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Effect of Eye Yoga and Mindful Relaxation Practices on Management of Digital Eye Strain in a Tertiary Care Hospital: A Comparative Interventional Study

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Abstract

Introduction

Digital eye strain is caused due to extended computer, tablet, and mobile phone usage. The study objective was to assess the effect of mind and body relaxation techniques on digital eye strain in near-sighted subjects.

Materials and method

A non-randomized comparative interventional study was carried out at a tertiary care eye clinic. Near-sighted individuals diagnosed with digital eye strain (dry eyes, burning sensation, headache, and eye fatigue due to digital media usage for more than 2 hours every day) were included in the study. Those with glaucoma, post refractory error surgery, squint, eye infections and who did not give consent were excluded. There were16 participants each in intervention and control group. Intervention included paying attention to peripheral motion, slow blinking and breathing, eye, head and shoulder mobility exercises performed for two hours daily for 15 days. Visual acuity was measured using Snellen's chart.

Results

There was statistically significant difference in the mean visual acuity within intervention group (p value -0.00001 of right eye and p value -0.0024 of left eye at 95% Confidence Interval (-0.10 to -0.45 of right eye and -0.10 to -0.40 of left eye) and between intervention and control group (p value 0.0006 of right eye p value 0.03 of left eye) at 95% CI (0.16 to 0.5: right eye, 0.02 to 0.36: left eye). Cohen's d value for right eye was 1.0 while for the left eye was 0.9 which was large effect size.

Conclusion

Practising mind-body relaxation technique can improve visual acuity non- pharmacologically.

Keywords- Digital eye strain, visual acuity, mind-body relaxation techniques, Snellen's chart

Introduction

In the twenty-first century, information technology has proven to be a boon to a person's overall development. However, if used excessively, it has some drawbacks. Spending excessive time on digital media has contributed to an increase in eye complaints. Most people visit an ophthalmologist for common ocular issues such as headache, double vision, eye strain, teary eyes, redness, burning, itching, and blurred vision. [1]

In India, Ophthalmologists frequently cite headache, eyestrain, fatigue, burning, watery eyes, and redness as common computer-related symptoms.[2]

The American Optometric Association defines computer vision syndrome, also referred to as digital eye strain, as a collection of vision and eye issues brought on by extended computer, tablet, e-reader, and mobile phone usage. Reduced blink rates brought on by prolonged use of a digital eye screen may cause dry, burning, and itchy eyes. [3] Digital eye strain may be caused by tunnel vision, working in a dimly lit environment, not blinking enough, reading very small print on very bright screens, and continual screen staring.[4] The prevalence of symptoms related to digital eye strain was 89.9%, and the most prevalent and upsetting symptoms were headache (19.7%) and eye strain (16.4%) in students who used digital devices for two or more hours each day.[5]

It is inferred that the higher percentage of visual issues among computer workers is due to both the strain of near work and the stress associated with it.[6]

Complex visual representations and messages are created by combining the two of our eyes, their connections to the brain, and our extraocular muscles. We all need to respond visually to a variety of simple and complicated circumstances in our daily activities. These muscles can become tired. As a result, regular exercise and adequate relaxation are required to keep our muscles healthy. A combination of eye yoga and mindful relaxation techniques is hypothesized to reduce symptoms of visual strain, resulting in improved visual acuity. People who spend a lot of time using computers have been demonstrated to benefit from yoga in terms of their ocular problems.[7] Employees' emotional well-being and stress management were found to improve even with a six-week short programme of yoga exercises. [8]

In myopia, the parallel light rays that enter the eyes converge inside of the retina. This makes it challenging to see distant objects. Snellen's chart is utilized to measure the visual acuity, which arranges the alphabets in six lines of progressively smaller type, the severity of myopia can be measured. The last line in the chart can be read from a distance of six metres by a person with normal vision (6/6 vision).[9] The traditional treatment for myopia involves wearing glasses with concave lenses in order to cause the retinal image to converge. Numerous studies have demonstrated the benefit of relaxing in the treatment of myopia. The pattern of observable tension in the neck, shoulders, upper arms, lower back, forehead, jaws, and shoulders is another method to describe blurry vision. Myopia progression is observed to be effectively controlled by retraining to ease tension in the muscles, increase eye mobility, and reduce mental strain. Myopia was successfully treated in a trial utilising holistic techniques viz. Cranio Sacral therapy, which involves gentle touch treatment to calm the body; Aroma therapy, which involves full-body massages using essential oils; breathing exercises, body stretching, and exercises for the neck and eyes.[10] The oblique muscles of the eye, which can be strengthened by specific relaxation techniques, are said to have a key part in vision, according to a theory put forth in the 1900s by an ophthalmologist named Dr. William Bates. He emphasised again that just 10% of vision is physical and 90% is psychological. Vision is improved by calm and is impaired by strain. [11]

So as per above rationale, our study objective was to assess the effect of mind and body relaxation techniques on digital eye strain in near-sighted subjects. Since this kind of study had not been performed in our study setting yet, this made our study unique.

Materials and Method

This was a non-randomized comparative interventional study carried out in November 2022 at a tertiary care eye clinic. After taking approval from the institutional ethics committee, all those visiting the clinic who were near-sighted and were diagnosed as having digital eye strain (dry eyes, burning sensation, headache, and eye fatigue from using a laptop or smartphone for more than 2 hours every day) by ophthalmologists were included in the study. Exclusion criteria included those with organic disorders including glaucoma, surgery for refractive problems, squint, or infectious eye conditions such conjunctivitis, scleritis, or uveitis. All those participants who did not give their consent were also excluded from the study.

Expecting a 60% improvement in visual acuity from baseline in intervention group and 5% improvement from baseline in control group, considering 95% Confidence Interval (CI), Power of 80%, 1:1 ratio of subjects in intervention and control group, sample size came out to be 28, 14 in each group. On adding 20% loss to follow up, final sample size was 32, 16 in each group. Calculation of sample size was done using OpenEpi.[12]
Study subjects coming to the clinic on Monday, Tuesday or Wednesday were classified as intervention group while those visiting the clinic on Thursday, Friday or Saturday were classified into the control group. This was done to prevent the dilution of our intervention. The allotment of sample into groups was based on matching pair technique. The matching variables were number of years of spectacles usage, refractive power and associated digital strain complaints. Data was collected in one week duration.
Intervention was provided in the form of mind-body relaxation practices such as paying attention to the peripheral motion to avoid tunnel visioning throughout the day, slow blinking (20-20-20 after every hour) and

slow breathing, Eye, head, and shoulder mobility exercises such as sideways movement, upward and downward, 8 figure, diagonal movement. Eye relaxation was accomplished by utilising a cold pack, vapour, or eye wash cup. Breathing exercises included 1: 4: 2 ratios of inhalation, holding breath and exhalation. Anulom Vilom was done for 30 minutes. Visualization of images and letters was done for affirmations for clearer vision.

During the relaxation phase, the individuals are instructed to concentrate on counting. This was done to make sure the mind was unperturbed by either good or negative thoughts and was in a neutral condition. The subject was given a thorough explanation of each step and was closely watched to ensure that it was carried out as intended. If any discomfort was experienced during the exercises, the individual was told to stop right away. No such mind-body relaxation exercises were provided to the control group.

The intervention was performed for two hours daily for 15 days. One hour in the morning and one in the evening. All those participants in the intervention group who did not complete the 15 days intervention cycle were considered as loss to follow up. Measurement of the mind-body relaxation practices was done for both the groups by objective and subjective assessment. Objective assessment involved measuring visual acuity after 15 days using Snellen's chart. [9]For subjective assessment, feedback form regarding the eye yoga and mindful relaxation practices was filled for the participants. The results of the study were declared to all 32 participants.

Results

Mean age of the participants in intervention and control group was 17.5 years and both the groups had eight males and eight females each.

Table 1 depicts the difference in between the mean visual acuity in Intervention group before and after intervention. There was statistically significant difference in the mean visual acuity in right and left eye both, before and after intervention with p value of -0.00001 (<0.05) and -0.0024 (<0.05) respectively at 95 % Confidence Interval (CI) (-0.10 to -0.45 in right eye and -0.10 to -0.40 in left eye).

Table 2 shows the difference in the mean visual acuity in the control group before and after the study. There was no statistically significant difference with a p value of -0.20 (>0.05) in both eyes at 95% CI (-0.10 to 0.20) in right eye and -0.20 to 0.13 in left eye.

Table 3 depicts the difference in mean visual acuity in right and left eye in between the intervention and control group. Before intervention there was no statistically significant difference in between the two groups at 95% CI. Therefore, making the two groups comparable for further analysis. After the intervention (mind and body relaxation practices), there was statistically significant difference in between intervention group and control group in both right (p value 0.0006) and left eye (p value 0.03); both less than 0.05 at 95% CI (0.16 to 0.5: right eye, 0.02 to 0.36: left eye).

Cohen’s d test was used to measure the effect size that is, magnitude of difference in the visual acuity in the intervention group before and after the intervention. Cohen’s d value ranges in between 0 and 1. A value of 0.2 represents small effect size, 0.5 represents medium effect size and 0.8 and above represents large effect size.

Cohen’s d value for right eye was 1.0 while for the left eye was. 0.9 that is large effect size.

As for the subjective assessment, out of 16 participants in intervention group, 8 indicated substantial improvement in the complaints related to digital strain, 5 reported a moderate amount of relief, and 3 reported little to no alleviation. No such improvement was observed in the control group.

Discussion

Our interventional study focussed on effect of eye yoga and mindful relaxation exercises in reducing digital eye strain. The Snellen’s chart was utilized to test the individuals' visual acuity and determine how the intervention affected their visual acuity as a part of objective assessment and a post intervention questionnaire was filled as a part of subjective assessment. As a result of practising both eye yoga and mindful relaxation, subjects' visual acuity was significantly improved as evident from Table 1 and 3 where in there was a difference in the mean

visual activity in the intervention group 15 days after the intervention as compared to the start. While control group showed no change in visual acuity as evident in Table 2.

Similar findings were also observed by Gupta S et al. in their study. There was statistically significant reduction in the eye fatigue scoring after six weeks of performing yoga ocular exercises in the intervention group while in the control group there was an increase in the eye fatigue scoring..[13]

Our study also depicted that eye yoga and mindful relaxation exercises had a large effect size in reducing digital eye strain with Cohen's d value of 1.0 for right eye and 0.9 for left which means that not only these exercises make a statistically significant difference in the visual acuity but they have a large impact on reducing the eye strain as well.

Our study also had certain limitations. Only the student population was recruited, resulting in small sample size. Therefore, the study can be undertaken among a bigger group, and it's possible to look for participants other than students. Also, the intervention was continued only for two weeks' time so long-term effect of these exercises cannot be ascertained. Therefore, follow up studies need to be conducted for longer duration of intervention period.

As for control group, results of the study were declared to them and they were persuaded to practice eye yoga and mindful relaxation exercises to improve the visual acuity.

Conclusion

The findings of present study indicate that practising mind-body relaxation techniques for a period of three weeks can improve visual acuity. It implies that practising eye yoga while also practising mindfulness can be an effective non-pharmacological way to increase visual acuity.

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Table 1: Difference in mean visual acuity in Intervention group before and after intervention (N=16)

Mean visual acuity	Right eye (mean ±SD)	Left eye (mean ±SD)
Before intervention	0.32 ± 0.20	0.30 ± 0.19
After intervention	0.59 ± 0.28	0.53 ± 0.27
Paired t test value	**6.90**	**-4.79**
p value	**-0.00001**	**-0.0024**
95% CI	**-0.10 to -0.45**	**-0.10 to -0.40**

Table 2: Difference in mean visual acuity in Control group before and after intervention (N=16)

Mean visual acuity	Right eye (mean ±SD)	Left eye (mean ±SD)
Before intervention	0.33 ± 0.19	0.32 ± 0.21
After intervention	0.27 ± 0.16	0.34 ± 0.20
Paired t test value	-1.34	-1.5
p value	-0.20	-0.20
95% CI	-0.10 to 0.20	-0.20 to 0.13

Table 3: Difference in mean visual acuity in right eye between Intervention and control group before and after intervention (N=32)

Mean visual acuity	Intervention group (n=16)	Control group (n=16)	Unpaired t test value	p value (95% CI)
	RIGHT EYE (mean ±SD)			
Before intervention	0.32 ± 0.20	0.33 ± 0.19	0	1 (-0.15 to 0.13)
After intervention	0.59 ± 0.28	0.27 ± 0.16	3.81	**0.0006 (0.16 to 0.5)**
	LEFT EYE (mean ±SD)			
Before intervention	0.30 ± 0.19	0.32 ± 0.21	0	1 (-0.16 to 0.12)
After intervention	0.53 ± 0.27	0.34 ± 0.20	2.25	**0.03 (0.02 to 0.36)**