



Research Article

RANDOMIZED OPEN LABEL CLINICAL TRIAL ON THE EFFICACY OF SAPTAMRITA GHRITA TARPANA, EYE EXERCISES AND SHATAVARYADI CHURNA IN VATAJA TIMIRA W.S.R. TO ASTIGMATISM

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ABSTRACT

Astigmatism is a type of refractive error in which refraction varies in different meridians of the eyes; consequently, the light rays entering the eye cannot converge to a point of focus but form various focal lines. All the refractive disorders including astigmatism come under *Timira*. In modern science the treatment options of astigmatism include spectacles, contact lens, and Lasik surgery which are very expensive. Hence in order to provide efficient and better cure by cost effective method through Ayurveda, this study was planned which incorporates *Kriya Kalpa* procedure, oral drug, and eye exercises to tackle it efficiently. **Aim:** To evaluate the efficacy of *Saptamrita Ghrita Tarpana* and Eye exercises in management of *Vataja Timira* w.s.r. to astigmatism. **Objectives:** 1. To evaluate the effect of eye exercises and *Shatavaryadi Churna* in *Vataja Timira* w.s.r. to astigmatism. 2. To evaluate the effect of *Saptamritam Ghrita Tarpana* and *Shatavaryadi Churna* in *Vataja Timira* w.s.r. to astigmatism. **Materials and Methods:** 30 patients with *Vataja Timira* were randomly assigned to two groups for a clinical trial. **Result:** The clinical data shows that the effect of therapy on *Vataja Timira* is 60% in Group A and 51.04% in Group B. **Conclusion:** It can be concluded that clinically *Saptamrita ghrita Tarpana*, *Shatavaryadi churna* and eye exercises combine work better to manage the *Vataja Timira*.

INTRODUCTION

Timira is classified as one of *Drishtigata Roga*^[1], which begins with blurred vision and progresses to deterioration of vision. *Timira* covers a wide range of refractive problems, including astigmatism. They are considered a public health challenge. Astigmatism is a type of refractive error in which refraction varies in different meridians of the eye; consequently, the light rays entering the eye cannot converge to a point of focus but form various focal lines^[2]. Although the cause is unknown, genetic, and environmental factors are likely to play a role. Family history of astigmatism, myopia, eye damage or surgery, and certain genetic and eyelid disorders are all common risk factors.

Astigmatism is a common refractive error accounting for as much as 13% of all refractive errors. The prevalence of astigmatism varies with age, with a high prevalence (approximately 20%) in the first months of life when the curvature of the cornea is very steep. In modern science the treatment options of astigmatism include spectacles, contact lens, and lasik surgery which are very expensive. Refractive errors other than astigmatism can be corrected with glasses but in astigmatism there is always some amount of discomfort even after best correction. Hence in order to provide efficient and better cure by cost effective method through Ayurveda, this study was planned which incorporates *Kriya Kalpa* procedure, oral drug, and eye exercises to tackle it efficiently. *Vataja Timira* can be correlated to astigmatism as the patient perceives the object as distorted in astigmatism. The refraction differs in different meridian due to altered curvature in refractive media which resembles *Vataja* affliction. *Snehana*, or oleation therapy, is the best treatment for *Vataja* disorders, which is why *Tarpana*,

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a type of *Snehana*, has been selected for the present disease. Eye exercises helps in improving the muscle strength of recti and oblique muscle of eye by helping proper focusing and alignment and hence prove to be a useful tool in correcting the focusing defect. *Shatavaryadi Churna* has *Timira Roga Nashaka* properties, hence is used internally to improve the nutritional aspect of eye^[3].

MATERIAL AND METHOD

Source of Data: 30 patients suffering from *Vataja Timira* who fulfilled the inclusion criteria were selected and placed in two groups by simple randomisation process from OPD & IPD of *Shalaky Tantra* department of NIA, Jaipur. Each patient provided written consent on a prescribed performa form. The study was conducted under a strict protocol to prevent bias and to reduce the source of error in the study.

Selection of Cases: 30 patients who attend the O.P.D and I.P.D. of *Shalaky Tantra* department of National Institute of Ayurveda Jaipur, irrespective of their religion, sex, occupation, socioeconomic status was selected.

Criteria for Selection of Patient

Inclusion Criteria

1. Patient diagnosed with astigmatism between the age group of 8-40 years.
2. Patient of astigmatism with cylindrical dioptric value between 0.50 to 8.00 D.

Exclusion Criteria

1. Patients having any lenticular or corneal opacity and other known ocular pathologies like vitreous and retinal diseases, glaucoma, ARMD etc were excluded from the study.
2. Patient taking *Snehapana* therapies from other routes.
3. Patient taking treatment for any other systemic disease.

Criteria for Withdrawal

1. Patient himself/herself wants to withdraw from the clinical trial at any time.
2. If the patient fails to adhere to the protocol requirement
3. During trial, if any serious condition progression and any other systemic disorders.

Laboratory Investigation: CBC was carried out before & after the trial in group A and group B.

Sites of Study: NIA Hospital, Jaipur.

Health condition /problem studied: *Vataja Timira/astigmatism*.

Study Design: Open label, parallel, randomized comparative clinical study.

Method of Generating Randomization Sequence: Computer generated randomization method.

Method of Allocation Concealment: SNOSE (Sequentially Numbered Opaque Sealed Envelope).

Blinding /masking: Open label

Primary outcome/s: Improvement in visual acuity in *Vataja Timira /astigmatism*.

Secondary outcome/s:

1. Reduction in asthenopia, headache and tearing.
2. Changes in keratometry ($K_1 K_2$).

Sample Population: All astigmatism patients reported to *Shalaky Tantra* OPD.

Sample Size: 15 patients having classical symptoms of *Vataja Timira* in each group.

Phase of trial: 2nd phase

Date of First Enrolment: After approval of ethical committee and CTRI registration.

Duration of Study: 60 days

Follow up: Follow up for 1 month with 15 days interval after completion of treatment.

Grouping: Group A: This group was treated with oral administration of *Shatavaryadi churna* 5g b/d along with *Saptamrita Ghrita Tarpana*.

Group B: This group was treated with oral administration of *Shatavaryadi churna* 5g b/d along with eye exercises for 30 days.

Table 1: Doses and Duration of trial

Before the treatment both the groups were given <i>Ajamodhadi churna</i> 5g B/D for three days for <i>Mrudu shodana</i> followed by internal administration of <i>Shatavaryadi churna</i> . <i>Anu Taila Nasya</i> and <i>Triphaladi Netra Parisheka</i> as <i>Purva Karmas</i> were carried for 3 days in Group A before <i>Tarpana</i> for <i>Shirah shodana</i> and <i>Netra shodana</i> .			
	Treatment	Duration	Follow up
Group A	<i>Shatavaryadi churna</i> 5 g b/d	For 1 month	1 month with 15 days interval after treatment
	<i>Saptamrita Ghrita Tarpana</i>	7 days	
	While oral medicine is continued for 1 month the <i>Kriyakalpa</i> were done for 2 sittings with an interval of 7 days in between.		
Group B	<i>Shatavaryadi churna</i> 5g b/d	For 1 month	

Eye exercises	30 days	
<i>Saptamrita Ghrita</i> eye drop 2 drops each eye twice a day	30 days	

Table 2: Saptamrita ghrita^[4]

S.No.	Drugs Name	Botanical Name	Part Used
1	<i>Goghrita</i>	Cow's ghee (<i>Jangama Dravya</i>)	Clarified butter
Kalka Dravya			
1	<i>Sapta parna</i>	<i>Alstonia scholaris</i>	Bark
2.	<i>Amalaki</i>	<i>Emblica officinalis</i>	Fruit
3.	<i>Mustaka</i>	<i>Cyperus rotundus</i>	Rhizome
4.	<i>Daru haridra</i>	<i>Berberis aristate</i>	Root
5.	<i>Pippali</i>	<i>Piper longum</i>	Fruit
Kwatha Dravya			
1	<i>Sapta parna</i>	<i>Alstonia scholaris</i>	Bark
2.	<i>Amalaki</i>	<i>Emblica officinalis</i>	Fruit
3.	<i>Mustaka</i>	<i>Cyperus rotundus</i>	Rhizome
4.	<i>Daru haridra</i>	<i>Berberis aristate</i>	Root
5.	<i>Pippali</i>	<i>Piper longum</i>	Fruit

Table 3: Shatavaryadi churna^[5]

S.No.	Drugs name	Botanical name	Part used
1.	<i>Shatavari</i>	<i>Asparagus racemosus</i>	Tuber/Root
2.	<i>Ela</i>	<i>Elettaria cardamomum</i>	Seeds
3.	<i>Vidanga</i>	<i>Embelia ribes</i>	Fruit
4.	<i>Amalaki</i>	<i>Emblica officinalis</i>	Fruit
5.	<i>Maricha</i>	<i>Piper nigrum</i>	Fruit
6.	<i>Pippali</i>	<i>Piper longum</i>	Fruit



Fig 1: Saptamrita ghrita



Fig 2: Shatavaryadi churna



Fig 3: Saptamrita ghrita Eye Drop

Assessment criteria (Subjective and Objective parameters)

- *Bhramantiva sa pashyati* (illusionary visual perception)
- *Aavil darshnam* (object appears hazy)
- *Vyaavidha darshanam* (objects appear distorted-tortuous)
- Blurred vision
- Defective vision
- Asthenopia- Headache (frontal, temporal) tearing, elongation of objects, keeping the reading material close to eyes
- Distant and near visual acuity
- Automatic and manual refraction
- Tonometry
- Ophthalmoscopy
- Keratometry

Grading System: The effect of therapy before and after the treatment was assessed with the help of following scoring pattern.

Main Symptoms

Table 4: Bhramantiva sa pashyati (Defective Vision)

Grade	Finding (Subjective)
0	No
1	Occasionally defective vision
2	Regular defective vision without disturbing routine works
3	Complete defective vision

Table 5: Aavil darshnam (Blur Vision)

Grade	Finding (Subjective)
0	No
1	Occasional blurring of vision
2	Regular blurring without disturbing routine works
3	Absolute darkness

Table 6: Vyaavidha darshanam (Distorted Visual perception)

Grade	Finding (Subjective)
0	No
1	Slightly
2	Moderate
3	Very much

Associated Symptoms

Table 7: Headache

Grade	Finding (Subjective)
0	No headache
1	Occasional dull aching pain (mild)
2	On and off headache that interferes with routine work; but bearable (moderate)
3	Severe headache experienced often and require analgesics (severe)

Table 8: Tearing (Netra Srava)

Grade	Finding (Subjective)
0	No
1	Slight watering from eye on strain (mild)
2	On and off watering from eye without any strain needs handkerchief at the interval of 3 hour or more (moderate)
3	Excess irritable watering from eye requires frequent use of handkerchief (severe)

Table 9: Elongation of objects-keeping the reading material close to eyes (Netra Aayasa)

Grade	Finding (Subjective)
0	No
1	Rarely keeping the reading material close to eyes
2	Sometime keeping the reading material close to eyes
3	Always keeping the reading material close to eyes

Visual Acuity: It was recorded as numerical convention and later graded in following way

Table 10: Snellen's Chart Grade

Grade	Visual acuity	logMar value
0	6/6	0
1	6/9	0.176
2	6/12	0.301
3	6/18	0.477
4	6/24	0.602
5	6/36	0.778
6	6/60	1

OBSERVATIONS

17 patients were registered in Group A and 17 in Group B and 30 patients completed the treatment and 4 patients were dropout.

Table 11: Age wise distribution of 34 patients of Vataja Timira -Astigmatism

S.No.	Age (in yrs.)	Number of Patients		Total	Percentage (%)
		Group A	Group B		
1.	6-10	0	1	1	2.94%
2.	11-15	0	3	3	8.82%
3.	16-20	4	3	7	20.58%
4.	21-25	4	4	8	23.52%
5.	26-30	3	2	5	14.70%
6.	31-35	3	2	5	14.70%
7.	36-40	3	2	5	14.70%

It was found that maximum number of patients i.e., 23.52 % belong to age group 21-25 years, followed by 20.58 % patients belong to age group 16-20 years, 14.70% patients belong to age group 26-30, 31-35 & 35-40 years of age group, 8.82% patients belong to age group 11-15 years and 2.94% patients between the ages of 6 and 10 years.

It was found that maximum i.e., 58.82% patients were females while rest of the patients i.e., 41.17% were males.

Table 12: Occupation wise distribution of 34 patients of Vataja Timira -Astigmatism

S.No.	Occupation	Number of Patients		Total	Percentage (%)
		Group A	Group B		
1.	Student	9	10	19	55.88%
2.	Service	1	1	2	5.88%
3.	Labour	1	2	3	8.82%
4.	Housewife	6	3	9	26.47%
5.	Business	0	1	1	2.94%

- On considering the nature of occupation, it was found that 55.85% of patients were from student category, 5.88% of patients were from service class, 26.47% of patients were housewives and 8.82% of patients were from labour group, 2.94% of patients were from businessman category.
- Most of the patients i.e., 50% were educated up to graduate education, 17.64% were educated up to primary school education, 11.76% were educated up to secondary education, 8.82% were educated up to higher secondary and post graduate, 2.94% were educated up to high school education.
- It was found that 88.23% of patients belonged to urban area and 11.76% belonged to rural area.
- It was found that maximum i.e., 64.70% patients were belonged to middle class while 23.52% of patients were belonged to lower middle class and 11.76% patient belonged to upper middle class.
- Maximum number of patient's i.e., 91.17% had good appetite, while 8.82% of patients had average appetite.
- It was found that most of the patients i.e., 85.29% had regular bowel habits, while 14.70% of patients had constipation.

- It was found that most of the patients i.e., 61.76% were found to be addicted to tea, while 20.58% had no addiction and only 8.82% of patients were addicted to coffee, 5.88% were found to be addicted to tobacco, 2.94% were found to be addicted to alcohol.
- It was found that maximum patients i.e., 88.23% were of *Rajasika prakriti* followed by 8.82% patients were of *Rajasika-Tamasika prakriti* and 2.94% patients were of *Satwika- Rajasika prakriti* each.
- It was found that maximum patients i.e., 94.11% were of *Madhyama Samhanana* followed by 2.94% of *Pravara Samhanana* and *Avara Samhanana*.
- It was found that most of the patients i.e., 85.29% had *Madhyama Satmya* followed by 8.82% had *Pravara Satmya* and 5.88% had *Avara Satmya*.
- It was found that 97.05% patients had *Madhyama Ahara Shakti* and 2.94% patients had *Avara Ahara Shakti*.
- It was found that maximum i.e., 70.58% were *Bala* while rest of the patients 29.41% were *Madhyama*.
- It was found that maximum number of patients i.e. 76.47% had less than 1 year of chronicity, 20.58% had 1-5 years of chronicity, followed by 2.94% of patients had 5-10 yrs.

Table 13: Chief complaints wise distribution of 34 patients of Vataja Timira - Astigmatism

S.No.	Chief complaints	Number of Patients		Total	Percentage (%)
		Group A	Group B		
1.	<i>Aavil Darshan</i>	16	17	33	97.05%
2.	<i>Bhramantiva sa pashyati</i>	16	14	30	88.23%
3.	<i>Vyavidhha Darshana</i>	3	5	8	23.52%

It was found that maximum numbers of patients i.e., 97.05% were having *Aavila Darshana*, 88.23% of patients had *Bhramantiva sa pashyati* while 23.52% of patients had *Vyavidhha Darshana*.

Table 14: Associated complaints (symptoms) wise distribution of 34 patients of Vataja Timira - Astigmatism

S.No.	Associated complaints	Number of Patients		Total	Percentage (%)
		Group A	Group B		
1.	Headache	11	17	28	87.5%
2.	Elongation of objects	3	1	4	65.62%
3.	Watering from eyes	7	3	10	46.87%

- It was found that 87.5% of patients had headache, 65.62% of patients had elongation of objects, and 46.87% of patients had watering from eyes.
- It was found that maximum number of patients (70.58%) were having *Sukshma nirikshanata*, 64.70% were having *Mala* and *Mutraavarodha*, 20.58% were having *Ushnabhitaptasya Jalaprareshata*, 29.41% were having *Durekshanata*, 32.35% were having *Swapna viparyayanata*, 11.76% were having *Atiatapa sevana*, 2.94% were having *Dhumanishevanam*, 20.58% were having *Rajosevana*, 5.88% were having *Ratri atyambupana*, 11.76% were having *Prasakta Samrodana*, 20.58% were having *Krodha* and *Chinta*, 23.52% were having *Shoka*, 26.47% were having *Shiroabhitapa* and use of elevated pillow daily it was found that maximum i.e., 41.
- 17% of eyes (of patients) were reported to have visual acuity of 6/9 while 5.88% of eyes had visual acuity of 6/18, 33.82% of eyes had visual acuity of 6/12, 4.41% of eyes had visual acuity of 6/6, 13.23% of eyes had visual acuity of 6/24 and 1.47% of eyes had visual acuity 6/60.
- It was found that maximum number of eyes i.e. 72.05% were having cylindrical dioptric power of 0.00 -1.00 D followed by 18.75% eyes having cylindrical dioptric power of 1.00-2.00D while 8.82% of eyes were having cylindrical dioptric power of 2.00-3.0 D, 1.47% of eyes were having cylindrical power 3.00-4.00 D.
- It was found that 100% patients were reported to have normal fundus picture.

RESULT

All the results are calculated by using software: In Stat Graph Pad 3.

- For non-parametric data Wilcoxon matched-pairs signed ranks test was used while for parametric data paired ‘t’ test was used and results calculated in each group.
- For calculating the Inter group comparison, Mann-Whitney U Test & Un-paired ‘t’ Test was used.

Table 15: Showing Effect of Therapy on Assessment Parameters. (Wilcoxon Matched Pairs Singed Ranks Test)

Associate Symptoms	Gr.	Mean		Mean diff.	Relief %	S.D.±	S.E.±	P	Results
		BT	AT						
<i>Aavila Darshan</i> (blurred vision) - Right Eye	A	1.86	0.66	1.20	67.50%	0.5606	0.1447	<0.001	H.S.
	B	1.85	0.78	1.07	79.42%	1.1462	0.2960	<0.001	H.S.
<i>Aavila Darshan</i> (blurred vision) - Left Eye	A	1.56	0.43	1.13	44.28%	0.8904	0.2457	<0.01	S
	B	1.7	0.5	1.2	51.4%	0.9155	0.2364	<0.01	S
<i>Bhramantiva sa pashyati</i> (Defective vision) - Right Eye	A	1.81	0.53	1.28	51.5%	0.8619	0.2225	<0.001	H.S.
	B	1.6	0.4	1.2	41.3%	0.5606	0.1447	<0.01	S
<i>Bhramantiva sa pashyati</i> (Defective vision) -Left Eye	A	1.2	0.74	0.5	70.6%	0.6399	0.1652	<0.001	H.S.
	B	1.32	0.54	0.8	50.9%	0.8165	0.2108	<0.01	S
<i>Vyavidha Darshana</i> (Distorted visual perception)- Right Eye	A	1.13	0.89	0.24	89.3%	0.471	0.1260	<0.001	H.S.
	B	0.53	0.20	0.33	20.1%	0.382	0.1260	<0.01	S
<i>Vyavidha Darshana</i> (Distorted visual perception)- Left Eye	A	0.86	0.26	0.6	26.5%	0.8281	0.2138	<0.01	S
	B	0.24	0.15	0.09	9.7%	0.7988	0.2063	>0.05	NS
Headache	A	1.24	0.5	0.7	50%	0.6325	0.1633	<0.001	H.S.
	B	1.26	0.33	0.93	33.9%	0.7037	0.1817	<0.01	S
<i>Netrayasa</i> (Elongation of objects)-Right eye	A	1.6	0.3	1.3	31.4%	0.4880	0.0125	<0.01	S
	B	0.7	0.4	0.3	40.1%	0.9612	0.2482	<0.01	S
<i>Netrayasa</i> (Elongation of objects)-Left eye	A	1.4	0.4	1.0	41%	0.6172	0.1594	<0.01	S
	B	0.73	0.2	0.5	20.4%	0.7432	0.1919	0.0152	NS
<i>Netrasrava</i> (Watering) -Right Eye	A	0.93	0.6	0.33	35.4%	0.5780	0.1260	<0.01	S
	B	1.0	0.86	0.2	14%	1.125	0.2906	>0.05	NS
<i>Netrasrava</i> (Watering)- Left Eye	A	1.6	0.3	1.3	80.1%	0.9412	0.24	<0.001	H.S.
	B	2.05	1.00	1.05	51.4%	0.5972	0.153	<0.001	H.S.
Visual Acuity- Right Eye	A	2.15	1.39	0.76	34.27%	0.88	0.22	<0.001	H.S.
	B	2.05	1.23	0.82	41.74%	0.51	0.133	<0.001	H.S.
Visual Acuity- Left Eye	A	1.34	0.52	0.82	60.15%	0.4172	0.10	<0.001	H.S.
	B	1.05	0.70	0.35	42.39%	0.5131	0.133	<0.001	H.S.
Subjective Refraction/ Cylindrical power and angle in degree-Right Eye	A	2.13	1.40	0.73	34.27%	0.8813	0.22	<0.001	H.S.
	B	2.06	1.2	0.86	41.74%	0.5135	0.133	<0.001	H.S.
Subjective Refraction/ Cylindrical power and angle in degree-Left Eye	A	1.33	0.53	0.80	60.15%	0.4124	0.10	<0.001	H.S.
	B	1.06	0.60	0.46	43.39%	0.5189	0.133	<0.001	H.S.

Table 16: Showing Effect of Therapy on Assessment Parameters

Objective Parameter	Gr	Mean		Mean Diff	% Change	S.D.±	S.E.±	T	P	S
		B.T.	A.T.							
Log MAR Value- Right Eye	A	0.95	0.71	0.24	24.50	0.31	0.070	3.146	<0.001	H.S.
	B	0.34	0.25	0.09	22.8	0.99	0.225	3.289	<0.001	H.S.
Log MAR Value- Left Eye	A	0.65	0.21	0.44	23.30	0.321	0.011	2.156	<0.001	H.S.
	B	0.24	0.12	0.12	25.9	0.78	0.124	2.179	<0.001	H.S.

Autorefractometry/ refraction cylindrical power and angle in degrees- Right Eye	A	6.34	6.14	0.2	12.6	0.23	0.049	1.24	<0.01	S
	B	1.7	1.2	0.5	20.11	0.50	0.145	2.688	<0.01	S
Autorefractometry/ refraction cylindrical power and angle in degrees- Left Eye	A	1.11	0.84	0.27	15.8	0.35	0.25	2.130	<0.01	S
	B	0.33	0.28	0.05	21.8	0.59	0.016	2.275	<0.01	S
Keratometry (K1) Right Eye	A	43.57	43.47	0.10	0.22	0.158	0.040	2.449	<0.01	S
	B	43.93	43.77	0.166	0.37	0.1543	0.039	4.183	0.001	HS
Keratometry (K1) Left Eye	A	43.65	43.58	0.06	0.13	0.199	0.051	1.293	>0.05	NS
	B	43.83	43.77	0.066	0.15	0.199	0.51	1.293	>0.05	NS
Keratometry (K2) Right Eye	A	44.67	44.63	0.033	0.07	0.129	0.033	1.000	>0.05	NS
	B	44.63	44.58	0.050	0.11	0.140	0.036	1.382	>0.05	NS
Keratometry (K2) Left Eye	A	44.77	44.58	0.0183	0.04	0.333	0.086	2.128	>0.05	NS
	B	44.73	44.72	0.016	0.03	0.114	0.029	0.5641	>0.05	NS
Tonometry/ IOP (mmHg)- Right Eye	A	16.47	16.13	0.33	2.00	1.113	0.287	1.160	>0.05	NS
	B	16.53	16	0.53	3.20	0.915	0.236	2.256	<0.01	S
Tonometry/ IOP (mmHg)- Left Eye	A	17.13	16.60	0.533	3.11	1.125	0.290	1.835	>0.05	NS
	B	16.13	15.93	0.200	1.23	1.207	0.311	0.6417	>0.05	NS

Table 17: Intergroup Comparison of Group A & B (Mann-Whitney U Test)

Parameter	Mean diff.		S.D. ±		S.E. ±		U	P	Result
	GA	GB	GA	GB	GA	GB			
<i>Aavila Darshan</i> (blurred vision) - Right Eye	0.87	1.25	0.753	0.956	0.192	0.278	80	>0.05	NS
<i>Aavila Darshan</i> (blurred vision) - Left Eye	1.123	0.566	0.980	0.478	0.22	0.124	78	>0.05	NS
<i>Bhramantiva sa pashyati</i> (Defective vision)- Right Eye	0.7	0.8	0.8719	0.5806	0.231	0.1547	82	>0.05	NS
<i>Bhramantiva sa pashyati</i> (Defective vision)-Left Eye	0.05	0.47	0.705	0.638	0.18	0.164	86	>0.05	NS
<i>Vyavidha Darshana</i> (Distorted visual perception)-Right Eye	0.54	0.32	0.5089	0.4856	0.135	0.1263	100.5	>0.05	NS
<i>Vyavidha Darshana</i> (Distorted visual perception) - Left Eye	0.263	0.8	0.7789	0.8875	0.206	0.2238	77	>0.05	NS
Headache	0.87	1.22	0.743	0.965	0.19	0.276	74	>0.05	NS
<i>Netrayasa</i> (Elongation of objects)-Right eye	0.9	0.7	0.8719	0.5706	0.321	0.2447	83	>0.05	NS
<i>Netrayasa</i> (Elongation of objects)- Left eye	0.08	0.76	0.765	0.345	0.18	0.124	88	>0.05	NS
<i>Netrasrava</i> (Watering) - Right Eye	0.78	0.45	0.5087	0.4888	0.12	0.1304	79	<0.01	S
<i>Netrasrava</i> (Watering)- Left Eye	1.122	0.667	0.890	0.587	0.35	0.137	91	>0.05	NS
Visual Acuity- Right Eye	0.9	0.5	0.4518	0.4606	0.321	0.2448	77	>0.05	NS
Visual Acuity- Left Eye	0.05	0.67	0.602	0.538	0.172	0.155	79	>0.05	NS
Subjective Refraction - Right Eye	1.234	0.646	0.810	0.418	0.245	0.127	72.5	>0.05	NS
Subjective Refraction-Left Eye	0.7	0.5	0.7718	0.672	0.3215	0.2347	84.5	>0.05	NS

Table 18: Intergroup Comparison of Group A & B

Objective Parameter	GR	Mean diff.	S.D.±	S.E.±	t	p	Results
Log MAR Value- Right Eye	A	0.24	0.31	0.08	0.498	>0.05	NS
	B	0.19	0.27	0.07			
Log MAR Value- Left Eye	A	0.086	0.099	0.025	0.148	>0.05	NS
	B	0.80	0.14	0.036			
Autorefractometry/refraction cylindrical power and angle in degrees- Right Eye	A	17.46	24	6.21	0.066	>0.05	NS
	B	16.86	25.5	6.59			
Autorefractometry/refraction cylindrical power and angle in degrees- Left Eye	A	18.67	15.32	4.4	0.462	>0.05	NS
	B	8.33	14.4	3.7			
Keratometry (K1) Right Eye	A	0.100	0.158	0.040	1.169	>0.05	NS
	B	0.166	0.154	0.039			
Keratometry (K1) Left Eye	A	0.066	0.199	0.051	0.000	>0.05	NS
	B	0.066	0.199	0.051			
Keratometry (K2)- Right Eye	A	0.033	0.129	0.033	0.3388	>0.05	NS
	B	0.50	0.140	0.036			
Keratometry (K2)- Left Eye	A	0.183	0.333	0.086	1.830	>0.05	NS
	B	0.016	0.114	0.029			
Tonometry/ IOP (mmHg)- Right Eye	A	0.33	1.11	0.287	0.5376	>0.05	NS
	B	0.53	0.915	0.236			
Tonometry/ IOP (mmHg)- Left Eye	A	0.53	1.125	0.290	0.7822	>0.05	NS
	B	0.200	1.207	0.311			

Table 19: Sammurchya Lakshana (Overall symptoms)

Group	N	Mean B.T.	Mean A.T.	Mean Dif.	Mean %	S.D.	S.E.	T	p
Group A	15	1.2	0.6	0.64	60	0.664	0.13	5.05	< 0.0005
Group B	15	1.45	0.56	0.68	51.04	0.315	0.14	6.12	< 0.0001

The analysis of the relief percentage of the *Sammurchya Lakshnas* (overall symptoms) from Table 19 shows that in Group A the mean score before treatment was 1.2 which was reduced to 0.6 after treatment, with mean difference of 0.64 giving an improvement of 60% and in Group B the mean Score before treatment was 1.45 which was reduced to 0.56 after treatment, with mean difference of 0.68 giving an improvement of 51.04%.

DISCUSSION

The following drugs have been selected for the clinical trial as shown below:

- *Netra pariseka* (as *Purva karma*) with *Triphaladi kwatha* for 3 days in Group A
- *Nasya* (as *Purva karma*) with *Anu taila* for 3 days in Group A
- *Ajmodadi churna* for 3 days for *Mrudu shodhana* in both groups
- *Saptamritam ghrita* for *Tarpana* in Group A and as an eye drop-in Group B
- *Shatavaryadi churna* for both groups

Netra Parisheka^[6]: *Netra Parisheka* is an Ayurvedic eye treatment that involves pouring a medicated liquid over the closed eyes. This treatment helps to dilate the superficial blood vessels in the eyes, which improves blood flow and circulation. Some of the medication also gets absorbed through the medial canthus, which is a highly vascularized area of the eye. This helps to pacify all the *Doshas* that are present in the eyes, which can lead to eye diseases. Specific formulations having many attributes are indicated in different pathological conditions. For example, this formulation pacifies all the *Doshas* hence *Triphaladi* decoction is chosen for this study.

Nasya^[7]: *Shiroshuddhi* by *Nasya* is a type of Ayurvedic treatment that involves cleansing the head through the nose. This treatment can help to remove blockages in the channels of the head and neck, and open them up to receive oil therapy (*Sneha*). The eyes are an organ that is particularly susceptible to the vitiation of *Kapha*. *Shiroshuddhi* can help to protect the eyes from this vitiation, by clearing away excess *Kapha* from the head and neck. Also *Nasya-karma* is a specific treatment methodology mainly indicated for

Urdhwajatrugata vikaras in Ayurveda. Both *Nasya* and *Abhyanga* are specifically done in *Murdha pradesha*, which causes vasodilatation in the skin and muscles by stimulating receptors of the sympathetic nervous system. Vasodilatation increases blood flow and helps to remove toxic products. *Swedana Karma* helps to remove toxins and impurities from the body by increasing sweating. This sweating helps to dissolve mucus and soften the channels, allowing the *Doshas* to flow more freely. The heating property of *Swedana Karma* also helps to liquefy *Kapha dosha*, making it easier to remove from the body. When the lukewarm oil enters the nasal cavity, the network of *Srotansi* carries the *Taila* towards the desired sites and cleanses the channels. By *Shodhana*, properties ingredients in drug probably remove the *Aama* at the cellular level and pacify the vitiated *Vata* and *Kapha Dosha*. Due to *Stroto Shodhana* and *Vatakapha shamana*, *Avaran* and *Sanga* of *Vatakapha Dosha* are removed and nutrition is enhanced to the respective sites.

Tarpana^[8]: The *Vataja* kind of ocular disorders are reported to be combated by *Tarpana*. Because *Snehana* is the most effective treatment for *Vataja* type diseases, and *Tarpana* is the most effective treatment for *Vataja* type *Drishtigata roga*, including *Timira*. As a result, this treatment plan is implemented. Corneal Epithelium and Endothelium is lipid permeable (lipophilic), whereas the stromal layer is hydrophilic. Hence drugs that are lipophilic or hydrophilic are easily transported to the cornea. Because the substance employed in the *Tarpana* method is a combination of *Ghrita* and decoctions of medicines, it can easily pass through the corneal epithelium (lipophilic) and endothelium (hydrophilic), regardless of its molecular size. The medicine used in *Tarpana* is in the form of an aqueous suspension that contains unique drug particles that do not leave the eye as quickly as the solution. Bioavailability and tissue contact duration is more. The active component of the medicine utilised in *Tarpana* will be absorbed more to cure the condition due to more tissue contact time. As a result, the *Netra Tarpana* achieves desired therapeutic concentration. Astigmatism is a clinical disorder caused by changes in refractive index or corneal curvature, according to contemporary pathology. The medicine operates in two ways: it allows for increased drug absorption by the corneal surface, and it also exerts direct pressure on the cornea. The medication enters the anterior chamber through the cornea, then enters the capillaries and ophthalmic arteries, and finally enters the Willis circle. Active principle of *Ghrita* penetrates the CNS and is absorbed by the surrounding structures, including the nerves that supply the eye, strengthening the ocular

muscles. This could have helped in overcoming the Asthenopic symptoms such as eye strain and headache.

Eye Exercises^[9]: Refractive errors are induced by aberrant activation of the external ocular muscles, according to William H Bates, and are accompanied with strain or effort to see.

- **Sunning:** Traditionally any treatment procedure starts with prayer to God. Here too God of light, Sun is worshipped. Not only that, closed eye gazing stimulates the visual apparatus.
- **Eye wash:** Helps in cleansing the ocular surface followed by palming. An eye bath is very effective in toning up the eyes and the surrounding tissues. It causes relaxation and helps in improving eyesight. Taken after the sun treatment, it adds to the relief and relaxation.
- **Palming:** It increases the contrast sensitivity and improves the imagination.
- **Fine print reading:** Strengthens the extraocular muscle especially medial rectus along with ciliary muscles.
- **Candle Light:** The flame stimulates the retinal cells, improves blood circulation, and gives the feeling of rest, comfort, and relaxation.
- **Swinging exercise:** As per the theory the gap between the bar and object gazed behind it seems to be reduced (when gazing through the bar) and increases (when gazing out of the bar). So, this stimulus of bar exercise stimulates the macula and improves the stereopsis. Fine movements of the eyeball during this exercise are also stimulated which helps in clarity of vision.
- **Playing with Ball:** This exercise improves the accommodative ability of the eyes. It helps to form the blinking habit.
- **Cold pad:** This method reduces the heat and burning sensations, tones up the tissues and nerves.
- **Eye Drop:** Nourishes and gives strength to the eyes.
- Sunning, palming and other eye exercises can help you relax more deeply. These exercises are helpful in pain, tiredness, and discomfort. Exercises also help to increase blood circulation and tone the muscles around the eyes. With the alleviation of this strain, muscle movement returns to normal, and all refraction defects disappear. All the eye exercises help to reduce astigmatism by acting on the external ocular muscles.
- **Oral Compound:** *Shatavaryadi churna*, a *Chakshushya* formulaion is indicated in *Timira* containing the *Chakshushya dravyas*.

CONCLUSION

At the time of completion of this study, final conclusions drawn based on deductive reasoning of the data obtained from this clinical trial are as follows;

- Astigmatism is common in younger age group, especially school going and college students.
- The main *Dosha* responsible for causing the disease is *Vata*.
- Maximum patients had *Vata-Pitta Prakriti* which was in accordance with *Jangal Desha* of the place of study.
- Astigmatism can be correlated with *Vataja Timira* explained in our classics clinically and pathologically to some extent.
- The *Nidana* like *Swapnaviparyaya*, *Dhumnisevanata* etc can be a major factor in developing the disease *Vataja Timira*.

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