computer users' visual discomfort before and after practicing yoga. Their findings indicated that yoga practiced reduced visual discomfort, while the group that did not receive any yoga intervention experienced increased discomfort after sixty days.

Rosemary Gaddum Gordon¹⁸: The following was said in an article published in 1995 by Gordon, D.B.O., M.A.: To sustain clear, correct focus, the extra ocular muscles must be flexible and energetic. Muscles soften and rest as we unwind. They may now move more freely and revert to their more natural condition as a result. Both the body and the intellect are involved in seeing. From a developmental perspective, the mind sees, and the eye is only an extension of the brain. Because of this relationship between the body and the mind, the eyes can only completely rest when the mind does. When the mind is just concentrated on one subject at a time, it relaxes. After six weeks of training, participants in a research by **M Ashok Kumar et al.¹⁹** on thirty medical students reported both objective and subjective improvements in their ocular health from yoga eye exercises²⁰. Beyond the eye-yoga effects, individuals in the yoga group may have benefited psychologically by attending regular sessions with the teacher, which might have an impact on the differences between the two groups. This lends credence to the theory that psychological affects can be a contributing element in the yoga class. Consequently, our results validate that yoga eye exercises are a non-pharmacological strategy for the relief of ocular tiredness. There haven't been many studies on eye yoga exercises, though, which suggests that further research is necessary to provide solid methodological proof that an eye yoga program may relieve eye tiredness. **FINAL VERDICT** The current study's findings indicate that pranayama practice combined with eye exercises for a 12-week period can enhance visual acuity. On the other hand, there is no improvement in visual acuity among the patients in the control group who had not engaged in pranayama exercise. It implies that pranayama and eye exercises may be utilized as a possible non-pharmacological method to enhance visual acuity.

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