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Yogic Eye Exercises Followed by the Ergonomic Advice on Eye Fatigue in Children Attending Online Classes in COVID-19

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ABSTRACT

Background: Computer use by children especially school-aged children is growing rapidly. In these decades, due to the rising use of IT, they are using computers or laptops not only for education purpose but also, for playing online games for a prolonged period. Therefore, extensive viewing of the computer screen can lead to eye discomfort, fatigue, blurred vision and headaches, dry eyes and other symptoms of eyestrain. But nowadays, in this hazardous situation, it has been compulsive and essential for the children to get an education by attending online lectures at home environment.

Methodology: 44 school-aged children attending online classes in the age group 6 to 15 years were included. Eye fatigue was assessed through the 7-point Likert Scale before the exercise session. The participants were instructed to follow the eye exercises and ergonomic advice for 6 days per week (twice a day) as a 4 weeks protocol. After the exercise session, again eye fatigue was assessed through the 7-point Likert Scale. Later data were collected and analysis was done.

Results: A significant reduction was seen in eye fatigue with self-relaxing yogic eye exercises followed by the ergonomic advice in school-aged children attending online classes in COVID-19.

Conclusion: Eye fatigue was significantly reduced in the post-exercise session followed by the ergonomic advice as compared to the pre-exercise session in school-aged children attending online classes.

Key Words: Eye fatigue, Computer use, Children, Eye exercises, Ergonomic advice

INTRODUCTION

Eyes are the vital organs in every individual's daily lives. Except during sleep, a huge variety of visual information is recognized by us through eye both at work and at home. Most of the users of visual displays have reported forms of visual discomfort such as tired eyes, dry eyes, eye strain, eye irritation, poor visual acuity, burning sensations, redness, and double vision.¹

Computer use by children especially school-aged children is growing rapidly.² They are using computers for various purpose such as educational purpose, for leisure pursuits and communication, in both schools as well as the home environment. According to the research in the ergonomics of children computer use, there are potential effects of computer use on a child's health, satisfaction and productivity.³

Today in Western Societies, information technology plays a major role in children lives.⁴ Based on a systemic reviews established by Masshall, et. al (2006), it has been reported that children are likely to use IT such as television, computers and electronic games for 25% of their waking hours. Laptops, mobile phones, electronic games along with television, has now denoted to be essential by many families.⁵

Computer use in specific is a necessary or essential type of IT with children using desktop and laptop computers to play games, complete learning programs, write documents, work with pictures and music in multi-media programs, surf the internet and communicate by email and chat rooms.⁶ With the rising use of computers and the internet at both school as well as home, the number of children using computers and their daily exposures has markedly increased.^{4,7}

Recent literature describes that children computers exposure is influenced by a variety of factors involving environmental

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factors of access, location and socio-economic factors such as age, gender, psychological attributes and general activity participation. Nearly, all children in the communities use computers at school and most of them use computers at home.⁸ Many studies reported that boys are more likely to have a higher vulnerability to computers as compared to girls.⁹ In Chou and Tsai's (2007) study, children computer exposure was usually used for gaming activities only, which is used more by the boys than the girls.¹⁰

The result of children computer exposure has markedly been both positive as well as negative.^{7,11} Positive effects include increased socialization,^{10,12} improved learning and academic skills¹³ and improved fine motor and eye-hand co-ordination skills.¹⁴ Negative effects include poor psychological development such as aggressive behaviour, violence, addiction, depression, attention deficits, somatic well-being,¹⁵ poor physical development¹⁶ and general health issues such as sleep deprivation and reduced nutrition.¹⁷

In this context, eye fatigue is a common complaint due to computer usage for academic or recreational purposes or social networking.¹⁸ Generally, eye fatigue can be developed by factors including insufficient lighting, prolonged watching of visual displays, poor diet, eye muscle insufficiency due to prolonged hours of office work and academic studies, psychological and emotional tension and ageing.¹⁹ In a recent state, university students are readily exposed to accelerated environmental eye fatigue as a common as well as frequent users of computer screens.¹⁸

Previous studies have proposed that eye disorders are often related to functional defects in the ocular muscles aggravated by pain and tension resulting from computer work.^{19,20} Hence, relaxation practices can help to relieve eye fatigue.²¹ Yoga practices correlate with physical as well as mental health benefits via down-regulation of the hypothalamic-pituitary-adrenal axis and the sympathetic nervous system.²² Previous studies proposed that yoga exercises are associated with better self-rated relaxation.²³ Also, according to a few studies it has been reported that the practice of eye yoga helps to relieve eye fatigue.

Hence, the purpose of this study was to assess the effects of self-relaxing yogic eye exercises along with ergonomic advice on eye fatigue in school-aged children attending online classes in COVID-19 phase.

MATERIAL AND METHODOLOGY

This study was done to find the effect of self-relaxing yogic eye exercises followed by the ergonomic advice on eye fatigue in school-aged children attending online classes in COVID-19. The study was carried out through a randomized sampling method using a lottery method in which 44 school-

aged children participated. The purpose of the study was explained to the participants through an online session and consent was taken through an online form. 44 school-aged children were taken for the study. The inclusion criteria were the participants those who were willing to participate in the age group of between 6 to 15 years and those who were attending online classes in COVID-19. The exclusion criteria were the participants those who were not willing to participate, those having colour blindness and those who were using eye spectacles since from their childhood onwards. 7- point Likert Scale questionnaire was the major outcome measure to assess eye fatigue in children. Demographic information and eye fatigue scores were measured as pre-test data (i.e. before the exercise session) Eye fatigue scores were also measured as post-test data (i.e. after the exercise session). The participants were instructed to follow the eye exercises along with ergonomic advice for 6 days per week (twice a day) as a 4 weeks protocol. Eye fatigue was measured using a questionnaire known as the 7- point Likert Scale for evaluating ocular fatigue. This questionnaire consisted of 11 items: tired eyes, sore/aching eyes, irritated eyes, watery eyes, dry eyes, eyestrain, hot/burning eyes, blurred vision, difficulty focusing, double vision, and visual discomfort with the following responses: 0=none, 1=slight, 2=moderate, 3=severe. Yogic eye exercises were conducted for about one hour per session, twice a week for 4 weeks. They consisted of 8 steps: palming, blinking, sideways viewing, front and sideways viewing, rotational viewing, up and down viewing, preliminary nose-tip gazing, near and distant viewing etc. Each step was performed for 5 minutes per cycle. After the eye exercises, the participants practised the Shavasana for 20 minutes to relax their eyes. The importance and benefits of each exercise were explained as follows: relaxes and revitalizes of the eye muscles, relaxes the tension of muscles strained by constant reading and close work, preventing and correcting squint, improves the coordination of medial and lateral muscles, restores balance in the muscles surrounding the eyes and improves the coordinated activity of both eyeballs, balances the upper and lower eyeball muscles, improves the accommodating and focusing power of the eye muscles, and increases the range of movements. Finally, the results were the key outcome to determine the effect of self-relaxing yogic eye exercises followed by the ergonomic advice on eye fatigue in the subjects. Then, statistical analysis and interpretation were done for each candidate to find out the effect of self-relaxing yogic eye exercises followed by the ergonomic advice on eye fatigue in school-aged children attending online classes in COVID-19 phase.

Statistical analysis of the recorded data was done by using the software INSTAT App. The unpaired t-test was used to determine p-value which differed from pre-data to post-data.

RESULTS

Interpretation

In this present study, out of 44 children's 26 were males and 18 were females respectively.

And in this percentage Male- 59 %, Female- 41% (Table 1)

Table 1: shows age, BMI and class-wise distribution

Tests	Mean	Standard Deviation	T Value	P Value	Interference
AGE	12.10	2.36	33.92	< 0.0001	Extremely Significant
BMI	19.55	5.35	24.23	< 0.0001	Extremely Significant
CLASS	7.09	2.38	19.76	< 0.0001	Extremely Significant
Total Hours of Lectures	4.45	2.14	13.80	< 0.0001	Extremely Significant

Statistical analysis was done by using unpaired t-Test.

Participants mean age, BMI, class, total hours of lectures were 12.10 years, 19.55 kg/m², 7.09 and 4.45 hours respectively. Statistical significance was set at P < 0.0001. After analyzing and comparing the data significant effect was found on eye fatigue by self-relaxing yogic eye exercises followed by ergonomic advice in school-aged children attending online classes in COVID-19.

The participants were instructed to follow the eye exercises and ergonomic advice for 6 days per week (twice a day) as a 4 weeks protocol. Eye fatigue scores were measured as pre-test data (i.e. before the exercise session) and also as post-test data (i.e. after the exercise session). The results which showed significant change are as follows: (Table-2)

Table 2: Comparison of Results Before and after the Exercise Session

Sr. No	Questions	MEAN + SD		t Value		p Value		INTERFERENCE	
		PRE-DATA	POST-DATA	PRE-DATA	POST-DATA	PRE-DATA	POST-DATA	PRE- DATA	POST- DATA
1	Tired Eyes	1.27 + 0.65	0.11 + 0.32	12.79	2.34	< 0.0001	0.0235	Extremely Significant	Significant
2	Sore/ aching Eyes	1.09 + 0.74	0.04 + 0.21	9.76	1.43	< 0.0001	0.1597	Extremely Significant	Significant
3	Irritated Eyes	0.77 + 0.64	0.04 + 0.21	7.98	1.43	< 0.0001	0.1597	Extremely Significant	Significant
4	Watery Eyes	0.86 + 0.76	0.13 + 0.34	0.12	2.6	< 0.0001	0.0125	Extremely Significant	Significant
5	Dry Eyes	0.34 + 0.47	0.02 + 0.15	4.71	1	< 0.0001	0.3229	Extremely Significant	Significant
6	Eye Strain	1.18 + 0.78	0.15 + 0.37	9.97	2.85	< 0.0001	0.0066	Extremely Significant	Significant
7	Hot/ burning Eyes	0.63 + 0.65	0 + 0	6.49		< 0.0001		Extremely Significant	
8	Blurred Vision	0.90 + 0.67	0.15 + 0.37	8.92	2.85	< 0.0001	0.0066	Extremely Significant	Significant
9	Difficulty in focusing	1.09 + 0.77	0.09 + 0.29	9.37	2.07	< 0.0001	0.04	Extremely Significant	Significant
10	Double Vision	0.29 + 0.63	0.02 + 0.15	3.1	1	0.03	0.3229	Very Significant	Significant
11	Visual Discomfort	0.72 + 0.78	0.04 + 0.21	6.11	1.43	< 0.0001	0.1597	Extremely Significant	Significant

DISCUSSION

The purpose of the present study was to find out the effect of self-relaxing yogic eye exercises followed by the ergonomic advice on eye fatigue in school-aged children attending online classes in COVID-19. A significant reduction was seen in eye fatigue with self-relaxing yogic eye exercises followed by the ergonomic advice in school-aged children attending online classes. This result confirms our null hypothesis by previous reports.

Eyes are the vital organs in every individual's daily lives. The main function of the eye muscles is the execution of eye movements. The muscles surrounding the eye, control many diverse eye movements. Although, these muscles are small and are not particularly strong, Exceptionally quick and accurate. They help the eye to perform many complex tasks, including tracking moveable objects, scanning objects and maintaining a steady image on the retina. Hence, fatigue in these muscles, makes it difficult to focus vision and can cause pain.

Computer use by children especially school-aged children is growing rapidly. They use computers, laptops or mobile phones not only for entertainment purpose but also for education purpose which leads to eye muscle fatigue. Hence, it is important to reduce eye fatigue and also to strengthen the eye muscles to work more efficiently and effectively.

The objective of this study was to determine the effect of self-relaxing yogic eye exercises followed by the ergonomic advice on eye fatigue in school-aged children attending online classes. The study was carried out on 44 school-aged children attending online classes. They were asked to follow the eye exercises along with ergonomic advice for 6 days per week (twice a day) as a 4 weeks protocol. After the eye exercises, we asked them to practice the Shavasana for 20 minutes to relax their eyes. Eyesight is one of the most important senses. So it is important to protect our eyes which will reduce the odds of blindness and vision loss.

Eye fatigue was significantly reduced in the post-exercise session followed by the ergonomic advice as compared to the pre-exercise session in school-aged children attending online classes.

Consequently, this study focuses on how self-relaxing yogic eye exercises followed by the ergonomic advice can reduce eye fatigue.

CONCLUSION

The study was carried out to find the effect of self-relaxing yogic eye exercises followed by the ergonomic advice on eye fatigue in school-aged children attending online classes in COVID-19. The data was assessed and a significant decline

was found in the eye fatigue in them.

LIMITATIONS OF THE STUDY

- The study is limited to a small sample size.
- Inadequate time for the study.
- As this study was conducted through an online session, we can not exactly predict whether the result and information given by subjects are precise

SUGGESTIONS AND RECOMMENDATIONS

- This project can be further taken up for the studies so that we can properly assess the subjects and find out the actual effect of self-relaxing yogic eye exercises followed by the ergonomic advice on eye fatigue in school-aged children attending online classes.
- Adequate time should be given to screening the target population.

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