Management of simple Myopia with Homoeopathic Medicine Ruta Graveolens 30 in the age group of 8 – 30 years in both sexes- A Randomized control trial

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Abstract

Background: Increased incidences of myopia, especially in Asian countries, have been attributed to excess near work. Topical use of Atropine was effective in controlling myopia but has got side effects and rebound effects after stopping the treatment. Myopia treatment has come a long way from glasses/contact lenses to advanced minimally invasive refractive procedures and tremendous improvement in technology and increased dependence on digital devices, control of myopia progression remains a big challenge. Homoeopathy mentions Ruta graveolens (Ruta) 30 for myopia with its action on accommodation. **Aim:** The aim of the study is to evaluate the effect of Ruta Graveolens 30 in terms of static, reducing, or improvingvisual acuity in cases of simple myopia in the age group of 8-30 yrs. in both sexes. **Materials and Methods:** A total of 320 subjects were screened by Dioptric Test and Vision acuity by Snellen chart, 52 subjects who were diagnosed to have simple myopia were divided into 2 groups by Lottery method sampling, where one group was treated with Ruta graveolens 30 and another group with Placebo, out of 52 subjects 6 subjects were dropped during follow-up. 46 cases of simple myopia from the aged 8–30 years were studied by randomised control method. before the study symptoms were recorded according to the Myopic questionnaire, Dioptric Test and Vision acuity. For the study group Ruta 30 and for the Control group Placebo was given in BD oral dose for 1 day & repeated after every 15 days for 3 months, thereafter, treatment was discontinued. After stopping treatment again symptoms were recorded. **Design:** This is a randomized, single-blinded, experimental study. **Results:** Before the study, the mean of the study group was -2.11 D (Right eye) -1.72 D (Left eye), while in the placebo group -2.23D (Right eye) -1.95 D (Left Eye). The difference in means between the two groups of -0.12 (Right eye) and -0.23 (Left Eye). In Dioptric Test, marked improvement was seen in 14 (60.86%) subjects in the study group where the average reduction in dioptric number was -0.75 D, and in 3 (13.04%) subjects' Dioptric number was static but in 6 (26.08%) subjects no improvement was seen. In visual acuity, 9 (39.13%) subjects show mark improvement with a reduction in visual acuity by 6/3, and 12 (52.17%) subjects show static numbers whereas 2 (8.69%) subjects show an increase in Visual acuity. The mean change after 3 months was 1.91 (Right Eye) and -1.65 (Left Eye) inthe Ruta group and 1.91(Right Eye) and -1.65 (Left Eye) in the placebo group respectively and the difference in their means of -0.34 (Right eye) -0.61 (Left Eye). **Conclusion:** The results of this study show that the use of Ruta 30 in BD orally dose for 1 day & repetition after every 15 days for 3 months has reduced significantly Myopic progression as compared to the Placebo Group.

Key words-Simple myopia, Homoeopathy, Ruta graveolens.

Introduction

Myopia is commonly referred to as short-sightedness. The light rays that enter the eye are focusedin front of the retina, rather than directly on it, so that distant objects appear blurred.[1]

Simple myopia is a common variety of myopia that progress during the period of body growth and stabilizes by the earlytwenties.

The etiology and pathogenesis of myopia have been debated for decades but the exact mechanismof its development is still unclear. Different etiological factors postulated were heredity, excessive near work, reduced rigidity of sclera, hormonal changes, systemic diseases, diet etc.[2] Different studies have shown a higher risk for children to become myopic if their parents are myopic.[3] A higher prevalence of myopia was seen among some ethnic groups and they showed almost the same incidence even though they settle in other countries. Genetic factors make an individual more susceptible to environmental influences like excessive near work for the development and rapid progression of myopia. Even though heredity plays a major role in myopia development but it can't explain the higher incidence and rapid progression of myopia observed the world over especially in Asian countries during the last few decades.[4]

Myopia is a growing global health concern, with an increasing prevalence - in 2000 1.4 billion people were myopic and it is estimated that this number will reach 4.8 billion in 2050.[5] Refractive error has been reported as the most common cause of reduced vision in children, affecting 2%–11% of the population below 16 years of age. It is also responsible for 60%80% of visual impairment in children.[6] Children are easily exposed to screens for a prolonged time from a very young age and are dependent on tablets, smart phones, televisions, laptops, or computers. This can be related to easy access to gadgets in today's world. Out of different studies done so far to control myopia, topical use of modern medicine Atropine 1% was found effective in controlling myopia but has side effects ethical issues and rebound effects after cessation of treatment.[7] Myopia treatment has come a long way from glasses/contact lenses to advanced minimally invasive refractive procedures such as femtosecond assisted procedures and small incision lenticule extraction. With increased dependence on digital devices, control of myopia progression remains a big challenge. Nowadays there are no widely used methods, considered safe and effective to slow down myopic progression.[8] The recommendation for lifestyle and behavior change is not enough; progressive addition spectacles have shown an insignificant effect. Myopia does not only affect education outcomes; disadvantages arising from myopia also extend to the quality of life and personal and psychological well-being and development. Myopia has also been demonstrated to significantly increase levels of anxiety among adolescents, whereas studies in children have identified links between having myopia and experiencing low selfesteem. Adolescents and younger children can experience social pressures against spectacle wear and may avoid wearing the spectacles they have been prescribed.[9]

In homoeopathy, different medicines were mentioned under the heading of myopia. However, these medicines are used for different varieties of myopia. Myopia associated with near work is concerned, Ruta graveolens (Ruta) seems to have more similarity as compared to other medicines. Allen TF has mentioned Ruta as a valuable medicine in the weakness of accommodation especially in near-sighted people. Clark JH has stated its use in ailments from overstraining eyes, from reading too much, especially fine work at night. Ruta has an affinity for eyes in general and the sclerotic portion of the eye in particular. Reduced rigidity of the sclera is one of the important factors in the incidence and progression of myopia especially of hereditary ones. Moffat JL and Norton AB have stated indications of Ruta in the weakness of ciliary muscles than internal recti. The ciliary muscle is used in the process of accommodation during near work. Different studies have observed reduced accommodative response in myopic individuals as compared to emmetropes. So Ruta can be used as an organ remedy to strengthen the weakness of accommodation in myopes. Organ remedy help to support weaker organs

to give tone and strength to organs so that constitutional medicines can work in a better way without causing much aggravation.

Homoeopathic medicine Ruta Acts upon the eyes: strain followed by headache. Eyes red, hot, and painful from sewing or reading the fine print. Disturbances of accommodation. Weary pain while reading. Pressure deep in orbits. Tarsal cartilage feels bruised. Pressure over the eyebrow.[10]

Ruta graveolens is an odoriferous herb belonging to the family Rutaceae. It is the source of Rue or Rue oil, called Sadab or Satab in Hindi. It is distributed throughout the world and cultivated as a medicinal and ornamental herb. The ancient Greeks and Romans held the plant in high esteem.`[11] Chemical Constituents of Ruta: It contains glycosides, alkaloids, volatile oils, and fixed oils. Rue contains rutin, psoralen, bergapten, graveolin, rutarin and naphthoharniarin. Rutin is a pale-yellow crystalline compound that belongs to the flavonosoidal glycoside category. Alkaloids like ruthenium, dictamen, rutamine, rubalinium, and 1-methyl-2-nonyl-4-quinoline are present in the drug. The fixed oils which are present in the drug are linoleic, stearic, and palmitic acid whereas volatile oils are limonene, cineole, ethyl valerate, methyl salicylate, caryophyllene, and myrecine.[12]

The commonly known photochemical compounds from R. graveolens are acridone alkaloids, coumarins, volatile substances, terpenoids, flavonoids, and furoquinolines (kuzovkina et al., 2004). The existence of saponin, tannins, and glycosides has also been proven (Hashemi et al., 2011). Rutin and quercetin are the main active flavonoids of R. graveolens. Rutin was first isolated from the leaves of R. graveolens (Pathak et al., 2003). The high content of aliphatic acids, alcohols, and ketones was found in R. graveolens volatile oil (Ivanovaa et al., 2003). 2-undecanoate (33.9%), 2Heptanol acetate (17.5%),1-dodecanol (11.0%), geyrene (10.4%), 2-nonanone (8.8%), 2-Decanone (1.9%), Geijerene (1.6%), trans-piperitenone oxide (1.4%), cis-piperitenone oxide (1.2%), 2-methylundecanal (1.1%), 2-dodecanone (1.1%), 2-nonanol (1.1%), elemol (1.1%) are the main components of the essential oil of the flowering aerial parts of the plant (Soleimani et al., 2009). R. graveolens produces high levels of linear furanocoumarins, mostly psoralen and methoxypsoralen (Gravot et al., 2004)[13]

Overstraining of the muscles of the eye. These muscles are largely tendinous. Continual use until it becomes an overuse. Eyestrain followed by headache, and the effects are also on the globe of the eye, and coating of the eye so that the overstrained eye is red. Pain in the eye, above and through the eye when he attempts to use the vision, that is, aggravation from the exertion of vision. From looking at the fine print, fine sewing. This overexertion of vision brings about redness, pain, and the inability to concentrate vision on one point. [14]

if a woman strains her eyes from long sewing on fine work, and the balls feel like fire, she needs Ruta.[14] anomalies of refraction; from writing by artificial light; fine needle work, etc.; in a weaver. [34] Aching in and over eyes, with blurred vision, as if they had been strained. After using eyes at fine work, watchmaking, engraving (Nat. m.); looking intently (Sen.). Amblyopia or asthenopia from overexertion of eyes or anomalies of refraction; from over-use in a bad light; fine sewing, overreading at night; misty, dim vision, with complete obscuration at a distance. Eyes burn, ache, feel strained; hot, like balls of fire. [15]

Vision- He sees distant objects more distinctly than usual; (the prover was myopic), *Vision very weak, as if the eyes were excessively strained.[16]

Spasms of lower lids, drawing tarsal cartilages back and forth. Tears and watering, in the open air, not when in the room. Heat, in the evening, when reading by artificial light. Spots on the cornea. Pain, as if strained. Short sight. Obscured vision, like gauze or fog before., from reading too much. A green halo encircles the light in the evening.[17]

Fretful. Itching inner canthi. Eyes burn. Lachrymation. Dim vision. [18]

The common Rue of our gardens is a native of Southern Europe. It was formerly in great repute in medicine; epilepsy, hysteria, hydrophobia, weakness of sight (from excessive reading).[19]

This power of Ruta does not appear to have been known before the proving was made. But impaired sight due to straining the eyes was an old use of the remedy; and here are symptoms from the proving His eyes feel as if he had strained the sight too much by reading; Weak, pressive-like pain in the right eye, with dimness of surrounding objects, as if from having looked too long at an object that was fatiguing to the eyes;" "A feeling of heat and burning in the eyes, and pain in them when he reads (in the evening and by candle-light)." Each of these symptoms was experienced by a separate prover[19]

It is useful for irritability of every tissue of the eye from overwork or from using eyes on fine work in poor light. The eyes burn and feel strained. Affections of the eyes from faulty refraction.[20]

Vision very weak, as if eyes were excessively strained. Objects seem dim before eyes as if a shadow were flitting before them. Dullness of sight brought on by taxing or straining eyes. As if the sight had been strained by too much reading. Letters seem to run together.[21]

Eyes burn, ache, feel strained and fatigued after reading too long, from fine sewing, too much reading, or otherwise overtaxing them; worse using them in the evening.[22]

Methodology

Study Design and Settings:

It was a randomized control trial done from the 46 diagnosed cases of simple myopia whowere enrolled from September 2022 to February 2023 in Motiwala (National) Homoeopathic Medical College And Hospital, Nashik, from screening in Dawn Breakers school by organizing an eye camp.

Population:

Inclusion criteria were: subjects suffering from Blurring (dimness) of distant vision for 3 monthsor diagnosed with myopia. Age group between 8 -30 years both male & Female and Those willing to give written informed consent. Subjects excluded were those who had Congenital myopia and pathological myopia, Pregnant and lactating females, Myopia is associated with other ocular diseases such as cataracts,glaucoma, etc., and other refractive errors such as hypermetropia.

Method of Selection of control group

Lottery method: each member of the population is assigned a number after which numbers areselected at random.

Intervention: Study group – Homeopathic medicine Ruta graveolens 30(Willmar Schwabe –made in India). Dose- Ruta graveolens 30 use in BD dose orally 43, 44, in Sac lac powder for 1 day with placebo (plane globules) 4 pills BD for 15 days. Repetition after 15 days

Control Group: 2 doses of sac lac powder, BD for 1 day with placebo (plane globules) 4 pills BD for 15 days. Repetition after 15 days

Measuring criteria – For assessment of the visual acuity – the Snellen chart and dioptric power will test.power of the patients will give a score for categorizing as below:

1. Dioptric power grading

- Normal: 0D
- Mild: 0-2D
- Moderate: 2-4D
- Severe: 4-6D

2. The following symptoms were given a score as below:

a. Headache

- No headache - 0
- Occasional dull aching pain (Mild) - 1
- Off and on the headache that interferes with routine work; but bearable (Moderate) – 2 • Severe headache experienced often and requires analgesics (Severe) - 3.

b. Watering of the eye

- No watering of the eye - 0
- Slight watering of the eye; on strain (Mild) -1
- Off and on watering of the eye even without any strain needs to hanker chief at the interval of 3or more (Moderate) - 2
- Excess irritable watering of the eye requires frequent use of a handkerchief (Severe) - 3. c. Heaviness in eye
- No heaviness in eyes - 0
- Patient complaints of heaviness in eyes on reading/writing more than 3 h and subsides after rest toeyes or sleep (Mild) - 1
- Patient complaints of heaviness in eyes on reading/writing less than 3 h but more than 1 h andsubsides a rest to eyes or after sleep (Moderate) - 2
- Heaviness even in reading less than 1 h and interfering with routine work (Severe) - 3. d. Eye strain
- No eye strain - 0
- Occasional eye strain on reading (Mild) - 1
- Off and on eye strain on reading (Moderate) - 2
- Eye strain continuous even without reading (Severe) - 3.

e. Pain in the eye

- No pain in the eye at all - 0
- Occasional pain in reading/writing sustains more than 1 h (Mild) - 1
- Pain in the eye on reading/writing sustains less than 1 h (Moderate) - 2
- Continuous pain in the eye even without reading/ writing (Severe) – 3

The effect of the treatment in each group will assess separately by analyzing the pretreatment andpost-treatment data, scores, and values

Result

Out of 23 cases of study group marked improvement was seen in 14 (60.86%) subjects in dioptric number where the average reduction in dioptric number was -0.75 D, and in 3 (13.04%) subjects dioptric number was static but in 6 (26.08%) subjects no improvement was seen.

In vision acuity in study group, 9 (39.13%) subjects show mark improvement with a reduction in visual acuity by 6/3, and 12 (52.17%) subjects show static numbers whereas 2 (8.69%) subjects show an increasein Vison acuity.

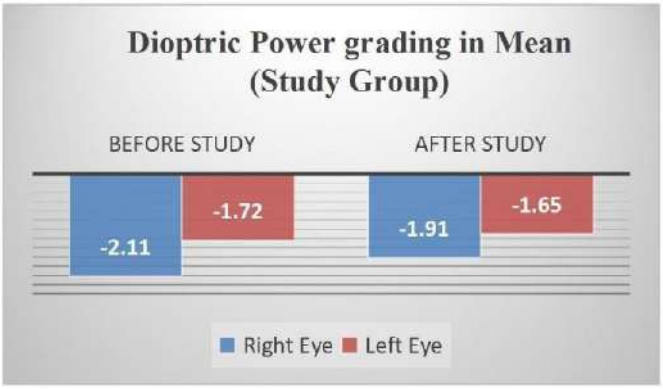
In Dioptric Test in control group, improvement was seen in 7 (30.43%) subjects in the study group where the average reduction in dioptric number was -0.64 D, and in 1 (4.34%) subjects dioptric number was static but in 15 (65.21%) subjects no improvement was seen.

In vision acuity in control group, 9 (39.13%) subjects show improvement and 14 (60.86%) subjects show static numbers whereas 3 (13.04%) subjects show an increase in Vison acuity.

Before study, mean of Ruta treated group was -2.11 D (Right eye) - 1.72 D (Left eye), while in placebo group -2.23D (Right eye) -1.95 D (Left Eye). The difference in means between two groups of -0.12 (Right eye) -0.23 (Left Eye). Mean change after 3 months was -1.91 (Right Eye) -1.65 (Left Eye) in Ruta group and -2.26(Right Eye) -2.27 (Left Eye) in placebo group respectively and difference in their means of -0.34 (Right eye) -0.61 (Left Eye). No new symptoms were noted during this study.

Table.1.1 Dioptric power grading in mean Study group Table.1.2 Dioptric power grading in mean Control Group

	Mean of Before study	Me Aft	an of er study		Mean of Before study	Mean of After study
Right Eye	-2.11 D	-1.	91Right Eye D		-2.23 D	-2.26 D
Left Eye	-1.72 D	-1.	65Left Eye D		-1.95 D	-2.27 D



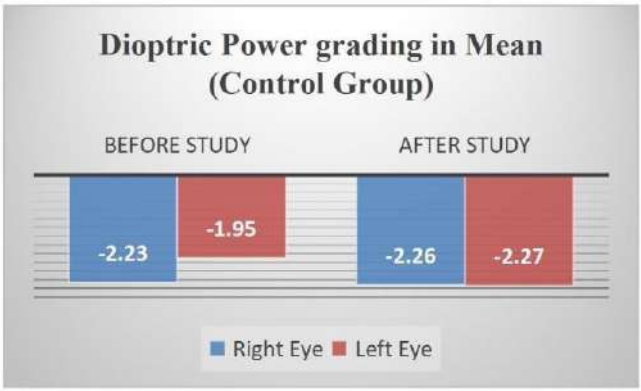
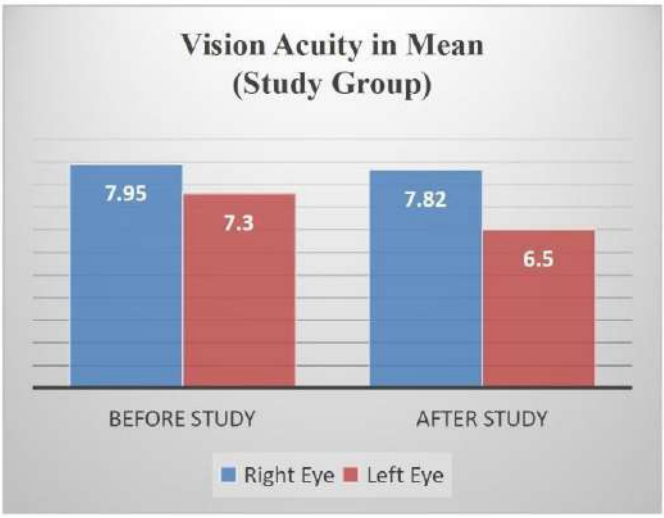


Table 2 Vision Acuity in Mean (Study & Control Group)

	Mean of Before study	Mean of After study		Mean of Before study	Mean of After study
Right Eye	6/7.95	6/7.82	Right Eye	6/11.22	6/10.83
Left Eye	6/7.3	6/6.5	Left Eye	6/9.13	6/9.52


Vision Acuity in Mean
(Study Group)
7.95
7.3
7.82
6.5
BEFORE STUDY
AFTER STUDY
Right Eye
Left Eye

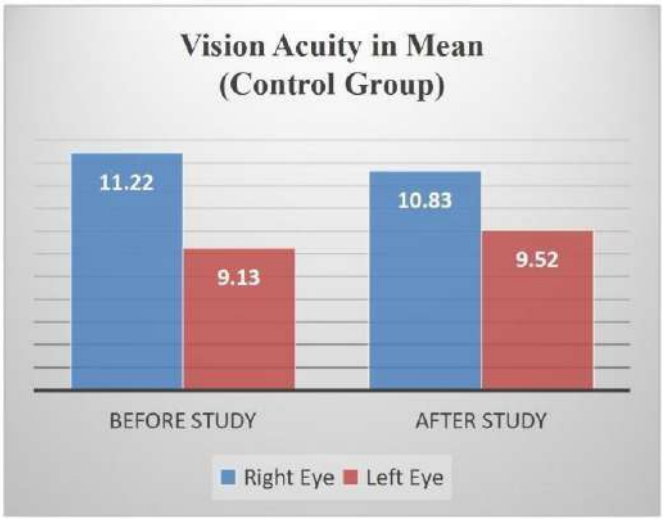

Vision Acuity in Mean
(Control Group)
11.22
9.13
10.83
9.52
BEFORE STUDY
AFTER STUDY
Right Eye
Left Eye

Table.3 Sex distribution of study Group

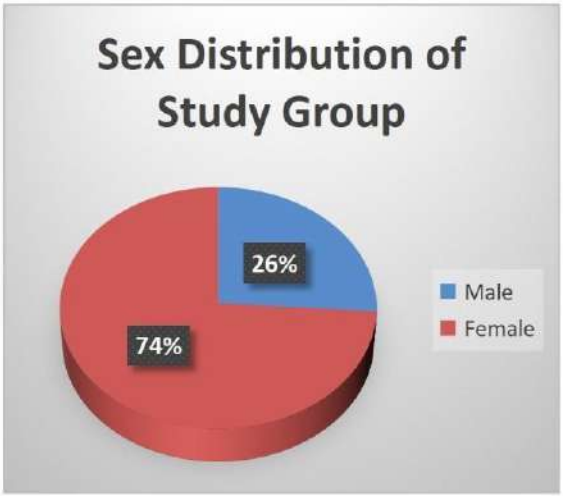
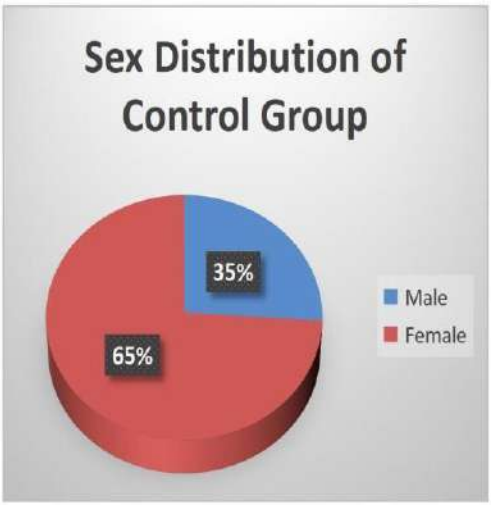
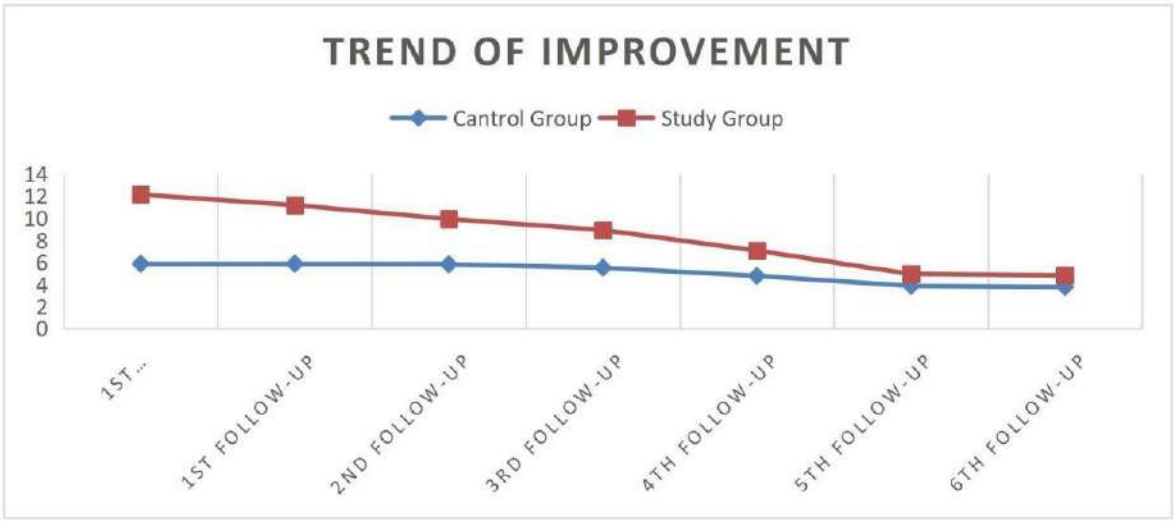


Table.3.2 Sex distribution of Control Group



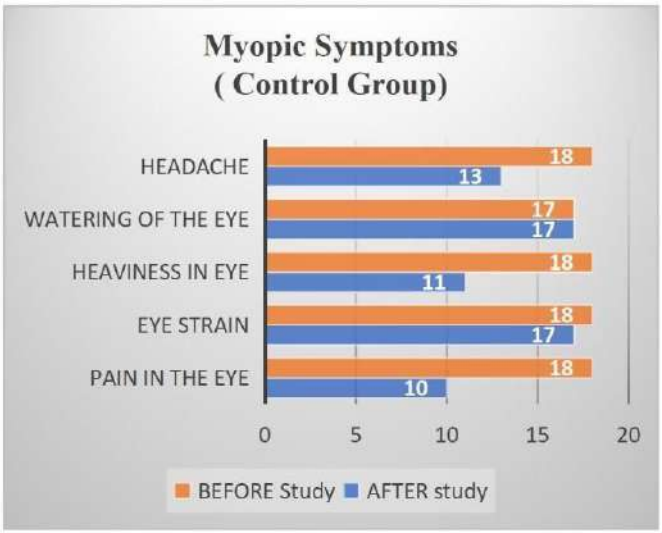
	Male	Female
Study Group	26%	74%
	Male	Female
Control Group	35%	65%

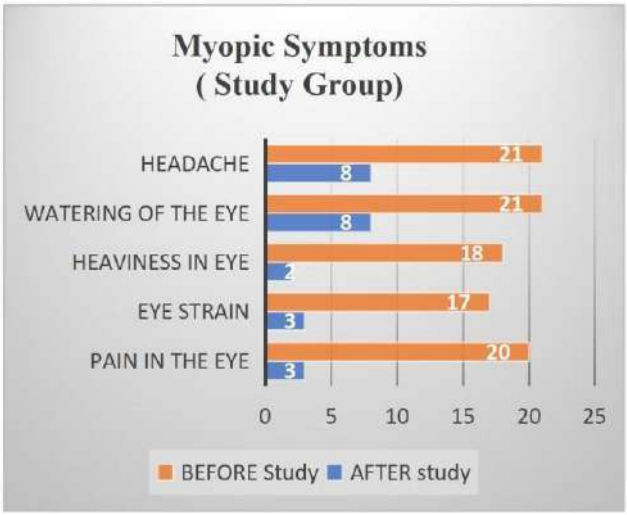


	1st Prescription	1st Followup	2nd Followup	3rd Followup	4th Followup	5th Followup	6th Followup

Control Group	5.86	5.86	5.82	5.52	4.78	3.86	3.78
Study Group	6.26	5.30	4.08	3.39	2.26	1.08	1.04

Table4.1 Myopic Symptoms Study Group Table4.2 Myopic Symptoms Control Group





Study group				Control group		
Symptoms	Before		After	Symptoms	Before	After
Headache	21		8	Headache	18	13
Watering of eyes	21		8 W	atering of eyes	17	17
Heaviness in eyes	18		2 He	aviness in eyes	18	11
Eye strain	17		3	Eye strain	18	17
Pain in eye	20		3	Pain in eye	18	10

Discussion :

In this study total 320 subjects were screened by Dioptric Test and Vision acuity by Snellen chart, 52 subjects who were diagnosed to have myopia were divided into 2 groups by Lottery method sampling (each member of the population was assigned a number after which numbers were selected randomly). where one group was treated with Ruta graveolens 30 and another group with Placebo, out of 52 subjects 6 subjects were dropped during follow-up.

Total no. of 46 subjects were assessed in this study, they were divided into 2 groups equally with the age groups from 8 -30 years. We found that 13 subjects had a family history of myopia in the Study group whereas 9 subjects had family history of myopia in the control group.

6 subjects showed no improvement after being given Ruta, it may be due to hereditary factors in the background of these subjects that made them susceptible to myopia progression when exposed to excessive near work. To tackle this problem, a constitutional line of treatment has to be planned after stopping Ruta treatment.

Progression rate of myopia was less than -1.00 D in the study group whereas in the control group, it was more than -1.00 D in 5 months

In this study going through the distribution based on gender, females (70%) were majority than the males (30%). The results of this study can be generalized, as this study involves subjects of 8-30 yrs age groups who are more vulnerable to myopia.

Conclusion

The results of this study shows that the use of Ruta 30 in BD orally dose for 1 day & repetition after every 15 days for 3 months has reduced Myopic progression significantly as compared to the Placebo Group. The effectiveness of Ruta graveolens was around 60 to 80 %. The myopic refractive error static was improved in 14 cases whereas static in 3 cases and increased in 6 cases. The visual acuity was improved in 9 cases,where as static in 12 cases and increased in 2 cases. There were no new symptoms arisen due to medication in the patient.

CONFLICT OF INTEREST-

There are no conflicts of interest.

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