



EFFECT OF KATAKAPHALA EYE DROPS ON DIGITAL EYE STRAIN- A PILOT STUDY
GURURAJ NATIKAR^{1*}, NAZNEEN²

^{1*} Associate Professor, Dept. of Shalakyatantra, SJGAMC, Koppal, INDIA

²Final BAMS Student, SJGAMC, Koppal, INDIA

Corresponding Author Email: guru7glb@gmail.com Access this article online: <https://jahm.co.in/>

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ABSTRACT:

The e-learning has emerged as a method for teaching during COVID-19 pandemic. That now has become the usual routine for additional knowledge source for students, who spend most of the time attending e-classes or reading e books in front of a computer or mobile screens. These devices cause harm to eyes like eyestrain, headache, red eyes, blurred vision etc. It is collectively known as digital eye strain. This study was aimed to conduct survey on digital eye strain among BAMS students and to evaluate the effect of *katakaphala* eye drops on digital eye strain. The survey was conducted using a questionnaire and first 100 students with features of digital eye strain were included for the study. Detailed examination including visual acuity and shirmers test was done. *Katakaphala* eyedrops was administered to the subjects 2drops in each eye, 4 times a day for 15 days. All parameters were documented on before and after treatment and on day of follow up. There was significant improvement in all parameters clinically and statistically except in redness of eye. By virtue of properties of the ingredients this *katakaphala* eye drops helped in relieving Headache, Eye strain & Redness in digital eye strain and improved vision.

Key words: Digital eye strain, *Katakaphala*, eye drops, *Shalakyatantra*, *Ayurveda*

INTRODUCTION:

Education is yet another domain that witnessed a change in paradigm to the online way of implementation. Online learning services served as a panacea during the pandemic. Video conferencing platforms like Zoom and Google Meet have been used by schools, colleges, and universities worldwide since the beginning of the lockdown. There was a rise in usage of internet services from 40 to 100%, compared to pre-lockdown levels. [1] The Digital Eye Strain Report of 2016, which included survey responses from over 10,000 adults from the USA, identified an overall self-reported prevalence of 65%, with females more commonly affected than males (69% vs. 60% prevalence). [2] Its pathophysiology is multifactorial, with several contributing factors being reduced contrast level of letters compared to the background of digital screens, screen glare and reflections, wrong distance and angle of viewing digital screens, poor lighting conditions, improper posture during usage, and infrequent blinking of eyes. [3] The eye focusing and ocular movements required for better visibility of digital screen place additional demand on an intricate balance between accommodation and convergence mechanisms, thus making people with uncorrected or under-corrected refractive errors even more susceptible. [4] The condition can cause an array of symptoms, including eyestrain, watering of eyes, headache, tired eyes, burning sensation, red eyes, irritation, dry

eye, foreign body sensation, blurred vision at near, and double vision. [5]

The signs and symptoms of digital eye strain matches with *aama netra lakshana* and the treatment modalities mentioned in *aama netra* are *ascyotana*, *seka*, *pindi* & *bidalaka*. [6] In this pilot study *katakaphala* + rose water eye drops is selected for *aschyotana dravya*. Rose (*taruni*) is *chakshushya*, *sheeta*, *tridosha shaamaka*, *paakghna*. [7] *Katakaphala* is used as *Vaariprasadanam* (clearing the water), its fruit is used as the best healing medicine for the eye ailments. [8]

OBJECTIVES:

1. To conduct survey on digital eye strain among BAMS students.
2. To evaluate the effect of *katakaphala* eye drops on digital eye strain.

MATERIALS AND METHODS:

I. Survey

A detailed questionnaire prepared by referring standard questionnaires for diagnosis and grading digital eye strain was used for survey among BAMS students (for 300 participants).

II. Clinical study

Selection of sample: first 100 members having digital eye strain from survey were selected for the study.

Preparation of drug:

Katakaphala eye drops was prepared as follows

1. *Katakaphala* seed paste is prepared by rubbing with clean stone (specially used for making paste of sandalwood) using rose water.
2. The obtained paste is mixed with rosewater at 1:50 ratio.
3. The liquid is then filled into clean droppers with all hygiene measures and packed well.

Inclusion criteria: Prepared eye drops were given to students suffering with signs and symptoms of digital eye strain enrolled in survey.

Exclusion criteria:

- Patients suffering with any systemic illness.
- Patients with other ocular pathology - infection, allergy, Glaucoma etc.

Dosage: 2drops in each eye, 4 times a day for 15 days.

Duration: 15 days

Follow up: 15 days.

Assessment criteria

1. Subjective parameters
 - Eyestrain
 - Headaches
 - Redness.
2. Objective parameters
 - Visual acuity
 - schirmer's strip test

OBSERVATIONS & RESULTS:

Table No. 1: Statistical analysis table (BT-AT)

Parameter	Mean		MD	SD	SE	Z-value	p-value	Remark
	BT	AT						
Headache	0.62	0.2	0.42	0.496	0.0496	8.467	<0.00001	H.S
Eye strain	1.72	1.06	0.66	0.654	0.0654	10.091	<0.00001	H.S
Redness	0.06	0.03	0.03	0.171	0.0171	1.754	0.0794	N.S
Visual acuity	0.33	0.26	0.07	0.256	0.0256	2.73	0.0063	S
Schirmer's test	1.93	1.15	0.78	0.416	0.0416	18.75	<0.00001	H.S

The mean for parameter headache before treatment is 0.62 and after treatment is 0.2 with SD 0.496 and SE 0.0496. There is significant difference within the group in terms of headache (z=8.467, p<0.00001)

The mean for parameter eye strain before treatment is 1.72 and after treatment is 1.06 with SD 0.654 and SE 0.0654. There is significant difference within the group in terms of eye strain (z=10.091, p<0.00001)

The mean for parameter redness before treatment is 0.06 and after treatment is 0.03 with SD 0.171 and SE 0.0171. There is no significant difference within the group in terms of redness (z=1.754, p=0.0794)

The mean for parameter visual acuity before treatment is 0.33 and after treatment is 0.26 with SD 0.256 and SE 0.0256. There is significant difference within the group in terms of visual acuity (z=2.73, p=0.0063)

The mean for parameter schirmer's test before treatment is 1.93 and after treatment is 1.15 with SD 0.416 and SE 0.0416. There is

significant difference within the group in terms of schirmer's test ($z=18.75$, $p<0.00001$)

Table No. 2: Statistical analysis of table (BT-AF)

Parameter	Mean		MD	SD	SE	Z-value	p-value	Remark
	BT	AF						
Headache	0.62	0	0.62	0.596	0.0596	10.402	<0.00001	H.S
Eye strain	1.72	0.06	1.66	0.654	0.0654	25.382	<0.00001	H.S
Redness	0.06	0	0.06	0.238	0.0238	2.521	0.0117	S
Visual acuity	0.33	0.24	0.09	0.287	0.0287	3.135	0.00171	S
Schirmer's test	1.93	0.17	1.76	0.429	0.0429	41.02	<0.00001	H.S

The mean for parameter headache before treatment is 0.62 and after follow up is 0 with SD 0.596 and SE 0.0596. There is significant difference within the group in terms of headache ($z=10.402$, $p<0.00001$)

difference within the group in terms of redness ($z=2.521$, $p=0.0117$)

The mean for parameter eye strain before treatment is 1.72 and after follow up is 0.06 with SD 0.654 and SE 0.0654. There is significant difference within the group in terms of eye strain ($z=25.382$, $p<0.00001$)

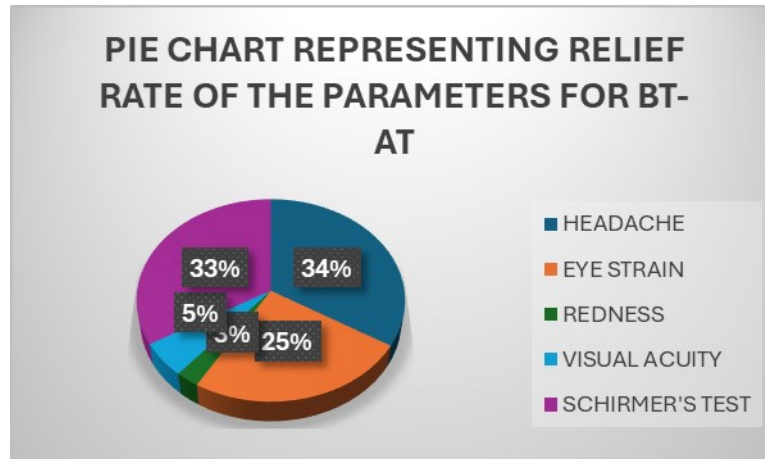
The mean for parameter visual acuity before treatment is 0.33 and after follow up is 0.24 with SD 0.287 and SE 0.0287. There is significant difference within the group in terms of visual acuity ($z=3.135$, $p=0.00171$)

The mean for parameter redness before treatment is 0.06 and after follow up is 0 with SD 0.238 and SE 0.0238. There is significant

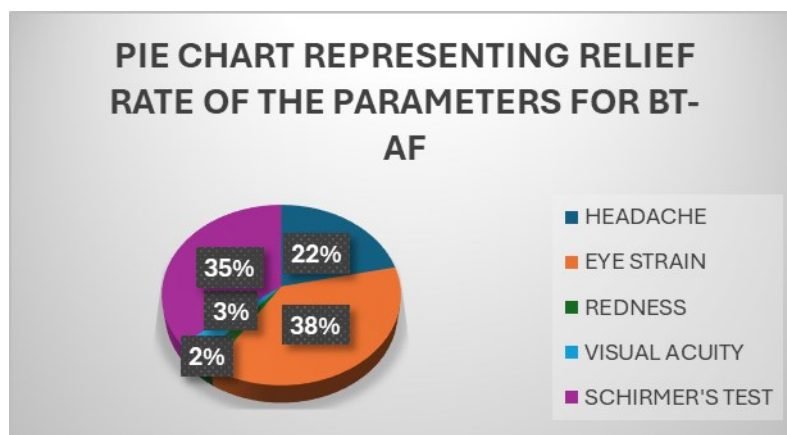
The mean for parameter schirmer's test before treatment is 1.93 and after follow up is 0.17 with SD 0.429 and SE 0.0429. There is significant difference within the group in terms of schirmer's test ($z=41.02$, $p<0.00001$)

Table No. 3: Relief rate

Parameter	Relief rate (BT-AT)	Relief rate (BT-AF)
Headache	39%	56%
Eye strain	28.60%	98.00%
Redness	3%	6%
Visual acuity	6.33%	8.33%
Schirmer's test	38.66%	92.16%



Graph No: 1 Relief rate before and after treatment



Graph No: 2 Relief rate before and after treatment

DISCUSSION

The medicinal functions of Rosaceae are partly attributed to their abundance of phenolics compound. Phenolics possess a wide range of pharmacological activities, such as antioxidants, free-radical scavengers, anticancer, anti-inflammatory etc., [9]

Therapeutic uses of rose extracts are anti-inflammatory, antimicrobial properties, anti-aging and skin repair benefits etc., [10]

The medicinal functions of *katakaphala* are - *VataShleshmahara* (Subsides *Vata* and *Kapha Doshas*), *Sheeta* (Cold in potency), *Madhura* (Sweet), *Kashaya* (Astringent) in taste, *Guru* (Heavy), *Netrya* (Good for eyes). [11]

Pharmacologically it has been validated for its effect on inflammation, microbial infections, gastrointestinal problem, nervous system, bones cells, cardiovascular systems, cancer and blood glucose level. It also has antioxidant activity. [12]

Hence, by virtue of properties of the ingredients this *katakaphala* eye drops helped in relieving Headache, Eye strain & Redness in digital eye strain and improved vision.

CONCLUSION

E-learning has become inevitable part of higher education. Hence this study may help in management of digital eye strain caused by e learning. *Katakaphala* drops can be used in

regular clinical practice as medicine for the management.

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