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Prevalence of glaucoma in Al Kharj: A retrospective record-based study

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ABSTRACT

Globally, glaucoma is the most common cause of irreversible blindness and is a complex illness. It doesn't cause symptoms until they're severe, so there may be more affected people than have been recognized. It frequently has to do with an increase in pressure inside the eye. If glaucoma is left untreated, it will continue to harm the optic nerve. Reporting the clinical statistics of glaucoma cases in Al Kharj city is the goal of our study. This retrospective study was carried out at King Khalid and PSA (Prince Sattam Bin Abdulaziz) University Hospitals in Al-Kharj, Saudi Arabia. All glaucoma patients who attended these hospitals between January 2022 and November 2022 had their medical records carefully examined. Patient demographic information, clinical information and information on their surgical and medical management methods were gathered and reported. There were 350 patients in all; 54% of them were men, 94.8% were Saudi citizens and the average age was 53. 82.2% of cases involved bilateral involvement. The most common kind of glaucoma was primary open-angle, which was followed by secondary glaucomas. Primary open-angle glaucoma, secondary glaucomas and primary angle-closure glaucoma were the most common glaucomas in the study population. In order to allocate resources, plan services and prevent blindness, it is essential to be aware of the prevalence of glaucoma.

Keywords: Glaucoma, Prevalence, Primary open-angle glaucoma, Blindness, Al-Kharj, Saudi Arabia.

1. INTRODUCTION

Glaucoma is a chronic, progressive damage of optic nerve. It frequently is related to an increase in pressure inside the eye. One of the main factors contributing to permanent vision impairment in adults around the world is glaucoma (Torabi et al., 2021). Data collecting on visual impairment and epidemiological trends for eye illnesses, such as glaucoma, has been advised by the World Health Organization (Khandekar et al., 2019). The primary

causes of blindness and reduced vision were glaucoma, cataract, xerophthalmia, trachoma, onchocerciasis and trachoma. There was still little information on the prevalence of blindness worldwide due to different medical conditions such diabetic retinopathy and age-related macular degeneration (Al-Najmi et al., 2021). There should be caution when interpreting the presented results because to the wide confidence interval in the prevalence rates and the substantially high heterogeneity associated with the published data from these regions because the prevalence of glaucoma is notably different across the Middle East (Cheng et al., 2014). There are few epidemiological records on glaucoma in the Kingdom. It is still uncertain how often the illness is according to population-based studies. According to Al-Shaaln et al., (2011) looked at the presenting causes of vision loss; glaucoma affected 5.2% of patients with visual symptoms.

Primary open-angle and closed-angle glaucoma are the two main subtypes of glaucoma, both of which are based on the angle of anterior chamber as shown by gonioscopy. The burden of disease in the Kingdom is greatly increased by primary congenital glaucoma and various secondary glaucoma caused by hereditary illnesses. A mutation in the CYP1B1 gene, which is autosomal recessive, causes the majority of primary congenital glaucoma cases (Prum et al., 2016). Torabi et al., (2021) however, have particularly examined the prevalence rates of glaucoma in Middle East. The purpose of this study was to identify the glaucoma patterns in Al Kharj city, evaluate the demographic factors that are related to the different types of glaucoma, assess the correlation between glaucoma types and factors like intraocular pressure and visual acuity and identify various treatment options.

2. METHODOLOGY

This study was authorized by IRB (Institutional Review Board) at the Faculty of Medicine (PSAU-2022 ANT 55 /44PI). The King Khalid Hospital of the Ministry of Health and Prince Sattam University were chosen as the two major referral centers in Al Kharj for the purposes of this retrospective study. All glaucoma sufferers' medical records that went to the chosen health care facilities between January 2022 and November 2022 were reviewed and their data were collected. This includes demographic information like gender, age and nationality as well as clinical information like glaucoma diagnoses, location of the glaucoma, secondary glaucoma types, intraocular pressure, topical ophthalmic drug usage and surgical and laser procedures used. Both institutions' institutional review and ethics boards granted their approval and the study followed the 2013 Helsinki Declaration's rules for ethical conduct. The best-corrected visual acuity, central corneal thickness, visual field assessment, pupillary examination, as well as slit-lamp examination of the anterior segment were all performed on each patient. For the majority of patients, an attached Goldman applanation tonometer was utilized to measure IOP; however, for the young and uncooperative patients, a ton open was employed. Angles were checked in these patients using direct gonioscopy lenses or Volk four-mirror gonioscopy lenses in the operating room. Through medicinal therapy, laser surgery or both, our management method sought to either reach the "target" IOP or reduce the IOP measured at presentation by 25%.

We represented continuous variables with the mean and standard deviation and categorical variables with frequencies and percentages. Categorical data were subjected to the chi-square test (or Fisher's exact test, if appropriate), while continuous variables with normally distributed distribution were subjected to the t-test and continuous variables with non-normal distribution were subjected to the Mann-Whitney U-test. The methodology employed in this study incorporates a number of statistical tools for analyzing independent papers pertaining to a certain field of study.

3. RESULTS

350 cases in all were analyzed. 189 of them (or 54%) were male. Participants' ages, which ranged from 39 to 69 years old on average the majority of the participants, were Saudi (94.8%). Additionally, bilateral glaucoma (82.2%) was the most common site followed by (17.7%) unilateral glaucoma (Table 1).

Table 1 Participants' distribution by country of origin, average age and glaucoma localization

Parameter		Number	Percentage
Nationality	Saudi	332	94.8%
	Non-Saudi	18	5.1%
Gender	Male	189	54%
	Female	161	46%
Age	Standard deviation(M+-SD)	53 years	15.1%
Site of glaucoma	Unilateral	62	17.7%
	Bilateral	288	82.2%

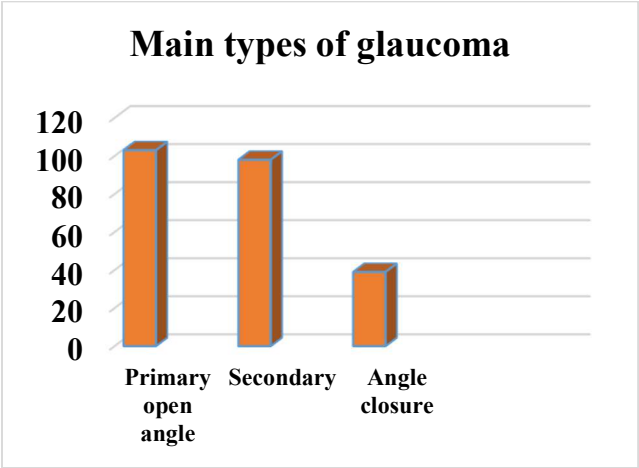

Figure 1 Main types of glaucoma

21 (6% of patients) had incomplete information regarding the kind of glaucoma and 25 (7.1%) were classified as glaucoma suspects. Primary open-angle glaucoma (103 cases) (29.4%), secondary glaucoma (98 cases) (28%) and angle closure glaucoma (51 cases) (14.5%) were the three most common glaucoma types (Figure 1, 2). Pseudo exfoliation glaucoma (35 cases) and Neovascular glaucoma (21 cases) were the two most prevalent kinds of secondary glaucoma, respectively (Table 2).

Table 2 Main types and subtypes of glaucoma along with types of secondary glaucoma in the study population

Type		No. of cases	Percentages
Primary open-angle glaucoma		103	29.4 %
Secondary glaucoma (98 cases)	Pseudoexfoliation glaucoma	35	10 %
	Neovascular glaucoma	21	6 %
	Uveitic glaucoma	11	3.1 %
	Lens-induced glaucoma	7	2 %
	Postsurgical glaucoma	6	1.7%
	Steroid-induced glaucoma	5	1.4 %
	Posttraumatic glaucoma	4	1.1%
	Other	9	2.5%

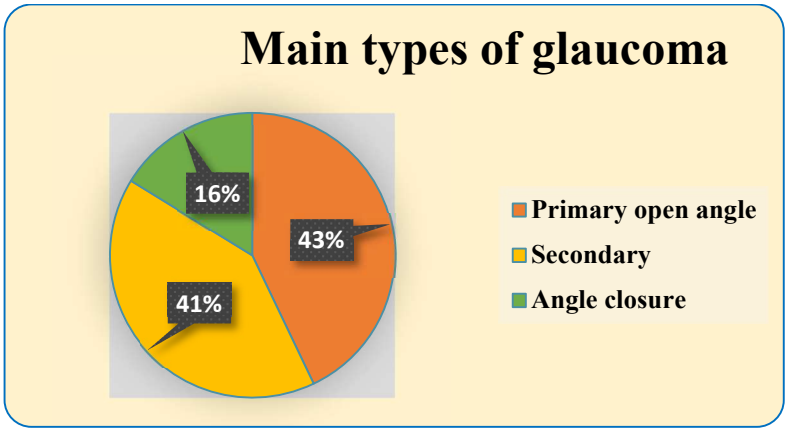

Figure 2 Main types of glaucoma

Regarding the various angle closure glaucoma subcategories, the proportion of patients with primary angle closure suspect cases was 7.7% (27 cases), the proportion of patients with primary chronic angle closure glaucoma was roughly 71% (251 cases) and 20.5% of the patients had acute angle closure crises (Figure 3) (Table 3).

Table 3 Different subgroups of angle closure glaucoma

Type	No. of cases	Percentages
Primary angle-closure suspect	27	7.7%
primary chronic angle-closure glaucoma	251	71%
Acute angle-closure crisis	72	20.5%

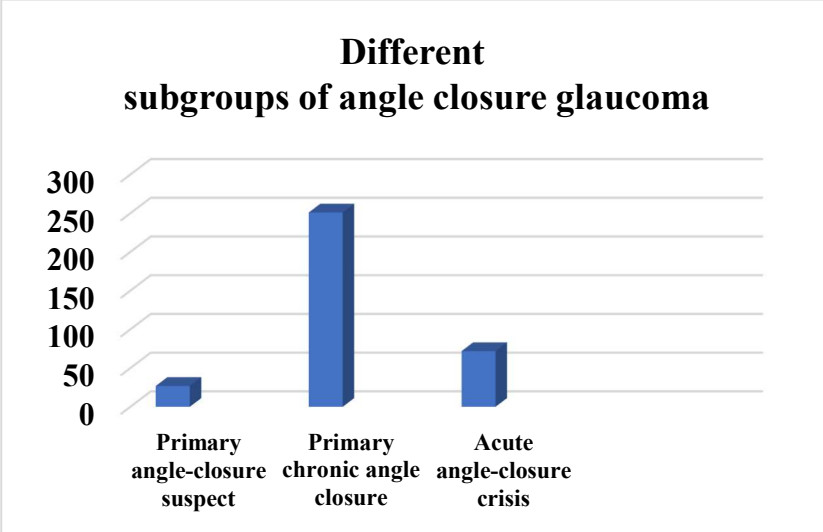

Figure 3 Different subgroups of angle closure glaucoma

When compared to the mean visual acuity recorded at the initial visit to the clinic, we saw that the mean visual acuity recorded during the second visit was lower. Every case has been subjected to a visual field examination. In some instances (Figure 4), they exhibit temporal wedge shifts and in others, sensitivity variations above and below the horizontal midline (Figure 5).

While there was no statistically significant difference between gender nationality and glaucoma sub types ($P > 0.05$), the distribution of age and site was significantly varied across glaucoma subtypes. According to the findings, patients with initial open-angle glaucoma were substantially more likely to have bilateral glaucoma than were those with angle closure glaucoma and secondary glaucoma in terms of the site of the disease ($P < 0.05$). The average intraocular pressure did not significantly differ across the groups, according to analysis.

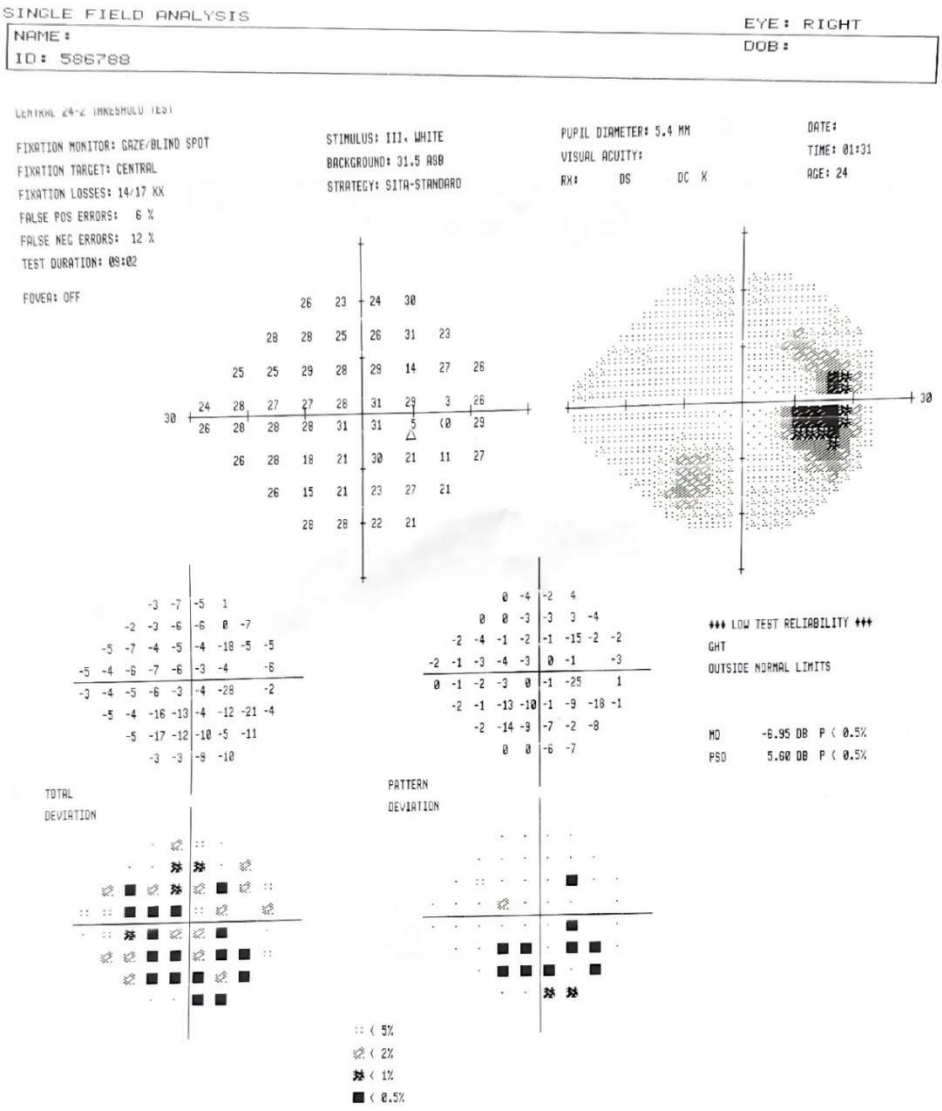

Figure 4 Right visual field in a case of glaucoma shows right eye reliable glaucoma visual field with temporal wedge change

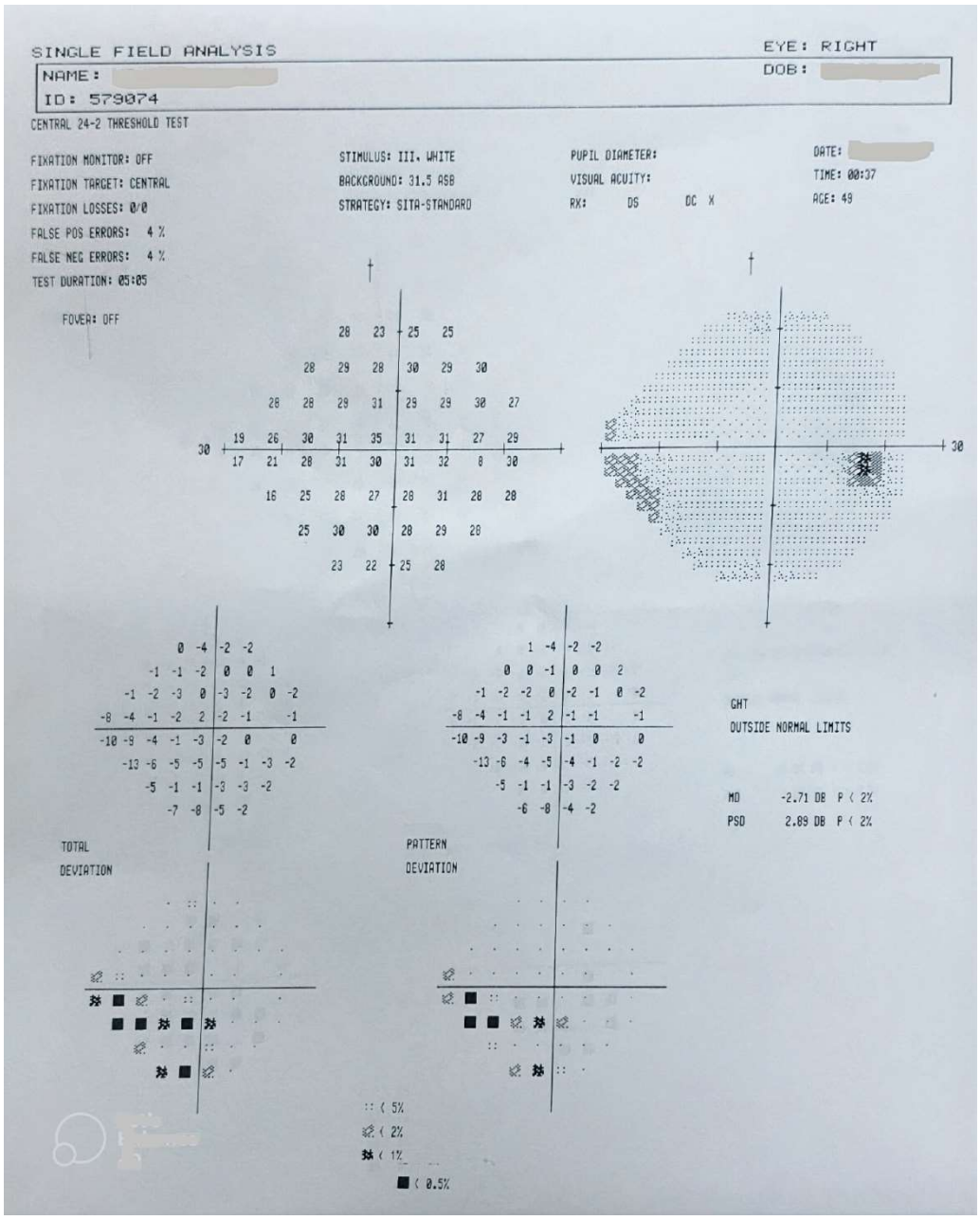

Figure 5 Right visual field in a case of glaucoma shows right eye reliable glaucoma visual field with nasal step and difference in sensitivity above and below the horizontal midline

4. DISCUSSION

The results of the study show that primary open-angle, secondary glaucoma and primary angle-closure glaucoma are the most common types of glaucoma in the Al Kharj of Saudi Arabia. The prevalence of glaucoma in the current study area is comparable to that found in studies conducted in communities with similar age groups and in other nations (Khandekar et al., 2019; Al-Mansouri et al., 2011; Buhrmann et al., 2000). The findings, however, are different from those of other worldwide studies: Africans are more likely to have primary open-angle than Europeans or Asians, while Asians are more likely to have angle-closure than either Europeans or Africans.

In contrast to the findings of Al-Obeidan et al., (2011) and Al-Zuhairy et al., (2018) primary open-angle cases were more common than primary angle-closure in our investigation, which may be related to the existence of certain risk factors for primary open-angle that have not been discussed here, such as myopia, diabetes mellitus and a family history of the illness. According to European Glaucoma Society Terminology, (2017) follow-up appointments for these cases should be made every 6 to 12 months and patients should be checked for changes or abnormalities in the results of the visual field and optic nerve head tests.

Thus, future strategies ought to concentrate on the "at-risk" population. Ages 40 and up are considered to be the at-risk range for glaucoma and diabetic retinopathy. We also advise doing comparable studies in Saudi Arabia's other regions. In the population of the Middle East, early correlations between the variables of chromosomes, age/gender, socio-economic level, IOP and vascular impacts have been discovered (Torabi et al., 2021). To lessen the irreversible vision loss brought on by late glaucoma diagnosis, effective screening programs and early detection are essential (Al-Ghamdi, 2019).

There are a few restrictions that must be understood. There were some missing data because this study was retrospective. Additionally, incorrect classification and diagnosis may both be problems. So, in order to determine the prevalence and burden of glaucoma as well as its risk factors, a comprehensive national survey is required.

5. CONCLUSION

According to this study, the most prevalent kinds of glaucoma found in the Al Kharj were primary open-angle, secondary and primary angle-closure glaucoma. It is essential to be aware of the prevalence of glaucoma in order to organize services, allocate resources and avoid blindness. It is necessary to use a public health strategy for early detection and effective management.

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Authors' Contributions

All authors contributed to the research and/or preparation of the manuscript. Ali Hassan A Ali, Hisham Hassan Algaaide and Mohammed Abdullah Alqarni participated in the study design and wrote the first draft of the manuscript. Essa Hazza Alonazi, Iftikhar Lafi N Alanazi, Rajwa Hussin S Alenezi and Raghad Faisal Alruwaili collected and processed the samples. Raghad Muteb Alruwaili, Dhai Nasser S Almuatiri, Abdulaziz F Alyahya and Shmoukh Mushref Alrawili participated in the study design and performed the statistical analyses. All of the authors read and approved the final manuscript.

Ethics Approval

All series of steps that were implemented in this study that included animal models were in compliance with Ethics Committee of Prince Sattam bin Abdulaziz University Institutional Review Board (PSAU-2022 ANT 55 /44PI).

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

REFERENCES AND NOTES

1. Al-Obeidan SA, Dewedar A, Osman EA, Mousa A. The profile of glaucoma in a tertiary ophthalmic university center in Riyadh, Saudi Arabia. Saudi J Ophthalmol 2011; 25 (4):373-9. doi: 10.1016/j.sjopt.2011.09.001
2. Al-Ghamdi AS. Adults' visual impairment and blindness: An overview of prevalence and causes in Saudi Arabia. Saudi J Ophthalmol 2019; 33(4):374-381. doi: 10.1016/j.sjopt. 2019.10.001
3. Al-Mansouri FA, Kanaan A, Gamra H, Khandekar R, Hashim SP, Al-Qahtani O, Ahmed MF. Prevalence and determinants of glaucoma in citizens of Qatar aged 40 years or older: A community-based survey. Middle East Afr J Ophthalmol 2011; 18(2):141-9. doi: 10.4103/0974-9233.80703
4. Al-Najmi Y, Kirat O, Elsayed MEAA, Albeedh M, Al-Rashed D, Al-Mohammed A. Glaucoma diagnoses and legal blindness from glaucoma among Bedouin patients of central Saudi Arabia: A hospital-based study. Middle East Afr J Ophthalmol 2021; 28(1):29-35. doi: 10.4103/meajo.MEAJO_7 7_21
5. Al-Shaaln FF, Bakrman MA, Ibrahim AM, Aljoudi AS. Prevalence and causes of visual impairment among Saudi adults attending primary health care centers in northern

Saudi Arabia. Ann Saudi Med 2011; 31(5):473-80. doi: 10.4103/0256-4947.84624

6. Alzuhairy S, Alalola FS, AlAkeel HA, Alayed DM, Al-Harbi IM, Al-Shetwi MM, Al-Nasser MA, Al-Jurayfani H, Mousa A. Profile and management outcomes of glaucoma cases at Qassim university hospital. Int J Health Sci (Qassim) 2018; 12(5):20-24.
7. Buhrmann RR, Quigley HA, Barron Y, West SK, Oliva MS, Mmbaga BB. Prevalence of glaucoma in a rural East African population. Investig Ophthalmol Vis Sci 2000; 41(1):40-8.
8. Cheng JW, Zong Y, Zeng YY, Wei RL. The prevalence of primary angle closure glaucoma in adult Asians: A systematic review and meta-analysis. PLoS One 2014; 9(7): e103222. doi: 10.1371/journal.pone.0103222
9. European Glaucoma Society Terminology and Guidelines for Glaucoma. 4th Edition-Chapter 2: Classification and terminology Supported by the EGS Foundation: Part 1: Foreword; Introduction; Glossary; Chapter 2 Classification and Terminology. Br J Ophthalmol 2017; 101(5):73-127. doi: 10.1136/bjophthalmol-2016-EGSguideline.002
10. Khandekar R, Chauhan D, Yasir ZH, Al-Zobidi M, Judaibi R, Edward DP. The prevalence and determinants of glaucoma among 40 years and older Saudi residents in the Riyadh Governorate (except the Capital): A community-based survey. Saudi J Ophthalmol 2019; 33(4):332-337. doi: 10.1016/j.sjopt.2019.02.006
11. Prum BE Jr, Rosenberg LF, Gedde SJ, Mansberger SL, Stein JD, Moroi SE, Herndon LW, Lim MC, Williams RD. Primary open-angle glaucoma preferred practice pattern (®) guidelines. Ophthalmol 2016; 123(1):P41-P111. doi: 10.1016/j.ophtha.2015.10.053
12. Torabi R, Harris A, Siesky B, Zukerman R, Oddone F, Mathew S, Januleviciene I, Vercellin ACV. Prevalence rates and risk factors for primary open angle glaucoma in the Middle East. J Ophthalmic Vis Res 2021; 16(4):644-656. doi: 10.18502/jovr.v16i4.9755