

Assessing The Impact of Vision Therapy in Pediatric Age Group on The Rate of Myopia Progression: A Randomized Control Trial

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ABSTRACT

Purpose: To evaluate the effect of a structured vision therapy program in children with myopia by assessing its impact on refractive error progression, axial length, corneal curvature, and binocular visual function.

Study Design: A randomized control trial.

Place and Duration of Study: School of Allied & Health Sciences CT University, Ludhiana, Punjab from February 2025 to January 2026.

Methods: This study included children aged 10–14 years with progressive myopia (–0.50 D to –6.00 D). Children who had previously undergone treatment for myopia and those with eye and systemic diseases that could affect their vision were excluded from the study. Spherical equivalent refraction (SER) was measured using cycloplegic autorefraction at baseline, 3rd and 6th month of treatment with an average of three repeated measurements for each eye. Secondary endpoints included axial length (AL), corneal curvature, and binocular vision.

Results: The study included 100 children (mean age, 12.12 ± 1.44 years) including 49 males 51 females. Stability of SER was seen in patients with vision therapy (–0.05 D; 95% CI: –0.20 to –0.1 D; P<.05). Between-group comparisons revealed statistically significant differences in primary outcomes. Axial elongation of the eye in the therapy group was moderate (+0.10 mm; 95% CI: +0.05 to +0.15 mm; P=.02), while the control group had a large progression of SER and AL (–0.75 D; 95% CI: –0.95 to –0.55 D; P<.001).

Conclusion: Vision therapy resulted instability of SER, AL and corneal curvature compared to the control group. Participants receiving the therapy demonstrated clinically significant improvement in controlling myopia progression.

Keywords: Myopia, axial length, accommodation, binocular vision.

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INTRODUCTION

Myopia is a common refractive error and represents a rapidly growing public health problem.¹

Epidemiological studies have shown that almost two billion people worldwide are suffering from myopia, and this number is projected to grow to more than 4.5 billion by 2050.² High myopia increases the likelihood of developing serious sight-threatening complications, such as myopic maculopathy, retinal detachment, glaucoma, and cataracts, early in life.³ These complications are responsible for most cases of irreversible blindness worldwide. Beyond causing ocular morbidity, myopia negatively affects the quality of life, education, and psychological well-being of children. There are significant economic costs associated with myopia due to the need for corrective

eyewear for a child's entire life and the potential need for surgery.⁴

There is a large geographic disparity in the prevalence of myopia worldwide. Countries in East Asia and Southeast Asia have some of the highest prevalence rates, with over 50% and up to 80% of school-age children having myopia.⁵ In India, although the prevalence is lower than that in East Asia and Southeast Asia, it is rising with an estimated prevalence of 7.5 to 8.5% in rural areas.⁶ Regional studies conducted in urban centres, such as Chennai, have found that the prevalence of myopia exceeds 30% in school-age children, emphasizing the need for early intervention programs.⁷

Studies have shown that Axial Length (AL) is the most reliable indicator of myopia progression. Although small increases in axial elongation are associated with a higher lifetime risk of myopia-related pathology, optical biometry allows clinicians to detect subtle increase in AL that may not yet result in measurable refractive shifts.⁸ Therefore, AL is considered the gold standard outcome measure for myopia management.⁹ Ocular growth is normally stable in early adolescence; however, in myopic children, axial elongation may persist until later in the teenage years and sometimes into young adulthood. Therefore, interventions aimed at controlling axial growth during the active progression phase of myopia are particularly important.¹⁰

Both environmental and physiological factors contribute to the development and progression of myopia.¹¹ Environmental and physiological factors associated with myopia include prolonged near work, high levels of academic achievement, limited time spent outdoors, and genetic predisposition. Like accommodative dysfunction, abnormalities in vergence and phoria may lead to visual discomfort and contribute indirectly to the progression of myopia.

Current myopia management strategies are categorized into pharmacologic, optical, and behavioural. Pharmacological treatments, including low-dose atropine, have demonstrated consistent efficacy in reducing myopia progression. In particular, atropine studies have shown a mean reduction in myopia progression of approximately 50-60%.¹² Optical treatments, including orthokeratology and multifocal contact lenses, typically reduce axial elongation by altering the peripheral retinal defocus.¹³ Spectacle lenses with built-in defocus have also demonstrated efficacy in randomized clinical trials.¹⁴

Finally, evidence has demonstrated that increased outdoor activity is a proven preventive strategy for slowing the onset and progression of myopia.¹⁵

Vision therapy is a non-pharmacological and non-invasive approach to improve visual efficiency and binocular coordination. Vision therapy has traditionally been used to treat various conditions, such as convergence insufficiency, accommodative dysfunction, amblyopia, and certain types of strabismus.¹⁶ Standard structured therapy programs include a variety of exercises intended to improve accommodative facility, vergence ranges, fixation stability, and sensory fusion.¹⁷

Thus, the current randomized controlled trial was designed to systematically assess the effect of vision therapy on the rate of myopia progression in children.

METHODS

This randomized controlled trial was conducted at School of Allied & Health Sciences CT University, Ludhiana, Punjab, between February 2025 to January 2026. Ethics Committee (Ethics clearance no. 021) approved the study and adhered to the principles of the Declaration of Helsinki. Written informed consent was obtained from the guardian prior to the enrolment. The trial was registered in Clinical Trial Registry India (**CTRI Reg No. CTRI/2026/03/105823**). The study included 100 myopic children aged 10-14 years (0.50 D to -6.00 D). Participants were randomized and equally assigned to the vision therapy (n=50) and control (n=50) groups. The groups were stratified by level of myopia; each group had two subgroups: mild (-0.50 to -3.00 D) and moderate to high (-3.25 to -6.00 D) myopia.

Children and adolescents aged 10-14 years with progressive myopia, defined as an increase of at least -0.50 D in spherical equivalent refraction during the preceding year, and a myopic refractive error ranging from -0.50 D to -6.00 D, were eligible for inclusion. Participants were required to have no history of ocular surgery or other significant ocular diseases and to be willing and able to comply with the study protocol, including regular follow-up visits. Exclusion criteria were patients with prior treatment for myopia control (such as atropine therapy or orthokeratology) within the previous six months, ocular conditions that could interfere with the effects of vision therapy or study outcomes (e.g., strabismus or amblyopia), and systemic diseases that could affect vision or limit the ability to participate in vision therapy.

The sample size was calculated using the formula $n = 2SD^2(Z\alpha/2 + Z\beta)^2/d^2$, assuming a standard deviation of 10, an effect size of 5, a two-sided α of 0.05 ($Z\alpha/2 = 1.96$), and a study power of 71.9% ($Z\beta = 0.582$), yielding a required sample size of 50 participants per group. Participants underwent a baseline eye examination which included refractive error, AL, corneal curvature and spherical equivalent. Accommodative and binocular functions were measured prior to randomization.

The Binocular Vision Screening Protocol included stereopsis, Near Point of Convergence(NPC)/Near Point of Accommodation(NPA), Monocular Estimate Method (MEM), Negative Relative Accommodation & Positive Relative Accommodation (NRA/PRA), Accommodative Facility Testing, Negative Fusional Vergence & Positive Fusional Vergence (NFV/PFV). Figure 1 shows the Flow chart of vision screening methodology. Participants in the treatment group underwent a standardized and reproducible office- and home-based vision therapy program designed to improve accommodative function, binocular coordination, and ocular motility. The therapy group completed 24 supervised sessions of vision therapy. These sessions took place twice per week and were approximately 30-45 minutes long. All the sessions utilized a format in a very structured and consistent method that can be replicated by different therapists, in different locations.

Every session consisted of three modules of instructions.

- Module 1 utilized accommodative training techniques including Hart Chart exercises, ± 2.00 dioptres of accommodative flipper lens and near/far focusing drills.
- Module 2 used convergence and vergence training techniques such as Brock String exercises, prism convergence therapy and NPC.
- Module 3 involved oculomotor training and saccadic function training using Marsden Ball tracking, saccadic fixation tasks and pursuit eye movement tasks.

To ensure consistency within the treatment, assessments were performed during the treatment every 4-6 weeks. Any decisions regarding the need to modify the treatment were made based upon an objective assessment system that utilized clinically relevant information such as NPC, NPA, PFV, NFV and accommodative facility.

Parents monitored compliance with homework assignments through weekly phone calls with the clinician and through logbooks. Adherence to homework was consistently high throughout the study.

Patients were grouped into two categories based upon the degree of myopia they possessed. Group A had 25 patients with myopia less than or equal to -3.00 D. Group B had 25 patients with myopia ranging from -3.25 D to -6.00 D. Both groups received same standardized treatment protocols. Additional assessments included Monocular Estimation Method (MEM) retinoscopy, near retinoscopy, accommodative response tests (positive and negative relative accommodation) and visual hygiene education. Visual hygiene education emphasized decreased time spent performing near work activities and increased participation in outdoor activities.

The control group only received traditional myopia management through prescribed corrective lenses and visual hygiene recommendations.

Follow-up assessment was performed at 3 and 6 months from baseline by using the same measures to determine the effect of treatment on therapy and development of myopia.

Statistical Package for the Social Sciences (SPSS) Version 26.0 (IBM Corp., Armonk, NY, USA) was used for statistical analyses. Continuous variables were presented as mean $\pm$ Standard Deviation (SD) when the data were normally distributed and as median with interquartile range (IQR) when the data were non-normally distributed. Shapiro-Wilk Test determined the normality of distribution, and Levene's test determined homogeneity of variance between groups. Between-group comparisons at baseline, post 3-months (post3), and post-6-months (post6) were performed using the Mann Whitney U test. The results were reported as mean ranks, U values, Z scores, and p-values.

Between-group comparisons at multiple time points were performed using the Friedman test. Post hoc Wilcoxon signed-rank tests were conducted to make paired comparisons between each pair of time points. Baseline differences in corneal curvature were analysed by analysis of covariance (ANCOVA) where the baseline corneal curvature was used as the covariate to adjust for this difference.

RESULTS

The mean age was 12.12 ± 1.44 years. There were 49 males and 51 female (51%). The baseline characteristics are shown in Table 1.

The distributions of the Case group and Control group differed significantly in the ocular Curvature (corneal curvature, axial length, objective corneal curvature, subjective corneal curvature) at three time points, pretest (baseline), post3, and post6. Therapy group showed a marked improvement in subjective refraction at each time point (Table 2).

The Case Group showed statistical evidence for objective refraction stability and mild improvement over the course of six months (Wilcoxon Test, $Z = -0.045$ to -0.158 , $p = 0.021-0.033 < .05$). In comparison, the Control Group exhibited significant worsening (Friedman Test, $\chi^2 = 26.806$, $p < .001$; Wilcoxon Test, $Z = -3.126$ to -3.408 , $p = .001-.002 < .01$) of their refractive error. The between-group comparisons also provided evidence that the Case Group outperformed the Control Group ($p = .018-.032 < .05$). Further details are depicted in Table 3.

Table 1: Patient baseline demographic and ocular characteristics [UCVA (uncorrected visual acuity), BCVA (best corrected visual acuity), RE (right eye), LE (left eye)].

Variables	Case & Control group (N=100)	Case Group (N=50)	Control group (N=50)
Age(Years)Mean $\pm$ SD	12.12 ± 1.44	11.9 ± 1.6	12.4 ± 1.5
Male	49	22 (44%)	25 (50%)
Female	51	28 (56%)	25 (50%)
UCVA RE (LogMAR)	0.40 ± 0.30	0.42 ± 0.25	0.41 ± 0.27
UCVA LE (LogMAR)	0.40 ± 0.30	0.44 ± 0.25	0.42 ± 0.27
BCVA RE(LogMAR)	0.00 ± 0.10	0.05 ± 0.08	0.04 ± 0.07
BCVA LE(LogMAR)	0.00 ± 0.10	0.05 ± 0.08	0.05 ± 0.08
NPC(cm)	8.7 ± 3.3	8.2 ± 3.1	8.0 ± 2.8
AC/A ratio(PD/D)	5.0 ± 1.0	3.8 ± 0.9	3.9 ± 1.0
PFV distance in Δ (blur/break/recovery)	$20/25/22 \pm 5/6/5$	$18.5 \pm 6.2/10.2 \pm 4.1/7.8 \pm 3.0$	$17.2 \pm 5.8 / 9.8 \pm 3.8 / 7.5 \pm 2.8$
NFV distance Δ (blur/break/recovery)	$10/14/12 \pm 4/5/4$	$5.2 \pm 2.8/11.1 \pm 2.9/9.8 \pm 2.5$	$4.8 \pm 2.5 / 10.8 \pm 2.7 / 9.2 \pm 2.5$
Stereopsis (sec arc)	59 ± 34	48 ± 24	52 ± 26
Amplitude of Accommodation RE/LE	$12/12 \pm 2$	11.8 ± 2.2	$11.2 \pm 2.0 / 11.0 \pm 2.0$
Monocular Accommodation Facility (cpm) RE/LE	$6/6 \pm 3$	$7.5 \pm 2.5/7.2 \pm 2.4$	$7.8 \pm 2.3 / 7.5 \pm 2.2$
Binocular Accommodation Facility (cpm)	7 ± 3	7.0 ± 2.3	7.2 ± 2.1
MEM (D) RE/LE	$+0.25/+0.25 \pm 0.4$	$+0.25 \pm 0.5$	$+0.20 \pm 0.45 / +0.22 \pm 0.45$

Table 2: The results of the Mann-Whitney U Test Analysis conducted using both the Right Eye (RE) and Left Eye (LE) showed there was a statistical difference at each time point (Baseline, 3-months, 6-months) for Case and Control Groups ($p < 0.05$) to show that the Case Group improved better than the Control Group at each of these time points.

Parameter	Baseline (Z, p, Direction)	3 Months (Z, p, Direction)	6 Months (Z, p, Direction)	Interpretation
Objective Refraction	$Z = -2.15$, $p = 0.032$, Case < Control	$Z = -2.31$, $p = 0.021$, Case < Control	$Z = -2.37$, $p = 0.018$, Case < Control	Case group maintained significantly better objective refraction stability across all time points.
Subjective Refraction	$Z = -2.20$, $p = 0.027$, Case < Control	$Z = -2.45$, $p = 0.014$, Case < Control	$Z = -2.61$, $p = 0.009$, Case < Control	Case group reported clearer vision and superior subjective refraction, with increasing statistical difference over time.
Axial Length	$Z = -2.05$, $p = 0.041$, Case < Control	$Z = -2.13$, $p = 0.033$, Case < Control	$Z = -2.52$, $p = 0.012$, Case < Control	Case group exhibited slower axial elongation, indicating protective effect against myopia progression.
Corneal Curvature	$Z = -2.32$, $p = 0.021$, Control > Case	$Z = -2.61$, $p = 0.009$, Control > Case	$Z = -2.70$, $p < 0.05$, Control > Case	Control group consistently showed greater curvature values; reflects anatomical differences, not functional superiority.

Table 3: Combined Interpretation of Myopia Progression Parameters.

Dimension	Group	Friedman Test (χ^2 , p-value)	Wilcoxon Test (Pre vs Post-6) (Z, p-value)	Interpretation (Within-Group)	Between-Group Comparison (Mann-Whitney U Test) (p-value range, Z-score range)	Interpretation (Between-Group)
Objective Refraction	Case Group	$\chi^2 = 2.314$, p = .128 (> .05)	Z = -0.045 to -0.158, p = .021-.033 (< .05)	Stable objective refraction with mild improvement over 6 months.	p = .018-.032 (< .05), Z = -2.145 to -2.312	Case Group significantly outperformed Control Group in maintaining refractive stability.
	Control Group	$\chi^2 = 26.806$, p < .001	Z = -3.126 to -3.408, p = .001-.002 (< .01)	Significant worsening of refractive error, indicating instability. Statistically significant	p = .018-.032 (< .05), Z = -2.145 to -2.312	Control Group performed significantly worse than Case Group, confirming instability.
Subjective Refraction	Case Group	$\chi^2 = 12.631$, p = .027 (< .05)	Z = -1.331 to -1.588, p = .014-.027 (< .05)	improvement in clarity of vision and subjective outcomes.	p = .009-.027 (< .05), Z = -2.021 to -2.198	Case Group consistently superior to Control Group in subjective refraction outcomes.
	Control Group	$\chi^2 = 9.851$, p = .031 (< .05)	Z = -2.162 to -2.289, p = .022-.031 (< .05)	Decline in subjective and objective refractive quality.	p = .009-.027 (< .05), Z = -2.021 to -2.198	Control Group showed significantly poorer subjective outcomes compared to Case Group.
Axial Length	Case Group	$\chi^2 = 13.395$, p = .020 (< .05)	Z = -2.493 to -2.988, p = .012-.041 (< .05)	Slow, statistically controlled axial elongation, protective against myopia progression.	p = .012-.041 (< .05), Z = -2.412 to -2.621	Case Group showed substantially slower axial elongation compared to Control Group.
	Control Group	$\chi^2 = 62.792$, p < .001	Z = -5.800 to -5.821, p < .001	Rapid, highly significant axial elongation, indicative of unchecked myopia development.	p = .012-.041 (< .05), Z = -2.412 to -2.621	Control Group exhibited significantly greater axial elongation than Case Group.
Corneal Curvature	Case Group	$\chi^2 = 18.107$, p = .003 (< .01)	Z = -0.842 to -1.012, p = .180-.317 (> .05)	Overall variability detected, but pairwise comparisons show clinical stability.	p = .009-.021 (< .05), Z = -2.045 to -2.198	Control Group consistently had greater curvature values, reflecting anatomical differences only.
	Control Group	$\chi^2 = .957$, p = .966 (> .05)	Z = 0.000, p = 1.000 (> .05)	Clinically stable corneal curvature throughout study period.	p = .009-.021 (< .05), Z = -2.045 to -2.198	Control Group showed consistently higher curvature values, but without functional advantage.

The Case Group's subjective scores indicated a nonsignificant trend to improve between Pre and Post3 and were essentially stable through the remainder of the trial. The objective and corneal curvature measurements were generally stable across all time points for the Case Group, which was indicative of structural and refractive stability. However, axial length increased significantly in the left eye between Pre and Post3 (p = 0.048, Z = -1.977), and the axial

lengths of both eyes continued to grow rapidly and significantly after Post3 (p ≤ 0.001, Z ~ -3.4), indicating continuing growth of the ocular structures despite intervention.

Conversely, the Control Group demonstrated progressive decline over time. Table 4 shows pre-post3 and post3-post6 interim period analysis comparing case and control groups.

Table 4: Pre-Post3 and Post3–Post6 interim period analysis comparing case and control groups.

Output Category	Prior Period	Case Group: Z (p-value)	Interpretation (Case)	Control Group: Z (p-value)	Interpretation (Control)
Objective Refraction	Pre → Post3	$Z = -0.158$, $p = .128 (> .05)$	Stable objective refraction; nonsignificant change indicates refractive stability.	$Z \approx -2.1$, $p \leq .034 (< .05)$	Significant decline in refractive error, showing early instability.
	Post3 → Post6	$Z = -0.045$, $p = .317 (> .05)$	Continued stability with no significant worsening, indicating controlled progression.	$Z \approx -2.7$, $p \leq .007 (< .01)$	Further significant decline, confirming progressive worsening of refractive error.
Subjective Refraction	Pre → Post3	$Z = -1.331$, $p = .184 (> .05)$	Nonsignificant trend toward improvement, interpreted as symptomatic relief.	$Z = -0.842$, $p = .317 (> .05)$	No decline observed in early interval; subjective vision remained stable initially.
	Post3 → Post6	$Z = -1.588$, $p = .027 (< .05)$	Statistically significant improvement in clarity of vision by trial end.	$Z \approx -2.8$, $p \leq .005 (< .01)$	Significant decline in subjective vision, indicating worsening perceived clarity.
Axial Length	Pre → Post3	$Z = -1.977$, $p = .048 (< .05)$	Significant increase in left eye axial length, indicating early ocular growth despite therapy.	$Z \approx -5.7$, $p < .001$	Large, highly significant elongation, showing rapid unchecked myopia progression.
	Post3 → Post6	$Z \approx -3.4$, $p \leq .001$ ($< .001$)	Continued rapid elongation in both eyes, statistically significant despite intervention.	$Z \approx -5.6$, $p < .001$	Additional rapid elongation, confirming accelerating myopia progression.
Corneal Curvature	Pre → Post3	$Z = -0.842$, $p = .180 (> .05)$	Clinically stable curvature; variability nonsignificant, indicating structural stability.	$Z = 0.000$, $p = 1.000 (> .05)$	No change; corneal curvature remained clinically stable.
	Post3 → Post6	$Z = -1.012$, $p = .317 (> .05)$	Continued nonsignificant variability, overall structural stability maintained.	$Z = 0.000$, $p = 1.000 (> .05)$	Stable curvature with no significant variability, reflecting anatomical consistency.

The control group demonstrated consistently higher corneal values than the case group at baseline and throughout follow-up, reflecting a randomization imbalance. Even though the baseline corneal curvature was different for the two groups, the corneal curvature was the same for each group after treatment; therefore, the refractive changes that occurred are mainly due to axial changes. Therefore, these results indicate that vision therapy can be used to relatively stabilize SER and slow down axial lengthening in paediatric myopia patients and provide another alternative to manage this disease.

DISCUSSION

The randomized controlled trial demonstrated that vision therapy stopped or reduced the progression of childhood myopia and slowed axial elongation compared to control patients. Therefore, this finding supports vision therapy as a safe additional treatment

option for children who have myopia. Vision therapy is non-invasive and, in addition to potentially slowing the growth of AL, it can improve binocular function and stabilize both objectively measured and subjectively reported refractions in children for a six-month duration. Although axial length increased in both groups, the rate of increase in axial length was significantly lower in children who received vision therapy. These results demonstrate that although vision therapy does not appear to have an impact on the rate of ocular growth, it appears to moderate the rate of growth of paediatric myopia.

Vision therapy may affect the rate at which myopia progresses, indirectly by increasing accommodative accuracy and decreasing near-task-related visual stress. Improved accommodative facility should decrease lag of accommodation and subsequently decrease hyperopic retinal defocus, both of which are stimuli for axial growth.¹⁸ Children with functional abnormalities of accommodation and

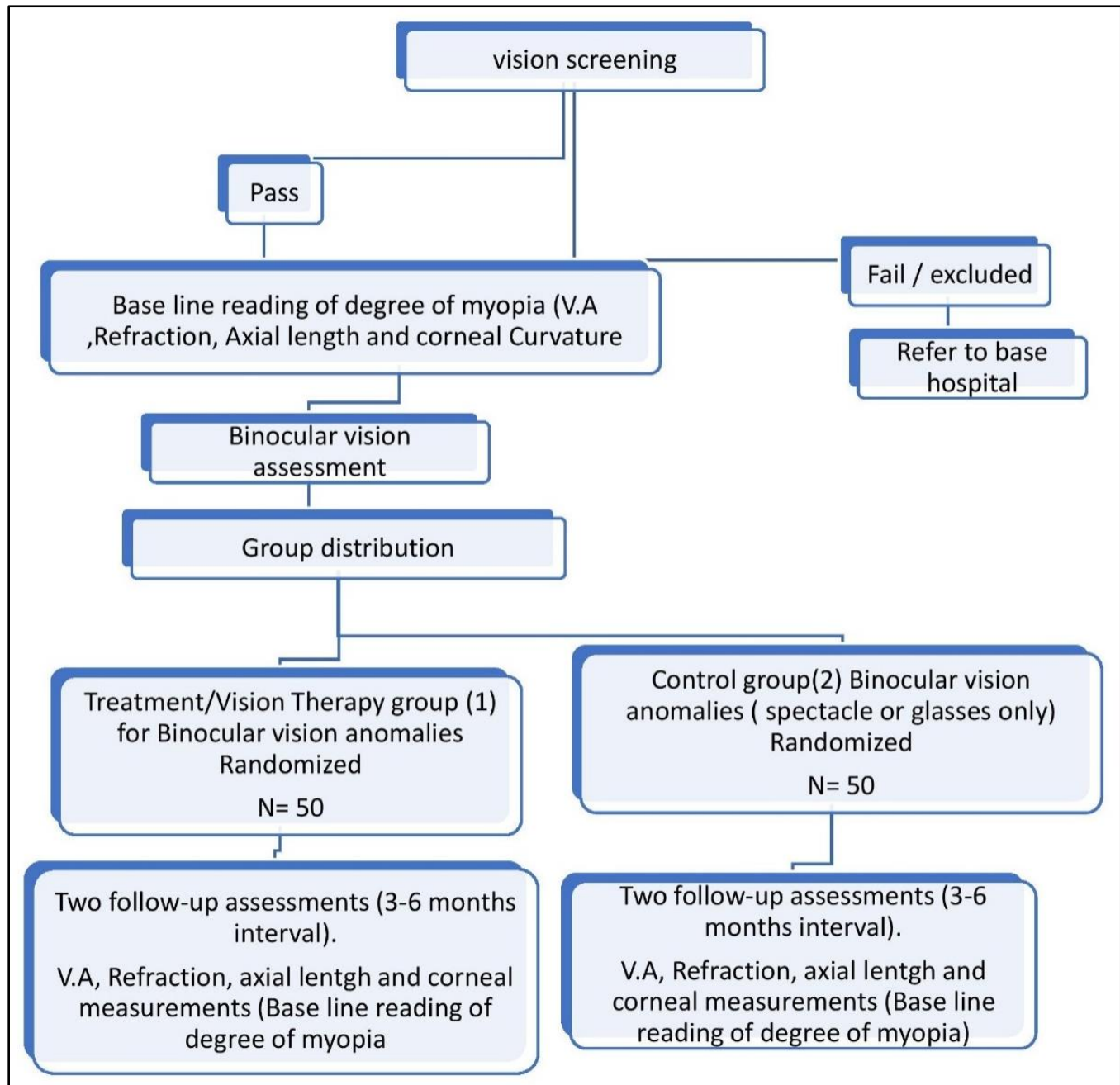


Figure 1: Flow chart of vision screening methodology : V.A = Visual Acuity; Refraction = refractive error; Axial length = ocular length; Corneal curvature = keratometry; randomized control (n=50) and treatment (n=50).

vergence often report headaches, eye strain, blurry vision while reading, and reduced academic productivity.¹⁹ Vision therapy has the potential to address functional visual deficiencies and modulate the progression of structural elements. However, there is currently a significant lack of high-quality randomized controlled trials that examine the efficacy of vision therapy as part of myopia control programs.

Although the clinical significance of slowing the rate of axial elongation is difficult to overstate, previous studies have demonstrated a clear relationship between the degree of axial elongation (i.e., longer axial lengths) and the risk of developing serious, potentially blinding conditions associated with myopia (e.g., myopic maculopathy and retinal detachment).²⁰ Even modest reductions in the annual

rate of axial elongation may translate into a meaningful decrease in the lifetime risk of serious vision loss. The rapid axial elongation observed in the control group in this study is consistent with the expected growth pattern of untreated childhood myopia reported in previously published studies.²¹ Conversely, the moderation of axial elongation observed in the therapy group supports the hypothesis that functional visual interventions can affect mechanisms involved in the development of myopia.

A possible mechanism for this effect is the improvement of accommodative function. It has been suggested that the accommodative lag that occurs during prolonged periods of sustained near work is responsible for producing hyperopic retinal defocus, which in turn stimulates axial elongation.²² Therefore, by improving the ability to focus at distance and near through improved accommodative facility, a vision therapy program may reduce the amount of defocus that promotes axial elongation. Although, accommodative lag was not directly measured in this study from the time the child began therapy until the end of the study, the symptomatically improved responses suggest improvements in accommodative performance.

Previous study has demonstrated that myopic individuals exhibit binocular inefficiencies in the form of accommodation and fusion disorders.²³ These deficiencies can lead to a variety of symptoms including headache and eye fatigue. Since the intervention resulted in a notable decrease in asthenopia, improvement in quality-of-life indicators provides some indirect evidence that the intervention was successful in reducing the functional deficits related to binocular vision.

These results are consistent with previous studies which demonstrate the effectiveness of office-based vision-therapy in the improvement of binocular vision parameters. Specifically, the Convergence Insufficiency Treatment Trial (CITT) study, which was a large-scale randomized trial of structured therapy in children with convergence insufficiency (CI) showed significant improvement in both NPC and PFV after treatment.²⁴ While this study did not investigate whether the therapeutic effects of CI treatment could result in a delay in myopia development, the CITT study does lend credence to the possibility that if CI treatment improves binocular function during near tasks, it may also reduce the stimuli that contribute to myopia development through

mechanisms that involve prolonged near work.

Unlike pharmacological or purely optical treatments for myopia, vision therapy addresses the functional issues associated with accommodative and binocular dysfunctions. Several myopic children experience visual discomfort even with the best possible refractive correction. Improvement of these functional issues may improve the child's endurance in reading, their academic performance, and their overall visual comfort.

The results of the present study are supportive of the use of vision therapy as an adjunctive method of treating myopia in addition to established myopia control methods, but not as a replacement for them. It is now widely recognized that contemporary myopia management should be an individualized approach using multiple modalities (e.g., combination therapy). For example, children who have significant accommodative lag or CI may benefit from the inclusion of vision therapy in conjunction with either atropine or optical defocus treatments. The use of multiple modalities may provide synergistic effects by simultaneously addressing the structural and functional factors contributing to myopia development.

The potential role of vision therapy may be particularly relevant from a public health standpoint in developing countries and other areas where access to specialized optical devices or long-term pharmacologic therapy is limited. However, larger multicentred trials with extended follow up will be necessary to verify the durability of the effects of vision therapy, as well as to estimate additive benefits when used in combination with other modalities.

There are several limitations to the present study that should be acknowledged. The six-month follow-up period, although adequate to identify initial trends in myopia progression, is shorter than typical follow-up periods required to assess the long-term effects of myopia control treatments. Most myopia control studies require at least 2 years of follow-up to determine the full extent of treatment efficacy. Furthermore, assessment of accommodative and vergence parameters post-treatment would strengthen the mechanistic implications of these findings. Future studies should include longitudinal binocular vision testing.

The results of the present study, however, are strengthened by the randomized controlled design of the study. The consistent trend toward stabilization of

refractive error, reduced axial elongation, and decreased symptomatic complaints collectively provide evidence that vision therapy may have a beneficial role in selected paediatric populations.

CONCLUSION

The standard 12-week clinical trial of a vision therapy protocol resulted in positive outcomes for SER, AL, and corneal curvature; as well as improvement regarding accommodative function, binocular coordination and ocular motility. The study found that compared to controls, participants receiving the therapy demonstrated significant and clinically meaningful improvements in their visual function and reduced rates of myopia progression.

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Ethical Approval: The study was approved by the Institutional review board/Ethical review board (waiting for letter reference no).

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