



ALTERNATIVE TREATMENTS AND HERBAL APPROACH TO THE GLAUCOMA.

¹Kendre Vaishnavi B*, ²Dr. Varma Rajani S, ³Somnath Shambhavi G.

^{1,2,3}shivlingeshwar College of Pharmacy, Almala, Tq: Ausa, Dist: Latur, Maharashtra, India. 413520.

ABSTRACT:

As we all know glaucoma is leading disorder nowadays which causes blindness. Glaucoma is nothing but group of disorder characterized by condition that damage to the optic nerve due to the increased intraocular pressure which affects the vision and other associated organ damage.

We are going to study in this topic about some non-pharmacological aspects and therapeutic aspects of herbal agents to improve the quality of patients life and life style modification such as dietary intake as well as improvement in physical exercises. Herbal agents such as baicalein, bilberry, marijuana and Ginkgo biloba would be beneficial as alternative therapy along with pharmacological agents.

While studying these all aspect we found that the alternative therapy and the lifestyle modification should become very useful to achieve the therapeutic goal. This study will be helpful for whole paramedical field to reduce the disease progression and as a clinical pharmacist it is our motive to introduce our clinical review study.

KEYWORDS: glaucoma, non-pharmacological aspects, Herbal agents, lifestyle modification, physical exercises, therapeutic goal.

INTRODUCTION:

Definition:

Glaucoma are disorder characterized by a group of diseases of optic neuropathy & changes in the optic nerve associated with loss of vision. The changes can occur due to disturbances into intraocular pressure.

Types of glaucoma:

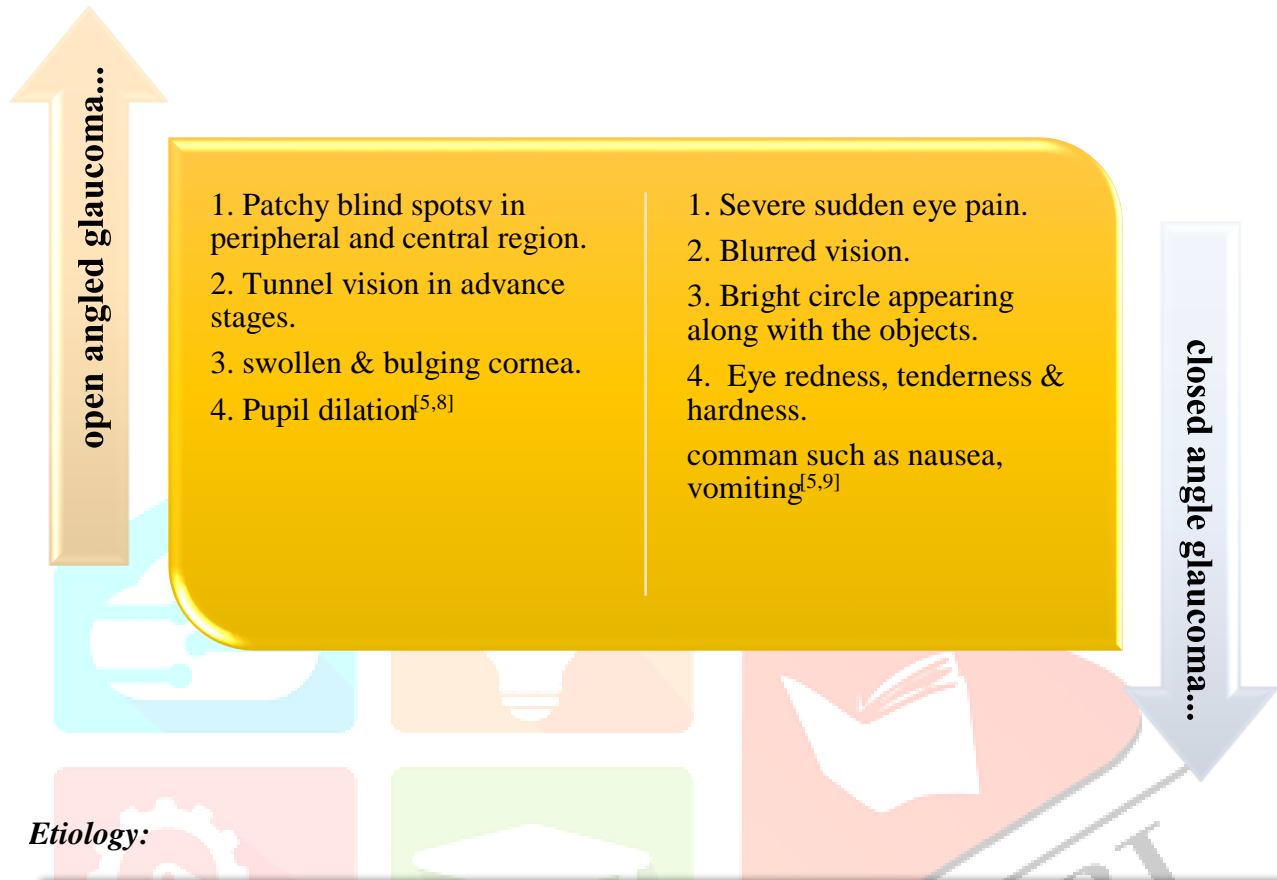
1) Open angled glaucoma.

In open angled glaucoma medical emergency or hospitalization is not needed but as the time passes it can cause vision abnormalities over the time. Intraocular pressure build gradually.

2) Closed angle glaucoma.

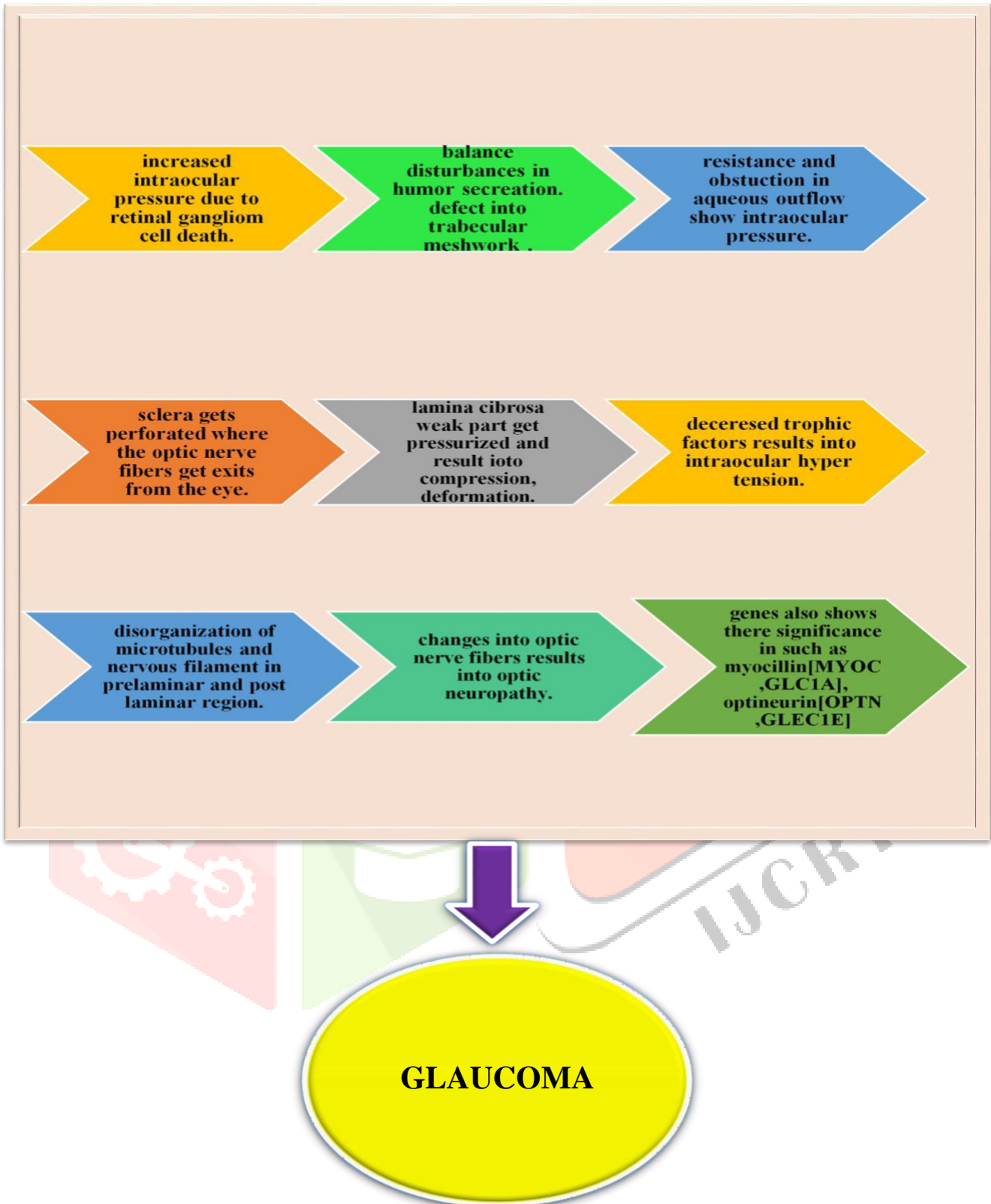
In closed angle glaucoma immediate medical attention is needed but as the time passes it can convert into worsened condition and need medical emergency. Intraocular pressure build more sudden than that of open angled glaucoma^[1,2,4]

Clinical features:



Etiology:

1. Increased intraocular pressure.
2. Increased susceptibility of optic nerve to ischemia.
3. Reduced or disrupted blood flow.
4. Autoimmune reaction.
5. Excitotoxicity.
6. Abnormal physiological processes.
7. Exfoliation syndrome.
8. Pigmentary glaucoma.
9. Systemic diseases.
10. Trauma.
11. Surgery.
12. Lens changes.
13. Drug induced ocular inflammatory disease.

Pathogenesis:**Treatment:**

1. Beta-adrenergic blocker:
Timolol.
Betaxolol Levobunolol.
2. Alfa-adrenergic agonists: Dipivefrine.
Apraclonidine.
Brimonidine.

3. Prostaglandin analogues:
Latanoprost
Tavoprost
Bimatoprost.
4. Carbonic anhydrase inhibitors:
Acetazolamide.
Dorzolamide.
5. Miotics:
Pilocarpine.

HERBAL AGENTS FOR GLAUCOMA:

1. Curcumin:

Synonyms: Turmeric

Biological Source: Plant- Curcuma Longa.

Family: Zingiberaceae.

Chemical Constituents: Volatile Oil: Turmerone, Germacrone, Atlantes, Zingiberene

Mechanism of action: curcumin helps into the inhibition of NF-Kb and possess the antioxidant and antitumor properties which shows decreased death of retinal ganglionic cells^[11]

2. Marijuana:

Synonyms: cannabis indica, Indian hemp.

Family: cannabinaceae.

Biological source: cannabis consists of dried flowering and fruiting tops of the pistillate plant of cannabis sativum linn.

Chemical constituents: resins: cannabidiol, cannabidiolic acid, cannabinol, cannabigerol, cannabichromene, tetrahydrocannabinol.

Volatile oils, Trigonelline Choline.

Mechanism of action: main active ingredient such as cannabidiol [CBD] and tetrahydrocannabinol are 30% effective into minimizing intraocular pressure in just 3-4 hrs. as per guidelines marijuana used oral, sublingual, intravenous route of administration. Psychotropic agents shows major ADRs so would be used along with good therapeutic planning is important by professionals^[11,12]

3. Ginkgo biloba:

Synonyms: maidenhair tree.

Family: Ginkgoaceae.

Biological source: dried leaves of ginkgo are obtained from dioecious tree of ginkgo biloba belong to family Ginkgoaceae.

Chemical constituents: terpenoids, flavonoids, bioflavonoids, organic acids, polyprenols.

Major: ginkgolide [A,B,C], Ginkgo toxin, ginkgolides and bilolides [A,B,C,J &M]. Mechanism of action: major activity of ginkgo biloba as antioxidant which protect the damage of mitochondrial layer in eyes and minimize cell injury. Ginkgo also also associate with its vasodilatory and anti inflammatory properties and works as neuroprotective which improve retinal ganglion cellular damage and stabilize the optic nerve injury^[11,13]

4. Bilberry:

Synonyms: blueberry.

Family: eriaceae.

Biological sources: dried ripe fruits of the plant *vaccinium myrtilloides* linn. Chemical constituents: flavonoids: anthocyanin, catechin, epicatechin and epigallocatechin.

Tannins: catechol tannins.

Organic acids: malic acids, citric acid, lactic acids, oxalic acids, succinic acid \ Volatile oils.

Others: iridoid glycosides.

Mechanism of action: bilberry extract used to minimize the death of retinal ganglionic cells after injury. Bilberry's chemical agents also works as neuroprotective which increases the chaperonone molecules results into decreased apoptosis of cell. Bilberry shows major role by reducing morbidity and mortality of glaucoma^[11,14]

5. Baicalin:

Synonyms: Baikal skullcap.

Biological name: *scutellaria baicalensis*.

Family: lamiaceae.

Chemical constituents:

Flavonoids: 5,6,7, Trihydroflavone.

Glycosides: tetuin.

Mechanism of action: inhibits the progression of retinal ganglion cells[RGCs]. Inhibits the NMDA receptors which stimulates the [RGCs] apoptosis, autophagy and oxidative stress by activating PK13/AKT signaling results into reduced intraocular pressure^[15,16]

ALTERNATIVE TREATMENTS AND LIFESTYLE MODIFICATION FOR GLAUCOMA:

Lifestyle modifications such as physical exercise and proper diet intake able to improve the disease condition of glaucoma. Systemic disorder of cardiovascular and respiratory system may show impairments on various biological systems oxygen levels. Disturbances into level of nitric oxide results in contraction of ocular vessel which is able to show increased intraocular pressure. Risk factors for glaucoma includes smoking, alcoholism lowers the oxygen levels and metabolic activities respectively. Above factors are able morbid disease condition, so we are going to management of these condition for a proper curative approach.

Factors include in life style modification.**1. Physical exercises:**

Physiological balance is ultimately depends on the physical balance of biological system. Physical maintenance is one of the more important factor into disease modification. As a study on evidences, we have found that the disease should be cured using the factors affect on biological system.

○ Anaerobic exercises:

Some clinical evidences had confirmed that the patient will be able to minimize the condition of glaucoma curing intraocular pressure which improve the levels of oxygen and managing the ischemic condition. Anaerobic exercise also prone to improve blood flow to the brain.

○ Yoga:

An ancient Indian therapy practiced till nowadays. It is nothing but the physiotherapy including both anaerobic as well as aerobic exercises. Yoga can improve the respiratory function and blood gas concentration into biological system with the help of gaseous exchange. Proper gas maintenance able to minimize hypoxic and ischemic morbidities and levels of nitric oxide also can be maintained. Intraocular pressure and retinal ganglionic tissue damage should be minimized with the help of yoga therapy.

Yoga position includes:

- Adhomukha svnasana.
- Halasana.
- Viparita karani.

2. Diet:

Diet intake is one of the most important factors for glaucoma. Intake of anti-oxidants and Omega 3s containing diet improves eye health and alters disease progression. Diet for glaucoma consists of the following factors in it as a supportive alternative management system.

- Coenzyme Q10.
- Siquinone.
- Melatonin.
- Ginkgo biloba extract.
- Magnesium.
- Vitamin B3.
- Mirgogenol.

3. Lifestyle suggestions:

○ Smoking cessation:

As a clinical study proved that smoking risk for glaucoma showing systemic defects into cardiovascular systems, respiratory system, and metabolic system. Smoking can cause lower level of oxygen in body and result into ischemia and vascular problem so that the supply of blood to the brain area would be impaired and it is one of the main causes of glaucoma associated with increased intraocular pressure. Smoking cessation is able to minimize the disease progression. It is one of the best alternative treatments for glaucoma.

○ Sleeping position:

Supine position is one of the favorite sleeping positions all over the world i.e. lying on face up, horizontally. Sleeping position is the most common cause of glaucoma with the excessive rise into intraocular pressure. Intraocular pressure is minimized utilizing sleeping position with head elevated 20-30 degrees in supine position and gives a curative approach to the glaucoma condition^[7,17]

4. Acupuncture:

Balanced flow of energy is determined when the acupuncture therapy is given to the patient. Energy is present in each and every animal on earth. Balance of energy is done by the acupuncturist utilizing the insertion of a needle under the skin. As a study on animal acupuncture showed better effects on biological systems. Utilization of acupuncture is able to minimize the intraocular pressure. As an experimental study, acupuncture showed improvement in central visual activity. Further testing of acupuncture as an alternative therapy along with pharmacological therapy will be able to improve the condition of glaucoma^[17]

CONCLUSION:

As per our study, glaucoma is now the most prone condition, resulting into permanent blindness followed by glaucoma. We have concluded that the disease glaucoma can be cured utilizing alternative therapies like lifestyle modification, diet improvements, physical exercises, and acupuncture therapy. Using herbal medication along with pharmacological agents, there is a chance to reduce mortality and morbidity in glaucoma. Agents like curcumin, ginkgo biloba, bilberry, and its chemical constituents impact in a better way on intraocular pressure to improve the quality of patients' lives. So, the herbal agents and lifestyle modification has a curative approach when used along with traditional treatment on glaucoma.

DISCUSSION:

We are going to discuss in this article about the herbal agents and lifestyle modification on glaucoma. As we all know glaucoma can cause the permanent loss of vision. As a clinical professional we have taken the review on 17 articles and we have found after studying them there are several ways to cure such difficult condition. Herbal agents such as curcumin, bilberry and marijuana which are available easily these are useful in this condition. Imbalance levels of gaseous in body and nitric oxides can impair the function of eye and condition would be worse so its management is need for now. As a clinical professional we studied the mechanism of each herbal agent and alternative therapies these will be very useful for all paramedical field professionals for practicing to improve the severe conditions like glaucoma.

SOURCE OF FUNDING: N/A.

ACKNOWLEDGEMENT: N/A.

REFERENCES:

1. Barbara g. wells, joseph t. dipiro, terry l. schwinhammer, Cecily v. dipiro. Pharmacotherapy handbook, seventh edition, pg. no. 719-725.
2. K D Tripathi, essentials of medical pharmacology, eighth edition, jaypee publication. Pg.no. 153-170.
3. Anne Waugh, Allison grant. Ross and wilson human anatomy and physiology in health and illness. 11th edition, chapter 8, pg.no. 203-205.
4. Roger walker, clive Edwards. Clinical pharmacy and therapeutics, third edition. Pg.no. 825.
5. Mayo clinic, glaucoma symptoms & causes, 23 oct 2020. Available from: <https://www.mayoclinic.org/diseases-conditions/glaucoma/symptoms-causes/syc20372839>
6. Kristin Schmid Biggerstaff, primary open- angled glaucoma [POAG], 16 mar 2020. Available from: [https://emedicine.medscape.com/article/1206147overview#:~:text=Glaucoma%20is%20currently%20efined%20as,of%20intraocular%20pressure%20\(IOP\).](https://emedicine.medscape.com/article/1206147overview#:~:text=Glaucoma%20is%20currently%20efined%20as,of%20intraocular%20pressure%20(IOP).)
7. Glaucoma research foundation, exercise, diet, lifestyle changes for people living with glaucoma. 14 may 2021. Available from: <https://www.glaucoma.org/news/blog/exercisediet-and-other-lifestyle-changes-for-people-living-with-glaucoma.php>
8. Leela raju, what to know about primary open angle glaucoma, 6 oct 2021. Available from: <https://www.healthline.com/health/eye-health/primary-open-angle-glaucoma>
9. vicente diaz, closed-angle glaucoma, 17 nov 2020. Available from: <https://www.healthline.com/health/closed-angle-glaucoma>
10. Robert N. weinreb, Tin aung, Felipe A. Medeiros. The pathophysiology and treatment of glaucoma. JAMA. 14 may 2014; 311(18):1901-1911.
11. Ahmad Aaref. Albert S Khouri. Alternative treatments for glaucoma. 30 oct 2021. Available from: https://eyewiki.aao.org/Alternative_Treatments_for_Glaucoma
12. Mack A, Joy J. marijuana and glaucoma. 2000. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK224386/#:~:text=Several%20clinical%20studies%20have%20found,do%20most%20conventional%20glaucoma%20medications.&text=This%20is%20true%20whether%20the,applied%20directly%20to%20the%20eye.>
13. Manisha P. more, anuja. S motule, Prajakta n. dongre, prerna a. patinge, Rahul D. jardarkar, Ravindra l. bakal, jagdish v. manwar. Pharmacognocoy, phytochemistry, pharmacology and clinical application of ginkgo biloba. GSC biological and pharmaceutical sciences, 2021;16(320):229-240.
14. Roy upton herbalist, Bilberry fruit vaccinium myrtilus l. standards of analysis, quality control and therapeutic compendium. 2001;1-28.
15. Ningmin zhao, jieranshi haoxang xu, Qing luo, Qiaoyan li, Mingzhou liu. Baicalin suppresses sglaucoma pathogenesis by regulating the P13K/AKT signaling in vitro and in vivo. 03 Dec 2021;2(12):10187-10198.
16. Wikipedia. Baicalein. Available from: <https://en.wikipedia.org/wiki/Baicalein>
17. Mosses B. graubard, Louis R. pasquile, Cynthia L. Grosskrenutz, Teresa C. chen, Douglas J. rhee. Complementary and alternative medicine for glaucoma. Glaucoma today.com. Sep-Oct 2006. Available from: https://glaucomatoday.com/articles/2006sept-oct/0906_04.html

18. Joshua D stein, Anthony P. Khwaja, Jennifer S. Weizer. Glaucoma in adults screening, diagnosis and management. JAMA. 2021;325(2):164-174.
19. Antinio Greco, maria ida rizzo, Armando de virgillio, andre a gallo, Massimo fusconi, marco de vincetillis. Emerging concepts in glaucoma and review of the literature. The American journal of medicine. 2016;129(9):1000 E7-E13.
20. Lingam Vijaya, Ronnie George, Pradip G. Paul, Mani Baskaran, Hema Malini Arvind, Prema raj, Ve Ramesh, Govindsamy kumaramini kavel, Catherine Mccarty. Prevalence of open-angle glaucoma in a rural south Indian population. Investigative ophthalmology and visual science. 2005;46(12):4461-4467.
21. Susan garatt, Socorro soberano. Primary open- angle glaucoma. American academy of ophthalmology. 2016;41-111.
22. Britannica. Glaucoma pathology. 24 feb 2022. Available from: <https://www.britannica.com/science/glaucoma>
23. Ronon conlon, haly saheb, Iqbal ike, K. Ahmed. Glaucoma treatment trends: A review. Canadian journal of ophthalmology. 2017;52(1):114-124.
24. Jiangan He, Haidang zou, Richard K. lee, Hiaowei tong, wenli tang, Yi zhang, Rong zhao, Ling ge. Prevalence and risk factors primary open-angled glaucoma in city of eastern china: a population- based study in New Pudong district shanghai. BMC ophthalmology. 2015;(2015)134.
25. Barbara cvenkel, Miriam kelko. Current medical therapy and future trends in management of glaucoma treatment. Journal of ophthalmology. 2020;6138132.
26. Charles W. Mcmonnies, glaucoma history and risk factors. Journal of optometry. 2017;10(2):71-78.
27. Robert K. casson, glyn chilow, John PM wood, Jonathan G. crowston, ivan Goldberg. Definition of glaucoma: clinical and experimental concepts. Clinical and experimental ophthalmology. 2012;40(4):341-349.
28. HE killer, A pircher. Normal tension glaucoma: review of current understanding and mechanisms of the pathogenesis.
29. Natalie schellack, G. schellack, selente benzuide nhout. Glaucoma: A brief review. SA pharmaceutical journal. 2015;82(5):18-22.
30. Luciano Quaranta, Inano riva, Chiara gerardi, Francesco addone, Irene Floriano, Anastasios G. konstas. Quality of life in glaucoma: a review of the literature. Advances in therapy.2016;33:959-981.
31. Claire Imrie, Andrew J. Tatham. Glaucoma: the patents perspective. British journal of general practice. 2016;66(646):371-373.
32. David A. lee, Evej Higginbotham, Glaucoma and its treatment: A review. American journal of health-system pharmacy. 2005;62(7):691-699.