Check for updates

OPEN ACCESS

DOI: 10.46903/gjms/22.4.suppl.1745

ORIGINAL ARTICLE

SEVERITY OF RECENTLY DIAGNOSED PRIMARY GLAUCOMA AT PRESENTATION IN KHYBER PAKHTUNKHWA

Manzoorullah, Bakht Danyal Khan, Yousaf Jamal Mahsood

Department of Ophthalmology, Khyber Girls Medical College, Hayatabad Medical Complex, Peshawar, Pakistan

ABSTRACT

Background: Glaucoma is a progressive optic neuropathy with distinct visual field defects. The aim of this study was to determine the severity at presentation of recently diagnosed primary glaucoma.

Materials & Methods: This observational cross-sectional study was conducted at the Glaucoma clinic of Department of Ophthalmology, Hayatabad Medical Complex, Peshawar from July 2023 to February 2024. After obtaining the ethical approval, patients of primary open angle glaucoma (POAG) and primary angle closure glaucoma (PACG) who were recently diagnosed (i.e. in last six months) were included in this study. All the patients underwent comprehensive ocular examination including intraocular pressure (IOP) measurement, gonioscopy and standard automated perimetry. The severity of glaucoma was determined by using the visual field parameters of Hoddap-Parrish-Anderson criteria. The demographics of both groups were recorded, and severity was determined by analysis through SPSS version 26.

Results: A total 228 eyes of 114 patients or primary glaucoma were included. Of these 114 patients, 57 were included in each group; Primary Open Angle Glaucoma (POAG) in group A and Primary Angle Closure Glaucoma (PACG) in group B. Group A had a mean age of 48.3 ±10.6 years while Group B had a mean age of 50.8 ± 11.9 years. In group A , the glaucoma was mild in 11 (19.3%) patients, moderate in 32 (56.1%) and severe in 14 (24.6%) patients. In group B, the glaucoma was mild in 15 (26.3%) patients, moderate in 33 (57.9%) and severe in 9 (15.8%) patients.

Conclusion: Majority of primary glaucoma patients present with moderate to severe stage of glaucoma at the time of initial diagnosis.

KEY WORDS: Glaucoma; Severity; Primary; Open; Angle; Eye; Blindness; Vision.

Cite as: Manzoorullah, Khan BD, Mahsood YJ. Severity of recently diagnosed primary glaucoma at presentation in Khyber Pakhtunkhwa. Gomal J Med Sci 2024 Oct-Dec ;22(4)Suppl:437-41. https://doi.org/1046903/gjms/22.4.suppl.1745

INTRODUCTION

Glaucoma is one of the leading causes of irreversible blindness globally.[1,2] Despite the high visual morbidity associated with this disease majority of the cases go undiagnosed resulting in decreased quality of life of patients.[3] Dealing with this menace has remained a top-priority task for ophthalmologists. The majority of glaucoma related blindness is due to Primary Open Angle Glaucoma (POAG) and Primary Angle Closure Glaucoma (PACG).[4] Both result in damage to the retinal nerve fiber layer (RNFL) and results in decreased vision or visual field defects with the risk ratio of blindness varying from 0.73 to 10.6.[5] One of the measures for preventing glaucoma related damage is widespread awareness and screening of at risk population through regular dilated fundus exams and intraocular pressure (IOP) monitoring.[6]

The severity of glaucoma and the type of glaucoma significantly influence the management strategies.[7] POAG typically progresses asymptomatically and is diagnosed in later stages compared to PACG which presents abruptly with a symptomatic patient.[8] However, the variations in severity at presentation have not been well documented in our demographics. Our study aimed at recording the different severity with which patients of POAG and PACG are present in our

Corresponding Author:

Dr. Yousaf Jamal Mahsood
Associate Professor
Department of Ophthalmology,
Khyber Girls Medical College, Hayatabad Medical Complex, Peshawar, Pakistan
E-mail: yousaf82@hotmail.com

Date Submitted: 09-06-2024
Date Revised: 13-09-2024
Date Accepted: 06-10-2024

population. By recording this information through demographic and glaucoma related variables like visual field index, mean deviation, and visual acuity; we aimed to determine on what is the severity of glaucoma at presentation and which form of glaucoma presents with severe manifestations. Understanding these differences is crucial for increasing awareness, targeted screening programs and overall visual outcomes of the patients. Our work will also contribute to the body of local data and support the formulation of region-specific guidelines.

MATERIALS AND METHODS

This observational study was carried out in the glaucoma clinic of department of ophthalmology, medical teaching institution at Hayatabad Medical Complex, Peshawar. The duration of this study was from July 2023 to February 2024. A total of 114 sample size was calculated taking a prevalence of 8.06%[9], confidence level of 95%, and absolute precision of 5% calculated on the WHO recommended calculator. A consecutive, non-probability sampling technique was used during the study. The selection of patients was done on this criterion: Primary glaucoma that was diagnosed within last six months of presentation and subjects between age of 30 and 70 years. The exclusion criteria included: subjects with a secondary cause of glaucoma such as trauma, steroids or systemic conditions, media opacity like lens, cornea or vitreous which affected visual fields, any coexisting retinal lesions, optic neuropathy from neurological causes or any ocular surgery recently (in last six months) which might affect vision of subjects.

The data collection process proceeded after the ethical approval was obtained from institutional ethics committee (499/HEC/B&PSC/2021). Patients who fulfilled our inclusion criteria were selected from the glaucoma clinic after taking informed consent. All the eligible patients underwent comprehensive ocular examinations. Visual acuity and best corrected visual acuity (BCVA) were recorded. In the anterior segment, the cornea, lens and media clarity were noted while in posterior segment; the health of the retina, vessels and optic nerve disc were assessed. The intraocular pressure (IOP) was recorded using Goldman applanation tonometer and four mirror indentation gonioscopy was performed for anterior chamber angles assessment. Demographic data was collected. The patients were evaluated for visual field assessment through an automated 24-2 SITA (Swedish Interactive Thresholding Algorithm) Standard protocol using Humphrey Visual Field Analyzer (Carl Zeiss Meditech) for each subject. The visual field reports were analyzed for reliability and global indices. Global indices recorded were Glaucoma hemifield test (GHT), Visual field Index (VFI) and Mean Deviation (MD). In instances of bilateral glaucoma, the eye with worse MD was selected, or the right eye was selected if both were of equal severity. All the variables were recorded on a predesigned proforma.

Data analysis was performed using SPSS version 26. Frequencies and percentages were used to describe categorical variables such as gender, visual impairment category, diagnosis, educational status, GHT and severity of POAG and PACG. Mean $\pm$ SD were computed for numeric variables like age, BCVA, IOP, VFI and MD. Stages of POAG and PACG were stratified among age, gender, and educational status to see effect modifiers. The initial presenting severity of patients presenting with glaucoma was determined by analyzing different variables. All the result were presented in the form tables and charts.

RESULTS

A total of 228 eyes of 114 patients were included in this study and divided into two groups: Group A with Primary Open Angle Glaucoma (POAG) and Group B with Primary Angle Closure Glaucoma (PACG). Group A had a mean age of 48.3 $\pm$10.6 years while Group B had a mean age of 50.8 $\pm$ 11.9 years. The demographics of study participants are given in table 1.

Table 1: Demographics of the study participants

Group	Age (Years) Mean $\pm$SD	Male, n (%)	Female, n (%)	BCVA (LogMAR units) Mean $\pm$SD	IOP (mmHg) Mean $\pm$ SD	VFI (%) Mean $\pm$SD	MD (dB) Mean $\pm$SD
POAG	48.3 $\pm$10.6	34(59.6)	23(40.4)	0.4 $\pm$0.1	28.5 $\pm$4.2	66.9 $\pm$6.8	-9.04 $\pm$1.6
PACG	50.8 $\pm$11.9	38(66.7)	19(33.3)	0.5 $\pm$0.1	28.2 $\pm$4.2	62.8 $\pm$10.9	-10.6 $\pm$3.8

SD=Standard Deviation, %=percentage, n=frequency, BCVA= Best Corrected Visual Acuity, LogMAR=Log of Minimal Resolution of Angle, IOP= Intraocular Pressure, VFI= Visual Field Index, MD= Mean Deviation, POAG=Primary Open Angle Glaucoma, PACG=Primary Angle Closure Glaucoma

Table 2: Distribution of Glaucoma by age and severity at presentation

Characteristics		POAG, N (%)	PACG, N (%)	Total, N (%)
Age Distribution (Years)	30 to 45	25 (43.9)	21 (36.8)	46 (40.4)
	46 to 60	24 (42.1)	21 (36.8)	45 (39.5)
	61 to 70	08 (14)	15 (26.3)	23 (20.2)
Total		57 (100)	57 (100)	114 (100)
		POAG, n (%)	PACG, n (%)	Total, n (%)
Severity of Glaucoma	Mild	22 (19.3)	30 (26.3)	52 (22.8)
	Moderate	64 (56.1)	66 (57.9)	130 (57)
	Severe	28 (24.6)	18 (15.8)	46 (20.2)
Total		114 (100)	114 (100)	114 (100)

%=percentage, n=frequency of eyes, N=number of patients, POAG=Primary Open Angle Glaucoma, PACG=Primary Angle Closure Glaucoma

The distribution of glaucoma according to age group and severity at presentation is shown in table 2. In both groups combined, 52 (22.8%) eyes (19.3% POAG and 26.3% PACG) presented with mild glaucoma, 130 (57%) eyes (56.1% and 57.9% respectively) presented with moderate glaucoma and 46 (20.2%) eyes (24.6% and 15.8% respectively) presented with severe glaucoma.

DISCUSSION

The primary purpose of this study was to determine the severity of primary glaucoma of recently diagnosed patients. For this purpose, we used the Hodapp-Anderson-Parrish grading system for glaucoma staging.[9] The data on this subject of severity is limited in Pakistan and specifically Khyber Pakhtunkhwa. A detailed study on 82 patients conducted in Islamabad in which different parameters like demographics, vertical Cup Disc Ratio(vCDR) and IOP were included but the severity of glaucoma presentation was not recorded.[10] Early diagnosis of Glaucoma with mild pathology has the best visual prognosis.[11] Similar recent studies in India are the most comparable due to similar geography; one study by Bhedasgaonkar in 2023 showed that 32%, 33%, and 35% of patients had early, moderate, and severe stages of glaucoma respectively while another study in 2022 by V Swetha showed around 50% of patients had either moderate or severe glaucoma.[12,13] Our study showed an overwhelming 77.2% combined rate of moderate plus severe glaucoma on presentation. These differences between the two countries could be attributed to public awareness, referral practice, healthcare accessibility, socioeconomic status or maybe even unintended biases. The reason, while difficult to pinpoint remains worth looking into to improve figures in our country. If we were to compare the severity of presentation between POAG and PACG, we found that the moderate plus severe patients were more in POAG (80.7%) compared to PACG (73.7%).

Our study showed no statistically significant link of gender with the prevalence of glaucoma and the literature has shown mixed results with more male patients in the west while more female patients in the east.[14,15] The link with age however is well established with older patient, especially >60 years have a higher chance of glaucoma.[16] Visual field Index (VFI) and Mean Deviation (MD) are previously established indicators of glaucoma severity which are also supplemented by our study in which a negative MD and low VFI are found in severe glaucoma.[17] Intraocular Pressure was historically an integral part of glaucoma, but contemporary times have defined it as the most important modifiable risk factor. Its association has been thoroughly studied in all sorts of studies with the most definite evidence coming from the Ocular Hypertension Treatment Study (OHTS) in 2003.[18] Even though our study proves the same, a limitation of our study is that we have not corrected the IOP by considering the central corneal thickness of our patients.

We feel the significance of our study lies in its contribution to valuable local data on the severity of glaucoma in the present Pakistani population. Documenting the severity of any disease is a gateway to better healthcare policy and resource allocation. The public health implications of high number

of patients presenting with moderate or severe glaucoma underscores the need for increased efforts for awareness programs.[19] We also identified some key predictors like age, MD and VFI which we can use in our practice to prioritize intensive monitoring and early interventions. Lastly our study provides a basis for comparative studies with other regions and even countries to further identify the best practices for improving visual outcomes.

The limitations of our study include the relatively small sample size, single center data collection and the cross-sectional design of the study. Standardized data collection methods could help further solidify our findings. We also lack detailed socio-economic data which has also been established as a risk factor for glaucoma.[20]Potential biases like selection bias, information bias could arise from variations in diagnostic criteria and reporting practices. The future directions are simple yet complex where we need enhanced public awareness campaigns about the morbidity of glaucoma and more targeted screening programs especially in high-risk populations. Regular screening is the best way to decrease the proportion of patients presenting with moderate and severe glaucoma. This will require training of healthcare providers even those not related to the field of Ophthalmology/Optometry as well as innovations in technology to screen rural far-flung areas. We recommend further larger, multicenter research to increase the sample size by including patients from various geographic regions and healthcare centers which can provide a more comprehensive picture of glaucoma severity in Pakistan. Longitudinal studies to track the progression of glaucoma are also missing in our local literature.

CONCLUSION

Most of the recently diagnosed primary glaucoma are of moderate to severe form and regular screening can help in identifying the patients at risk at earlier stage. This will help in reducing burden of glaucoma related blindness.

REFERENCES

1. Lin Y, Jiang B, Cai Y, Luo W, Zhu X, Lin Q, et al. The global burden of glaucoma: findings from the Global Burden of Disease 2019 study and predictions by Bayesian age-period-cohort analysis. J Clin Med. 2023;12(5):1828. https://doi.org/10.3390/jcm12051828
2. Kazmi S, Jabeen A, Gul R. Rising glaucoma burden in Pakistan: a wake-up call for nationwide screening? J Pak Med Assoc. 2022 May;72(5):1016. https://doi.org/10.47391/JPMA.3722. PMID: 35713085.
3. Stein JD, Khawaja AP, Weizer JS. Glaucoma in adults-screening, diagnosis, and management: a review. JAMA. 2021;325(2):164-74. https://doi.org/10.1001/jama.2020.21899
4. Zhang N, Wang J, Chen B, Li Y, Jiang B. Prevalence of primary angle closure glaucoma in the last 20 years: a meta-analysis and systematic review. Front Med. 2021 Jan 18;7:624179. https://doi.org/10.3389/fmed.2020.624179
5. George R, Panda S, Vijaya L. Blindness in glaucoma: primary open-angle glaucoma versus primary angle-closure glaucoma-a meta-analysis. Eye. 2022 Nov;36(11):2099-105. https://doi.org/10.1038/s41433-021-01802-9
6. Hamid S, Desai P, Hysi P, Burr JM, Khawaja AP. Population screening for glaucoma in UK: current recommendations and future directions. Eye. 2022 Mar;36(3):504-9. https://doi.org/10.1038/s41433-021-01687-8
7. Alwazae M, Alhumud A, Aldarrab A, Hemid AB, AlHassan RA, AlAdel F, et al. Encounter glaucoma decision aid trial. Eur J Ophthalmol. 2023 Jan;33(1):291-6. https://doi.org/10.1177/11206721221093020
8. Arshad H, Ali M, Khan AS, Akhtar F, Mueed A. Late presentation of primary open-angle glaucoma and its predictors at a tertiary eye care hospital in Pakistan. J Clin Exp Ophthalmol. 2021;12:899.
9. Hodapp E, Parrish RK II, Anderson DR. Clinical decisions in glaucoma. St. Louis, MO: C.V. Mosby; 1993.
10. Sadiq M, Mahsood YJ, Ahmad W, Khan MA, Akhtar F. Demographic and socioeconomic characteristics of glaucoma suspects in a tertiary care center of Pakistan. Pak J Ophthalmol. 2023;39(1):55-60. https://doi.org/10.36351/pjo.v39i1.1499
11. De Moraes CG, Liebmann JM, Levin LA. Detection and measurement of clinically meaningful visual field progression in clinical trials for glaucoma. Prog Retin Eye Res. 2017 Jan;56:107-47. https://doi.org/10.1016/j.preteyeres.2016.10.001
12. Bhedasgaonkar S, Nadkarni SU. Extent of glaucomatous damage on the first presentation. Oman J Ophthalmol. 2023 May 1;16(2):227-32. https://doi.org/10.4103/ojo.ojo_51_22
13. El-Medany AY, Jeganathan VS, Tatham AJ. Severity of glaucoma at first presentation to hospital eye services. Int J Open Access Ophthalmol. 2017;2(1):1-5. https://doi.org/10.15226/2474-9249/2/1/00122
14. Mahabadi N, Zeppieri M, Tripathy K. Open-angle glaucoma. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. PMID: 28722917.
15. Kapetanakis VV, Chan MP, Foster PJ, Cook DG, Owen CG, Rudnicka AR. Global variations and time trends in the prevalence of primary open-angle glaucoma (POAG): a systematic review and meta-analysis. Br J Ophthalmol. 2016;100(1):86-93. https://doi.org/10.1136/bjophthalmol-2015-307223
16. Tan C, Hou Y, Qiao YS, Chen JY, Sun XH. The study of the correlation between age and the pathogenic factors of primary glaucoma: a review. Zhonghua

Yan Ke Za Zhi. 2022 Dec;58(12):1106-10. https://doi.org/10.3760/cma.j.cn112142-20220616-00297

17. Kim HJ, Sung MS, Park SW. Factors associated with visual acuity in advanced glaucoma. J Clin Med. 2023 Apr 24;12(9):3076. https://doi.org/10.3390/jcm12093076
18. Lee BL, Wilson MR; Ocular Hypertension Treatment Study (OHTS). Ocular Hypertension Treatment Study (OHTS) commentary. Curr Opin Ophthalmol. 2003 Apr;14(2):74-7. https://doi.org/10.1097/00055735-200304000-00003
19. Sekimitsu S, Elze T, Zebardast N. Impact of the Affordable Care Act on glaucoma severity at first presentation. Ophthalmic Epidemiol. 2023 Jun;30(3):326-9. https://doi.org/10.1080/09286586.2022.2089357
20. Gedde SJ, Vinod K, Wright MM, Muir KW, Lind JT, Chen PP, et al. American Academy of Ophthalmology Preferred Practice Pattern Glaucoma Panel. Primary open-angle glaucoma preferred practice pattern®. Ophthalmology. 2021 Jan;128(1):71-150. https://doi.org/10.1016/j.ophtha.2020.10.022

CONFLICT OF INTEREST
Authors declare no conflict of interest.
GRANT SUPPORT AND FINANCIAL DISCLOSURE
None declared.

AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design:	M, BDK
Acquisition, Analysis or Interpretation of Data:	M, BDK, YJM
Manuscript Writing & Approval:	M, BDK, YJM

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.