



Effect Of Yogic Eye Exercises Along With Pranayam On Visual Acuity On Computer Science Students Of Central India:-

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Abstract

Introduction:- To alleviate eye fatigue associated with near and intermediate tasks, it is crucial to optimize the efficiency and coordination of accommodation and vergence systems. The current demand for prolonged engagement in computer- and gazette-related activities has significantly heightened the necessity for near and intermediate visual tasks. This increased workload places excessive strain on the extraocular and ciliary muscles, potentially leading to eye fatigue and related asthenopic symptoms. Across the globe, eye fatigue ranks as one of the frequently reported conditions among the non-presbyopic population experiencing asthenopic symptoms. Seeking relief from eye fatigue is imperative to enhance performance in near and intermediate tasks.

Material and Methods: This study was done on 30 computer science students of central India , M.P, divided into study and control groups equally. Study group subjects performed kapalabhati ,Pranayama and Yogic eye exercises regularly for Twelve weeks while control group participants did not participate in any kind of exercise. The assessment of visual acuity and the impact of Pranayama and eye exercises were examined using Snellen's chart..

Results: Thirty individuals participated in both the study group and the control group. The study group exhibited a visual acuity of 34.30 ± 20.28 in the right eye before intervention, which improved to 30.70 ± 21.89 after intervention. Similarly, the visual acuity in the left eye was 34.60 ± 20.08 before intervention and 30.46 ± 21.62 after intervention. In the control group, the values for the right eye were 32.60 ± 20.37 and 32.30 ± 20.44 , and for the left eye, they were 31.10 ± 19.22 and 30.90 ± 19.15 . Statistical analysis using a paired t-test indicated a statistically significant improvement in visual acuity scores among the study group participants. However, the results were statistically non significant in the control group subjects.

The findings suggest that engaging in Pranayama and Yogic eye exercises contributes to enhancing vision, as reflected in improved visual acuity.

<p>CC License CC-BY-NC-SA 4.0</p>	<p>Top of Form Conclusion: The current research proposes that the combination of Pranayama and Yogic eye exercises has the potential to serve as a non-pharmacological intervention for enhancing visual acuity. Keywords:: <i>Visual acuity, Pranayama, Yogic eye exercises, Snellen's chart</i></p>
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Introduction:

Eyes play a crucial role in the daily lives of individuals. Except during sleep, a diverse range of visual information is perceived through the eyes, both at work and at home. Users of visual displays commonly report visual discomfort such as tired eyes, dry eyes, eye strain, irritation, poor visual acuity, burning sensations, redness, and double vision¹⁻⁴. Nowadays, university students face accelerated environmental eye fatigue as frequent users of computer screens. Eye fatigue is a common complaint due to computer usage for academic, recreational, or social networking purposes⁵. Generally, eye fatigue can be influenced by factors such as artificial or insufficient lighting, prolonged viewing of visual displays, poor diet, eye muscle inefficiency due to extended hours of office work and academic studies, psychosocial and emotional tension, and aging⁵. Prior studies have indicated that eye disorders are often associated with functional defects in ocular muscles aggravated by pain and tension resulting from computer work^{6,7}. Therefore, relaxation practices may help alleviate eye fatigue⁸. Yoga practices have been linked to physical and mental health benefits by down-regulating the hypothalamic-pituitary-adrenal axis and the sympathetic nervous system⁹. Previous studies reported that yoga exercises are associated with improved self-rated relaxation¹⁰⁻¹² and significantly reduced stress levels in nursing students¹³. These practices have been shown to enhance visual perceptual sensitivity and the ability to discriminate a flickering stimulus by increasing the frequency of blinking, reducing the magnitude of the optical illusion that a flicker is steady. Nursing students in the yoga exercise group experienced a significant decrease in stress levels over the 12-week period, while those in the control group had an increase in stress levels. However, few studies have provided evidence that the practice of eye yoga helps relieve eye fatigue. Hence, this study aims to assess the effects of yogic eye exercises on Visual Acuity in computer science students of central India.

MATERIAL AND METHODS

Study Design

Present study was carried out in Computer Science students of central India. Total 30 healthy subjects (both male and female) who were in the age group of 18–30 years belonging to similar socio-economic status were recruited in the study. All the study participants were staying in college hostel having similar eating and sleeping patterns. The study subjects were selected according to following preset inclusion and exclusion criteria:

Inclusion Criteria

1. Indian subjects with or without refractory error
2. Both male and female subjects.
3. Subjects in 18-30 years of age.

Exclusion Criteria

1. Subjects with colour blindness.
2. Subjects with organic diseases like glaucoma, eye infections, eye injury, malignancy, post surgery for refractive errors, squint.
3. Subjects suffering from medical conditions known to impact cognitive functioning like neurological disorders, head injuries, cardiovascular diseases and diabetes.
4. Subjects not willing to give written consent.

All the participants were briefed in detail regarding the nature of study and written informed consent was obtained from each of them.

Study was approved by the Institutional ethics committee.

Two groups were created viz: study and control group.

Subjects were divided randomly into two groups; containing 30 subjects (18 male and 12 female) each. Visual acuity values were recorded from all the study participants before starting the study. Participants of study group were taught Yogic eye exercises, Kapalbhathi and Pranayama. They performed Yogic eye exercises and Pranayama 2 times a day for (total one hour) 12 weeks regularly under supervision. Participants from control group were busy with their daily activities without exercise. Visual acuity was recorded from all the participants at the end of 12 weeks to see the effect of exercises on vision¹³⁻¹⁴.

Study Procedure

Participants in the study group consistently engaged in the prescribed exercise techniques according to the established protocol for a duration of 12 weeks..

1. Palming and Visualization with Kapalbhathi: Warm the hands by rubbing palms over each other. Both the eyes should be covered and closed with the palms to allow the fingers to cross on the forehead. The palms should be cupped to avoid applying pressure to the eyeballs.

. Person should open the eyes and see if any light is getting in or not. The warmth of the hands along with blocking out all external light, relaxes the pair of tensed eyeballs.

Kapalbhathi: Along with palming, subjects need to exercise the diaphragm by exhaling suddenly and rapidly through both the nostrils. Inhalation is automatic and passive process. The air should be exhaled from the lungs with a rapid and forceful inward stroke of the abdominal muscles. The abdominal stroke should be complete and the air should be expelled forcefully. During inhalation, no conscious expansion is required and the abdominal muscles should be relaxed. The exercise should be executed in three phases, with each phase comprising 20 to 30 strokes per minute. A brief rest pause can be incorporated between the phases. A little rest pause can be taken in between. Throughout the exercise, the thoracic muscles should be kept contracted.¹⁵ Subject need to practice it for 5–10 minute sessions, at least twice a day.

2. Blinking: Subjects are told to make a routine of blinking regularly, once or twice per 10 seconds. It helps in cleaning and lubricating the eyes particularly in glass and contact lens wearers.

3. Near and far focusing with Kapalbhathi: Subject should hold index fingers or two pencils, in front of the face—one should be at 7.5 cm away and other at arm's length. Subject need to focus on one with eyes open, then blink and focus on other. It should be repeated several times whenever an opportunity arises. Subjects should incorporate Kapalbhathi pranayama into their focusing exercises.

4. Shifting with Kapalbhathi: It is essential to move the eyes to prevent eye strain. Prolonged staring can be harmful to our eyes. One should avoid continuous staring at an object. The subject needs to imagine looking at the center of a giant clock with their face straight ahead.. Head should be still all the time, subject has to look as far as possible towards the 12 O'clock position, look for 2 seconds, then move the gaze clockwise at 3' O'clock, then 6' O'clock, then 9' O'clock and back to 12' O'clock position. At every position subject has to hold his/her vision for two seconds and should expire in three bouts with contraction of abdominal muscles. i.e., Kapalbhathi. This cycle should be repeated anticlockwise. The participant needs to perform this exercise three times clockwise and three times anticlockwise in an alternating manner.

5. Splashing: Every morning subjects have to splash close eyes 20 times first with warm water and then 20 times with cold water. Repeat the procedure in the night by splashing the closed eyes 20 times first with cold water and then 20 times with warm water. This stimulates the circulation of blood.

Outcome Measures

Acuity of vision

It is the degree to which the details and contours of objects are perceived. We have measured the acuity of vision of all the subjects using Snellen's chart.

Snellen's chart – in 1875 Snellen created a new set of chart that used six meters as the standard measurement distance. It is a chart used for testing distant vision which is tested by the ability of the subject to recognize test letters on the chart. The test Block letters which are black on white background are of different sizes. Each line of letters has a figure of 60, 36, 24, 18, 12, 9, 6 and 5 meters noted beside it. The chart is designed so that each letter a normal individual can read at a specified distance subtends a visual angle of 5 minutes. The width of each stroke of the letter is 1 minute, and the lines in the letter are also separated by 1 minute of arc. Consequently, the 'minimum separable' in a normal individual corresponds to a visual angle of approximately 1 minute.. If the subject, who stands at 6 meters (20 feet) distance reads the chart with one eye at a time and can read no further than the '24 meters' line, his visual acuity is 6/24. It means a letter which can be read by a normal individual at 24 meters is being read at a distance of 6 meters only. Normal visual acuity is 6/6 or 6/5¹⁶⁻¹⁷.

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)			

Table 1 :Visual Acuity findings in study group

Intervention	Right Eye			Left Eye		
	Mean	Std Dev	SEM	Mean	Std Dev	SEM
Before Yoga	32.60	20.37	3.71	31.10	19.22	3.51
After Yoga	32.30	20.44	3.73	30.90	19.15	3.49
P value=0.00(S)			P value=0.00(S)			

Table 2 :Visual Acuity findings in Control group

DISCUSSION

In the present study Snellen's chart was used to check visual acuity in normal healthy subjects and to see the effects of Pranayama and Yogic eye exercises on visual acuity. Results suggested that there was significant improvement visual acuity in subjects practicing Pranayama along with Yogic eye relaxation exercises as compared with control group. Our study results are comparable with that of Shirley Telles et al, they studied the visual discomfort in 30 professional computer users before and after yoga, their results suggested that the yoga practice reduce visual discomfort, while the group who had no yoga intervention showed an increase in discomfort at the end of sixty days¹⁸.

Rosemary Gaddum Gordon, D.B.O, M.A. published the article in 1995 in which he mentioned that: The extra ocular muscles need to be flexible and energized in order to maintain clear accurate focus. As we relax, muscles soften and rest. This allows them to return to their more natural state and move more freely. Vision is a function of both body and mind. Developmentally the eye is an extension of the brain, and it's the mind that sees. As a result of this body-mind connection the eyes only relax fully when the mind is relaxed. The mind relaxes when it is focused on just one thing at a time¹⁹. Study conducted by M Ashok Kumar et al on 30 medical students concluded that yoga eye exercises shown objective as well subjective improvement in ocular health of study participants after 6 weeks of exercise²⁰.

The differences between the two groups, besides the eye-yoga effects, may be influenced by psychological benefits gained by participants in the yoga group from attending frequent meetings with the instructor. This supports the concept that psychological effects could be an additional factor in the yoga group. Therefore, these findings confirm that yogic eye exercises can be considered as a non-pharmacological intervention for relieving eye fatigue. However, there have been few studies related to eye-yoga exercises, implying that follow-up studies are needed to establish rigorous methodological evidence to support the relief of eye fatigue through an eye-yoga program.

CONCLUSION

The results of the present study suggest that practice of pranayama along with eye exercises for 12 weeks improves the visual acuity. In contrast, the control group subjects who had not practiced pranayama do not show any improvement in the visual acuity. It suggests that pranayama along with eye exercises can be used as potential non-pharmacological measure for visual acuity improvement.

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