

Yoga for Young Eyes: Exploring the Effects on Visual Acuity in Adolescents

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Abstract: Visual acuity is a crucial aspect of eye health, significantly influencing overall quality of life. Vision impairment is a significant global health issue, impacting an estimated 2.2 billion individuals. A substantial proportion of these cases, roughly 1 billion, could be prevented or treated with proper care. India has made notable progress in reducing blindness through targeted initiatives, with its National Program for Control of Blindness and Visual Impairment contributing to a decline in blindness prevalence. According to global health research, around 33.6 million people worldwide are blind, and 206 million experience moderate to severe visual impairment. This study aimed to investigate the impact of yogic practices on visual acuity among school children. A group of 60 students, comprising 33 females (55%) and 27 males (45%) aged 10-19 years, participated in the study. The participants were engaged in yogic practices and underwent ocular vision tests using Snellen's Chart before and after the yogic intervention. The data collection process involved Snellen's Chart tests to determine visual acuity, and paired sample t-tests were calculated using SYSTAT 13 to identify significant changes between pre-test and post-test values. The results revealed a significant decline in visual acuity for both eyes, as indicated by the p-values. Furthermore, a notable decrease was observed in the mean values of the post-test. These findings suggest that incorporating yogic practices into school curricula may have a positive impact on visual health among children. By promoting eye health and addressing vision problems early on, schools can play a vital role in ensuring the overall development and well-being of their students. The study results highlight the potential benefits of incorporating yogic practices into school curricula thus promoting visual health and overall well-being among children.

Keywords- Yoga, Yoga effect, Visual acuity, Adolescents, Ocular health.

I. Introduction

Visual acuity also known as Clarity of vision is the measurement of the ability to discriminate two stimuli separated in space at high contrast relative to the background (1). It is assessed by determining how well an individual can identify and distinguish specific letters or symbols, known as optotypes, from a standard distance. Low visual acuity can pose substantial challenges in daily living, affecting an individual's ability to perform everyday tasks with ease (2). Visual acuity is typically assessed using standardized tests such as the Snellen chart, which features black letters or symbols against a white background to provide high contrast. This allows eye care professionals to accurately evaluate a patient's visual acuity (3).

The Snellen chart is a widely used tool for measuring visual acuity, typically evaluated at a distance of 6 meters (20 feet). Normal visual acuity is denoted as 6/6 on the Snellen chart, indicating that an individual can read letters or symbols clearly at a distance of 6 meters. If a patient fails to read the chart, they may be referred for additional testing to determine the underlying cause of their visual impairment. It's essential to understand that every individual's eyes and eyesight are unique, and normal vision can vary from person to person (4).

The World Health Organization defines blindness as a presenting visual acuity of 3/60 or worse. Despite efforts, including the Global Action Plan's 25% reduction target by 2019, the goal wasn't fully met. Recent estimates indicate 33.6 million people are blind and 206 million have moderate to severe visual impairment worldwide (5).

Assessing visual acuity involves evaluating various components of the eyes including eye coordination, peripheral field, focus, depth perception and colour vision. A comprehensive eye examination is crucial to determine the physiological condition of different eye components and identify any potential issues that may be affecting visual acuity. By understanding normal vision and the factors that influence visual acuity, eye care professionals can provide accurate diagnoses and develop effective treatment plans to improve patients' eyesight and overall quality of life (6,7,8).

Ancient yogic texts explain various kriyas, asanas, pranayama and mudras that can help alleviate eye-related ailments, either directly or indirectly through yogic practices. Existing research substantiates this notion and shaped our decision to undertake this study (9).

II. Material and Methods

Study Design and Participants

For this study male and female students aged 10-19 from Shri Guru Ram Rai School in Dehradun, Uttarakhand, Northern India, were selected using quota sampling technique. After obtaining permission from the school principal and the Head of Ophthalmology Department, students underwent a pre-eye test at Shri Guru Ram Rai Institute of Medical & Health Sciences, Dehradun (Fig.1,2). The students' visual acuity was assessed using Snellen's chart, and the results were documented. After examining the test results 60 students (120 eyes) were chosen to participate in yoga sessions for 90 days. The experimental group consisted of 33 females (55%) and 27 males (45%). In this training programme the students participated in a 60-minute yogic practice session, comprising various Asanas. Each Asana was held in its final posture for a duration specified in the training program or as per the individual's capacity to ensure safe and effective practice. A follow-up eye test was conducted (Fig.3), and the differences between the test results were analysed and recorded. The participants' daily routines and activities remained unchanged throughout the study.

Each session began with a 3-minute prayer, Mahamrityunjay Mantra recitation. This was followed by 20 minutes of Shatkarma practices, including Jalneti, Rubberneti, and Tratak. Various Asanas were then practiced for 10 minutes, including Suryanamaskar, Vrikshasana, Shashankasana, Marjaryasana-Bitilasana, and Shavasana. Next 5 minutes were devoted to Nadishodhan Pranayam and Shambhavi Mudra. Finally, the Chakshushi Mantra was recited for 15 minutes, followed by a 2-minute Shanti Path (Fig.4,5).

Inclusion Criteria: The study included participants aged 10-19 years with myopia and myopic astigmatism, who had no history of ocular diseases, surgery, trauma, medically and physically fit. Participants were also required to be willing to participate in the research study.

Exclusion Criteria: The study excluded individuals who refused to participate, lacked yoga experience, were medically or physically unfit, were taking prescription medications and those unable to commit to regular yoga practice.

Ethical Consideration: The study received approval from the Shri Guru Ram Rai Institute of Medical & Health Sciences, Institutional Ethical Committee on April 26, 2025 (reference number SGRR/IEC/17/25). Written informed permission was acquired from each participant's guardian. Participants in the study carried on with their regular daily activities, and ethical rules were adhered to. There were no intrusive procedures done.

Fig.1



Fig.2



Fig.3



Fig.4



Fig.5



Table 1&2: Showing Pre-test and Post-test mean value of right eye (RE)& light eye (LE).

Table1.

Variable	N	Mean
PRE_VA_RE	60.000	0.308
POST_VA_RE	60.000	0.083

Table.2

Variable	N	Mean
PRE_VA_LE	60.000	0.339
POST_VA_LE	60.000	0.115

Table 3&4: Showing mean difference, standard deviation difference & p value of right and left eye respectively.

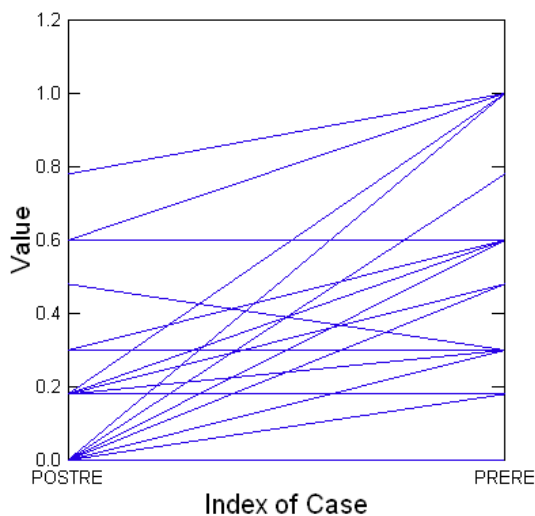
Table 3.

Variable	Mean Difference	95.00% Confidence Interval		Standard Deviation of Difference	t	Df	p-Value
		Lower Limit	Upper Limit				
PRE_VA_RE	0.225	0.172	0.277	0.204	8.511	59.000	0.000
POST_VA_RE							

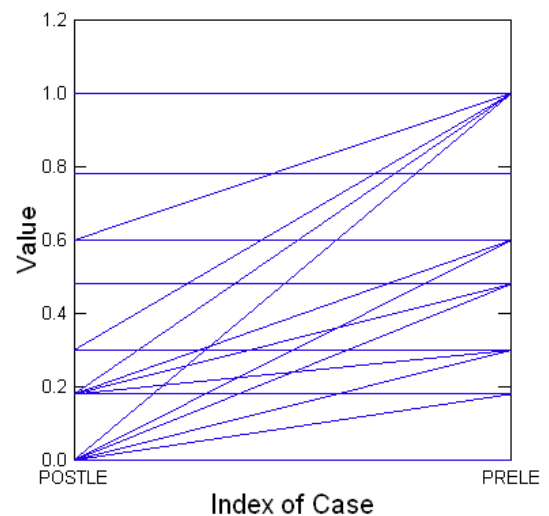
Table 4.

Variable	Mean Difference	95.00% Confidence Interval		Standard Deviation of Difference	t	Df	p-Value
		Lower Limit	Upper Limit				
PRE_VA_LE	0.225	0.172	0.278	0.206	8.458	59.000	0.000
POST_VA_LE							

Paired t-Test



Paired t-Test



III. Result

Data analysis was performed by taking LogMAR value (Logarithm of the Minimum Angle of Resolution), SYSTAT 13 and Microsoft Excel. Tables 1 and 2 present the pre-test and post-test mean values of visual acuity for the right eye (RE) and left eye (LE), respectively, in the experimental group. A notable improvement was observed in both eyes following the intervention. In

Table 1, the mean value of visual acuity for the right eye (VA_RE) improved from 0.308 (pre-test) to 0.083 (post-test) among 60 participants, indicating a positive shift towards improved vision. Similarly, as shown in Table 2, the mean value of visual acuity for the left eye (VA_LE) showed improvement from 0.339 (pre-test) to 0.115 (post-test). To determine the statistical significance of these changes, paired sample t-tests were conducted, as shown in Tables 3 and 4. As per Table 3, the mean difference in visual acuity of the right eye was 0.225, with a 95% confidence interval ranging from 0.172 to 0.277. The standard deviation of the difference was 0.204, and the corresponding t-value was 8.511 with 59 degrees of freedom (df). The result was statistically significant with a p-value < 0.001. Similarly, Table 4 shows that the mean difference for the left eye was 0.225, with a 95% confidence interval between 0.172 to 0.278. The standard deviation of the difference was 0.206, yielding a t-value of 8.458 and df = 59. This difference was also statistically significant ($p < 0.001$).

These findings demonstrate a statistically significant improvement in visual acuity for both eyes after the intervention, suggesting its potential efficacy in enhancing ocular function.

IV. Discussion

As this study aimed to investigate the effects of yoga on visual acuity in adolescents a comprehensive yoga module was designed, incorporating various yogic practices to enhance visual acuity.

The daily intervention sessions followed a structured schedule, beginning with a 3-minute spiritual invocation through the recitation of the Maha Mrityunjay Mantra, a powerful prayer believed to promote physical and mental well-being. This was followed by a 20-minute session of Shatkarma/Shatkriyapacticeslike Jalneti, Rubbarneti, and Tratakto cleanse the eyes and get them ready for additional yogic exercises.

- Jalneti: Using saline water to cleanse the nasal passages improves tear duct function, lessens eye strain, helps to avoid sinus-related eye issues, treats eye conditions including myopia.
- Rubbarneti: The primary goal of nasal cleansing using a rubber catheter is to clear the nose, which can indirectly help the eyes by lowering sinus pressure and congestion that may impact the eyes thus improving respiratory health in general.
- Tratak: Focused staring is a concentration technique that develops eye muscles, increases eye stability & steadiness. Additionally, it enhances focus, reduces eye strain, illuminates and clears the eyes (10,11).
- The participants were then engaged in a 10-minute asana practice, which comprised of multiple yoga poses meant to encourage balance, relaxation, and physical flexibility. The following asanas were practiced:
- Suryanamaskar: Sun salutations, a flowing sequence of postures, boosts blood circulation to the eyes, warming up the body and reducing psycho-physiological tension, which can help alleviate eye strain and promote overall eye health.
- Vrikshasana: Tree pose fosters balance and stability, reducing eye strain caused by frequent gaze shifts, while also promoting focus and concentration for the eyes, body, and soul (12).
- Shashankasana: Rabbit pose helps to calm stress and promote relaxation by soothing the facial muscles, particularly around the eyes.
- Marjaryasana-Bitilasana: Cat-cow pose improves spinal flexibility and relieves tension in the neck, shoulders, and eyes.
- Shavasana: Corpse pose calms the nervous system, inducing deep relaxation, reducing eye strain and boosting overall eye health, while fostering mental serenity and alleviating fatigue (13).
- Subsequently a 5-minute session of Pranayama and Mudra practices, designed to regulate the breath and calm the mind were followed:
- NadishodhanPranayam: Alternate nostril breathing oxygenates the blood, harmonizes the nervous system, and helps prevent headaches by reducing tension and anxiety. It also alleviates eye strain, promotes relaxation, and supports overall eye health.
- Shambhavi Mudra: This practice is believed to awaken inner energy and promote spiritual growth, leading to peace, relaxation, and reduced eye strain. It also improves focus and attention (14).

The session wrapped up with a 15-minute recitation of the Chakshushi Mantra, fostering spiritual growth and inner peace by honouring the Sun God. This practice is believed to alleviate eye-related issues and promote healing (15,16,17,18), followed by a 2-minute Shanti Path, invoking peace and harmony.

V. Conclusion

This study found that yoga exercises significantly improved visual acuity in adolescents, suggesting that regular practice can be a beneficial and non-invasive way to enhance eye health and potentially slow down visual decline. By incorporating specific yogic exercises into their routine, teenagers may be able to maintain better vision and support long-term eye health.

According to this study, adolescents in the experimental group who practiced yoga exercises experienced a significant reduction in Visual Acuity in both their left and right eyes. The findings suggest that yoga may be a beneficial, non-invasive approach to reducing Visual Acuity thus enhancing teenagers' general eye health. Maintaining better vision and reducing the progression of Visual Acuity may be achieved with regular practice of particular yogic exercises.

Future research should focus on replicating and expanding these findings to increase the robustness of the results and inform evidence-based practices that can positively impact public health.

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Conflicts of Interest

There are no conflicts of interest.

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