To Assess the Quality of Life in Glaucomatous Patients Who Underwent Trabeculectomy Versus Medical Treatment Using the Glaucoma Quality of life-15 (GQOL-15) Questionnaire.

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ABSTRACT

Purpose: To assess the Quality of life in Glaucomatous Patients who Underwent Trabeculectomy versus Medical treatment using the Glaucoma Quality of life-15 (GQOL-15) Questionnaire.

Methodology: This cross sectional study was carried out at Hayatabad medical complex Peshawar from March (2019) to June (2019). Patients with an established diagnosis of Primary Open-angle glaucoma with a minimum of one or more anti-glaucoma medications or a documented history of Trabeculectomy of the previous six months with no family history of glaucoma were selected for the study. The total number of patients in each group was 32. After complete eye examination, fifteen questions were asked from each patient and responses documented.

Result: There was significant differences ($P < 0.001$) in visual function scores by glaucoma severity (mild, moderate, severe). As severity increased, visual impairment worsened across all variables, with peripheral vision and total scores increasing from mild to severe cases. While compareing the visual function between groups, the Trabeculectomy group had significantly fewer impairments in all activities, including walking, judging foot distance, and adjusting to lighting, indicating better visual function compared to the Medicine User group ($P < 0.001$).

Conclusion: Trabeculectomy may provide better functional vision outcomes in everyday activities compared to medication alone.

Keywords: Glaucoma, GQoL, Trabeculectomy.

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INTRODUCTION

Glaucoma is a progressive and chronic optic neuropathy that can result in irreversible vision and visual field loss.[1] Its prevalence is about 2% in persons older than 40 years of age. It is counted to be the second leading cause of reversible blindness and the first in irreversible blindness worldwide. It is estimated that primary angle glaucoma is the most common form of glaucoma which affect approximately 80 million people by 2020 and will lead to over of 110 million people by 204 the most common form of glaucoma which affect approximately 80 million people by 2020 and will lead to over of 110 million people by 2040.[2,3] Maintaining stable visual functioning and enhancing patients' quality of life (QoL) at a manageable cost are the key objectives of glaucoma therapy. The achievement of therapeutic goals based on visual acuity (VA), visual fields (VF), intraocular pressures (IOP), and optic disc characteristics is significant from the perspective of the practitioner, but patients are not aware of these gains until they result in an enhanced quality of life (QoL). As a result, patient perception of QoL is a key factor in determining how well glaucoma management is working.[4]

Surveys conducted in India and Spain, showed that every factor like poor economic status, low literacy rate, gender, and age directly contributed toward the quality of life in Glaucoma patients.[5-9] Another study showed that the quality of life in Glaucomatous (POAG) is negatively associated to the older and female sex, especially unmarried women which bring them into a state of anxiety and depression.[10] It has also been reported that measuring the degree of variance in both physical and mental health, and the different aspects of illness by an individual perception affects the quality of life in many ways. In addition, limited motility and vision-related movement have the highest impact on the economic status of an individual economy and quality of life.[11]

In clinical practice, glaucoma patients have a lower quality of life than the general health population due to worsening visual acuity and visual field loss.[12,13] In particular, glare and dark adaptation are severely affected in Glaucomatous patients as reported by Nelson et al 14 Lab Iris et al showed that urban people have more tendency toward distant activities and social functioning and are adversely affected due to vision-related quality of life. (23) Buys et al. and Jones et al showed that socioeconomic deprivation and visual field loss (worsening) related directly to the figure of glaucoma and vision-related quality of life.[14,15]

New approaches have been promulgated that show the correlation between clinical indices of visual function and quality of life for the management of Glaucoma patients. Clinical trials suggest that change in the quality of life is a key measurement of the treatment once visual dysfunction occurs.[16,17]

Various instruments have been developed to assess how patients with glaucoma perceive their condition and to measure self-reported, vision-related quality of life. The latest and refined tool commonly used today is the 'Glaucoma Quality of Life-15 (GQOL-15) questionnaire, which evaluates visual and functional disabilities from the patient's perspective.[18] Physicians typically rely on objective values from clinical measurements obtained under controlled conditions to assess visual function. However, these measurements do not capture patients' experiences of vision-related quality of life. This study aims to determine the subjective relationship of Glaucomatous patients' perception of undergone trabeculectomy toward vision-related quality of life.

METHODOLOGY

Ethical approval was taken from the Ethical Committee of Hayatabad Medical Complex Hospital Peshawar. Patients with diagnosis of Primary Open-angle glaucoma, with a minimum of one or more anti-glaucoma medications or a documented history of Trabeculectomy of the previous six months with no family history of glaucoma. Sample size was 32 in each group, calculated using formula $n=(\Delta/\sigma Z\alpha/2+Z\beta)2$ and a 95% confidence level. The ophthalmological examination like VA, intraocular ocular pressure (IOP), and refraction was done by the Ophthalmologist and Optometrist. The data was analyzed using SPSS version 20 (IBM, Armonk, New York, USA). The Kruskal-Wallis (KW) test

was applied for comparisons between the groups. A P-value ≤0.05 was considered statistically significant.

In this study, we used a glaucoma staging system (GSS) created by Nelson and team(19). The GSS categorizes central visual fields into three groups: "mild," "moderate," and "severe." Those with "mild" glaucoma have lost less than half of their visual field in one eye, "moderate" cases involve losing more than half of the visual field in each eye, and "severe" cases entail losing more than half of the visual field in either eye. Before study, a trial run was done with ten glaucoma patients, to make sure that the questions in the questionnaire were clear and easy to understand.

RESULTS

Table 1 shows the demographics of the Trabeculectomy and Medicine User groups. The IOP ranges 16-27 mmHg and Cup-to-Disc Ratio ranges 0.8-1.0. Table 2, highlights significant differences ($P < 0.001$) in visual function scores by glaucoma severity (mild, moderate, severe). Table 3 shows that the Trabeculectomy group had significantly lower (better) median scores compared to the Medical Group across various visual tasks. For overall vision, the Medical group had a median score of 2 (IQR: 1), while the Trabeculectomy group scored 1 (IQR: 1; $p < 0.001$). Similar significant differences were noted in different tasks as shown in table 4.

Table -1: Descriptive Statistics

Variables	Trabeculectomy		Medicine User	
	Frequency	Percentage	Frequency	Percentage
Age				
20 - 40 Years	17	53.1%	21	65.6%
41 - 60 Years	9	28.1%	7	21.8%
61 - 80 Years	6	18.7%	4	12.5%
Gender				
Male	21	65.6%	19	59.3%
Female	11	34.3%	13	40.6%
Systemic Diseases				
DM	17	53.1%	21	65.6%
HTN	15	46.8%	11	34.3%
Both DM/HTN	29	90.6%	24	75%
Right Eye	13	40.6%	21	65.6%
Left Eye	19	59.3%	11	34.3%

Table -2: Comparison of GQL-15 Medicine User Group

Medicine User group	Mild (n=9)		Moderate (n=15)		Severe (n=8)		Kruskal-wallis (KW)	P- value
	Median	IQR	Median	IQR	Median	IQR	Statistic	
Peripheral Vision	5	4.0 - 6.0	10	9.0 - 11.0	15	14.0 - 17.0	142.3	<0.001**
Glare and Dark Adaptation	8	7.0 - 9.0	13	11.0 - 14.0	18	16.0 - 20.0	141	<0.001**
Center and Near Vision	1	1.0 - 1.5	3	2.5 - 4.0	5	4.5 - 6.0	0.2	<0.001**
Outdoor Mobility	0.5	0.5 - 1.0	1.5	1.0 - 2.0	3	2.5 - 4.0	80.5	<0.001**
Total Score	15	12.0 - 18.0	25	22.0 - 28.0	40	36.0 - 44.0	21.7	<0.001**

Table -3: Comparison of GQL-15 Trabeculectomy Group

Trabeculectomy group	Mild (n=11)		Moderate (n=13)		Severe (n=24)		Kruskal-wallis (KW)	P- value
	Median	IQR	Median	IQR	Median	IQR	Statistic	
Peripheral Vision	7	6.0 - 8.25	11	9.0 - 11.0	18	16.0 - 19.75	140.1	<0.001**
Glare and Dark Adaptation	10	9.0 - 11.0	14	11.0 - 14.0	20	18.0 - 22.0	139.91	<0.001**
Center and Near Vision	2	2.0 - 2.0	2	2.5 - 4.0	4	4.0 - 5.0	87.51	<0.001**
Outdoor Mobility	1	1.0 - 1.0	1	1.0 - 2.0	2	2.0 - 3.0	79.25	<0.001**
Total Score	20	17.75-22.0	30	26.5 - 32.0	45	39.0 - 49.0	20.46	<0.001**

Table -4: Comparison of GQL-15 Scores Between the Trabeculectomy and Medical Groups

Variables	Medical Group		Trabeculectomy		Statistical Test (MW)	P-Value
	Median	IQR	Median	IQR		
Overall	2	1.0-2.0	1	1	14.33	<0.001**
Walking on uneven ground	3	2.0-4.0	2	1.0-1.0	14.8	<0.001**
Walking on steps/stairs	3	2.0-4.0	1	1.0-1.0	14.27	<0.001**
Judging distance of foot to step	2	1.0-2.0	1	1.0-1.0	11.55	<0.001**
Tripping over objects	2	1.0-2.0	1	1.0-1.0	10.15	<0.001**
Bumping into objects	2	1.0-2.0	1	1.0-1.0	9.61	<0.001**
Seeing objects coming from the side	2	1.0-2.0	1	1.0-1.0	14.31	<0.001**
Peripheral vision	1	1.0-1.0	6	6.0-7.0	14.36	<0.001**
Walking after dark	3	2.0-4.0	3	1.0-2.0	14.72	<0.001**
Seeing at night	2	1.0-2.0	1	1.0-2.0	13.86	<0.001**
Adjusting to dim lights	2	1.0-2.0	1	1.0-2.0	12.43	<0.001**
Adjusting to bright lights	2	1.0-2.0	1	1.0-2.0	3.43	<0.001**
Light to dark room transition	1	1.0-1.0	2	1.0-2.0	10.28	<0.001**
Dark to lightroom transition	2	1.0-2.0	3	1.0-1.0	12.97	<0.001**
Recognizing faces	1	1.0-1.0	1	1.0-1.0	10.49	<0.001**
Reading newspapers	2	1.0-2.0	4	1.0-1.0	10.81	<0.001**
Central and near vision	1	1.0-1.0	2	2.0-2.0	11.31	<0.001**
Crossing the road (Outdoor)	1	1.0-1.0	1	1.0-1.0	10	<0.001**

DISCUSSION

This study enabled us to assess the impact of glaucoma on quality of life (QoL), with a particular focus on daily activities that may pose significant challenges for glaucomatous patients. For tasks focusing on areas central, near vision, peripheral vision, glare and dark adaptation, and outdoor mobility, significant differences were observed between Trabeculectomy group patients and the Medicine user group. Additionally, within the glaucomatous patients, difficulties in daily visual functions intensified with increasing glaucoma severity, aligning with findings from other recent studies on this subject.[19-22] In this study, in the trabeculectomy group subjects were aged 20-40 years was 17(53.1%), (41-60 years) was 9(28.1%), and (61-80 years) was 6(18.7%), similarly in Medicine Group (20-40 years) 21(65.6%),(41-60 years) was 7(21.8%), and in (61-80 years) was 4(12.5%). In a study by Tarek T et al., the mean age of participants was 55.94 years (SD ±10.29), with cases averaging 55.86 years (SD ±8.86) and controls 56.02 years (SD ±11.57). In contrast, another study reported older averages, with the mean age of glaucoma patients at 70 years (SD ±9.1) compared to 63 years (SD ±8.9) for controls. This discrepancy may be due to the greater impact of age on quality of life, as older individuals may experience more pronounced effects than younger participants.[20,21] The male subjects in our study were more in numbers than females in both the medicine group 19(59.3%) and in Trabeculectomy group 21(65.6%). However, other studies found that female subjects were in the majority, with more females among cases (58.0%) compared to controls (47.4%), aligning with findings from similar research.[21] These variations may be attributed to cultural and social differences, which could account for the observed discrepancies.

The median score for the Trabeculectomy group in our study based on mild, moderate, and severe cases were 20, 36, and 45. Similarly, in the Medicine user group was 15,25, and 40. The score differences among patients at various glaucoma stages were statistically significant, in line with findings from previous studies done in Australia, India, and China their mild (20), moderate (30), and severe (45). The differences in scores across glaucoma stages were statistically significant, consistent with studies conducted in Australia (21.7, 29.6, 40), India (18.2, 32.2, 43.2), and China (20.76, 28.73, 44.55). Additionally, a study from Egypt supported our findings, reporting median summary scores for case subgroups as follows: mild (20), moderate (30), and severe (45) (21, 23, 24). However, a study from Nigeria did not observe statistically significant differences between patients with mild and moderate glaucoma when using the GQL-15 assessment tool, suggesting that early-stage glaucoma may present particular challenges for patients.

In this study, the differences between moderate and severe cases were significantly greater than those between mild and moderate cases, particularly in the central and near vision, and outdoor mobility subscales. These findings align with other studies.[21-24] However, an Australian study presented a contrasting view. It found that patients with severe glaucoma were relatively less affected by activities involving central and near vision or peripheral vision, but felt more disabled by activities requiring outdoor mobility. The study suggested that certain functional impairments might become less noticeable as the disease progresses, potentially because patients adapt to their deteriorating vision, accept their reduced visual abilities, or use aids and strategies to manage their visual disability.[21] These explanations may also help explain the findings of this study, as sociocultural and educational factors can significantly influence how patients cope with their condition. In developing countries like Pakistan, there is often a lack of aids or adaptations to support patients, limited access to healthcare facilities, late diagnoses, and poor adherence to disease management. Moreover, lower educational levels frequently lead to a poor understanding of the disease, insufficient follow-up care, and higher levels of anxiety among patients.

In this study, significant differences ($p < 0.001$) were observed between the medical and trabeculectomy groups across various activities. For instance, walking on uneven ground (MW = 14.8), walking on steps (MW = 14.27), and peripheral vision (MW = 14.36) showed higher

difficulty in the trabeculectomy group, with medians ranging from 1 to 3 in the medical group and 1 to 6 in another group. Other activities such as adjusting to bright lights (MW = 3.43) and reading newspapers (MW = 10.81) also demonstrated significant differences, indicating greater functional impairment in the trabeculectomy group. However, for the comparison between the two groups in the study as a whole we found that the median score of the Medicine is higher than the trabeculectomy group, and also the Kruskal-Wallis (KW) statistical test results for the medicine group is 21.7 which is near to 22 and the trabeculectomy group is 20.4. assuming statistical analysis we found that the trabeculectomy group performed better than the medicine group.

CONCLUSION

These findings suggest that trabeculectomy may provide better functional vision outcomes in everyday activities compared to medication alone.

Conflict of Interest: None to declare

Ethical Approval: The study was approved by the Institutional Review Board / Ethical Review Board No. 1408 on dated 17.07.2023.

Author Contributions: Muhammad Asif: Concept, Design, Manuscript editing, Manuscript review.

Samina Karim: Litrature search, Data analysis, Manuscript preparation, Manuscript eiditing, Manuscript review.

Fazal Nauman: Data acquisition, Statistical analysis, Manuscript editing.

Ghazala Durre Huwaydah: Concept, Litrature search, Data acquisition, Data analysis, Statistical Analysis.

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