Effect of Eye Exercises on Vision-Related Symptoms in Young Adults

Journal of Health and Rehabilitation Research (2791-156X)
Volume 4, Issue 3
Double Blind Peer Reviewed.
https://jhrlmc.com/
DOI: https://doi.org/10.61919/jhrr.v4i3.1555
www.lmi.education/
LINK MEDICAL INTERFACE

Irsa Zahid[1], Faiza Amjad[2], Muhammad Umer Riaz[1], Rutaba Hussain[3], Hira Tariq[4], Fatima Altaf[5], Komal Iftikhar[6], Intsam Aslam[7]

Correspondence
Intsam Aslam
intsamaslam6@gmail.com

Affiliations
1 Afro Asian Institute, Affiliated with GCUF, Lahore, Pakistan
2 Riphah International University, Lahore, Pakistan
3 Pakistan College of Rehabilitation Sciences, Lahore, Pakistan
4 Gulab Devi Educational Complex, Lahore, Pakistan
5 The University of Lahore, Lahore, Pakistan
6 Lahore College of Pharmaceutical Sciences, Lahore, Pakistan
7 PSRD College of Rehabilitation Sciences, Lahore, Pakistan

Keywords
Eye exercises, visual impairment, Computer Vision Syndrome, visual acuity, vision therapy, randomized controlled trial, palming, figure-8 exercise.

Disclaimers

Authors' Contributions	All authors contributed significantly to the conception, data collection, and writing of this study.
Conflict of Interest	None declared
Data/supplements	Available on request.
Funding	None
Ethical Approval	Respective Ethical Review Board
Study Registration	N/A
Acknowledgments	N/A

ABSTRACT

Background: Visual impairment is a widespread issue, with 80% of cases being preventable or curable. Eye exercises have been proposed as an effective non-invasive intervention to alleviate vision-related symptoms, especially in young adults at risk of Computer Vision Syndrome (CVS).

Objective: To evaluate the effect of eye exercises on vision-related symptoms in young adults.

Methods: A randomized controlled trial was conducted on 99 participants aged 18-35 years, randomly assigned into three groups: a control group, a relaxation group (palming exercise), and an exercise group (figure-8 and focusing exercises). Participants performed exercises for four weeks, four days a week, completing three sets of 10 repetitions daily. Visual symptoms were assessed using the Convergence Insufficiency Symptom Survey (CISS), and data were analyzed using SPSS version 25. The Kruskal-Wallis test and Friedman test were applied, with significance set at $p < 0.05$.

Results: Both intervention groups showed significant improvement in visual symptoms compared to the control group. The relaxation group had a p-value of 0.000, and the exercise group showed a p-value of 0.000. The control group showed no significant improvement ($p = 0.050$).

Conclusion: Eye exercises, specifically palming, figure-8, and focusing exercises, were effective in reducing vision-related symptoms in young adults.

INTRODUCTION

Visual impairment, defined as the decreased ability to see that cannot be corrected by traditional methods such as glasses, presents significant challenges globally. According to the World Health Organization (WHO), common visual problems include myopia, hypermetropia, uncorrected refractive errors, cataracts, infectious diseases, macular degeneration, and vitamin A deficiency, with 80% of these impairments being either preventable or curable (1). The global burden of visual impairment is considerable, with refractive errors, such as myopia and hypermetropia, affecting approximately 43% of individuals, cataracts at 33%, and glaucoma at 2% (2). Refractive errors, which result from the inability of light to focus properly on the retina, are caused by abnormalities in the shape of the eye, the size of the eyeball, or changes in the lens due to aging (3-5). As daily visual demands increase, particularly in environments that involve prolonged use of visual display terminals (VDTs) such as computers and mobile devices, individuals face an elevated risk of developing visual discomfort, a condition referred to as Computer Vision Syndrome (CVS) (6). It has been reported that approximately 80% of individuals experience some form of visual discomfort after using visual devices, a trend exacerbated by the increased reliance on digital screens in academic and professional settings (7).

Computer Vision Syndrome (CVS) is a condition characterized by a range of symptoms resulting from extended screen use, including ocular, extra-ocular, and accommodative issues. Ocular symptoms include redness, dry eyes, and a burning sensation, while extra-ocular symptoms manifest as backache, shoulder pain, and headaches. Accommodative symptoms such as double vision, changes in focus, and blurred vision are also common (9, 10). This syndrome affects an estimated 60 million individuals globally, and the prevalence continues to rise each year (8). The increased screen time, improper ergonomic setups, uncorrected refractive errors, and suboptimal lighting conditions contribute to the worsening of these symptoms (11, 12). Most individuals affected by CVS frequently use digital devices like laptops and mobile phones for 1 to 4 hours daily (13). Vision-related symptoms such as double vision, tired eyes, and blurred vision are aggravated by improper working conditions and can significantly impact daily functioning and productivity (14, 15).

Effective interventions to alleviate vision-related problems include eye exercises, which have been shown to enhance visual function and reduce the incidence of eye fatigue. Vision therapy, for instance, can improve accommodation power, eyesight, and the ability to shift focus, offering relief to individuals suffering from visual strain (16). Previous studies have demonstrated the effectiveness of various eye exercises, including palming, blinking, and focusing, in reducing symptoms associated with eye fatigue and improving visual acuity (17-20). The present study aims to

Manuscript Submitted under JHRR ID 1555: September 16/2024 | Accepted: September 25/2024

evaluate the effects of specific eye exercises, such as palming, figure-8, and focusing exercises, on vision-related symptoms among young adults. These exercises, performed consistently over four weeks, were expected to result in a statistically significant improvement in visual symptoms compared to the control group. By addressing this issue, the study contributes to the growing body of evidence supporting the use of non-invasive, therapeutic eye exercises as an effective strategy for managing and preventing visual impairments in the modern digital age.

MATERIAL AND METHODS

A randomized controlled trial was conducted over six months, from 21 June 2021 to 10 November 2021, after obtaining approval from the institutional ethics committee. The study adhered to the ethical standards outlined in the Declaration of Helsinki, ensuring the protection of participants' rights and welfare throughout the trial. The sample size consisted of 99 participants, selected using a simple random sampling technique. Young adults aged 18 to 35 years, experiencing at least one visual symptom, including those diagnosed with computer vision syndrome, were included in the study (18). Participants with mental disabilities, systemic diseases, or any history of eye injury were excluded to maintain the integrity and reliability of the findings (17).

Participants were randomly assigned into three groups using the lottery method: one control group and two intervention groups. The control group received no intervention, while the first intervention group, referred to as the relaxation group, performed palming exercises. The second intervention group, referred to as the exercise group, performed figure-8 and focusing exercises. Both intervention groups followed a four-week program, with exercises conducted four days a week, completing three sets of 10 repetitions of each exercise per day. The assessment of visual symptoms was conducted using the Convergence Insufficiency Symptom Survey (CISS) questionnaire, a validated self-report instrument designed to measure the severity of visual symptoms (22).

Data collection was carried out at three time points: baseline (0 weeks), mid-intervention (2 weeks), and post-intervention (4 weeks). Participants' responses to the CISS questionnaire were recorded, and the data were analyzed using SPSS version 25. For within-group analysis, the Friedman test was applied to assess the differences across the three time points within each group. Between-group analysis was conducted using the Kruskal-Wallis test to compare the differences in visual symptom improvement between the control and intervention groups. A p-value of less than 0.05 was considered statistically significant for all tests.

All participants provided informed consent before the start of the trial, acknowledging their voluntary participation and their right to withdraw at any time without repercussions. Confidentiality of participant data was maintained throughout the study, and no personal identifiers were included in the final analysis. The study did not receive any financial support, and the authors declared no conflicts of interest, ensuring that the research findings were unbiased and solely focused on the scientific inquiry (21).

Results

The study aimed to assess the effectiveness of eye exercises in reducing vision-related symptoms among 99 participants. The participants were randomly assigned into three groups: a control group, a relaxation group (palming exercises), and an exercise group (figure-8 and focusing exercises). Visual symptoms were evaluated using the Convergence Insufficiency Symptom Survey (CISS) questionnaire at baseline, 2 weeks, and 4 weeks. The data were analyzed using SPSS version 25, with between-group comparisons performed using the Kruskal-Wallis test and within-group comparisons using the Friedman test.

Table1: Frequency of Vision-Related Symptoms

Symptom	Never	Infrequently	Sometimes	Fairly/Often	Always	p-Value (Between Groups)
Tired Eyes	53	9	15	7	15	0.001
Loss of Concentration	26	33	22	17	1	0.001
Trouble Remembering What Read	44	19	21	10	5	0.001
Double Vision	23	32	30	13	1	0.001
Sore Eyes	40	44	9	6	0	0.001

Between-Group Analysis the Kruskal-Wallis test revealed a statistically significant difference between the control, relaxation, and exercise groups for all vision-related visual symptoms compared to the control group.

symptoms ($p < 0.001$). This indicates that the interventions were effective in reducing

Table 2 Within-Group Analysis

Test Statistics	Value
Chi-Square	14.579
df	2
Asymp. Sig. (p-value)	0.001

Within-Group Analysis Control Group The control group showed no significant improvement in symptoms over time ($p = 0.050$), indicating that there was no change in visual symptoms without intervention. Relaxation Group (Palming Exercise) The relaxation group showed significant improvements in symptoms over the course of the study, with a p-value of less than 0.001, indicating that the palming exercises were effective in reducing visual symptoms.
Exercise Group (Figure-8 and Focusing Exercises)
The exercise group also demonstrated significant improvements in visual symptoms ($p < 0.001$), confirming the effectiveness of figure-8 and focusing exercises.

Table 3 Summary of Findings

Group	Chi-Square	df	Asymp. Sig. (p-value)
Control	6.000	2	0.050
Relaxation	42.741	2	0.000
Exercise	35.043	2	0.000

Both the relaxation and exercise groups showed statistically significant improvements in reducing visual symptoms, as evidenced by the within-group analysis. The control group, however, did not demonstrate significant changes over time. The between-group analysis also confirmed the effectiveness of eye exercises, with the relaxation and exercise groups significantly outperforming the control group in reducing symptoms such as tired eyes, double vision, and sore eyes. This data supports the conclusion that eye exercises, particularly palming, figure-8, and focusing exercises, are effective interventions for alleviating vision-related symptoms in young adults.

DISCUSSION

This randomized controlled trial aimed to evaluate the effectiveness of specific eye exercises, including palming, figure-8, and focusing exercises, in reducing vision-related symptoms among young adults. The results of the study demonstrated significant improvements in visual symptoms in both intervention groups, with the relaxation and exercise groups showing substantial reductions in symptoms such as tired eyes, loss of concentration, and double vision, compared to the control group. These findings align with previous research, which has consistently reported the positive effects of eye exercises in managing visual discomfort, particularly in individuals using visual display terminals for extended periods (10).

Previous studies have highlighted that eye exercises can effectively improve accommodation power, reduce eye strain, and enhance the overall ability to focus, particularly among those experiencing symptoms of Computer Vision Syndrome (CVS) (16). The current study's findings are consistent with those of Shah et al., who reported similar improvements in visual acuity and reduced convergence insufficiency symptoms following eye and facial exercises (4). Furthermore, Rizanti's study on the effectiveness of ocular exercises demonstrated that regular practice of palming, blinking, and focusing exercises significantly reduced eye fatigue and enhanced the functioning of extraocular muscles, further supporting the current study's conclusions (10). In both the relaxation and exercise groups, the interventions led to significant improvements in visual symptoms, as demonstrated by the p-values below 0.001, which strengthens the evidence for using eye exercises as an effective therapeutic option for vision-related problems.

Despite the positive outcomes, the study had several limitations. One of the primary limitations was the relatively short duration of the intervention (four weeks), which may not have been sufficient to observe long-term improvements in visual function. Additionally, the study relied on self-reported symptoms using the CISS questionnaire, which, while validated, introduces a level of subjectivity that could affect the results. Future studies should consider using objective measures of visual function alongside self-reported data to provide a more comprehensive assessment of the effectiveness of eye exercises. Another limitation was the relatively homogenous sample, which consisted of young adults between the ages of 18 and 35 years. This age group is less likely to experience age-related changes in vision, such as presbyopia, which limits the generalizability of the findings to older populations (18).

In terms of strengths, the study followed a rigorous randomized controlled trial design, ensuring that the results were robust and could be attributed to the interventions rather than external factors. The use of a validated questionnaire (CISS) to assess visual symptoms added credibility to the findings. Furthermore, the study's large sample size (99 participants) provided sufficient power to detect significant differences between the intervention and control groups. The study also adhered to ethical standards, including the Declaration of Helsinki, ensuring the protection of participant rights and the integrity of the research process.

Based on the findings, the study recommends that eye exercises, such as palming and figure-8 exercises, be considered as non-invasive and cost-effective interventions for reducing visual symptoms, particularly in individuals at risk of developing CVS due to prolonged screen use. Future research should focus on longer-term interventions and include a more diverse population, such as older adults or individuals with more severe visual impairments, to better understand the generalizability and long-term benefits of these exercises. Additionally, exploring other types of eye exercises and comparing their effectiveness could provide further insights into optimal management strategies for vision-related symptoms.

CONCLUSION

In conclusion, this study contributed to the growing body of evidence supporting the use of eye exercises in managing

visual discomfort. Both the relaxation and exercise interventions significantly reduced vision-related symptoms, making them viable options for individuals experiencing visual strain, particularly in modern environments where screen use is prevalent. These findings hold promise for further application in clinical and occupational settings, where eye health is increasingly challenged by the digital age.

REFERENCES

1. Desai VR, Alagesan J. Effect of Eye Exercises on Myopia: Randomized Controlled Study. J Pharm Biomed Sci. 2011;10(10):1-5.
2. World Health Organization. Visual Impairment and Blindness: WHO Fact Sheet No. 282. August 2014. Available from: https://www.who.int
3. Poudel S. Effect of Display Gadgets on Eyesight Quality (Computer Vision Syndrome) of M.Sc. Students in Tribhuvan University. Int J Sci Eng Res. 2018;9(8):1-7.
4. Shah PJ, Sangeetha M. Effects of Facial, Neck Massage and Traditional Chinese Eye Exercises Along with Eye and Facial Exercises on Visual Acuity and Convergence Insufficiency Among Young Adults with Low Myopia. Indian J Ophthalmol. 2020;68(1):69-74.
5. Shareef H, Sameen M, Jafaar S. The Impact of Eye Exercises on High Myopia and Visual Acuity in Patients Aged 15-30 Years. J Phys Conf Ser. 2020;1(1):1-10.
6. Gammoh Y. Digital Eye Strain and Its Risk Factors Among a University Student Population in Jordan: A Cross-Sectional Study. Cureus. 2021;13(2):1-8.
7. Rosenfield M. Computer Vision Syndrome (AKA Digital Eye Strain). Optometry. 2016;17(1):1-10.
8. Ranasinghe P, Wathurapatha W, Perera Y, Lamabadusuriya D, Kulatunga S, Jayawardana N, et al. Computer Vision Syndrome Among Computer Office Workers in a Developing Country: An Evaluation of Prevalence and Risk Factors. BMC Res Notes. 2016;9(1):1-9.
9. Loh K, Redd S. Understanding and Preventing Computer Vision Syndrome. Malays Fam Physician. 2008;3(3):128-9.
10. Rizanti AP. Yoga Ocular Exercises to Maintain Eye Health During Work and Distance Learning in the New Normal Era. J Berita Ilmu Keperawatan. 2021;14(1):1-9.
11. Bergqvist UO, Knave BG. Eye Discomfort and Work with Visual Display Terminals. Scand J Work Environ Health. 1994;20(1):27-33.
12. Bogdanici CM, Sandulache DE, Nechita CA. Eyesight Quality and Computer Vision Syndrome. Rom J Ophthalmol. 2017;61(2):112-6.
13. Telles S, Naveen K, Dash M, Deginal R, Manjunath N. Effect of Yoga on Self-Rated Visual Discomfort in Computer Users. Head Face Med. 2006;2(1):1-6.
14. Kurunhikattil PK. Role of Eye Exercises in Improving Performance of Professionals Working with Computers. J Indian Syst Med. 2016;4(3):145-50.
15. Omer. 7 Eye Exercises to Reduce Eye Strain and Strengthen Eye Muscles. Home-Eye Care. 2018. Available from: https://home-eyecare.co.uk
16. Desai R, Palekar T, Patel D, Rathi M, Joshi R, Shah A. Effects of Yogic Eye Exercises for Myopia Among Students. J Dent Res Rev. 2020;7(5):69-73.
17. Daugherty KM, Frantz KA, Allison CL, Gabriel HM. Evaluating Changes in Quality of Life After Vision Therapy Using the COVD Quality of Life Outcomes Assessment. Optom Vis Dev. 2007;38(2):75-82.
18. Joshi H, Retharekar S, Rairikar S, Shyam A, Sancheti P. Effect of Eye Exercises on the Visual Acuity and Refractive Error of Myopics. Int J Ther Rehabil Res. 2017;6(2):249-53.
19. Marg E. Flashes of Clear Vision and Negative Accommodation with Reference to the Bates Method of Visual Training. Optom Vis Sci. 1952;29(4):167-84.
20. Osborn COK. Eye Exercises. 2018. Available from: https://example.com
21. Poudel S. A Research Report About Effect Of Display Gadgets On Eyesight Quality (Computer Vision Syndrome) Of M.Sc. Students In Tribhuvan University. Int J Sci Eng Res. 2018;9(8):1-7.
22. Begley CG, Caffery B, Chalmers RL, Mitchell GL. Use of the Dry Eye Questionnaire to Measure Symptoms of Ocular Irritation in Patients with Aqueous Tear Deficient Dry Eye. Cornea. 2002;21(7):664-70.
23. Lagacé J-P. Dr. Jean-Pierre Lagacé, Optometrist. 2021. Available from: https://example.com
24. Lertwisuttipaiboon S, Pumpaibool T, Neeser KJ, Kasetsuwan N. Effectiveness of a Participatory Eye Care Program in Reducing Eye Strain Among Staff Computer Users in Thailand. Risk Manag Healthc Policy. 2017;10:71-7.