

Effect of Various Ayurvedic Drug Formulations for *Tarpana* in Refractive Errors w.r.t. *Timira*: Systematic Review and Meta Analytical Study

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ABSTRACT

Myopia, a prevalent visual disorder, has been on the rise globally, leading to concerns about its long-term impact on ocular health. According to Ayurveda, involvement of *Patala* by various *Doshas* is responsible for development of refractive errors. *Acharya Sushrut* and *Acharya Vagbhat* have recommended various *Kriyakalpa* and treatments like *Nasya*, *Dhumpana*, etc. among which *Tarpana* is considered as foremost in management of *Timira*. Refractive errors are an avoidable cause of visual impairment and are in utmost need to be considered for subsiding its further progression in blurred vision by prescribing appropriate glasses or last option being refractive surgeries. This study explores the potential of *Tarpana*, an Ayurvedic ocular therapy, as a novel approach in myopia management. The results revealed promising findings, suggesting that *Tarpana* might serve as a complementary therapy in the management of myopia. These findings have significant implications for the field of ophthalmology, shedding light on potential alternative treatments for myopia and encouraging further research into holistic approaches for visual health.

Key Words *Tarpana*, *Myopia*, *Refractive errors*, *Timira*, *Ophthalmology*, *Myopia management*, *Ocular health*, *Meta-analysis*

Received 12th January 23 Accepted 07th January 24 Published 10th January 2024

INTRODUCTION

In Ancient Ayurveda, *Acharyas* have quoted "*Sarvendriyanam Nayanam Pradhanam*" meaning *Netra* i.e. eyes are the prime sense organ among rest of the sense organs¹. 80% of knowledge is perceived through sense of sight. *Acharya Sushrut* has explained *Drishtigata Rogas* in *Uttar Tantra* of *Sushrut Samhita*². *Timira*, which can be correlated with errors of refraction due to similar symptomatology, comes

under this group³. Further, it is evaluated in many articles that most symptoms of *Timira* simulate myopia.

Myopia is one of the three visual refractive errors which affects around one third of the population in the world. Myopia is classified as pathological or progressive and high or degenerative myopia on the basis of clinical features³. The refractive errors are produced when vitiated *Doshas* situated in first and second *Patala* are affected

ORIGINAL RESEARCH ARTICLE

and thus its progression results in further preventing functional capacities of *Patalas* leading to blurred vision (*Avyakta Darshan*). This involvement of *Patala* by various *Doshas* is hence responsible for development of refractive errors⁴. *Acharya Sushrut* and *Acharya Vagbhat* have recommended various *Kriyakalpa* and treatments like *Nasya*, *Dhumapana*, etc. among which *Tarpana* is considered as foremost in management of *Timira*².

The word *Tarpana* is derived from the root 'Trup' meaning -Satisfied. The literary meaning of *Tarpana* is to give nourishment to eyes through medicated drug formulations for a specular time period and in a particular formed frame⁴.

Study rationale- Refractive errors are avoidable causes of visual impairment . Its incidence in children being 8 in per 100⁵. Therefore, they are in utmost need to be considered for subsiding its further progression in blurred vision by prescribing appropriate glasses or last option being refractive surgeries. Refractive errors are a major public health problem and thus need to be treated by using Ayurvedic herbal formulations like *Tarpana Kriyakalpa* which are of non-invasive type and locally acting therapy with few to no side effects/ complications.

Tarpana is also known to relieve associated symptoms of refractive errors such as Headache, Eyestrain, Ocular pain, Excessive watering of eyes, etc.

METHODS

- Protocol for the study-
 - The guidelines of PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analysis) statement are followed for this systematic study. Published literature from various articles is collected for this study as represented in table no.1.
- Eligibility criteria-
 - Study design- All articles, including case studies, interventional studies and RCTs on various Ayurvedic drug formulations used as *Tarpana* and their results in refractive errors.
 - Population- 8 to 50 years of age group of both genders are included for this study, having no systemic disorders and diagnosed with refractive errors.
- Information sources-
 - We obtained required data from Ayurvedic texts, online data sources like Google scholar, Pubmed and AYUSH research.
- Data extraction and Quality assessment-
 - Data extracted from above sources was then assessed for quality and further analyzed based on variables i.e. authors name, age groups, gender, diagnosis, dioptric power, interventions, medicinal drug use, outcomes depending on follow-ups and duration of course and represented in tabular form in table no. 2.

Table 2 Age group/ Drug formulations and contents

Sr. No.	Age group	Drug formulations	Total drugs
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ORIGINAL RESEARCH ARTICLE

1.	10-50 years	<i>Amlakyadi Gana</i>	04
2.	8-40 years	<i>Balashatavaryadi Ghrita</i>	07
3.	10-12 years	<i>Patoladi Ghrita</i>	15
4.	Above 30 years	<i>Phaltrikadi Ghrita</i>	06
5.	8-30 years	<i>Jeevantyadi Ghrita</i>	10
6.	8-30 years	<i>Goghrita</i>	01
7.	25 years	<i>Triphala Ghrita</i>	04
8.	18 years	<i>Anantadi Ghrita</i>	10
9.	16-25 years	<i>Yashtimadhu Ghrita</i>	02
10.	10-25 years	<i>Mahatriphaladi Ghrita</i>	17

○ Statistical Data Analysis-

- A total of 9 articles (including 10 drug actions/study) ,out of which 2 interventional articles were analyzed based on qualitative and quantitative analysis represented in table format i.e. table no. 1.

- Out of these articles, two provide results in terms of symptom assessment whereas the rest of the articles have reported their results based on gradations where a total of three gradations have been put forth and the results are then categorized in percentages.

○ Interventions-

The articles selected for this statistical study include two single case studies, two interventional and six RCTs. Among these, various drug formulations are used for *Tarpana Kriyakalpa* in patients diagnosed with refractive errors in the Indian population. In the interventional studies, oral drug administration is done along with localized *Tarpana* therapy. In the majority of trials, it is observed that three

sessions of seven days of *Tarpana* are administered to patients with regular follow ups.

Effects of Intervention-

-Individual drug action is not accessible due to oral drug administration.

-Drug administration for varied duration in different age groups also affects the outcome/result of the study.

DISCUSSION

Statistical Estimation of Results-

The obtained data were analyzed statistically. The values were expressed as a percentage of relief. The data were analyzed by paired-'t' tests for the comparison of before and after treatment obtained score of subjective and objective parameters in individual articles.

$p > 0.05$ Insignificant

$p > 0.05 \& 0.01 =$ Significant.

$P < 0.001 =$ Highly significant

Tabular representation of acquired data-

Table 1 Tabular representation of articles included for the study

Sr. No.	Author	Region/ location of trial	Age group (in years)	Sample size	Diagnosis	Study type	Treatment period	Drug Name	Total drugs	Results
1.	D.K. Ahuja(+3)	Himachal Pradesh	10-50	20	Myopia	RCT	12 weeks	<i>Amalakyadi Gana</i>	4	Mild- 30%; Mod- 20%; Unchanged-

ORIGINAL RESEARCH ARTICLE

											50%
2.	Sabarinath MK, SM Pasha	Banglore	8-40	30	Myopia	RCT	7 Days	Balashatavaryadi Ghrita	7	Mild- 40%; Mod.- 60%	
3.	Ashwathi K., Pradeep Kumar K.	Karnataka	10-12	20	Myopia	RCT	3 sessions of 5 days each	Patoladi Ghrita	15	Mild- 20%; Mod.- 30%; Marked- 25%	
4.	Dinish SG, (+3)	Jamnagar	Above 30	30	Presbyopia	Interventional	3 sessions of 7 days	Phaltrikadi Ghrita	6	Mild- 66.67%; Mod.- 13.33%; Unchanged- 20%	
5.	Poonam, (+3)	Jamnagar, Gujarat	8-30	28 (out of 54)	Myopia	RCT	5 sessions of 5 days	Jeevantiyadi Ghrita		Mild- 22.73%; Mod.- 36.36%; Marked- 22.73%	
6.	“	“	“	26 (out of 54)	“	“	“	Goghrita	1	Mild- 50%; Mod.-22.22%; Marked- 11.11%	
7.	Suraj C., (+2)	Rajasthan	25	1	Myopia	Single case study	7 days	Triphala Ghrita	4	Blurred vision- 0.8 to 0.2-0.3	
8.	Jayakrishna A., (+3)	Kerala	18	1	Myopia	Single case study	5 days	Anantadi Ghrita	10	Blurred Vision- 0.8→0.2 (Improvement- 60%)	
9.	Shamli Z., (+1)	Pune	16-25	25	Myopia	Interventional	3 sessions of 7 days	Yashtimadhu Ghrita	2	Mild- 64%; Mod.- 20%; Unchanged- 16%	
10.	Durgesh P.G., (+2)	Jamnagar	10-25	15	Myopia	RCT	3 sessions of 7 days	Mahatriphaladi Ghrita	17	Mild- 66.67%; Mod.- 20%; Marked-0%; Unchanged- 13.33%	

DISCUSSION

Among the above 10 studies i.e. described in table no. 1, after statistical analysis of the acquired data it is noted that *Tarpana Chikitsa Upakrama* cures the associated symptoms of Refractive errors when given for an approximate time period of 25-30 days. The differences in opinions regarding *Timira* in modern science being compared to Refractive errors is noted in above articles, where Myopia as well as Presbyopia can be considered as *Dwitiya Patalgata Vyadhi*. The involvement of *Patalas* by various *Doshas* is responsible for the development of different kinds of refractive errors including Myopia and Presbyopia. *Tarpana* being a locally acting treatment procedure is a feasible and cost-effective treatment option in refractive errors considering

Refractive surgeries in the Modern era. According to a generalized study on included articles, it is evaluated that around 30-70% of the population is getting relief in symptoms as well as 1-2 dioptic power enhancement in vision as represented in table no. 3 and figure 2. It is also noted from table no. 2 that the drug formulations used for *Tarpana* are of *Bruhana* and *Balya* properties which are further given in lipid form using Ghrita formulations where Ghrita is of par-excellence among *Chakshushya Dravyas*.

ORIGINAL RESEARCH ARTICLE

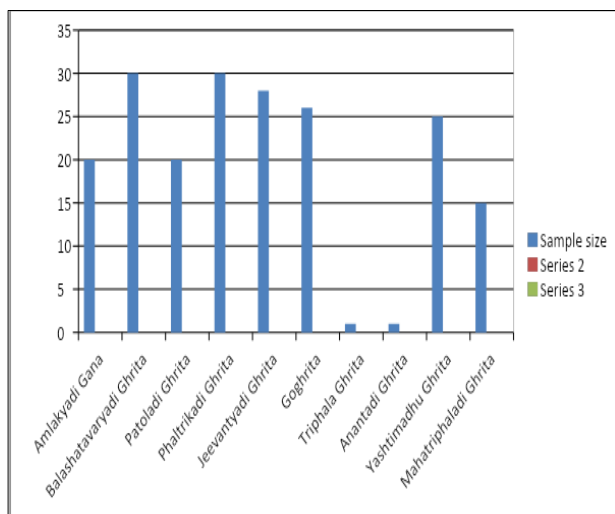


Figure 1 Graphical representation of Sample size

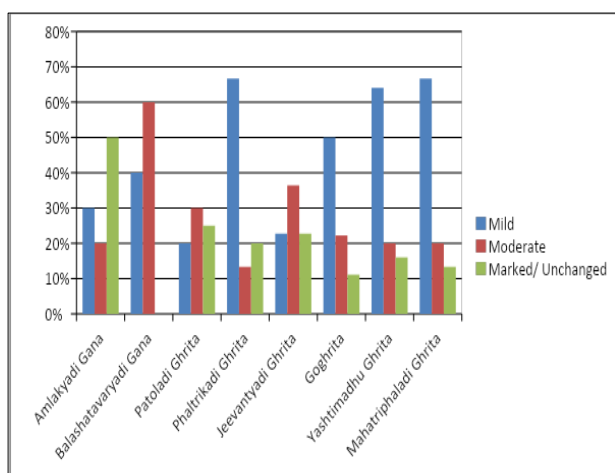


Figure 2 Statistical presentation of outcomes

Table 3 Tabular representation of overall comparison of treatment effect (Quantitative analysis)-

Class	Grading
0-25%	No improvement
26-50%	Mild improvement
51-75%	Moderate improvement
76-100%	Marked improvement

Limitations of Review-

The patients diagnosed with refractive errors were selected, in particular Myopia and Presbyopia but the outcomes and results of individual studies were described in different formats.

Duration of treatment course is also varied in the included 9 articles along with their large scale variations of age groups in population.

Drug intervention is also noted in two of the studies in the form of oral administration.

CONCLUSION

This analytical study represents that all the Ayurvedic drug formulations used as *Tarpana* in treating refractive errors have provided better results with betterment in associated symptoms like Headache, Eye strain, Ocular pain etc. No effective change is observed in cylindrical glasses of the population.

In a nutshell, the present statistical study has established that *Tarpana* can be used in patients suffering from Refractive errors and has better results due to local treatment.

ORIGINAL RESEARCH ARTICLE

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ABBREVIATIONS-

- Dr. – Doctor
i.e.- id est.
etc.- Et cetera
PRISMA- Preferred Reporting Items for Systematic Reviews & Meta-analysis
RCT- Randomized Clinical Trial
AYUSH- Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homeopathy
Sr. No.- Serial Number
P.G.- Post-graduate
Ph.D.- Doctor of Philosophy