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Changes in Visual Discomfort following Yoga among Children Attending Online Classes during COVID-19

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Abstract

Previous studies suggest that excess use of digital devices causes visual discomfort where as yoga has been shown to be useful in reduction of visual discomfort. Earlier studies have not shown the effect of yoga on children using digital devices. With this background, the present study was planned to determine the effect of yoga on visual discomfort among children attending online classes during COVID- 19 pandemic. Twenty children of both sexes and their ages ranged between 8 to 14 years were included in the study. All the participants divided into two groups: (i) Yoga group (YG) and (ii) Control group (CG). The participants were screened to exclude those who (i) had any clinical condition such as Sjögren's syndrome or kerato-conjunctivitis sicca and (ii) Used medication for drying of the eyes. None of the participant had to be excluded based on these criteria. Both group were assessed before and after twenty one days of yoga intervention and visual discomfort were measured using computer vision syndrome questionnaire. The scores of both the groups were comparable at baseline, after twenty one days there was a significantly decreased score in the YG group, whereas the CG showed significantly increased scores. The results suggest that the yoga practice appeared to reduce visual discomfort, while the group who had no yoga intervention (CG) showed an increase in discomfort at the end of twenty one days.

Keywords: Visual discomfort; Yoga; Computer vision syndrome; Sjögren's syndrome; Kerato-conjunctivitis sicca.

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INTRODUCTION

Everyone was confined to their homes due of the COVID-19 pandemic that is currently sweeping the world. Schools, universities, and private institutions were all closed. There is minimal chance of the school reopening as initially planned because there is currently no immediate cure for the Novel Corona Virus. As a result, this out break has transformed the conventional teaching approach into an online learning programme (Jin *et*

al., 2021). Additionally, it directly affects children's life and psychological and physical well being. Children spend the majority of their time in front of digital screens (such as laptops, computers, and smartphones) for school, homework, and other purposes. Children who utilise digital devices for extended periods of time frequently develop ocular issues (Ichhpujani *et al*., 2019). The most prevalent issue related to excessive usage of digital devices is computer vision syndrome (CVS). The most typical signs of digital eye strain are eye itchiness, dryness, foreign body sensation, impaired vision, wetness, and headaches (Sheppard & Wolffsohn, 2018). According to a recent survey, children are more likely than adults to experience CVS symptoms (Mohan *et al.*, 2021). The symptoms of CVS can be managed in a variety of ways. One of the popular approaches to deal with these concerns is through yoga. According to Visweswaraiah and Telles (2004), yoga is a traditional Indian science that comprises a variety of poses, breathing techniques, meditation techniques, and purification procedures. Yoga has been shown to help kids focus better and remember things better while reducing stress and anxiety (Weaver & Darragh, 2015). People with progressive myopia who Practice a variety of yoga poses report fewer symptoms of visual strain. Additionally, it has been found that computer users who practice group yoga had fewer symptoms of computer vision syndrome (Telles *et al*., 2006). The purpose of the current study was to determine whether yoga exercises reduced children's self-rated eye discomfort when they regularly used digital gadgets.

METHODS

Participants

Twenty students from the Kendriya Vidyalaya in Chandigarh, India, participated in the study. They are all using digital platforms to take classes. They spent at least three hours each day, six days per week, using digital devices. Ages of the participants, who were of both sexes, ranged from 8 to 14. Participants who (i) had any clinical conditions, such as Sjögren's syndrome or keratoconjunctivitis sicca, or (ii) took eye drying medication were examined to rule them out. Based on these standards, none of the participants had to be disqualified. Prior to the trial, the participant's guardians were informed of the study's specifics and their consent was obtained prior to the study.

Design of the study

Twenty people were split into two groups, the experimental group and the control group. Each subject was evaluated both before and after the twenty-one-day period. While control group spent their time in routine activities, the experimental group practiced yoga for an hour every day for 21 days.

Assessments

Visual discomfort was assessed using computer vision syndrome questionnaire. It consists of sixteen items having five responses. Items are related to the symptoms of computer vision syndrome. Each item has five responses that are divided into frequency and intensity. Three responses belongs to frequency of the symptom i.e. *Never* = The symptom does not occur at all, *Occasionally* = Sporadic episodes or once a week, *Often or Always* = 2 or 3 times a week or almost and two response belongs to intensity i.e. *Moderate* and *Intense*. If participant mark *Never* for frequency, wouldn't marking anything for intensity. Frequency was considered as Never = 0, occasionally = 1, Often or always = 2; and intensity was considered Moderate = 1, Intense = 2 (Seguí, *et. al*., 2015).

Data extraction

The total score was calculated by applying the following formula:

Score $\sum_{i=1}^{16}$ (frequency of symptom occurrence)i

(intensity of symptom)i

(Where Frequency: Never = 0, Occasionally = 1, Often or always = 2 & Intensity: Moderate = 1, Intense = 2).

The overall assessment was conducted by obtaining the total score, recorded as the DES score. The result of frequency X intensity was recorded as: 0 = 0; 1 or 2 = 1; 4 = 2. If the total score was ≥6 points, the child was considered to be suffering from digital eye strain. DES scores were further categorized as mild (DES score = 6-12), moderate (DES score = 13-18), and severe (DES score = 19-32).

Intervention

Sixty minutes of yoga program includes yoga postures (asanas for 20 minutes), meditation (10 minutes), regulated breathing exercise (Pranayama for 10 minutes), visual cleansing exercise (Trataka for 10 minutes) and guided relaxation (10 minutes).

Trataka includes maintaining a fixed look on the thumb. Practitioners were instructed to sit comfortably, keep their back straight, and use either their right or left thumb as a cue to guide their gaze. Participants were advised not to look away or turn

their heads while practicing Trataka. Defocus after that while keeping the thumb in your line of sight.

These methods were chosen in light of a prior study (Telles *et al*., 2006) that shown a significant variation in computer vision syndrome among computer users.

RESULTS

Data analysis

Paired t-test was performed to analyze the obtained data. Stastical test (t-test) was done using SPSS (version 24.0).

DISCUSSION

During the COVID-19 epidemic, the majority of schools were closed, which has an impact on 1.2 billion children's education through out 186 nations (*Unesco*, n.d.). Most of the kids used internet channels to finish their education. Twenty kids who were enrolled in online classrooms during the COVID epidemic were tested for self rated visual discomfort in the current study. Participants were split into a control group and a yoga group. Following a 21 days yoga intervention, the YG Mean SD (4.93.07) showed a considerably lower score, whereas the CG Mean SD (18.913.17) showed a significantly higher score, which is similar to a prior study conducted among computer users. Following a sixty day yoga intervention, the prior study revealed equivalent results (the yoga group exhibited a substantial decrease in visual discomfort while the control group showed a significant increase in scores) (Telles *et al*., 2006). The youngsters most frequently displayed the symptoms of headache, itching and dry eyes. In the current survey, 97% of youngsters attended online classes using a smartphone. The use of smartphones is a significant risk factor for dry eye disease in youngsters, according to a prior study. According to this study's findings (Moon *et al.,* 2014), 71% of school-aged children who have dry eyes also use smartphones (P = 0.036). Continuous smartphone use causes a decrease in blink rate, and due of the small screen and close viewing distance, asthenopia symptoms are brought on. When using a computer, the American Academy of Ophthalmology advises keeping your arm at least 25 inches away from the screen. A specific yoga Practice that combines asnas (postures), breathing exercises (pranayama), and meditation can increase lung capacity, lung strength, and flexibility while lowering blood pressure, heart rate, and back pain (Novotney, 2009). In the current investigation, the combination of yoga practice showed a reduction in visual perception and strain (Telles *et al*., 2007). According to a study conducted among medical students, eye exercises and pranayama can be used as potential non-pharmacological measures for improving visual acuity (Gosewade, Drugkar & Shende, 2016). According to Gupta and Aparna (2020), yoga's ocular eye exercises can also help undergraduate optometry students feel less eye tired. According to Hath yoga pardipika, "Trataka closes the door way causing these problems and eradicates all eye diseases, fatigue, and sloth." With this discussion, it can be concluded that employing a combination of asanas, pranayama, and relaxation techniques, such as trataka, assists children who use online learning platforms to reduce visual discomfort. The self-rated visual pain increased in the control group, on the other hand. The psychological advantages indicated with "additional care" can be linked to this difference between the yoga group and control group (Delbanco, 1993). Regular yoga courses were attended by the yoga group in the current study, which may have provided additional care and/or contributed to the advantages that group experienced. Increased visual pain during the follow-up may have been caused by the control group's lack of this yoga Practice.

Table 1: Changes in Computer vision syndrome before and after twenty one days

Group	Variables	Pre Mean±S.D.	Post Mean±S.D.	SEM	t value	p value
YG	Computer vision syndrome	14±12.58	4.9±3.07	3.80	2.39	.040
CG	Computer vision syndrome	14.7±11	18.9±13.17	2.30	-1.81	.102

Limitations

Further studies are required for evaluating the effect of yoga on visual discomfort on involving larger populations of different age groups in children. A main limitation of the study is that well recognized objective indicators of visual discomfort (eye dryness) were not measured.

CONCLUSION

Children in the experimental group in the current study appeared to experience less visual discomfort, but the control group (CG) experienced more discomfort after twenty-one days. The study's findings imply that yoga practice is advantageous for kids who regularly use digital devices.

Limitations: Further studies are required for evaluating the effect of yoga on visual discomfort on involving larger populations of different age groups in children. A main limitation of the study is that well recognized objective indicators of visual discomfort (eye dryness) were not measured.

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